



**Hy-Tec Industries Pty Limited**

ABN: 90 070 100 702

**Austen Quarry  
Stage 2  
Extension Project  
(MOD 1 - SSD 6084)**

**Statement of  
Environmental Effects**



*Prepared by:*

**R.W. CORKERY & CO. PTY. LIMITED**

**March 2018**



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# Hy-Tec Industries Pty Limited

ABN: 90 070 100 702

## Austen Quarry Stage 2 Extension Project (MOD 1 -SSD 6084)

### Statement of Environmental Effects

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**Prepared for:**

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

Telephone: (02) 9647 2866  
Fax: (02) 9647 2924  
Email: [darryl.thiedeke@hy-tec.com.au](mailto:darryl.thiedeke@hy-tec.com.au)

---

**Prepared by:**

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

**Brooklyn Office:**

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

**Orange Office:**

62 Hill Street  
ORANGE NSW 2800

**Brisbane Office:**

Suite 5, Building 3  
Pine Rivers Office Park  
205 Leitchs Road  
BRENDALD QLD 4500

Telephone: (02) 9985 8511  
Email: [brooklyn@rwcorkery.com](mailto:brooklyn@rwcorkery.com)

Telephone: (02) 6362 5411  
Email: [orange@rwcorkery.com](mailto:orange@rwcorkery.com)

Telephone: (07) 3205 5400  
Email: [brisbane@rwcorkery.com](mailto:brisbane@rwcorkery.com)

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March 2018



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## EXECUTIVE SUMMARY

Hy-Tec Industries (NSW) Pty Limited (Hy-Tec) has been operating the Austen Quarry since 2002, initially under the original development consent for the Quarry that was granted by Lithgow City Council in 1994, and since 15 September 2016 under Development Consent SSD 6084 (SSD 6084). Hy-Tec has now been operating under SSD 6084 for over 16 months and is proposing to modify the conditions of SSD 6084 to improve the efficiency of operations, update the wording of conditions concerning biodiversity offsetting and to increase annual production to satisfy customer demand.

The proposed modifications to SSD 6084 include the following components.

1. An increase in the approved annual quantity of Quarry products transported from the Quarry from the currently approved limit of 1.1 million tonnes per annum (Mtpa) to 1.6Mtpa and the associated increase to the maximum daily product truck despatch limit from 250 to 300 trucks and the average daily product truck despatch limit from 150 to 200 trucks.
2. A modification to the approved hours of operations to permit truck loading and product transport activities to commence from 4:00am rather than the currently approved start time of 5:00am.
3. A re-alignment of the extraction area boundary to remove areas no longer to be extracted and to add small areas required to improve safety within the extraction area.
4. A modification to the approved boundary of the overburden emplacement to remove areas no longer required to be disturbed for development.
5. A modification to the wording of conditions relating to biodiversity offsetting obligations to reflect biodiversity credits only, rather than the currently approved biodiversity offset strategy, and a modification to biodiversity offsetting requirements commensurate with the proposed reduction in disturbance.

All remaining operations at the Quarry would remain generally consistent with those approved under SSD 6084 and in some instances, as was approved in the original 1994 development consent for the operation.

This *Statement of Environmental Effects* (SoEE) has been prepared by R.W. Corkery & Co. Pty Ltd (RWC) on behalf of Hy-Tec and provides a detailed description of the proposed modifications to operations and summarises the results of assessments of potential environmental impacts. A summary of the assessments of key environmental issues is provided below.

### Traffic and Transportation

The proposed modification to the approved product despatch limits requires an associated increase to the maximum and average daily laden truck despatch limits. The majority of product despatch traffic would continue to travel towards Sydney via Jenolan Caves Road and the Great Western Highway. A road transport assessment was undertaken by The Transport Planning Partnership (TPPP, 2018) and included modelling of future road capacity and intersection performance as well as qualitative review of the road network, transport routes, traffic volumes



and composition, road safety and potential conflicts with other road users. It was identified that the continued implementation of the Traffic Management Plan, Driver's Code of Conduct and Hy-Tec's Chain of Responsibility standard would maintain safety standards, minimise conflicts with other road users and continue Hy-Tec's excellent record for transport management and safety.

The assessment included modelling of predicted future traffic levels under a peak operations scenario and maximum operations scenario to assess predicted road capacity and intersection performance along the transport route. Road capacity and intersection performance remained acceptable under the peak operations scenario that was predicted to occur on no more than 10 days in a year. The maximum operations scenario modelled 300 trucks despatched towards Sydney in a single day (the proposed limit to operations) and is considered likely to occur on no more than five days in a year. Road capacity was acceptable under this scenario, however, by 2025 the level of service at the intersection of Jenolan Caves Road and the Great Western Highway would become unacceptable during the afternoon peak period, principally due to the growth of traffic levels on the Great Western Highway. The level of service at this intersection would also become unacceptable during the morning peak period by 2029.

Hy-Tec has committed to monitoring the performance of this intersection from 2022 under existing conditions of SSD 6084 and would implement this monitoring under the proposed modifications. It is in the interest of Hy-Tec to ensure that the intersection of Jenolan Caves Road and the Great Western Highway and the product despatch operations of the Quarry are operating efficiently. It is therefore proposed that the results of monitoring at this intersection would be used to plan ongoing Quarry product despatch operations, ensuring that the performance of this intersection is maintained. It should be noted that the performance of the intersection of Jenolan Caves Road and the Great Western Highway would only reach an unacceptable level if:

- the traffic levels on the Great Western Highway grows at the predicted rate of two per cent per annum; and/or
- the final designs for the intersection upgrades proposed by RMS do not eventuate.

### **Operational and Road Traffic Noise**

An assessment of operations and road traffic noise was undertaken by Muller Acoustic Consulting (MAC, 2018) to consider possible changes to operational noise from intensified operations, road traffic noise from increased product despatch activities and the implications of commencing product loading and despatch from 4:00am rather than the currently approved start time of 5:00am.

It was concluded that operational noise levels would remain within the relevant assessment criteria at all assessed privately-owned residences. Any change to road traffic noise levels resulting from the proposed increase to daily maximum and average product despatch levels would result in a negligible ( $>0.1\text{dB(A)}$ ) change in road traffic noise between the Quarry entrance and the Great Western Highway. This includes road traffic noise during the morning shoulder period (between 4:00am and 7:00am).

Road noise at the Glenroy Bridge is a factor of the road surface and the structure and age of the bridge. A series of mitigation measures are proposed to limit noise impacts at this location and have been discussed with the property owners closest to the bridge. However, it should be noted

that Hy-Tec is not the only company using the Jenolan Caves Road for heavy vehicle transportation (Hy-Tec vehicles make up 22% of all vehicle traffic) and the Company has previously paid for upgrades to the bridge. It is anticipated proposed mitigation measures would largely resolve the potential road noise at this location that are caused by Hy-Tec contracted vehicles. Ongoing monitoring at this location would provide a record of improvements and a trigger for further mitigation, if necessary. It is considered that noise levels under the proposed modifications would remain generally consistent with existing approved operations.

### **Air Quality**

Cumulative air quality was assessed by Todoroski Air Sciences (2018) to consider possible effects relating to intensified operations under the proposed modifications. It was concluded that cumulative particulate matter concentrations and deposited dust levels would not be expected to significantly change as a result of the proposed modifications and would remain within criteria levels.

### **Biodiversity**

The biodiversity offsetting obligations resulting from the Stage 2 Extension Project were reviewed by Niche EH (2018) in light of the proposed reduction in total extent of the extraction area and the overburden emplacement. Niche EH (2018) confirmed that there would be a decrease in the biodiversity obligations under the proposed modifications (comprising a reduction of 62 ecosystem credits and 308 species credits relating to the Silver-leafed Mountain Gum).

The minor additional areas of disturbance would not impact any known threatened flora, threatened fauna or Endangered Ecological Communities and when considered on balance with the areas that would no longer be disturbed under the proposed modifications, would be a minor change to native vegetation impacts.

### **Other Environmental Impacts**

It is acknowledged that minor changes would be required to management of environmental resources within the Quarry. However, it is concluded that the following matters would remain generally consistent with the existing approved operations.

- Blasting and blast management.
- Management of water resources.
- Waste Management
- Visual Amenity
- Aboriginal Cultural Heritage
- Historic Heritage
- Agricultural Resources
- Hazards

## Social and Economic Considerations

Hy-Tec considers that the following economic benefits would result from the proposed modifications.

- Employment of an additional 15 transport personnel and possible employment of nine additional local operational employees. The majority of transport personnel live locally, and therefore the flow-on benefits from employment would also be experienced locally.
- The proposed increase to annual product despatch limits would increase the quantum of annual contributions paid to Lithgow City Council in the short term compared to existing operations.

It is acknowledged that approval to commence product despatch activities may be perceived by members of the local community as potentially increasing sources of sleep disturbance and noise related to an increase in the approved daily limits on laden truck movements. However, the assessment of traffic and transport, operational noise and road noise as well as air quality impacts indicates that environmental impacts would remain generally consistent with the existing approved operations and it is considered that social amenity would also remain largely unchanged.

The owners of the ‘Glenroy’ property permit camping on the property adjacent to the Cocks River. Through consultation with the landowners, it has been identified that short-term high-level noise caused by vehicles crossing the Glenroy Bridge at high speed has in the past caused the residents to be woken during the night. This sleep disturbance has the potential to impact campers in this location. A series of mitigation measures would be implemented to manage road noise impacts at this location and have been discussed and agreed with the landowners.

The management of operations at the Quarry, including environmental management, would remain largely unchanged. Ongoing community engagement through the Hy-Tec website, blasting notifications and the ease of access to the complaints phone line would continue to provide the local community with access to Quarry management to express any concerns they may have on an ongoing basis.

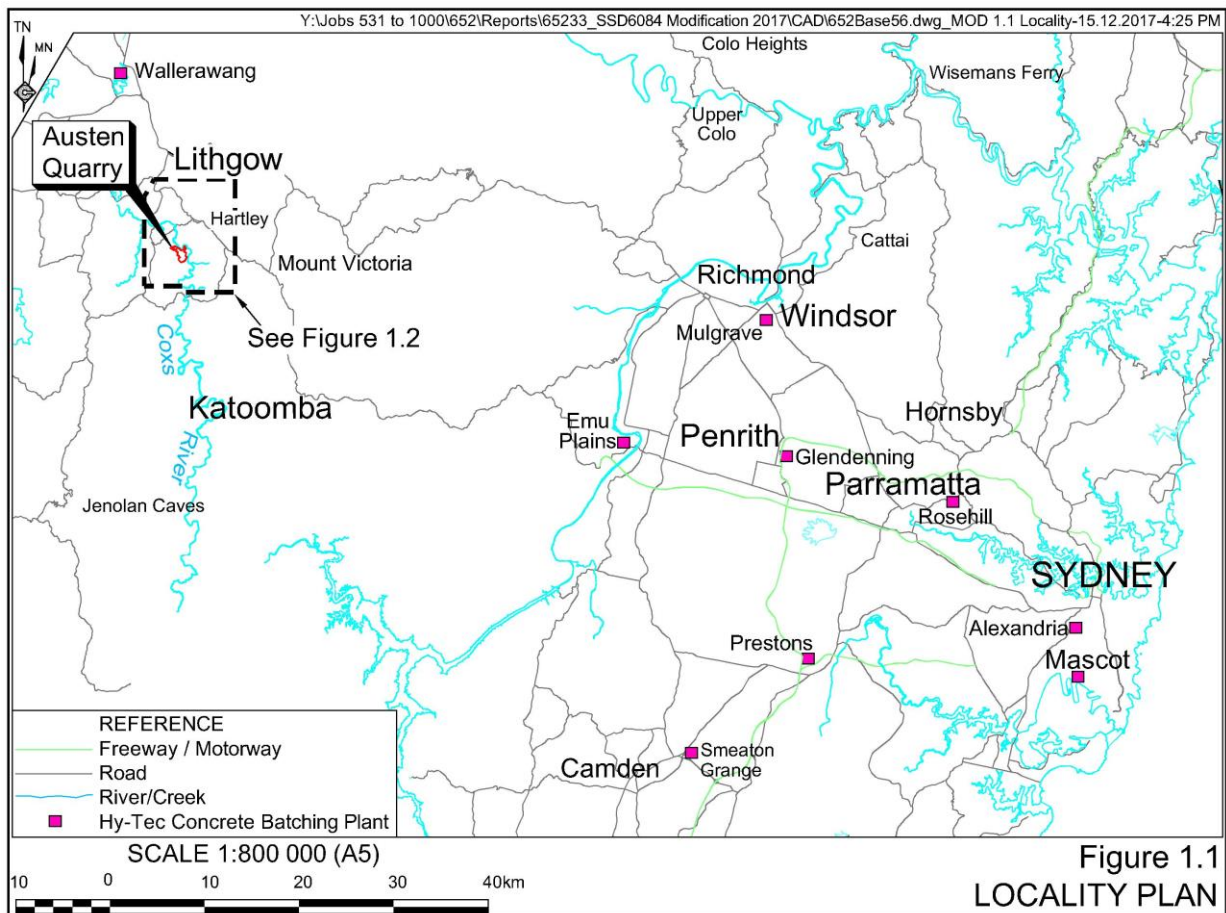
## Conclusion

It is common for operations to identify and seek efficiencies as development progresses. In this instance, the operating environment has brought on the need for change, with the increased customer demand and the recently experienced changes in peak traffic periods prompting the proposed modifications. However, Hy-Tec is also taking this opportunity to improve management of native vegetation and biodiversity offsetting requirements for the operation. On balance, Hy-Tec considers that the proposed modifications would permit the ongoing efficient and environmentally and socially responsible operation of the Austen Quarry.

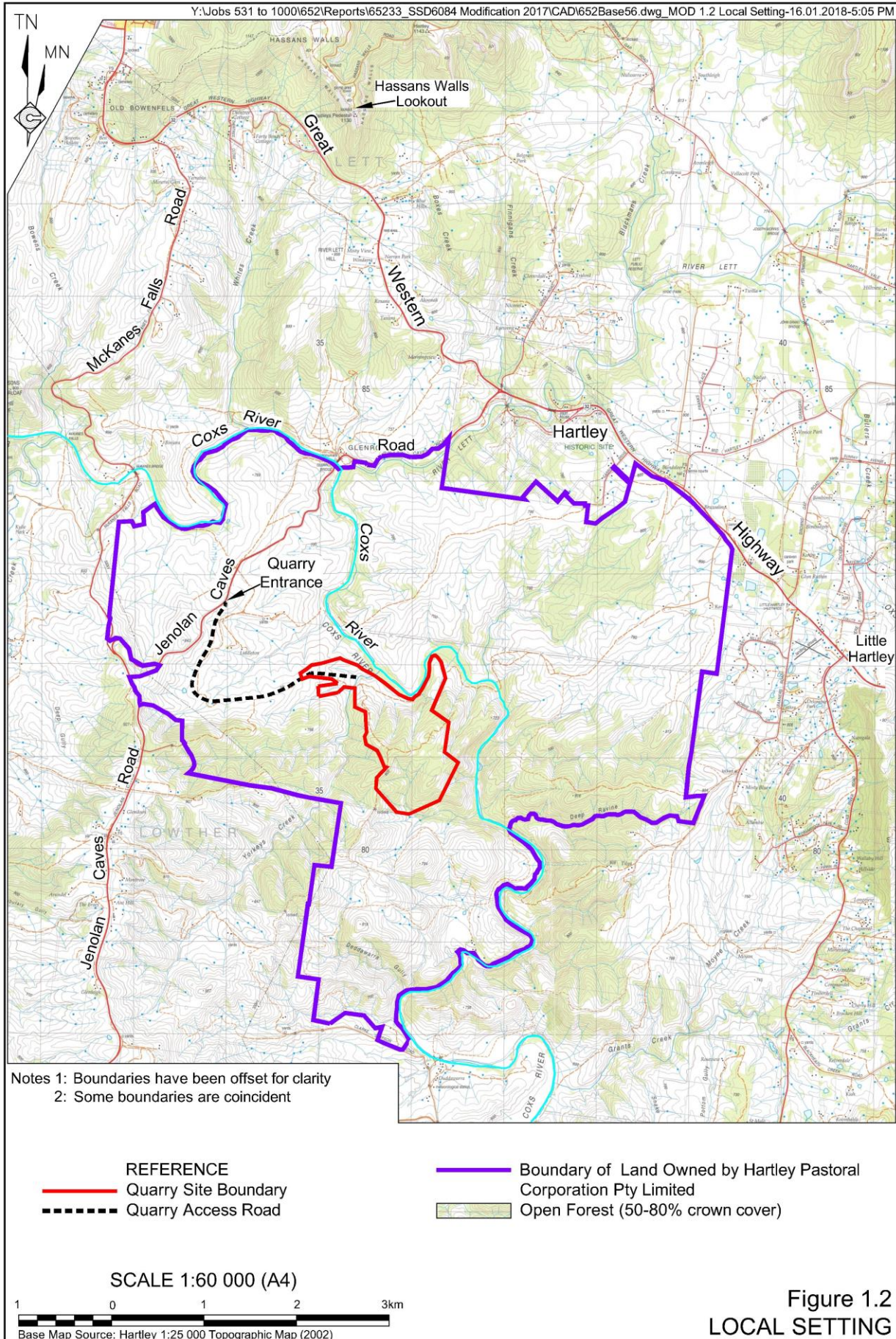
# 1. INTRODUCTION

## 1.1 SCOPE

This *Statement of Environmental Effects* (SoEE) has been prepared by R.W. Corkery & Co. Pty Ltd (RWC) on behalf of Hy-Tec Industries (NSW) Pty Limited (Hy-Tec) to support an application to modify Development Consent SSD 6084 (SSD 6084) for the Austen Quarry (the Quarry). SSD 6084 is reproduced as **Appendix 1**. The Quarry is located on rural land, owned by the Hartley Pastoral Corporation Pty Ltd (HPC), approximately 3.5km south-southwest of the village of Hartley and 10km south of Lithgow. **Figure 1.1** displays the location of the Quarry in relation to Sydney, Lithgow and the Hy-Tec concrete batching plants. **Figure 1.2** presents the local setting including the village of Hartley, the Great Western Highway and Jenolan Caves Road.



The majority of the products of the Quarry are transported to the Hy-Tec concrete batching plants in the Sydney metropolitan area as well as the concrete batching plant in Wallerawang, to local road works and other destinations.





The proposed modifications to SSD 6084 includes the following components.

1. An increase in the approved annual quantity of Quarry products transported from the Quarry, from the currently approved limit of 1.1 million tonnes per annum (Mtpa) to 1.6Mtpa and the associated increase to the maximum daily product truck despatch limit from 250 to 300 trucks and the average daily product truck despatch limit from 150 to 200 trucks.
2. A modification to the approved hours of operations to permit truck loading and product transport activities to commence from 4:00am rather than the currently approved start time of 5:00am.
3. A re-alignment of the extraction area boundary to remove areas no longer to be extracted and to add small areas required to improve safety within the extraction area.
4. A modification to the approved boundary of the overburden emplacement to remove areas no longer required to be disturbed for development.
5. A modification to the wording of conditions relating to biodiversity offsetting obligations to reflect biodiversity credits only, rather than the currently approved biodiversity offset strategy, and a modification to biodiversity offsetting requirements commensurate with the proposed reduction in disturbance.

Further information on each of these components and the proposed changes is described in Section 3.1.

The proposed modifications are being made under Section 4.55(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act), as it is considered that the development, as modified, will remain substantially the same development as that originally approved under SSD 6084. The Department of Planning and Environment (DPE) has indicated its agreement that the application falls within the scope of Section 4.55(2) of the EP&A Act in correspondence dated 16 November 2017 that also provided environmental assessment requirements for the application (reproduced as **Appendix 2**). It is noted that the DPE correspondence refers to Section 96(2) of the EP&A Act. On 1 March 2018, the numbering of sections within the EP&A Act were modified and Section 96(2) renumbered to Section 4.55(2). The content of this section of the EP&A Act did not change, only the numbering. The consent authority for the modification application will be the Minister of Planning on the advice of the Secretary of DPE.

## **1.2 DOCUMENT FORMAT**

The SoEE is structured in seven sections and a set of eight appendices, as follows.

Section 1: introduces Hy-Tec and the existing approved Quarry and provides background information about the proposed modifications as well as describing the legislative and planning context for the application and the consultation undertaken.

Section 2: provides an overview of the existing Quarry and its operations and environmental performance to date.

- Section 3: outlines the approvals required, describes the proposed modifications and compares the current operation with the proposed operation.
- Section 4: presents the environmental setting of the Austen Quarry including an overview of the surrounding land ownership and land uses.
- Section 5: identifies key environmental issues relating to the proposed modifications and summarises the findings of the technical assessments. This section reviews the existing management measures that are implemented at the Quarry and considers the need for additional measures and monitoring.
- Section 6: evaluates and justifies the proposed modifications in terms of biophysical and socio-economic considerations and presents the consequences of not proceeding with the proposed modifications.
- Section 7: presents a reference list for the various source documents referred to for information and data used during the preparation of the SoEE.

Appendices: the following documents are referred to throughout the SoEE.

1. A copy of Development Consent SSD 6084.
2. A copy of correspondence from DPE dated 16 November 2017 providing environmental assessment requirements.
3. A record of consultation activities and outcomes.
4. A revised Statement of Commitments.
5. An assessment of biodiversity offsetting obligations prepared by Niche Environment and Heritage Pty Ltd
6. A Road Transport Assessment prepared by The Transport Planning Partnership Pty Ltd.
7. A Noise and Blasting Assessment prepared by Muller Acoustic Consulting Pty Ltd.
8. An Air Quality Impact Assessment prepared by Todoroski Air Sciences Pty Ltd.

## **1.3 THE APPLICANT AND THE QUARRY SITE**

### **1.3.1 The Applicant**

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

Adelaide Brighton originated in 1882 and is an S&P/ASX200 company with 1 600 employees and operations in all Australian States and Territories. Adelaide Brighton has a modest position in the pre-mixed concrete markets through Hy-Tec and associated companies in Victoria, New

South Wales, South Australia, Northern Territory, Southeast Queensland and northern Queensland. The Company has an emerging position in aggregate supply with strategic reserves at the Austen Quarry (near Lithgow), in northern New South Wales, South Australia, Northern Territory, Victoria and southeast Queensland.

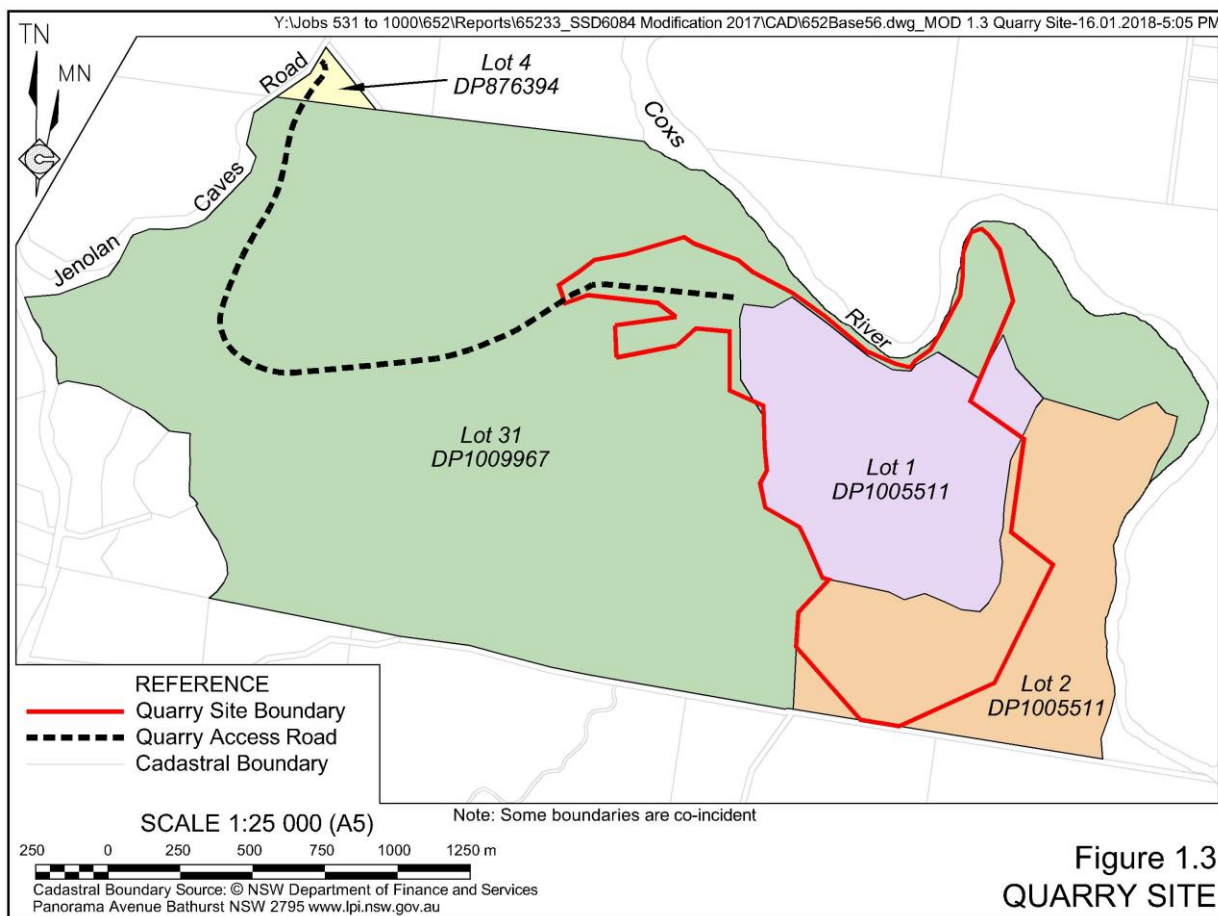
### 1.3.2 The Quarry Site

The Austen Quarry Site (the Quarry Site) incorporates:

- the approved extraction area, overburden emplacement and processing area within Lot 1 and Lot 2 DP1005511; and
- miscellaneous stockpiles, road access and water management infrastructure on Lot 31 DP1009967;

The Quarry Access Road is located on Lot 31 DP1009967 and Lot 4 DP876394. A range of buffers to surrounding undisturbed areas are also located on the lots noted above.

This land is leased by Hy-Tec from the HPC. **Figure 1.3** displays the above lots and the boundary of the Quarry Site and Quarry Access Road.



## 1.4 EXISTING APPROVALS

The Quarry is operated with the following development consent, approvals and licences.

1. Development Consent SSD 6084 issued by DPE on 15 July 2015 to approve the Austen Quarry Extension Project.
2. Environment Protection Licence 12323 issued by the NSW Environment Protection Authority (EPA). This licence is renewed annually with the anniversary date being 1 July.
3. Two Water Access Licences (WALs).
  - WAL 37423 (Aquifer) to access 20 units (currently 20ML) per annum of groundwater from the *Coxs River Fractured Groundwater Source* under the *Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources* and Works Approval 10WA119180.
  - WAL 25616 (Unregulated River) to obtain 20 units (currently 20ML) of water per annum from the *Upper Nepean and Upstream Warragamba Water Source* under the *Water Sharing Plan for the Greater Metropolitan Region Unregulated River Water Sources* and Works Approval 10WA103330
4. Approval EPBC 2013/6967 under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) that permits removal of the threatened plant Silver-leaved Mountain Gum (*Eucalyptus pulverulenta*) within disturbance areas of the Quarry that was determined to be a controlled action. This approval requires Hy-Tec to prepare and implement management actions within the approved Biodiversity Offset Area and for management of Silver-leaved Mountain Gum within the Quarry Site and Biodiversity Offset Area generally.

## 1.5 BACKGROUND TO THE PROPOSAL

In 1994, AUS10 Rhyolite Pty Ltd sought and obtained development consent for a hard rock quarry within the “Liddleton” property owned by HPC. Lithgow City Council issued development consent DA 103/94 on 24 November 1994 for the development and operation of the Quarry and ultimately endorsed the development consent on 22 March 1995. Hy-Tec entered into a lease to become the operator of the Quarry in early 2002 and commenced the sale of aggregates and other quarry products in 2005. DA 103/94 was relinquished on 15 September 2015 and operations commenced under SSD 6084.

The Stage 2 Extension Project was approved under SSD 6084 on 15 July 2015 to permit the following.

- Lateral extension and deepening of the approved extraction area.
- Lateral extension of the approved overburden emplacement.
- Extended midweek hours of operation.
- Extension of the approved life of the Quarry to 2050.

- Ongoing extraction, processing or stockpiling activities consistent with the existing operation.
- Approval of a Biodiversity Offset Strategy that included a 94.3ha Biodiversity Offset Area directly adjacent to the Quarry.

Although approved in July 2015, quarry operations under SSD 6084 did not commence until 15 September 2016 and vegetation disturbance directly associated with the extended extraction area did not occur until April 2017, with Quarry extraction activities remaining within the original Stage 1 area through to late 2017.

Operations under SSD 6084 have now been occurring for over 16 months and Hy-Tec is seeking the proposed modifications to adjust annual production levels and operating settings to account for existing market conditions and to reduce and realign the approved areas of disturbance so that a final Biodiversity Offset Strategy may be developed.

## 1.6 RELEVANT LEGISLATION AND STATUTORY PLANNING

### 1.6.1 Introduction

A number of Commonwealth, NSW, regional and local planning instruments or policies apply to the operation of the Quarry and the proposed modifications. A brief summary of each relevant planning instrument is provided in the following subsections with the environmental aspects requiring consideration identified.

### 1.6.2 Commonwealth Legislation

As described in Section 1.4, Hy-Tec holds Approval EPBC 2013/6967 under the EPBC Act for the removal of 721 individual Silver-leaved Mountain Gum (*Eucalyptus pulverulenta*) plants which is a ‘controlled action’ as the plant is listed as vulnerable under the EPBC Act. As approval is required under the EPBC Act, biodiversity offsetting must be developed and implemented in accordance with the *EPBC Act Environmental Offsets Policy* (DSEWPaC, 2012).

### 1.6.3 NSW Legislation

The following NSW legislation is relevant to the assessment of the proposed modifications and is referenced throughout this document, where relevant.

- *Environmental Planning and Assessment Act 1979*
- *Protection of the Environment Operations Act 1997*
- *Water Management Act 2000*
- *Biodiversity Conservation Act 2016 and the Biodiversity Conservation Regulation 2017*

## 1.6.4 State Environmental Planning Context

### State Environmental Planning Policy (State and Regional Development) 2011

One of the purposes of this State Environmental Planning Policy (SEPP) is to define those developments of State significance requiring Ministerial approval under the provisions of the EP&A Act. As an extractive industry, the Stage 2 Extension Project is identified as State Significant Development under Schedule 1 (7(a)) of this SEPP by virtue of annual extraction exceeding 500 000tpa and resource quantity exceeding 5 million tonnes. As such, Ministerial approval for the proposed modifications is required.

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

This SEPP (“the Mining SEPP”) was gazetted in recognition of the importance to New South Wales of mining, petroleum production and extractive industries and to provide proper management and orderly and economic use and development of land containing material resources. The Mining SEPP also establishes appropriate planning controls to encourage ecologically sustainable development through environmental assessment, and sustainable management.

The Mining SEPP describes the matters that the consent authority needs to consider when assessing a new or modified proposal. These matters are as follows.

- Clause 12AB Non-discretionary development standards for mining.
- Clause 12 Compatibility with other land uses.
- Clause 13 Compatibility with mining, petroleum production or extractive industry.
- Clause 14 Whether natural resource and environmental management will ensure that the development is undertaken in an environmentally responsible manner.
- Clause 15 Efficiency of resource recovery
- Clause 16 Transportation on public roads and potential conflict with residential areas or schools.
- Clause 17 Plans to ensure the rehabilitation of the development.

The proposed modifications would not modify existing operations to the extent that the satisfaction of the matters would be compromised. While transportation activities would increase, these would be within the carrying capacity of the roads to be used and would not conflict with any additional residential or school areas. The design of the final landform would be slightly modified, however rehabilitation methods would be applied as currently approved.

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

Hazardous and offensive industries, and potentially hazardous and offensive industries, relate to industries that, without the implementation of appropriate impact minimisation measures, would, or potentially would, pose a significant risk in relation to the locality, to human health, life or property, or to the biophysical environment. As the only hazardous substances materials to be stored at the Quarry would be restricted to well managed diesel fuel and other

hydrocarbon products, and the transport of ammonium nitrate for blasting does not exceed the relevant thresholds for Class 5.1 materials, the Stage 2 Extension Project is not classified as potentially hazardous industry.

### **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 Quarry is located within the Warragamba catchment which forms part of Sydney's water supply. However, the proposed modifications would not modify approved water management strategies or result in any change to approved impacts to the Cocks River. The reduced disturbance in the vicinity of the overburden emplacements may reduce the volume of sediment-laden runoff reporting to sediment basin SB3b, providing a net benefit and therefore this SEPP is not considered further in this document.

### **1.6.5 Local Planning Context**

#### **Lithgow Local Environmental Plan 2014**

The Lithgow Council Local Environmental Plan (LEP) was gazetted in 2014 and guides development in the local government area by encouraging the proper management, development and conservation of natural resources and the built environment. The Quarry is located on land zoned RU1 – Primary Production under the LEP. The objectives of this zone are as follows.

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To encourage diversity in primary industry enterprises and systems appropriate for the area.
- To minimise the fragmentation and alienation of resource lands.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.
- To minimise the environmental and visual impact of development on the rural landscape.
- To provide for recreational and tourist development and activities of an appropriate type and scale that do not detract from the economic resource, environmental or conservation value of the land.
- To maintain or improve the water quality of receiving water catchments.

The proposed modifications would not limit the achievement of these objectives.

### Lithgow City Council Land Use Strategy 2010-2030

The Lithgow Land Use Strategy 2010-2030 (LCC, 2011) was endorsed by the then Department of Planning and Infrastructure in May 2012. It explores the land use and planning issues currently facing the LGA and provides recommendations for resolving these issues. The issues of greatest relevance to the proposed modifications include the following.

- Local industry - The LGA is heavily dependent on both mining (including extractive industries) and retail as the largest employment industries in the region. These two industries are linked through employment and provision of disposable incomes.
- Sydney Drinking Water Catchment - LCC (2011) identifies that 18.44% of the Lithgow LGA is within the Sydney Drinking Water Catchment and development in these areas should be subject to additional criteria to establish a neutral or beneficial effect upon water quality before development approval is obtained.
- Environmentally Sensitive Land, Water and Biodiversity Resources - The land on which the Quarry is situated has been mapped in LCC (2011) as being within an area of environmentally sensitive land, of high to moderate biodiversity sensitivity and as potentially containing Endangered Ecological Communities (EEC).
- Scenic Quality of Landscapes - LCC (2011) recognises the importance of the scenic landscape to the LGA and the existing and future economic impact of this attribute.
- Protection of Primary Production Resources - LCC (2011) highlights the potential land use conflict between residents seeking a rural lifestyle and the use of land for primary production.
- Mineral Resources (including Extractive Industry) and Agricultural Lands - LCC (2011) recognises the significant contribution the mining and extractive industries make to the LGA and the contribution of agriculture.
- Forestry - Forestry-zoned lands represent 14.9% of land area within the Lithgow LGA.
- Wind Resource - The Central Tablelands has been established by the NSW Government as a renewable energy precinct based on the relatively high wind resources of the area.

The proposed modifications would not result in changes to the existing operation that would impact the land use and planning issues relevant to the Stage 2 Extension Project. Impacts to the threatened plant Silver-leaved Mountain Gum (*Eucalyptus pulverulenta*) would be improved under the proposed modifications due to the reduced extent of the extraction area and overburden emplacement boundaries.

LCC (2011) highlights that the biggest threat to primary production resources within the LGA is continued fragmentation, predominantly for rural lifestyle development. However, the proposed modifications would not impact the primary production resources of the LGA.



## 1.7 CONSULTATION

### 1.7.1 Government Agencies

DPE was contacted during preparation of this *Statement of Environmental Effects* to seek assessment requirements for the application. Correspondence received from DPE on 16 November 2017 is included as **Appendix 2**. DPE requested that Hy-Tec include detailed assessments of:

- traffic impacts;
- air quality;
- operational and road noise; and
- blasting impacts.

In addition, DPE requested that the *Statement of Environmental Effects* consider the likely changes to the total resource extracted and changes to the rehabilitation activities and conceptual landform as well as potential changes to water management.

Lithgow City Council (Council) were consulted via phone and correspondence (dated 22 December 2017) and provided email feedback on the proposed modifications on 16 January 2018. A meeting with Council officers and Hy-Tec representatives was held on 2 February 2018 in the Council offices. A summary of the outcomes of this meeting is provided in **Appendix 3**. Council was provided with a draft copy of the SoEE and attendees discussed the various components of the proposed modifications and potential changes to approved operations and environmental impacts. In summary, Council did not provide specific requests for the assessment and generally agreed on the benefits of modifying the annual levels of product despatch, realignment of the extraction area and overburden emplacement boundaries and the modifications of wording concerning biodiversity offsetting obligations. Council's principal concerns related to the potential impacts associated with proposed start time of 4:00am for truck loading and product despatch, the ongoing operation of the intersection of Jenolan Caves Road and the Great Western Highway and enforcement of the Driver's Code of Conduct. Council recommended that Hy-Tec undertake further consultation with the owners of the Glenroy property, which was agreed by Hy-Tec.

Hy-Tec also consulted with Roads and Maritime Services (RMS) regarding the condition of Jenolan Caves Road at the Glenroy Bridge and to request further information regarding plans for upgrade to the intersection of Jenolan Caves Road and the Great Western Highway. RMS confirmed that resurfacing of the road at the Glenroy Bridge was undertaken on 8 February 2018 and that signs providing a warning to heavy vehicle drivers regarding compression braking in this location had been damaged and were in the process of being replaced. RMS also confirmed that designs for grade separation at the intersection of Jenolan Caves Road and the Great Western Highway were still appropriate and had been incorporated into zoning maps within the *Lithgow Local Environmental Plan 2014*. However, it was acknowledged that the recent upgrade to this intersection meant that this was a longer-term plan.

The proposed modification to the extent of vegetation disturbance and the description of biodiversity offsetting requirements described in SSD 6084 would require a variation to the controlled action approval EPBC 2013/6967 under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). EPBC 2013/6967 relates to the management of impacts to

the threatened Silver-leaved Mountain Gum and therefore any variation to EPBC 2013/6967 relates to the modified boundaries for the extraction area and overburden emplacement (a positive outcome for the Silver-leaved Mountain Gum) and the proposed change to conditions in SSD 6084 that refer to offsetting obligations. The Federal Department of the Environment and Energy (DoEE) was consulted by phone and correspondence dated 22 December 2017. Initial feedback from officials with DoEE requested that the Department be provided a copy of the *Statement of Environmental Effects* to assist with review of the proposed changes. It was noted that, at the time this application was finalised, DoEE was yet to endorse the *Biodiversity Conservation Act 2016*. As a result, retiring biodiversity credits under the existing legislation may be problematic from a Federal perspective. However, it is anticipated that this impasse would be resolved by the time any biodiversity credits would be retired for the Quarry (i.e. September 2018).

### 1.7.2 Local Community

The proposed modifications were presented at a meeting with the chairman of the Hartley District Progress Association (HDPa) on the 13<sup>th</sup> December 2017 and were discussed further in a phone conversation on 2 February 2018. The chairman of the HDPa generally agreed that the proposed modifications were acceptable and understood the reasons for the application. The concerns of the owners of the Glenroy property were discussed, principally relating to the potential noise impacts at the Glenroy Bridge. The chairman of the HDPa also reviewed the consultation flyer and provided advice on information to be included that would be relevant to the local community. It was agreed that Hy-Tec would continue to advise the HDPa of the progress of the application.

Hy-Tec maintains contact with neighbours of the Quarry and in the surrounding area to notify residents of the proposed blasting schedule. A two-page summary flyer of the proposed modifications was provided to those community members that have previously requested blast notifications as well as properties neighbouring the Quarry (see **Appendix 3**). The brochure included information on how the community could contact Hy-Tec to provide feedback on the proposed modifications. The brochure was dropped in letterboxes on Wednesday 20 December 2017.

Only one community member responded to the letterbox drop. The owners of the Glenroy property contacted Hy-Tec by phone and spoke to the Quarry Production Manager. This phone call was followed by a hand-written letter mailed to the Hy-Tec head office and received on 25 January 2018. A copy of the hand-written letter is reproduced in **Appendix 3**. The feedback from the owners of the Glenroy property principally concerned road traffic noise and sleep disturbance due to the noise of vehicles crossing the Glenroy Bridge. The concerns raised by the owners of the Glenroy property are discussed further in Section 3.4 and Section 5.3.

It should be noted that Hy-Tec have previously funded an upgrade of the Glenroy Bridge (in 2012) to reduce impacts at this location.

Representatives of Hy-Tec met with the owners of the Glenroy property on 7 February 2018 and again on 2 March 2018. A summary of the matters discussed during these meetings and actions resulting from the discussions is provided in **Appendix 3**. In summary, the owners of the Glenroy property reiterated their concerns regarding truck speed and traffic noise when crossing Glenroy Bridge, the need for additional material to be despatched, their disagreement with the approval process and their general objection to the Quarry operation.

For the purpose of this assessment, the key outcome of the meeting was identifying the potential for trucks crossing the Glenroy Bridge to cause a short-term loud noise that wakes the residents and people camping along the Coxs River. It is acknowledged that this has the potential to impact not only the residents but visitors to the property. A series of mitigation measures and commitments were discussed at the meeting. These are described in detail in **Appendix 3** and summarised in Section 3.4. Alternatives to the proposed notification such as product despatch late in the evening was also discussed. It should be noted that by the second meeting on 2 March 2018, Hy-Tec had started to put in place measures to mitigate noise at this property. The owners of the Glenroy property acknowledged Hy-Tec's proactive approach to mitigating impacts and that Hy-Tec was not the only company using Jenolan Caves Road for transportation activities, however, reiterated their long-standing objection to the Quarry operation.

## **1.8 MANAGEMENT OF INVESTIGATIONS**

This document has been compiled by Mr Nicholas Warren B.Sc., M.Bus (Marketing), M.Env.Sc. (Senior Environmental Consultant) of R.W. Corkery & Co. Pty Limited. A peer review has been completed by Mr Rob Corkery, B.Appl.Sc (Hons), M.Appl.Sc., Principal and Managing Director of R.W. Corkery & Co. Pty Limited.

Quarry plans for the proposed modifications were supplied by Mr Rod Huntley of Groundwork Plus Pty Ltd, with other details related to current and proposed operations provided by the following Hy-Tec personnel.

- Mr David Cilento (NSW General Manager)
- Mr Darryl Thiedeke (National Planning and Development Manager)
- Mr Daniel Reed (Project Manager)
- Mr Lee Attard (NSW Quarry Operations Manager)
- Mr Rodney Welsh (Quarry Production Manager)
- Mr Craig McDonald (Quarry Supervisor)

A range of specific environmental investigations have been undertaken to assess the potential environmental impacts of the proposed modifications. The relevant studies have been appended to his document and are referenced throughout. These studies, the responsible consultancy and qualifications of the relevant personnel are as follows.

- Road Transport Assessment. Mr Ken Hollyoak (Eur Ing BSc(Hons) MSc(Dist) CPEng MIEAust MAITPM MICE FCHIT) and Ms Doris Lee (BE Civil) of The Transport Planning Partnership Pty Ltd.
- Noise and Blasting Assessment. Mr Rod Linnett (Ass. Dip. Eng., MAAS, MIOA) of Muller Acoustic Consulting Pty Ltd.
- Air Quality Impact Assessment. Ms Katie Trahair (BSc Env, CASANZ) and Mr Philip Henske (BSc Physics and Ecology, CASANZ) of Todoroski Air Sciences Pty Ltd.
- Biodiversity Assessment. Ms Sian Griffiths, (B.Env.Sc. (Hons)) of Niche Environment and Heritage Pty Ltd.

## 2. EXISTING QUARRY OVERVIEW

### 2.1 APPROVED OPERATIONS

#### 2.1.1 Introduction

The resource extracted at the Quarry is rhyolite, an extrusive, volcanic rock which is blasted, crushed and screened to produce high quality aggregates, manufactured sand and other road pavement products. An exploration drilling program completed during planning for the Stage 2 Extension Project confirmed proven reserves within the Quarry of approximately 44 million tonnes within the approved extraction area.

A ridge on the northern side of the extraction area has been retained as a visual barrier to reduce visual impacts of the extraction area when viewed from Hassans Walls, approximately 5.7km north of the extraction area (see **Figure 1.2**). It remains Hy-Tec's intention not to extract this ridge with vegetation maintenance activities in this area focusing on preserving its function as a screen for views towards the extraction area.

The extraction and secondary processing areas have been located and designed to enable the efficient recovery of material while limiting, as much as possible, the environmental impacts of operations. **Figure 2.1** displays the approved Quarry layout. The extraction area and primary crushing station are connected to the secondary processing area by a primary conveyor. The primary conveyor transfers the primary-crushed feed from an elevation of 750m AHD to the primary stockpile at approximately 685m AHD. By locating the secondary processing area on the northern side of the hills that form the extraction area, processing occurs at an elevation of between 700m AHD and 680m AHD and is shielded to the south by the hills and the retained ridge of the extraction area.

The following subsections provide a brief overview of the existing Quarry and approved operations focussing on those components that would be modified under the proposed modifications.

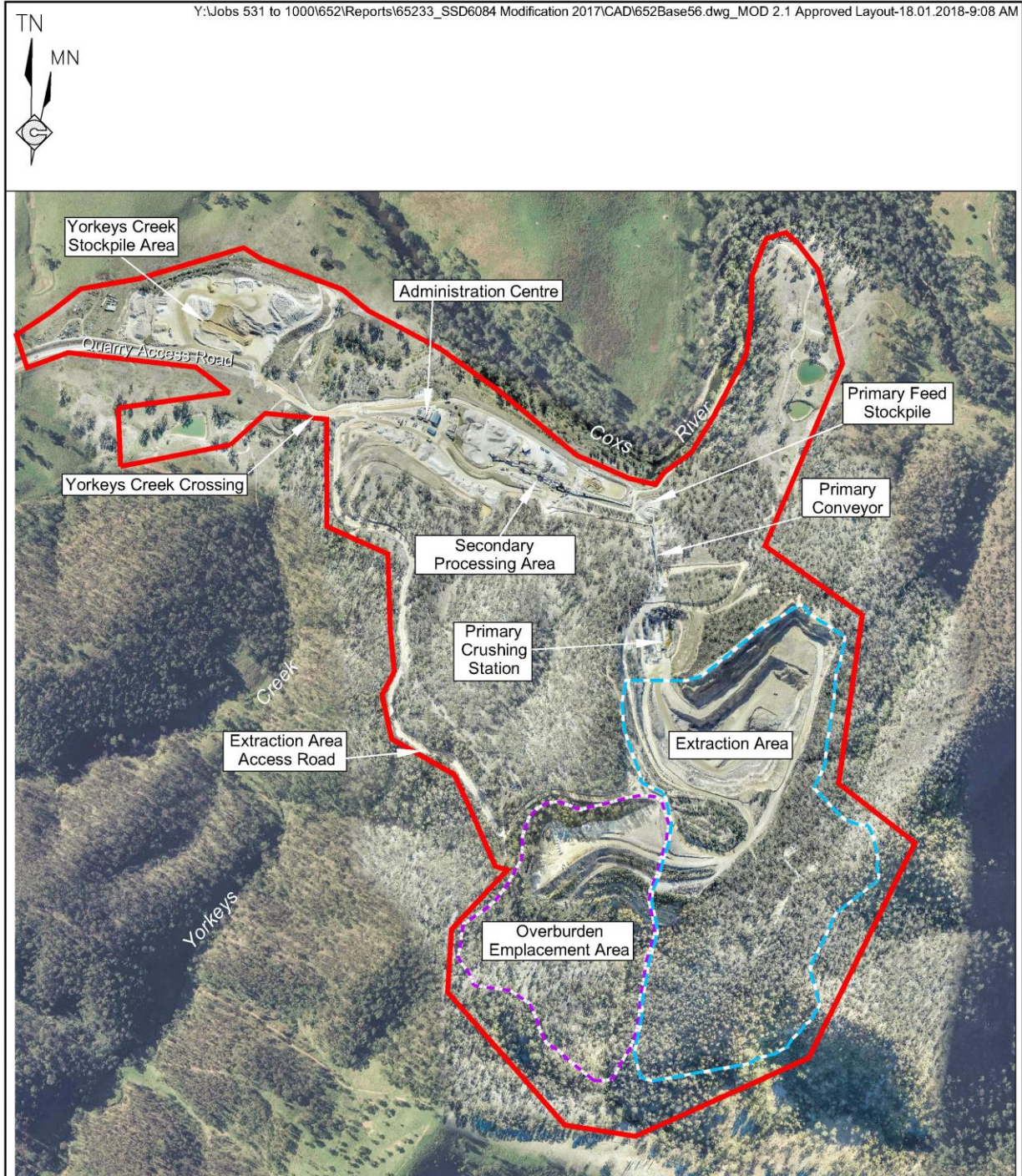
#### 2.1.2 Extraction Operations

Extraction of rhyolite is undertaken using conventional drill and blast, load and haul methods. Vegetation is first cleared by bulldozer and/or hydraulic excavator and stockpiled for placement over sections of the Quarry to be rehabilitated. Any available soil resources are then stripped and stockpiled for spreading over rehabilitated slopes of the overburden emplacement, or other areas of the Quarry to be rehabilitated.

Blasting occurs at a maximum frequency of once per week. Current blast sizes may vary according to the location within the extraction area but generally vary from 10 000t through to approximately 100 000t (with an average of approximately 60 000t).

Extraction is approved to a depth of 685m AHD.

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Note: Some boundaries have been offset for clarity

- REFERENCE
- Quarry Site Boundary
  - - - Extraction Boundary
  - - - Overburden Emplacement Area Boundary

SCALE 1:12 000 (A4)



Base Photograph Source: CEH Survey - May 2017

Figure 2.1  
 APPROVED STAGE 2  
 QUARRY LAYOUT



Although subject to modifications based on localised geological conditions or the optimal locations of quarry ramps or sumps, the following general design criteria of the Quarry extraction area has been adopted. Flexibility with bench widths and heights is allowed to account for the need to mitigate and manage geological geotechnical and operational risk as a result of progressive operational plans.

- Operational Face Height: 15m
- Operational Bench Width: 20-100m
- Terminal Bench Width: 5m-10m
- Face Angle: 70° to 80° (approximate)

The maximum 80° face angle is subject to further geotechnical investigation throughout the life of the Quarry to ensure a safe and stable landform is achieved within the extraction area.

Where material unsuitable for the production of saleable products, such as weathered rhyolite or non-rhyolitic dyke material, is encountered, these materials are considered overburden and are placed within the overburden emplacement located immediately adjacent to the extraction area.

### 2.1.3 Crushing, Screening and Stockpiling Operations

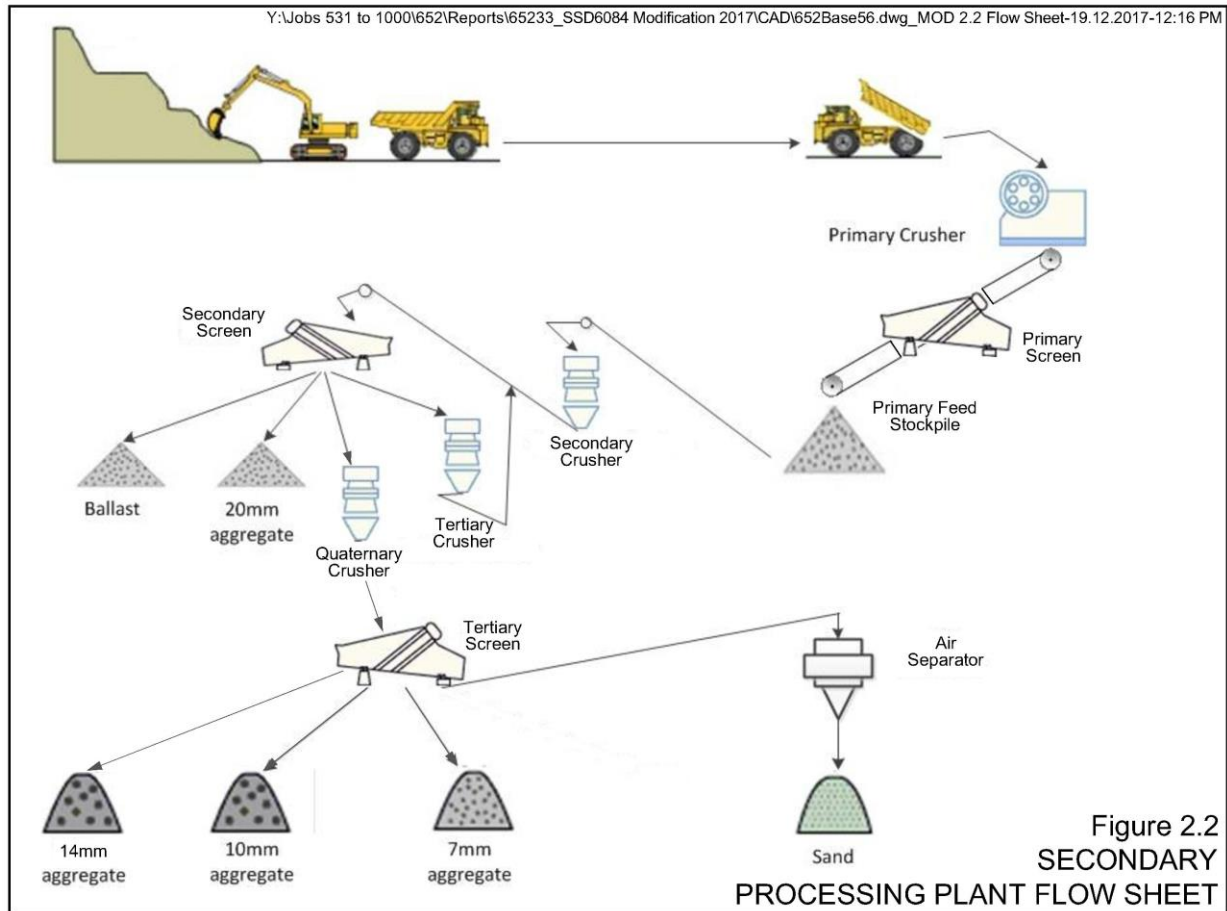
#### Processing Plant Design and Operations

The processing operations involve the use of a series of crushers and screens to crush and separate the rhyolite into various size aggregate and sand products and to blend some products to produce customised road pavement products.

A graphical representation of the flow of materials through the processing plant is provided in **Figure 2.2**. The blasted or fragmented rock is transported by haul truck to the primary crushing station located on the northern side of the extraction area at approximately 750m AHD. After crushing to <250mm, the rhyolite is conveyed from the primary crusher to the primary screen where scalps may be separated from the primary feed. Material for further processing is transferred via the primary conveyor to the primary feed stockpile within the secondary processing area. Further crushing and screening are undertaken in a 4ha area on the southern side of the Cocks River. A 1.5m high bund is maintained on the northern side of the processing area to clearly define the area for entering trucks and to contain all runoff within the area.

Within the secondary processing area, the primary crushed rhyolite is reclaimed from the base of the primary feed stockpile and conveyed to secondary and tertiary crushers to further reduce the size of the rock. Normally, the crushed rhyolite is conveyed to a screen deck where oversize rock is re-circulated and re-crushed to make products of 20mm size or smaller. All <14mm crushed rock that passes through the screens is conveyed to a vertical shaft impactor where this product is further shaped before being separated into smaller aggregate sizes. An air separator is used for the production of a sand product.

Any scalps removed following primary crushing are conveyed to a temporary stockpile located on the southern edge of the secondary processing area and are periodically transported to the Yorkeys Creek Stockpile Area to the west of Yorkeys Creek or to the overburden emplacement (see **Figure 2.1**).



Although it is an approved activity, Hy-Tec is yet to develop an area within the Yorkeys Creek stockpile area for a mobile pugmill. Development of this area will be subject to demand for the intended production of road pavement materials from the products stockpiled within the area.

### Product Stockpiling

A wide range of aggregates (40mm, 20mm, 14mm, 10mm, 7mm and 5mm), rail ballast, gabion material, blended road pavement products, manufactured sand products, select fill, and drainage materials are produced at the Quarry. Stockpiles of the various aggregates and blended products are located within the secondary processing area from where road trucks are loaded by front-end loader and despatched. Up to approximately 80 000t of products can be stored within the secondary processing area.

A number of products are customised to meet the customers' individual specifications. As a result, a number of smaller stockpiles are maintained for these products.

The bulk of excess products including manufactured sands, select fills, drainage materials and road pavement materials are stockpiled within the Yorkeys Creek stockpile area (see **Figure 2.1**). Approximately 90 000t of material is transferred to the Yorkeys Creek stockpile area each year with approximately 90% of this material sold during the year.

## 2.1.4 Rate of Production and Quarry Life

The demand for the Quarry products has increased since operations commenced under SSD 6084 to a level approaching the limit for products transported from the Quarry of 1.1Mtpa. During the 12 months to 30 June 2017, transportation of quarry products was 1 058 563t.

Condition 7 of Schedule 2 of SSD 6084 limits the life of the approved Quarry to 30 June 2050. However, the actual life of the Quarry will be dependent on the ongoing demand and rate of production. Any possible extension beyond the current approved Quarry life would require a modification to SSD 6084 or a new development application, as appropriate.

## 2.1.5 Product Transportation

### Site Access and Transport Routes

All trucks access the Quarry only via the existing entrance from Jenolan Caves Road. This entrance and the associated intersection with Jenolan Caves Road have been upgraded to accommodate the approved level of truck transportation. To avoid truck queuing on Jenolan Caves Road early in the morning, the gates to the Quarry are opened approximately 30 minutes before operating hours commence (trucks cannot access the weighbridge to register arrival at the Quarry until 5:00am). Trucks that arrive before 5:00am park in dedicated bays while waiting.

All products are loaded into road registered trucks within either the secondary processing area or the Yorkeys Creek stockpile area. Trucks exit the Quarry via the departure weighbridge and Quarry Access Road, with virtually all of the trucks turning right onto Jenolan Caves Road and continuing northwards to the intersection with the Great Western Highway. Some trucks may turn left at Jenolan Caves Road to access local customers, as needed. The majority of truck movements generally are in an easterly direction towards the Blue Mountains and the Sydney metropolitan area.

Depending on demand for construction materials for local projects between Hartley and Lithgow, there are likely to be periods when a higher proportion of trucks (typically rigid trucks) turn left or in a westerly direction at the Jenolan Caves Road – Great Western Highway intersection to supply those projects or other destinations beyond Lithgow. Aggregates from the Austen Quarry are also delivered to the Hy-Tec concrete batching plant at Wallerawang. The existing transport routes used by the majority of trucks are displayed on **Figure 2.3**.

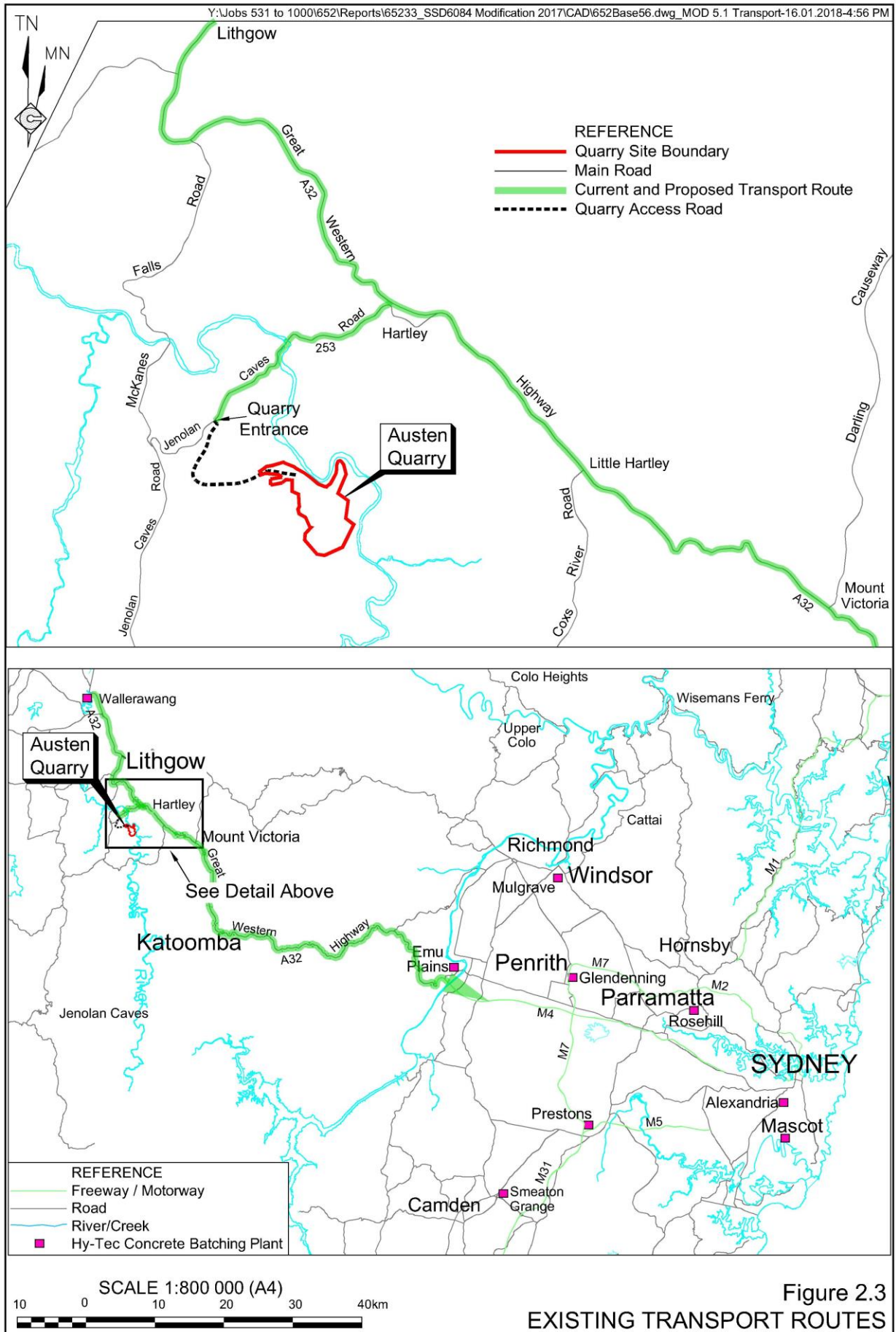
### Heavy Vehicle Types

Product trucks entering and leaving the Quarry are typically truck and dog trailer combinations or less commonly 19m B-Doubles. Other trucks such as smaller rigid vehicles and trucks licenced for Higher Mass Limits also make up a small proportion of quarry traffic. For the purpose of assessment, it has been assumed that the average load size for all trucks exiting the Quarry is approximately 33t, taking into account the capacity of all vehicles carrying material from the Quarry.

### Approved Traffic Levels

The traffic levels associated with product despatch are limited under Condition 8 of Schedule 2 of SSD 6084 to a daily maximum of 250 laden truck movements and a daily average of 150 laden truck movements, with the daily average calculated over a calendar month.





Over the 12 months to 30 June 2017 the maximum daily laden truck movements was 203 and the highest monthly average was 137 per day during November of 2016 with an overall daily average for the period of 1 July 2016 to 30 June 2017 of 113 laden truck movements per day.

### 2.1.6 Hours of Operation

The hours of operation are approved under Condition 1 of Schedule 3 of SSD 6084 as presented in **Table 2.1**.

**Table 2.1**  
**Approved Hours of Operation**

|   | <b>Monday to Friday</b> | <b>Saturday</b>  | <b>Sundays / Public Holidays</b> |
|---|-------------------------|------------------|----------------------------------|
| Blasting  | 10:00am to 3:00pm       | No Activity      | No Activity                      |
| Extraction Operations<br>Processing Operations<br>Overburden Management<br>Stockpile Management | 6:00am to 10:00pm       | 6:00am to 3:00pm | No Activity                      |
| Loading Trucks and<br>Product Despatch  | 5:00am to 10:00pm       | 5:00am to 3:00pm | No Activity                      |
| Maintenance   | 24 hours/day – Any day  |                  |                                  |

### 2.1.7 Employment

There are currently 20 local full-time employees at the Quarry with approximately 45 people employed as transportation contractors and 10 local people employed as part-time or full-time contractors.

### 2.1.8 Water Management

Water management and monitoring for the Quarry Site is described in the approved Water Management Plan. Hy-Tec would continue to source water from four sources, namely:

- a series of storage and sediment dams located across the Quarry Site, interconnected by a series of pipes and pumps to two water storage tanks;
- a sump maintained on the floor of the primary crushing station where surface runoff and groundwater seepage collects;
- a sump maintained on the floor of the extraction area for the capture and storage of surface runoff and groundwater; and
- surface water from the Coxs River should the Quarry exhaust water available or the licensed allocation from the dams specified above.

The key uses for water sourced under the Maximum Harvestable Rights for the Quarry or under licence would continue to be the following.

- Truck washing and routine maintenance.
- Irrigation of rehabilitation and other vegetation plantings.
- Dust suppression.

Potable water would continue to be purchased from Lithgow City Council or other local sources and held in two 10kL tanks with the administration area and at the primary crushing station for drinking and ablutions facilities.

As described in Section 1.4, two Water Access Licences (WALs) have been issued under the *Water Management Act 2000* for the expected take of groundwater (WAL 37423) and surface water (WAL 25616). Each of these licences has a corresponding works approval.

## **2.1.9 Waste Management**

Waste at the Quarry may be separated into two categories; production waste including overburden, oversize or fines/scalps and non-production waste including general waste, oils and scrap steel that require disposal/recycling.

### **Production Waste**

The current production of overburden is described in more detail in Section 3.6, however in summary, Hy-Tec has found that the volume of overburden material being produced at the Quarry is much less than predicted in the 2014 EIS (RWC, 2014). The overburden emplacement was designed to contain approximately 2 860 000 m<sup>3</sup> of overburden over the life of the Quarry. It is now proposed to decrease the capacity of overburden emplacement to approximately 2 100 000m<sup>3</sup> (the design volume including a swell factor of 1.3) due to the reduced volumes being produced.

Hy-Tec aims to incorporate all crushed components of the rhyolite into aggregate, road pavement, select fill and other manufactured sand products. Approximately 5% to 6% of material produced is removed as scalps and transferred from the scalps stockpile within the secondary processing area to the Yorkeys Creek stockpile area with a much smaller percentage of production waste separated from the products in the secondary processing area. Approximately 90 000t of material is stockpiled in the Yorkeys Creek stockpile area each year with currently up to 90% sold throughout the year or blended with other material to customer specifications.

### **Non-production Waste**

A number of solid and liquid wastes are produced on site. Hy-Tec manages the wastes in the manner detailed in **Table 2.2**.

## **2.1.10 Infrastructure and Services**

### **On-Site Road Network**

Access to the Quarry is only via the Quarry Access Road which is sealed for approximately 3.1km between the intersection of Jenolan Caves Road and the site administration area. The various areas of the Quarry are connected by existing internal access roads that are modified, as required, to provide access to active areas of the Quarry.

**Table 2.2  
Waste Management**

| Waste Type            | Management   | Frequency of Removal                                       |
|-----------------------|--|--|
| Sewage                | There are no mains sewerage services available to the Quarry. An on-site sewage treatment biocycle unit is maintained on site and capable of managing sewage for 30 persons. | Continuous   |
| Waste Oil and Greases | Waste oil is collected from the workshop sump and other locations and is regularly removed for recycling.  | Monthly or as needs basis                                  |
| General Solid Wastes  | All general solid wastes are currently collected in waste skips. Separate bins are provided for recyclable materials such as paper, cardboard and plastic.                   | Weekly   |
| Scrap Metal           | A small amount of scrap metal is collected in skip bins, primarily as a result of plant maintenance and parts replacement.   | Removed on an as needs basis by a licenced metal recycler. |
| Tyres                 | Placed within a marked used tyre storage area until disposed of at a licensed waste management facility or removed by a third party approved to recycle tyres.               | Removed on an as needs basis.                              |
| Batteries             | Placed within a covered and marked used battery storage area until collected by a licensed contractor for recycling.   | Removed on an as needs basis.                              |

### Buildings and Weighbridges

The principal buildings at the Quarry Site are the existing office, weighbridge offices and maintenance workshop with existing smaller structures and buildings used for crib rooms and parts storage.

The Quarry operates with two weighbridges, one for incoming trucks and one for outgoing trucks (see **Figure 2.1**). Trucks are not able to receive a transport docket if it is overloaded or if it approaches outside the approved hours of transport operations.

### Power

No mains power is connected to the Quarry. All electrical power is generated by three diesel-powered generators. Three 1000kVA generators are used to supply power for the primary crushing station and the secondary processing plant. A third, smaller 35kVA generator provides power to the administration area, workshop and weighbridges.

### Communications

The administration office operates with one communications line for both telephone and data transfer. Either UHF two-way or mobile telephones are used throughout the Quarry for on-site communication.

### Hydrocarbon Storage

The existing fuel bay incorporates a 31 400L diesel tank and a 10 000L diesel fuel truck tank. All oils, greases etc. are stored in a concrete-bunded facility within a building adjacent to the workshop.

Based on existing records held by the Quarry, approximately 1.2 million litres of diesel are used per year for the fixed processing plants, mobile equipment and to power the generators.

## 2.1.11 Rehabilitation

Rehabilitation management for the Quarry Site, including the progressive rehabilitation activities, the conceptual final landform and anticipated final land use is described in the approved Landscape and Rehabilitation Management Plan.

The performance indicators and completion criteria for rehabilitation activities would be consistent with those provided in Section 9.1 of the approved Landscape and Rehabilitation Management Plan and reproduced in **Table 2.3**.

**Table 2.3**  
**Rehabilitation Completion Criteria, Performance Indicators and Monitoring Strategy**

Page 1 of 4

| Objectives  | Completion Criteria  | Domain* | Performance Indicator  | Monitoring Strategy   |
|---|--|---------|--|---|
| <b>Decommissioning</b>  |  |         |  |   |
| <ul style="list-style-type: none"> <li>To maximise the re-use or recycling of materials.</li> <li>To stabilise the area surrounding the infrastructure to be decommissioned in order to prevent pollution to air, land or water.</li> </ul>           | Final land use is defined and agreed by relevant stakeholders.   | 1 to 5  | Final land use agreed and formalised in Rehabilitation Plan.     | Not Applicable  |
|   | Services are isolated, disconnected, removed and terminated.   | 3       | Completed to the satisfaction of Council.                        | Survey of services to be completed.   |
|   | Infrastructure and associated buildings not required are demolished and removed.                             | 3       | Completed to the satisfaction of Council.                        | Survey of infrastructure to be completed.                                       |
|   | All internal roads, car parks and hardstands not required for the end land use/user are ripped and profiled. | 3       | Completed to the satisfaction of Council.                        | Survey of infrastructure to be completed.                                       |
| <ul style="list-style-type: none"> <li>To remediate any contamination and ensure the area is non-polluting prior to commencement of the landform establishment phase.</li> </ul>  | Contaminated sites are identified for remediation.   | 1 to 5  | Contaminated Sites Report (or equivalent) completed.             | Soils tested and analysed as part of Contaminated Sites Report (or equivalent). |
|   | Any Contaminated land is remediated.   | 1 to 5  | Site free of contaminants.                                       |   |
|   | Identified heritage sites are retained.  | 1 to 5  | No damage to known sites.  | Sites resurveyed prior to relocation of previously removed artefacts.           |
| <b>Landform Establishment</b>   |  |         |  |   |
| <ul style="list-style-type: none"> <li>To stabilise all disturbed areas and minimise erosion and dust generation.</li> <li>To provide a low maintenance, geotechnically stable and safe landform suitable for the intended final land use.</li> </ul> | The final landform achieves the nominated design of the EIS or subsequent Rehabilitation Plan.               | 1       | Terminal faces and benches are geotechnically stable.            | Survey following completion of landform establishment activities.               |
|   |  | 2       | Bitumen application complete.                                    |   |
|   |  | 3 and 5 | Appropriate slopes at approximately 26°.                         |   |
|   |  | 4       | Ripped and profiled surface accommodates surrounding topography. |   |
|   |  | 4       | Water diversion structures retained.                             |   |
| <p>* Domain 1 = Extraction Area      Domain 2 = Overburden Emplacement      Domain 3 = Secondary Processing Area<br/>Domain 4 = Water Management Structures      Domain 5 = Yorkeys Stockpile</p>   |  |         |  |   |

**Table 2.3 (Cont'd)**  
**Rehabilitation Completion Criteria, Performance Indicators and Monitoring Strategy**

Page 2 of 4

| Objectives  | Completion Criteria   | Domain*   | Performance Indicator  | Monitoring Strategy   |
|---|---|-----------|--|---|
| <b>Landform Establishment (Cont'd)</b>  |   |           |  |   |
| <ul style="list-style-type: none"> <li>To achieve the nominated design for each landform.</li> <li>To blend the created landform with the surrounding.</li> </ul>                                 | Final landform does not pose a security or safety risk  | 1         | Safety bund is extended across entry ramps.<br>Signage erected identifying 'deep void – no access'.                              | Inspection by Site Manager.   |
|   | The rehabilitated area does not represent an erosion hazard.                                  | 1 to 5    | Erosion does not exceed 0.3m (gully) deep.   | Visual inspection.  |
|   |   | 2         | Any required banks are constructed at 10m vertical intervals with a back-slope of <5% (3°) and longitudinal slope of <2% (1.5°). | Survey following completion of landform establishment activities.   |
| <b>Growth Medium Development</b>  |   |           |  |   |
| <ul style="list-style-type: none"> <li>To achieve a soil profile capable of sustaining the specified final land use.</li> </ul>   | Soil is stockpiled in accordance with the management measures described in Section 8.4.1.5.   | 1 and 2   | Soil stockpiles do not exceed 2m in height.  | Survey of stockpiles completed.   |
|   | Soil is spread to a depth of 30cm on sloped surfaces (≥10°) and 60cm on flat surfaces (<10°). | 1-3 and 5 | Soil depths as nominated.  | Maintenance of soil inventory (comparison of soil excavated to that spread over landform).<br>Survey of treated areas completed annually and included in Annual Review. |
|   | Soil condition does not limit growth medium development and seed application success.         | 1 and 3-5 | pH levels are equivalent to that of the local setting (4.5 to 6.0).  | Soil analyses.  |
| <ul style="list-style-type: none"> <li>To minimise the potential for erosion, sedimentation and dust generation prior to establishment of vegetation.</li> </ul>                                  | Erosion of soil is minimised.   | 1 to 5    | Erosion does not exceed 0.3m (gully) deep.   | Visual inspection.  |
|   |   | 1 to 5    | Average soil loss per annum is <40 tonnes/ha/year.   | Inspection of sediment basins and calculation of sedimentation.   |
|   | Placement of mulch of woody debris on rehabilitated areas.                                    | 1-3 and 5 | Native fauna observed utilising habitat provided by woody debris.  | General observation.  |
| <p>* Domain 1 = Extraction Area      Domain 2 = Overburden Emplacement      Domain 3 = Secondary Processing Area<br/>Domain 4 = Water Management Structures      Domain 5 = Yorkeys Stockpile</p> |   |           |  |   |

**Table 2.3 (Cont'd)**  
**Rehabilitation Completion Criteria, Performance Indicators and Monitoring Strategy**

Page 3 of 4

| Objectives  | Completion Criteria  | Domain*                       | Performance Indicator  | Monitoring Strategy   |
|---|--|-------------------------------|--|---|
| <b>Ecosystem and Land Use Development</b>   |  |                               |  |   |
| <ul style="list-style-type: none"> <li>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 extraction area and completed lifts of the overburden emplacement.</li> <li>To select and establish vegetation with the species diversity commensurate to the relevant ecological community or agricultural land use.</li> </ul> | Appropriate native plant species used in rehabilitation.   | 1-3                           | Species used are consistent with those of the disturbed vegetation communities.  | Review against species list provided by ecologist or rehabilitation specialist. |
|   |  | 1-3                           | <i>E. pulverulenta</i> included in revegetation.   |   |
|   | Appropriate pasture species used in rehabilitation.  | 5                             | Species used are consistent with those nominated by landowner.   | Monitoring by ecologist or rehabilitation specialist.                           |
|   | Appropriate native plant species richness is present for the restored ecological community.        | 1-3                           | At least 80% of species planted present (including Silver-leaved Mountain Gum).  |   |
|   | Appropriate density/structure of native overstorey species.  | 1-3                           | Overstorey projected foliage cover (PFC) = 10% – 20% approximates that of target community <sup>1</sup> .  |   |
| Appropriate density/structure of native lower storey.   | 1-3  | Lower storey PFC = 10% – 20%. |  |   |
| <ul style="list-style-type: none"> <li>To select and establish vegetation with the species diversity commensurate to the relevant ecological community or agricultural land use.</li> </ul>   | Appropriate native groundcover coverage.   | 1-3                           | Groundcover PFC = 55% – 65%.   | Monitoring by ecologist or rehabilitation specialist.                           |
| <b>Ecosystem and Land Use Sustainability</b>  |  |                               |  |   |
| <ul style="list-style-type: none"> <li>To re-instate ecological communities with biodiversity commensurate with or greater than those communities disturbed by the Proposal and previous quarry operations.</li> </ul>  | The established land form and vegetation is sustainable and consistent with the intended land use. | 1 to 5                        | Establish areas of rehabilitation consistent approval conditions. Land use classifications to include: <ul style="list-style-type: none"> <li>Rehabilitation of Woodland Ecological Communities;</li> <li>Agricultural land; and</li> <li>Biodiversity Offset Area.</li> </ul> | Monitoring by ecologist or rehabilitation specialist.                           |
| <ul style="list-style-type: none"> <li>To ensure that the ongoing viability of these ecological communities are sustainable following the active management by the Applicant.</li> </ul>  | There are no potential hazards that are not consistent with the intended land use.                 | 1 to 5                        | The site is free of safety or environmental hazards including: <ul style="list-style-type: none"> <li>holes, tunnels or unstable areas;</li> <li>quarry infrastructure or debris; or</li> <li>hazardous materials.</li> </ul>  | Visual inspection.  |
| * Domain 1 = Extraction Area      Domain 2 = Overburden Emplacement      Domain 3 = Secondary Processing Area<br>Domain 4 = Water Management Structures      Domain 5 = Yorkeys Creek Stockpile Area  |  |                               |  |   |

**Table 2.3 (Cont'd)**  
**Rehabilitation Completion Criteria, Performance Indicators and Monitoring Strategy**

Page 4 of 4

| Objectives  | Completion Criteria  | Domain* | Performance Indicator   | Monitoring Strategy  |
|---|--|---------|---|--|
| <b>Ecosystem and Land Use Sustainability (Cont'd)</b>   |  |         |   |  |
| <ul style="list-style-type: none"> <li>To ensure that the ongoing viability of these ecological communities are sustainable following the active management by the Applicant.</li> </ul>  | The soil pH is representative of the intended land use.                            | 1 to 5  | pH levels are equivalent to that of the local setting (4.5 to 6.0).   | Soil analyses.   |
| <ul style="list-style-type: none"> <li>To integrate the rehabilitated ecological communities with those incorporated into and protected by a Biodiversity Offset Strategy for the Proposal (refer to Section 2.14).</li> <li>To retain areas on the Site amenable to future agricultural or industrial activities.</li> </ul> | Surface runoff from rehabilitated areas does not result in downstream pollution.   | 1 to 5  | Receiving waters affected by surface water runoff from rehabilitated areas have EC<1500µS/cm and a pH between 5.5 and 8.5.    | Monitoring of water quality contained with sediment basins and receiving waters. |
|   | Exotic weeds or vegetation is not competing or impacting on the intended land use. | 1 to 5  | Noxious weeds are not present within rehabilitation or biodiversity offset areas until data from analogue sites is available. | Monitoring by ecologist or rehabilitation specialist.                            |
|   | Feral pests are not competing or impacting on the intended land use.               | 1 to 5  | Feral pests are not present within rehabilitation or biodiversity offset areas until data from analogue sites is available.   | Inspection by Quarry personnel.  |
| * Domain 1 = Extraction Area      Domain 2 = Overburden Emplacement Area      Domain 3 = Secondary Processing Area<br>Domain 4 = Water Management Structures      Domain 5 = Yorkeys Creek Stockpile Area   |  |         |   |  |

## 2.2 ENVIRONMENTAL PERFORMANCE

### 2.2.1 Environmental Management

As discussed in Section 2.1, the Quarry design provides for the mitigation of visual impacts when viewed from distant vantage points and the location of the secondary processing area provides natural attenuation of potential impacts to the acoustic environment and dust dispersion to the south of the Quarry. Periodic applications of a bituminous film on the terminal extraction faces exposed to distant views further reduces the visual impact of the extraction area.

SSD 6084 requires the preparation, approval and implementation of a series of environmental management documents. Hy-Tec operates the Quarry in accordance with the following approved post-approval documentation.

- Environmental Management Strategy and Plan
- Blast Management Plan
- Noise Management Plan
- Air Quality Management Plan
- Water Management Plan



- Traffic Management Plan incorporating a Drivers Code of Conduct
- Landscape and Rehabilitation Management Plan
- Biodiversity Offset Management Plan
- Silver-leaved Mountain Gum Management Plan

Each of these documents is available from the Hy-Tec website as well as the relevant approval documentation, reporting requirements under SSD 6084 of environmental monitoring results.

Responsibility for quarry environmental management ultimately rests with the Quarry Production Manager with assistance from the Quarry Supervisor. Hy-Tec has also implemented an Environmental Management Induction program for all personnel and contractors to communicate the relevant responsibilities of personnel as described in the various management plans.

## **2.2.2 Environmental Monitoring**

Hy-Tec currently monitors a range of environmental features within and surrounding the Quarry in accordance with the conditions of SSD 6084 and EPL 12323. Existing monitoring includes the following.

- Continuous meteorological monitoring through an on-site meteorological station.
- Ground vibration and air blast overpressure monitoring for every blast at a location adjacent to the village of Little Hartley.
- Biannual attended noise monitoring at three representative residential locations and annual unattended noise monitoring at a single location (Residence 31).
- Monthly deposited dust monitoring at the three locations listed in EPL 12323.
- Continuous particulate matter (PM<sub>10</sub>) monitoring at an approved location to the southwest of the Quarry.
- Monitoring of water extracted from the Coxs River (in accordance with WAL 25616) and groundwater removed through extraction activities or that seeps onto the extraction area floor (in accordance with WAL 37423).
- Monitoring of the volume of any waters discharged from the Quarry to the Coxs River.
- Monthly water quality monitoring at EPL Points 2 and 3 and monitoring prior to and during any discharge for EPL Points 1, 8, 9, 10 and 11. Monitoring involves measurement of pH, total suspended solids, and oil and grease but may also include electrical conductivity, turbidity, total dissolved solids and biological oxygen demand. Monitoring at Yorkeys Creek and existing water management structures occurs in response to environmental incidents such as flooding or other significant rain events.
- Fauna and flora monitoring is completed annually through surveys by a suitably qualified ecologist. Survey results are recorded and compared to results to previous surveys.

- Macro-invertebrate monitoring is completed through annual aquatic surveys undertaken by suitably qualified specialist consultants. Results are recorded and compared to results from previous surveys.
- Erosion and sediment and control structures across the Quarry are monitored on an on-going basis to ensure they remain functional and impacts are minimised.
- The visibility of Quarry components is reviewed periodically from Hassans Walls Lookout to establish the need/effectiveness of on-site mitigation measures.

The Water Management Plan was approved on 16 October 2017 and Hy-Tec has completed the installation of three groundwater monitoring bores around the periphery of the Quarry. The bores have been equipped with a data logging water level meter to record periodic measurements of the groundwater level. In addition, a program of groundwater quality monitoring will commence for each bore and any sumps in the extraction area. A quarterly program estimating the Quarry water balance will be used to qualify predictions made in the assessment documents.

Monitoring data is recorded for future reference and provided in each Annual Review with an overview of results and trends for the reporting period of the report. A review of previous monitoring data and annual reporting suggests very few instances where trigger levels were exceeded and no instances where environmental harm was occurring.

### 2.2.3 Compliance Documentation

The first independent environmental audit of the Quarry required under Condition 8 of Schedule 5 of SSD 6084 was conducted on 17 October 2017 with the audit report and Hy-Tec's response to the issues raised from the audit submitted to DPE on 8 December 2017. In summary, the audit found that Hy-Tec continues to operate the Quarry generally in compliance with the conditional requirements of SSD 6084 and the approved management plans. Five non-compliances and 18 administrative non-compliances were identified. There were no non-compliance issues regarding implementation of EPL 12323. The majority of the non-compliance issues related to management activities involving a lack of documentation recording on-site environmental management activities and therefore Hy-Tec were unable to demonstrate compliance to the auditor. None of the issues raised, threatened or caused material environmental harm. Hy-Tec is finalising some minor requests from DPE regarding the audit report and once the final audit report and response document are approved by DPE, both documents will be made available on the Hy-Tec website.

Hy-Tec also prepares an Annual Review document each year in accordance with Condition 4 of Schedule 5 of SSD 6084. The Annual Review reports on operational activities over the preceding 12 months, reviews environmental management and rehabilitation over that time and summarises planned activities for the next 12 months. The 2017 Annual Review (VGT, 2017) covered the period from 16 September 2016 (commencement of SSD 6084) to 30 June 2017. The report identified two non-compliance issues in relation to the timing for compliance noise monitoring and implementation of the Water Management Plan (as it had not been approved at the time of the report). A single campaign of noise monitoring was missed in April 2017 and has since been made up with an additional campaign of monitoring in December 2017 (available from the Hy-Tec website). The non-compliance with conditions requiring implementation of a Water Management Plan was noted to have been caused by failure to have

the plan approved by the Secretary at the time the Annual Review was prepared. It is noted that the Water Management Plan was approved on 16 October 2017 and Hy-Tec is in the process of implementing requirements under this plan.

In summary, Hy-Tec remains satisfied that the operation will continue to be compliant with the conditions of SSD 6084 and EPL 12323 with annual reviews of the compliance status of the operation.

#### **2.2.4 Complaints Register**

Hy-Tec publishes the complaints register for the Quarry on the Company's website. The current register covers the period from July 2015 to the present and indicates that there have been no formal complaints received publicly or via any government agency throughout that period.

As described in the Environmental Management Strategy and Plan (Groundwork Plus, 2016), any complaints received at the Quarry will be investigated and actions taken in response to the complaints to reduce the risk of repeat incidences. Feedback will also be provided to the complainant in all cases.

#### **2.2.5 Rehabilitation**

Hy-Tec has established several areas within the Quarry for rehabilitation activities and conservation. Progressive rehabilitation activities have focused on areas to the south of the overburden emplacement and in the areas dedicated to replanting of the Silver-leaved Mountain Gum (*Eucalyptus pulverulenta*). Replanting has occurred with mixed success to date with the most recent planting activities (involving 500 Silver-leaved Mountain Gum) unsuccessful due to impacts by herbivores including feral goats and kangaroos.

A new program involving planting of 1 000 Silver-leaved Mountain Gum and other native plants is planned to occur during early 2018.

### 3. DESCRIPTION OF THE PROPOSED MODIFICATIONS

#### 3.1 INTRODUCTION

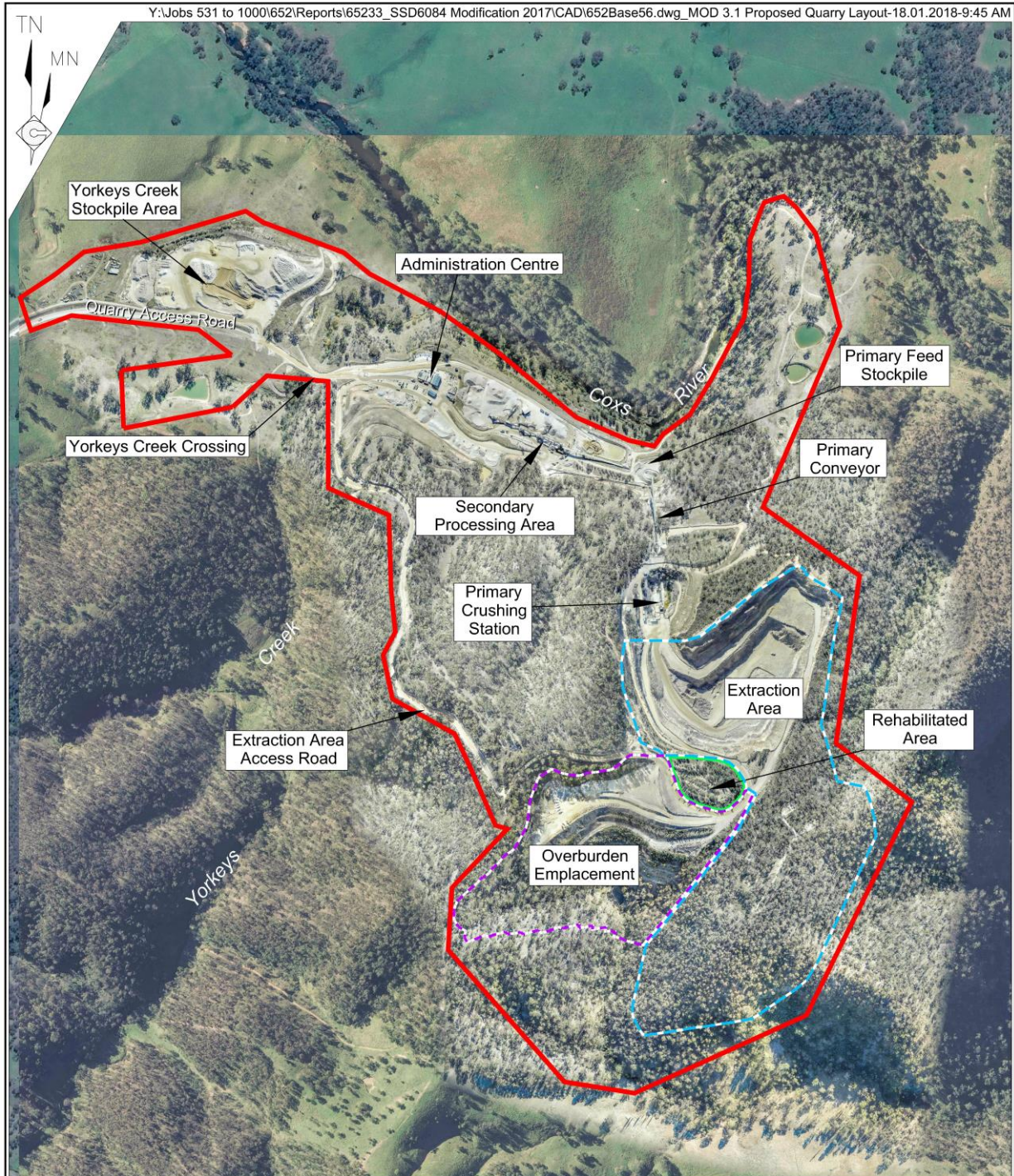
As described in Section 1.1, the proposed modifications to SSD 6084 includes the following components.

1. An increase in the approved annual quantity of quarry products transported from the Quarry from the currently approved limit of 1.1 million tonnes per annum (Mtpa) to 1.6Mtpa and the associated increase to the maximum daily product truck despatch limit from 250 to 300 trucks and the average daily product truck despatch limit from 150 to 200 trucks.
2. A modification to the approved hours of operations to permit truck loading and product transport activities to commence from 4:00am rather than the currently approved start time of 5:00am.
3. A re-alignment of the extraction area boundary to remove areas no longer to be extracted and to add small areas required to improve safety within the extraction area.
4. A modification to the approved boundary of the overburden emplacement to remove areas no longer required to be disturbed for development.
5. A modification to the wording of conditions relating to biodiversity offsetting obligations to reflect biodiversity credits only rather than the currently approved biodiversity offset strategy and a modification to biodiversity offsetting requirements commensurate with the proposed reduction in disturbance.

While there are five components that are proposed for modification, the operations at the Quarry would remain generally consistent with those approved under SSD 6084 and in some instances, as was approved in the original 1994 development consent for the operation. Each of the components of the proposed modifications is described in the following subsections including the background and summary of the proposed changes to the existing approved operations.

#### 3.2 OVERVIEW OF THE PROPOSED MODIFICATIONS

**Figure 3.1** displays the proposed Quarry Site layout and identifies the proposed boundaries for the extraction area and the overburden emplacement, as well as the rehabilitated land that would no longer be disturbed. **Table 3.1** presents a summary of the components or activities approved under SSD 6084 and an overview of the proposed modifications. The relevant section in the SoEE where the issue is discussed is also provided.



**Note:** Some boundaries are coincident

- REFERENCE
- Quarry Site Boundary
  - - - Extraction Boundary
  - - - Overburden Emplacement Area Boundary
  - Rehabilitated Area (Offset for Clarity)

SCALE 1:12 000 (A4)



Quarry Plan Source: Groundwork Plus - December 2017  
 Base Photograph Source: CEH Survey - May 2017 & Google Earth - October 2016 (surrounds)

Figure 3.1  
 PROPOSED QUARRY LAYOUT

**Table 3.1**  
**Overview of the Approved and Proposed Activities**

Page 1 of 2

| <b>Component or Activity</b>   | <b>Approved Operation</b>   | <b>Proposed Modifications</b>  | <b>Relevant SoEE Section</b> |
|--|---|--|------------------------------|
| Area of Disturbance for the Extraction Area and Overburden Emplacement | Approximately 41.7ha  | Approximately 37.4ha, a total reduction of 4.3ha   | Figure 3.1<br>3.6            |
| Duration of Approval   | 30 June 2050  | No Change  | 3.4                          |
| Maximum Annual Sales Level   | 1.1 Million tpa   | 1.6 Million tpa  | 3.4                          |
| Extraction Area  | An area of 28.2ha to an elevation of 685m AHD                                 | Reduced by 3.0ha (including 1.2ha of previously rehabilitated land) to a total of 25.2ha.<br>Retain extraction to an elevation of 685m AHD | 3.6                          |
| Overburden Emplacement   | Approximately 13.5ha to an elevation of 810m AHD                              | Reduced by 1.3ha to a total of 12.2ha. Minor increase in final elevation to 830m AHD, consistent with surrounding landscape.               | 3.6                          |
| Method of Extraction   | Drilling / blasting and load and haul to Primary Crushing Station             | No Change  | 2.1.3                        |
| Secondary Processing Operations  | Four stage crushing and screening plant and air separator - throughput 400tph | No Change  | 2.1.3,<br>2.1.4              |
| Product Stockpiling within the secondary processing area               | Stockpile capacity = 80 000t  | No Change  | 2.1.5                        |
| Hours of Operations for Extraction and Processing Activities           | Mon-Fri: 6:00am-10:00pm<br>Saturday: 7:00am-3:00pm                            | No Change  | 2.1.8, 3.5                   |
| Blasting   | Mon-Fri: 10:00am-3:00pm   | No Change  | 2.1.8, 3.4                   |
| Loading Product Trucks and Despatch Hours of Operation                 | Mon-Fri: 5:00am-10:00pm<br>Saturday: 5:00am-3:00pm                            | Mon-Fri: 4:00am-10:00pm<br>Saturday: No Change   | 3.5                          |
| Yorkeys Creek stockpile area   | Area = 4.4ha<br>Capacity = 750 000 tonnes                                     | No Change  | 2.1.5                        |
| Quarry Access Road   | 3.1km in length sealed  | No Change  | 2.1.7                        |
| Maximum Product Transportation   | 1.1 Million tpa   | 1.6 Million tpa  | 3.4                          |
| Daily Truck Loads  | Average 150<br>Maximum 250  | Average 200<br>Maximum 300   | 3.4                          |
| On-site Administration and Amenities                                   | Site Office, two weighbridges, workshops, stores and amenities                | No Change  | 2.1.12                       |

**Table 3.1 (Cont'd)**  
**Overview of the Approved and Proposed Activities**

Page 2 of 2

| <b>Component or Activity</b>                         | <b>Approved Operation</b>  | <b>Proposed Modifications</b>  | <b>Relevant SoEE Section</b> |
|--|--|--|------------------------------|
| Services<br>Diesel<br>Telecommunications<br>Sewerage | Annual Usage = 1.2 million litres<br><br>1 line<br>Biocycle Unit (30 persons)  | Annual Usage = Approximately 1.8 million litres<br>No Change<br>No change  | 2.1.12,<br>3.4               |
| Water Management System                              | Includes a series of sediment basins, sumps, clean water dams, clean water diversions and drains to manage the capture and storage of surface water runoff and minimise the potential for uncontrolled discharge to the Coxs River.  | No change to the approved water management system.   | 2.1.10,<br>5.6.2             |
| Rehabilitation                                       | Revegetation of terminal extraction benches.<br>Temporary measures to ensure erosion and sediment control.<br>Monitoring for the success of revegetation and erosion control.<br>Final landform suitable for passive biodiversity conservation (woodland / forest vegetation) and minor grazing.<br>Removal of all buildings, infrastructure and stockpiles. | Final landform design would be modified based on updated Quarry design.<br>No change to rehabilitation objectives, proposed final land use or rehabilitation methods.  | 2.1.13,<br>3.8               |
| Biodiversity Offsetting                              | Approved Biodiversity Offset Area covering 93.4ha to retire a total of 902 ecosystem credits for three vegetation communities and 11 092 species credits for the Silver-leaved Mountain Gum.   | Remove reference to the Biodiversity Offset Area in the conditions of consent and refer only to credit obligations.<br>A reduction in the total disturbance resulting in obligations to retire 840 ecosystem credits for three vegetation communities and 10 784 species credits for the Silver-leaved Mountain Gum. | 3.7                          |

### 3.3 APPROVALS REQUIRED

The following conditions of SSD 6084 are sought to be modified under the proposed modifications.

- Condition 2 of Schedule 2 to reference that Hy-Tec would need to carry out the Stage 2 Extension Project also in accordance with this SoEE.
- Condition 8 of Schedule 2 to update annual and daily product despatch levels.
- Consider removal of Condition 9 and Condition 10 of Schedule 2 as development consent DA 103/94 was surrendered on 15 September 2016.

- Condition 18 of Schedule 2 to re-survey and mark the modified extraction limits.
- Condition 1 of Schedule 3 to present the modified hours of operation.
- Condition 10 of Schedule 3 to update the approved criteria for annual average PM<sub>10</sub> to be consistent with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (EPA, 2016).
- Condition 25 and Condition 26 of Schedule 3 to reflect the proposed submission of an updated Biodiversity Offset Strategy to satisfy the biodiversity credit requirements and the need to secure the Biodiversity Offset Strategy within 2 years of approval of the Biodiversity Offset Strategy.
- Updating the Statement of Commitments provided as Appendix 3 of SSD 6084 to remove commitments that are no longer relevant or that are covered by other conditions of consent.
- Appendix 4 of SSD 6084 be replaced by **Figure 3.4** and **Figure 3.5**.
- Appendix 6 be removed from SSD 6084.

In addition, the controlled activity approval provided under EPBC 2013/6967 would need to be varied to reflect the reduced impact to the Silver-leaved Mountain Gum and any revised approach to satisfying offsetting obligations for this species.

No modification to the Scheduled Activity specified in EPL 12323 would be required as the operation would remain within the existing scale of 500 000t to 2 000 000t of material extracted, processed or stored. Condition L6.2 of EPL 12323 would need to be modified to describe the proposed commencement of “loading and unloading of trucks and transport to and from the premises at 4:00am”.

### 3.4 ANNUAL PRODUCTION AND PRODUCT DESPATCH LEVELS

The demand for the Quarry products used in the manufacture of concrete, preparation and management of construction sites, road construction, rail works, and landscaping has increased since the preparation of the 2014 EIS (RWC, 2014) and is unlikely to decrease in the foreseeable future. In addition, hard rock resource supplies within the Sydney metropolitan area have been diminishing with operations reducing supply as they reach closure and/or exhaustion of reserves.

As a result of the increasing demand and diminishing supply of hard rock products for the Sydney market, the demand for products from the Quarry is such that Hy-Tec management are now actively limiting production to ensure that the approved annual product despatch limit of 1.1Mtpa is not exceeded. It is considered that an annual limit of 1.6Mtpa would more closely reflect the current and expected future demand for the products from the Austen Quarry.

It is therefore proposed that Condition 8 of Schedule 2 of SSD 6084 be modified to reflect annual sales of 1.6Mtpa with laden truck movements increased accordingly. **Table 3.2** presents the proposed change to annual production and associated product truck despatch limits compared to existing limits.



**Table 3.2**  
**Existing and Proposed Annual Sales and Product Transport Levels**

| Limit                                       | Current Approval   | Proposed           | Percentage Change |
|---|--------------------|--------------------|-------------------|
| Annual quantity transported from Quarry     | 1.1 million tonnes | 1.6 million tonnes | 45.5%             |
| Daily Maximum Laden Truck Loads Despatched  | 250                | 300                | 20.0%             |
| Daily Average Laden Truck Loads Despatched* | 150                | 200                | 33.3%             |

\*Averaged over one calendar month.

Hy-Tec is continually researching methods to optimise truck movements from the Quarry with new capabilities with truck capacity and safety enabling more efficient operations. Hy-Tec is satisfied that a 33% increase in average daily truck levels will be sufficient to manage the larger quantity (45%) of products transported from the Quarry.

The proposed changes to the limits on products despatched from the Quarry each year and the daily product transport levels would result in changes to the following related matters.

- Employment of transportation contractors would increase from 45 to an estimated 60 contractors. Operational positions may also increase if it is decided to expand the afternoon and evening roster. For the purpose of assessment, it has been assumed that nine additional local full-time operational staff would be employed once the Quarry reaches the proposed maximum annual sales.
- Annual diesel usage would increase from 1.2 million litres per year to approximately 1.8 million litres per year.
- Extraction would occur at a faster rate and therefore approved impacts through vegetation clearing and potential aquifer interference may occur sooner, however progressive rehabilitation of areas no longer required for operations would also commence sooner. It should be noted that although these impacts would occur sooner, the quantum of the impact would remain consistent with the existing approved operation. That is, there are no significant changes to impacts to biodiversity (see Section 5.5.4) or to groundwater resources (see Section 5.6.2)

Similarly, the following activities that are inter-related with the rate of production and product despatch would not change under the proposed modifications.

- There would be no changes to the existing access to the Quarry, the existing transport route and Drivers Code of Conduct or the heavy truck types used for product despatch.
- There are no proposed changes to the existing approved methods of extraction or to the processing or stockpiling activities described in Section 2.1.4 and Section 2.1.5.
- There are no proposed changes to the approved blasting frequency i.e. no more than one blast per calendar week. All blasts will remain within the approved criteria limits for airblast overpressure and ground vibration at any privately-owned residence.

- It is proposed that the approved Quarry life to 30 June 2050 be retained. Production is dependent on the continued demand from customers and the construction industry. Any changes to the proposed completion of approved extraction activities would result in Hy-Tec progressing to closure and rehabilitation sooner, or in the event that additional reserves are proven, a new development consent is obtained to extend the operational life of the Quarry.

During consultation for the proposed modifications, the concerns of the landowners of the Glenroy property located on Lot 10 DP 830372 adjacent to the Glenroy Bridge were raised in discussions with Council and the HDPa and in a meeting with the landowners of this property on 7 February 2018 (as described in Section 1.7.2 and summarised in **Appendix 3**). In particular, the noise generated by trucks crossing the Glenroy Bridge was raised as a concern. It should be noted that in late 2012, Hy-Tec paid for the removal of raised sections at the approaches to the Glenroy Bridge caused by the misalignment of the bridge deck and its approaches. This work has noticeably reduced impact noise when trucks leave the bridge when travelling both southwards and northwards.

During the meeting with the landowners of the Glenroy property, they acknowledged that road noise impacts experienced in this location were not caused exclusively by Hy-Tec contracted drivers. The landowners also informed the Hy-Tec representatives that trucks travelling at a speed of 40km/hr generally did not cause intrusive noises, the noise impacts were perceived to come from trucks travelling at higher speeds. A brief summary of the issues discussed in the meeting and the outcomes are provided in **Appendix 3**.

As a result of that meeting additional mitigation measures were proposed that included the following.

- Planting of trees to screen the view of Jenolan Caves Road from the property and to act as a noise barrier. The timing and suitable species for use in this process would be agreed with the landowners.
- Hy-Tec has agreed to contact RMS to formally request RMS consider reducing the speed limit on the bridge and the approaches to the Glenroy Bridge to 40km/hr. If this is not possible, it would be recommended that advisory speed signs be modified to reflect 40km/hr in this location.
- Regardless of the result of consultation with the RMS, Hy-Tec will advise all transport contractors that they are to limit their speed on this section of Jenolan Caves Road to 40km/hr, where it remains safe to do so.
- Hy-Tec has agreed to contact the operators of the Oberon Quarry and other known sources of heavy vehicles on Jenolan Caves Road to request that these operations instruct vehicle drivers to show consideration for residents at the property and, if feasible, reduce heavy vehicles speeds to 40km/hr at this location.
- Hy-Tec would also investigate noise mitigation at this property, such as double-glazing or shuttering of windows.

The approved Noise Management Plan for the Quarry includes a program of noise monitoring that incorporates quarterly attended monitoring at the Glenroy Property. Longer term unattended monitoring is currently undertaken annually at the residence closest to the Quarry

(Residence 31 or Location B – see **Figure 4.1**). To inform ongoing management of transport activities, Hy-Tec would include the Glenroy property in the annual unattended monitoring program. Unattended monitoring would be undertaken for a period of two years with ongoing monitoring reviewed in light of the results of monitoring and comparison with truck despatch from the Austen Quarry. Should noise impacts be occurring as a result of trucks other than those contracted to Hy-Tec, these results would be identified in the relevant compliance monitoring reports and discussed with DPE and the landowners.

It should be noted that since the initial consultation program and the meetings with Council, the HDPa and with the owners of the Glenroy property, RMS has undertaken a program of road maintenance on the Glenroy Bridge that includes resurfacing of the road surface at the bridge (undertaken on 8 February 2018). This is likely to have improved road noise at this location. RMS has also confirmed that it is in the process of reinstalling signs warning heavy vehicles to limit compression braking at this location.

### **3.5 MORNING PRODUCT DESPATCH HOURS**

Hy-Tec has recently received feedback from transport contractors and Hy-Tec personnel that peak traffic hours for vehicles travelling towards Sydney on the Great Western Highway and through western Sydney are occurring earlier in the mornings. This is assumed to be attributable to more people in the Lithgow and Blue Mountains local government areas commuting towards Sydney each morning for work.

Hy-Tec plans its transport activities, where possible, to ensure the efficiency of despatch and to limit potential congestion impacts on the local and regional road network. However, it is apparent that commencing product transport activities earlier in the day would increase the efficiency of Hy-Tec operations and possibly reduce the contribution of product transport trucks to peak hour delays. This would help reduce the impact of the traffic build up between Lithgow and the approach to Mt Victoria as well as at other locations where delays are common along the Great Western Highway.

All transportation operations at the Austen Quarry are undertaken by independent contractors, and from the perspective of these contractors, commencing product despatch earlier in the day and avoiding traffic delays where possible, allows drivers to more effectively run their businesses and to maximise the number of journeys during busy periods. As these contractors are paid for each load and the distance travelled, the ability to complete more journeys in one day improves the efficiency of their operations. By reducing the time spent idling in traffic, the fuel consumption and cost-efficiency of truck maintenance is also improved. Many of the transport contractors employed by Hy-Tec are based locally to the Quarry and this efficiency would provide direct benefits to local families and available disposable income for these employees.

It is anticipated that a return journey for a truck departing the Quarry between 4:00am and 5:00am would be one to one and a half hours less than a truck departing after 5:00am. The truck would return to the Quarry for a second trip between 9:00am and 10:00am with this second journey also likely to occur outside the key peak hours of 7:30am to 9:30am. It would be likely that these trucks would be returning to the Quarry against the traffic during the peak hours and therefore would not contribute to traffic delays in an easterly direction.

It is proposed to commence truck loading and product despatch activities from 4:00am on week days. There would be no change to truck loading and product despatch on a Saturday. There are

no other changes to the proposed hours of operation, with extraction and processing operations as well as overburden and product stockpiling activities not commencing until the currently approved time of 6:00am. From an operational perspective, use of the various components of the processing plant would be the most significant noise source for the operation. **Table 3.3** provides a summary of proposed operating hours.

**Table 3.3**  
**Proposed Hours of Operation**

|   | <b>Monday to Friday</b> | <b>Saturday</b>  | <b>Sundays / Public Holidays</b> |
|---|-------------------------|------------------|----------------------------------|
| Blasting  | 10:00am to 3:00pm       | No Activity      | No Activity                      |
| Extraction Operations<br>Processing Operations<br>Overburden Management<br>Stockpile Management | 6:00am to 10:00pm       | 6:00am to 3:00pm | No Activity                      |
| Loading Trucks and<br>Product Despatch  | 4:00am* to 10:00pm      | 5:00am to 3:00pm | No Activity                      |
| Maintenance   | 24 hours/day – Any day  |                  |                                  |
| * The only proposed change to operating hours   |                         |                  |                                  |

Concerns regarding the earlier starting hours for product loading and despatch was raised in discussions with Council, the HDPa and the landowners of the Glenroy property. However, the key focus of the issues raised was the potential for sleep disturbance at the Glenroy property caused by the short term high level noise caused by vehicles crossing the bridge. It is anticipated that these issues would largely be resolved through the mitigation measures proposed in Section 3.4 and that ongoing monitoring would draw attention to ongoing impacts. The landowners acknowledged Hy-Tec’s proactive approach to management of the issue.

It should be noted that proposed change to operating hours for product loading and despatch would not change the extent of any potential impact, only the time during the day at which it may occur. Where these impacts may result from Hy-Tec contractors, they would be largely mitigated, or would result in disciplinary action from Hy-Tec. As Jenolan Caves Road is a state road, it is used as a major arterial for a variety of operations and at all hours of the day and night.

### **3.6 QUARRY EXTRACTION AND OVERBURDEN EMPLACEMENT BOUNDARY**

As operations within the approved Stage 2 extraction area have progressed, it has been observed that lower volumes of overburden material are being produced than were predicted in the 2014 EIS (RWC, 2014). Estimates of overburden volumes were made based on the results of the exploration drilling program with the results in each of the drilled holes extrapolated to infer resource and overburden volumes. While this process provides sufficient accuracy for operational planning, it may not identify areas where weathered material is reduced or in some cases present in greater volumes. In addition, a greater volume of overburden and the scalps and fines material that would normally have been placed in the overburden emplacement, has been sold as product for road works and other projects. This further reduces the volume of material placed annually in the overburden emplacement. As a result, the overburden emplacement has not been developed as predicted and Hy-Tec has concluded that this area can reasonably be reduced in size.

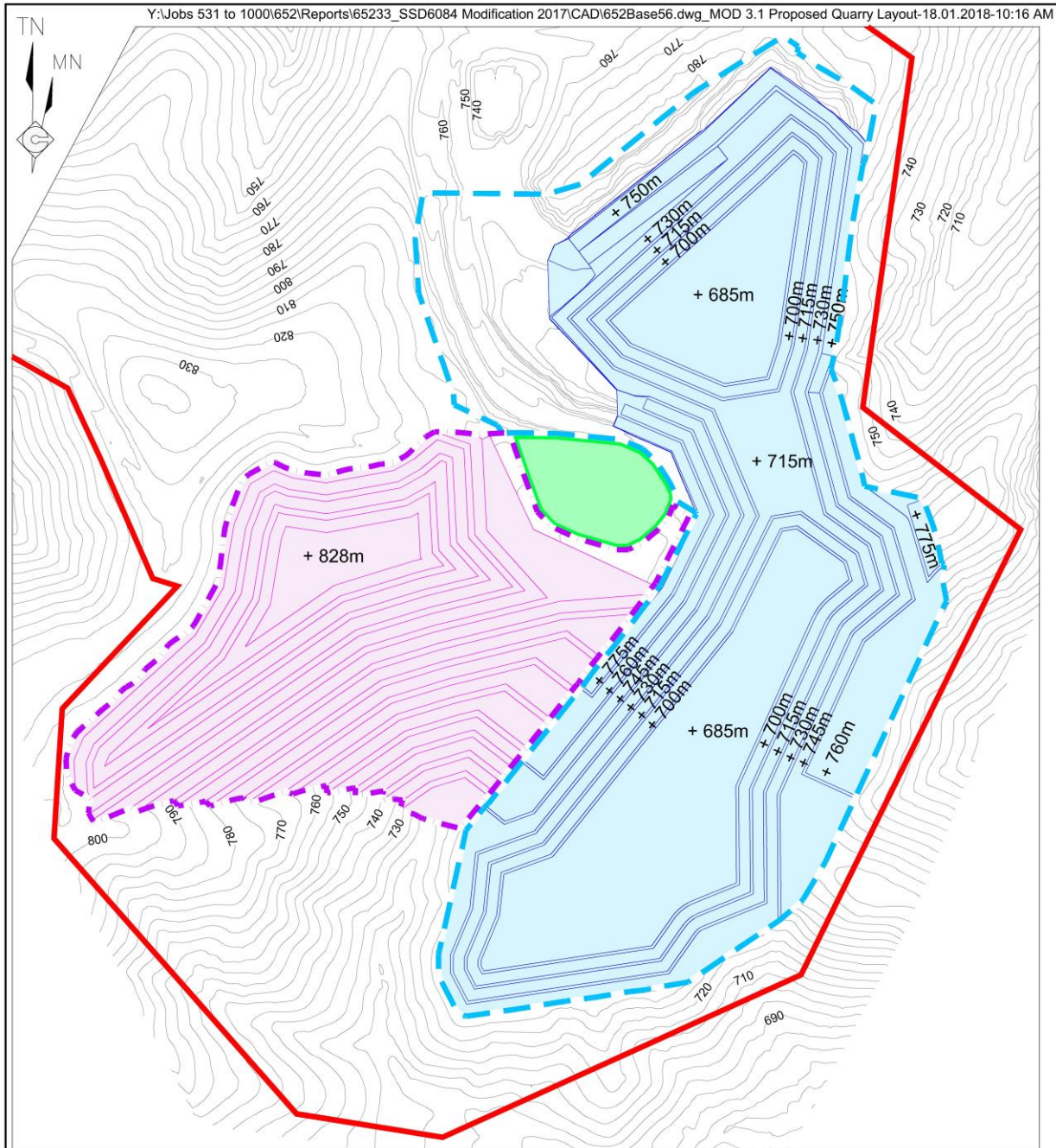
In reviewing the disturbance required for the overburden emplacement, it has also been determined that a 1.2ha area that was previously rehabilitated and was to be extracted under the Stage 2 Extension Project will in fact be conserved. However, conserving this land requires a minor realignment of the approved extraction area to improve safety in areas where the extraction area narrows. The resulting changes to these boundaries results in an overall reduction in the area to be disturbed for the Stage 2 Extension Project of 4.3ha. **Figure 3.2** displays the proposed extraction area and overburden emplacement.

In summary, the component areas of Quarry would be modified as follows.

- The extent of the extraction area would be reduced along the western boundary while the eastern boundary would be realigned to improve safety at narrow areas. The overall change would be a reduction of 3.0ha.
- The overburden emplacement would be reduced by a total of 1.3ha through removal of the southern section and lateral extension to the east into what would formerly have been the extraction area.
- An area of 1.2ha (formerly part of the extraction area) to the west of the extraction area that has been revegetated and is habitat for revegetated Silver-leaved Mountain Gum would be conserved.

The proposed modification to the extraction boundary and the proposed increase in annual production would modify the approved sequence of development. **Figure 3.3** presents the proposed sequence of extraction and **Table 3.4** presents the anticipated rhyolite extraction and overburden production for each stage of the development. It is noted that predictions of overburden production for each stage would depend on the volume of material that may be sold during that stage, however Hy-Tec is confident that the proposed extent of the overburden emplacement would be sufficient for the total volume of overburden that would need to be emplaced.

The total volume of predicted rhyolite extraction would increase due to the realignment of the extraction area and larger volume of material, formerly considered overburden, that is now sold as product. The approach taken to planning the design of the Quarry is more economical and therefore a higher volume of saleable product would be generated in what is a smaller disturbance area (in terms of total disturbance). This is a factor of the existing design and operational controls to mitigate and manage geological geotechnical and operational risk (see Section 2.1.2) and is approved under the conditions of SSD 6084. Progressive operational plans may result in different final volumes to those presented in **Table 3.4**, however this information provides an indication of the general approach to progressive extraction.



**Note:** Some boundaries are coincident and are offset for clarity

- REFERENCE
- Quarry Site Boundary
  - Extraction Area Boundary
  - Overburden Emplacement Area Boundary
  - Rehabilitated Area (Offset for Clarity)
  - Existing Contour (mAHD)(Interval = 5m)
  - Design Contour
  - + 685m Spot Height (mAHD)

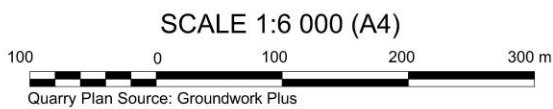


Figure 3.2  
 PROPOSED EXTRACTION AREA  
 AND OVERBURDEN EMPLACEMENT

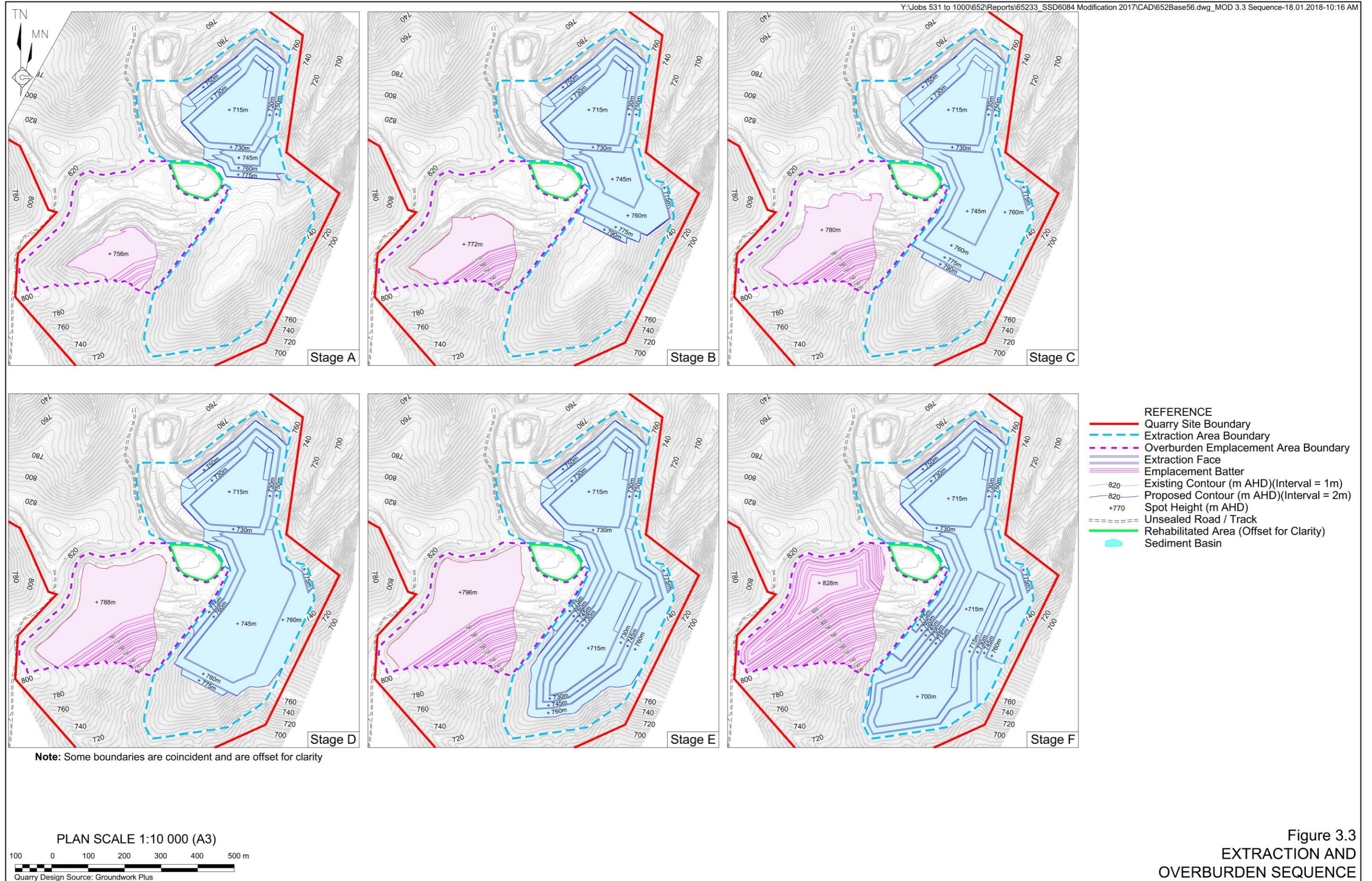


Figure 3.3  
EXTRACTION AND  
OVERBURDEN SEQUENCE

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**Table 3.4**  
**Rhyolite and Overburden Production**

| Extraction Stage | Total (bcm)       | Rhyolite <sup>1</sup> |                   | Overburden <sup>2</sup> |                  |
|------------------|-------------------|-----------------------|-------------------|-------------------------|------------------|
|                  |                   | bcm                   | t                 | bcm                     | t                |
| A                | 1 960 000         | 1 764 000             | 4 586 400         | 196 000                 | 392 000          |
| B                | 1 350 000         | 1 215 000             | 3 159 000         | 135 000                 | 270 000          |
| C                | 3 275 000         | 2 947 500             | 7 663 500         | 327 500                 | 655 000          |
| D                | 2 220 000         | 2 064 600             | 5 367 960         | 155 400                 | 310 800          |
| E                | 3 045 100         | 2 831 943             | 7 363 052         | 213 157                 | 426 314          |
| F                | 5 033 700         | 4 681 341             | 14 171 487        | 352 359                 | 704 718          |
| G                | 1 986 600         | 1 748 208             | 4 545 341         | 238 392                 | 476 784          |
| <b>Total</b>     | <b>18 870 400</b> | <b>17 252 592</b>     | <b>44 856 739</b> | <b>1 617 808</b>        | <b>3 235 616</b> |

bcm = bank cubic metres  
Note 1: In situ density = 2.6t/m<sup>3</sup>  
Note 2: In situ density = 2.0t/m<sup>3</sup>  
Source: Groundwork Plus

**Table 3.5** presents a comparison of material production predicted in the 2014 EIS (see Table 2.2 of RWC (2014)) and the predicted production under the proposed modifications. It is noted that even with an increase to total saleable product of more than 8Mt due to the ongoing sale of material formerly considered overburden, it is predicted that the total quantity of rhyolite within the extraction area would be extracted before 30 June 2050, the limit to the Quarry life nominated in Condition 7 of Schedule 2 of SSD 6084.

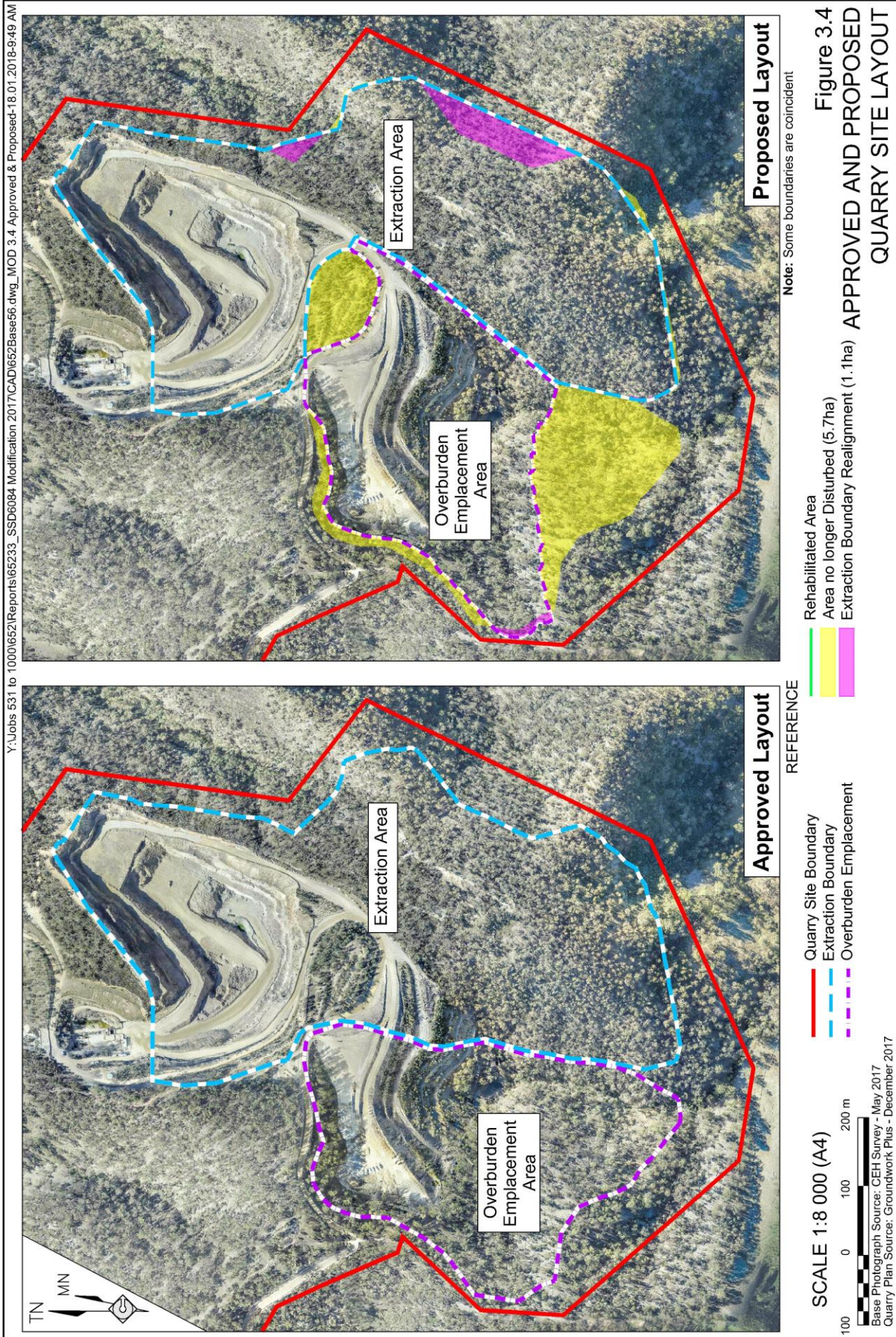
**Table 3.5**  
**Existing Approved Production and Proposed Production**

|                         | Units | Existing Approved Production | Proposed Production | Change in Production |
|-------------------------|-------|------------------------------|---------------------|----------------------|
| Total                   | bcm   | 16 380 000                   | 18 870 400          | +2 490 400           |
| Rhyolite <sup>1</sup>   | bcm   | 14 157 500                   | 17 252 592          | +3 096 092           |
|                         | t     | 36 809 000                   | 44 856 739          | +8 047 739           |
| Overburden <sup>2</sup> | bcm   | 2 222 500                    | 1 617 808           | -604 692             |
|                         | t     | 4 445 000                    | 3 235 616           | -1 209 384           |

bcm = bank cubic metres  
Note 1: In situ density = 2.6t/m<sup>3</sup>  
Note 2: In situ density = 2.0t/m<sup>3</sup>  
Source: Groundwork Plus

**Figure 3.4** displays a comparison of the approved and proposed extraction area and overburden emplacement boundaries. This figure highlights the areas that would no longer be disturbed for Quarry operations and the areas where some minor additional disturbance would be needed.

It is considered that the total reduction in area to be disturbed provides an overall benefit to native vegetation (through reduced clearing) in the vicinity of the Quarry.



The proposed modifications to the boundaries of the extraction area and overburden emplacement would result in changes to the areas of native vegetation that would need to be cleared for the Stage 2 Extension Project and to the biodiversity offsetting obligations required for the Stage 2 Extension Project. These matters are described in Section 3.7 and considered in more detail in Section 5.3.

The proposed modifications to the boundaries for the extraction area and overburden emplacement would also change the shape and design of the final landform, however rehabilitation methods, monitoring and the proposed final land use would not change. The updated final landform is described in more detail in Section 3.8.

The proposed modifications to the boundaries for the extraction area and overburden emplacement would not require any change to the blast frequency or the approved methods of extraction. In addition, there would be no changes to the configuration or management of sediment basins, drains and diversions approved under SSD 6084.

### **3.7 BIODIVERSITY OFFSETTING**

Hy-Tec has continued to investigate its options to secure biodiversity offsetting obligations in accordance with the relevant legislation, guidelines and policies. A proposal to secure the approved Biodiversity Offset Area under a Nature Conservation Trust Agreement, in accordance with the *Nature Conservation Trust Act 2001* was approved under the Landscape and Rehabilitation Management Plan for the Quarry. However, following the commencement of the *Biodiversity Conservation Act 2016* and *Biodiversity Conservation Regulation 2017* on 25 August 2017, the *Nature Conservation Trust Act 2001* was repealed, and this option is no longer available. The deadline to secure the approved biodiversity offset area and satisfy biodiversity offsetting obligations resulting from the approval of the Stage 2 Extension Project is currently 15 September 2018.

Hy-Tec has been reviewing the options available under the Biodiversity Offsets Scheme and considers that the wording of Condition 25 of Schedule 3 of SSD 6084 currently limits the options available to Hy-Tec to satisfy its offsetting obligations. It is noted that the Biodiversity Offsets Scheme provides the following options to meet offset obligations.

- Retiring credits based on the like-for-like rules.
- Funding a biodiversity conservation action that benefits the threatened entity impacted by the development.
- Committing to deliver ecological rehabilitation in accordance with the ancillary rules for ecological rehabilitation. This option is currently only available to State significant mining projects.
- Making a payment to the Biodiversity Conservation Fund calculated using the offset payments calculator.

Further to this, credits may be retired based on the like-for-like rules through a dedicated biodiversity offset area or through purchase and retirement of credits purchased on the open market. It is considered more appropriate that Condition 25 of Schedule 3 of SSD 6084 refer only to the biodiversity credits required to be retired as result of the Stage 2 Extension Project.

As described in Section 3.6, Hy-Tec is proposing an overall reduction of the extraction area and the overburden emplacement by 4.3ha. This modification would reduce the total area of native vegetation clearing required under the Stage 2 Extension Project by approximately 2.3ha, however this does not include an approximately 2.0ha area that was the subject of revegetation and was assessed separately by Niche EH for the 2014 EIS. Due to the proposed minor realignment of the extraction area, impacts would increase on the eastern edge of the extraction area but decrease elsewhere where the extent of the overburden emplacement is decreased. Niche Environment and Heritage Pty Ltd (Niche EH) prepared the Terrestrial Ecology Assessment for the Stage 2 Extension Project (Niche EH, 2014) and has been commissioned to assess the proposed biodiversity credits required to be offset to satisfy the offsetting obligations associated with total vegetation clearing of 24.2ha under the proposed modifications. The results of the Niche EH assessment are provided in full as **Appendix 5**.

In summary, changes for the specific vegetation communities and the Silver-leaved Mountain Gum would be as follows.

- An overall increased disturbance of 0.8ha for HN570: Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion and a final requirement to offset 649 ecosystem credits.
- An overall decreased disturbance of 2.5ha for HN527: Forest Red Gum - Yellow Box woodland of dry gorge slopes, southern Sydney Basin and South Eastern Highlands Bioregion and a final requirement to offset 131 ecosystem credits.
- Decreased disturbance of 0.6ha for HN501: Apple Box - Broad-leaved Peppermint dry open forest of the Abercrombie-Tarlo area, South Eastern Highlands Bioregion and a final requirement to offset 60 ecosystem credits.
- The number of Silver-leaved Mountain Gum plants that would be removed is reduced from 721 individuals to 701 individuals and a final requirement to offset 10 784 species credits.

The final offsetting requirements for ecosystem credits includes credits to offset a 10m buffer area adjacent to any vegetation clearing to account for unexpected impacts. This is consistent with the methodology applied for the 2014 Terrestrial Ecology Assessment (Niche EH, 2014).

It is therefore proposed that Condition 25 and Condition 26 of Schedule 3 of SSD 6084 be modified to the following.

*Biodiversity Offset Strategy*

*25. By 30 June 2018, the Applicant must submit a Biodiversity Offset Strategy, prepared in consultation with the OEHL, for the retirement of ecosystem and species credits as set out in Table 5, to the satisfaction of the Secretary.*

Table 5: Biodiversity credits to be retired

| <b>Credit Type</b>  | <b>Number of Credits</b> |
|---|--------------------------|
| <b>Ecosystem Credits</b>  |                          |
| HN570: Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands | 649                      |
| HN527: Forest Red Gum - Yellow Box woodland of dry gorge slopes, southern Sydney Basin and South Eastern Highlands    | 60                       |
| HN501: Apple Box - Broad-leaved Peppermint dry open forest of the Abercrombie-Tarlo area, South Eastern Highlands     | 131                      |
| <b>Species Credits</b>  |                          |
| Silver-leaved mountain gum ( <i>Eucalyptus pulverulenta</i> )   | 10 784                   |

#### Security of Offsets

26. Within 2 years of approval of the Biodiversity Offset Strategy, unless otherwise agreed with the Secretary, the Applicant shall make suitable arrangements to provide appropriate long-term security for the Biodiversity Offset Strategy, to the satisfaction of the Secretary.

*Note: Mechanisms to provide appropriate long term security to the land within the Biodiversity Offset Strategy in accordance with the NSW Biodiversity Offset Policy for Major Projects 2014, including a Biobanking Agreement, Voluntary Conservation Agreement or an alternative mechanism that provides for a similar conservation outcome. Any mechanism must remain in force in perpetuity.*

It should be recognised that the Niche EH (2014) Terrestrial Biodiversity Assessment identified that the majority of Silver-leaved Mountain Gum plants that would be removed under the Stage 2 Extension Project were plants that had been successfully planted by Hy-Tec and were included in rehabilitation and landscaping works at the Quarry. There is no mechanism under existing guidelines for biodiversity assessment for separate treatment of threatened flora successfully propagated and later removed. This provides little incentive for proponents such as Hy-Tec to proactively include these plants in rehabilitation works. It should be acknowledged that the proposed biodiversity obligations for the Stage 2 Extension Project would include requirements to retire 10 784 species credits for the Silver-leaved Mountain Gum of which approximately 9 398 credits have resulted from impacts to plants successfully planted by Hy-Tec.

An updated Biodiversity Offset Strategy would include the mechanism proposed by Hy-Tec to secure and retire credits in accordance with any modified conditions of consent. While Hy-Tec maintains that the currently approved Biodiversity Offset Area would provide a suitable location for an on-site offset, the feasibility of purchasing both ecosystem and species credits on the open market to satisfy the biodiversity credit obligations has been investigated. Niche EH has reviewed the availability of suitable credits and would act as a broker for the trade of biodiversity credits in this regard. It is acknowledged that there has not yet been a sale of biodiversity credits for the credit type *HN570: Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands* or for the Silver-leaved Mountain Gum. Therefore, alternative options are likely to be considered for these credit types consistent with the options available under the Biodiversity Offsets Scheme. Hy-Tec would continue to consult with DPE and the Office of Environment and Heritage to develop a suitable offsetting strategy for these credit types.

It is also acknowledged that offsetting requirements under the controlled activity approval EPBC 2013/6967 would need to be satisfied. Once the variation to EPBC 2013/6967 is

finalised, the DoEE would be further consulted during preparation of a Biodiversity Offset Strategy and any updates to management plans required under the approval, to ensure that Hy-Tec is satisfying its offsetting requirements under the EPBC Act. However, the existing program of planting between 500 and 1 000 plants of the Silver-leaved Mountain Gum over the last two years, grown at a local nursery from seed collected at the Austen Quarry, would continue and should be acknowledged in this assessment. Hy-Tec is proud of its success with revegetation of this threatened plant within the Quarry Site (in fact, the majority of biodiversity offsetting obligation for the Silver-leaved Mountain Gum was generated by removal of plants established by Hy-Tec).

### 3.8 REHABILITATION

Rehabilitation of the Quarry Site would remain generally consistent with that described in the 2014 EIS (RWC, 2014), Appendix 4 of SSD 6084 and the approved Landscape and Rehabilitation Management Plan. **Figure 3.5** and **Figure 3.6** present the proposed final landform and cross-sections of those areas that would change significantly over the life of the Quarry. The proposed changes to the extraction area would result in a slightly narrower extracted void while reduction to the overburden emplacement would reduce the areas that would require treatment and revegetation activities.

The performance indicators and completion criteria for rehabilitation activities would be consistent with those provided in Section 9.1 of the approved Landscape and Rehabilitation Management Plan and described in Section 2.1.13 and **Table 2.3**.

A comprehensive description of rehabilitation objectives, final land use, strategies for revegetation activities and erosion and sediment controls in the final landform are provided in Section 2.13 of the 2014 EIS (RWC, 2014). The approach to rehabilitation under the proposed modifications would remain generally consistent with this description and that provided in the approved Landscape and Rehabilitation Management Plan.

The progressive development of the extraction area and overburden emplacement under the proposed modifications is presented on **Figure 3.3**. The progressive development and progressive rehabilitation activities would remain consistent with the approved development, albeit within a slightly smaller area. Progressive rehabilitation would continue to focus on those areas of the Quarry Site no longer required for operations and involve the progressive revegetation of areas of disturbance through the creation of a final landform, placement of a growth medium and establishment of vegetative cover suitable for a predominantly passive biodiversity conservation land use with some integrated agricultural productivity. Progressive rehabilitation also includes replanting activities undertaken by Hy-Tec within the Quarry Site generally, such as the proactive replanting of Silver-leaved Mountain Gum as described in Section 2.2.5.

Terminal faces of the extraction area would be retained at 70° to 80° with a coating of bitumen spayed over the faces visible from vantage points to the north and northeast. The application of a bitumen coating is intended only as an interim or short-term measure to reduce adverse visual impacts until revegetated areas become effective as a screen. The long-term visual impact of the terminal faces would be progressively reduced by the establishment of vegetation on the

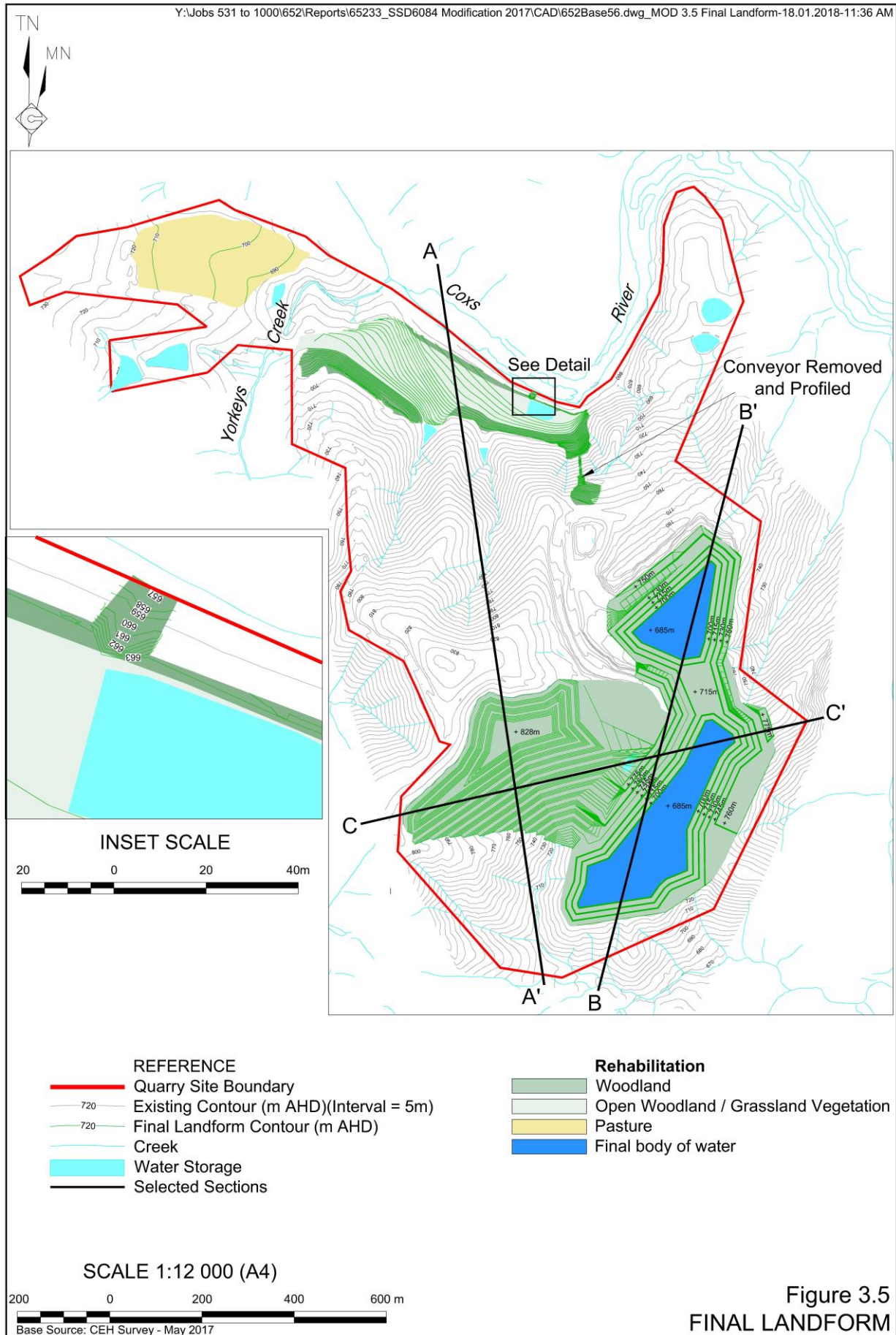
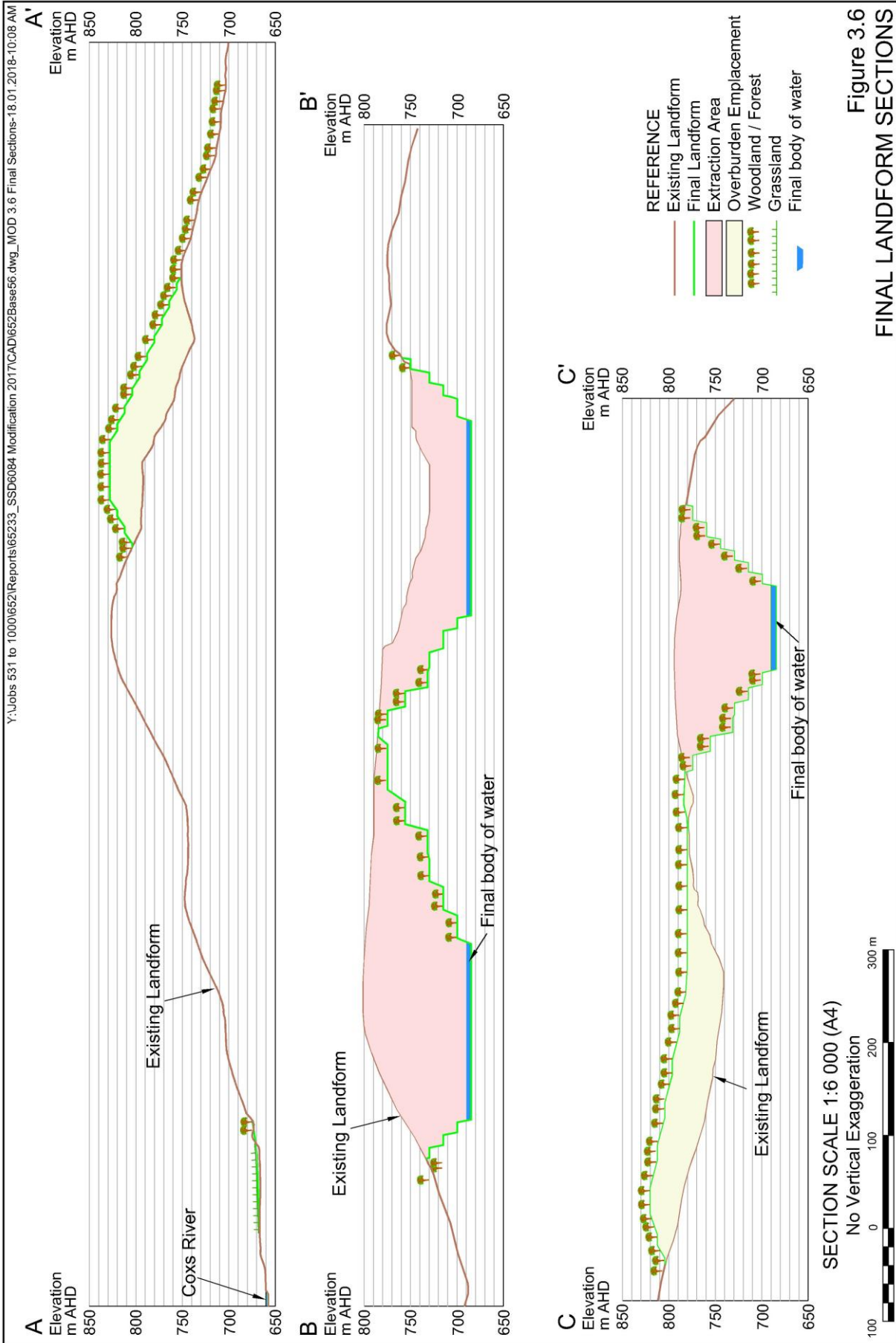


Figure 3.5  
 FINAL LANDFORM





final benches. The realigned extraction area and overburden emplacement would not result in significant changes to the outlook of vantage points to the north and northeast such as Hassan's Walls and the outlook from properties to the south and southeast of the Quarry Site. Potential visual impacts of the Stage 2 Extension Project were comprehensively assessed in Section 4.4 of the 2014 EIS (RWC, 2014). **Figure 3.6** presents cross-sections of the final landform indicating that the final overburden emplacement would be developed to an elevation of approximately 830m AHD, which is higher than the approved overburden emplacement (810m AHD). However, as demonstrated in **Figure 3.6**, this elevation is consistent with the nearby ridge and therefore would effectively blend with the surrounding landscape.

The proposed progressive development (**Figure 3.3**) and the proposed final landform (**Figure 3.5**) are not sufficiently different to the currently approved final landform to require alternative strategies for erosion and sediment control. Benches would continue to be designed to be even but slightly scarified to assist in reducing sediment movement, with all water diverted to sumps within the Quarry floor. In the rehabilitated landscape, water captured within the Quarry floor would naturally evaporate. Given the low yields recorded in groundwater monitoring bores (ranging from 0.06L/s to 17.8L/s, but typically less than 0.5L/s - see Section 5.1.2 of the WMP) it is unlikely that a permanent water feature would develop, however, rainfall runoff may be captured in the Quarry floor intermittently.

The final void would be slightly smaller than that currently approved for the Quarry due to the reduction of extraction area by approximately 3.0ha. The detailed design of the final void and terminal benches within the extraction area would continue to be subject to localised geological conditions and the optimal locations of quarry ramps or sumps. This would be determined progressively, is necessary from an operational safety perspective, reduces the possible geotechnical risks from slippages and does not influence the environmental impacts of extraction as long as extraction remains limited to the area within the proposed extraction boundary and to the approved elevation of 685m AHD.

The long-term objectives for the rehabilitation of the Quarry Site are to:

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

Finally, it should be noted that the approved Landscape and Rehabilitation Management Plan for the Quarry would be updated following determination of the modification application to reflect the realigned boundaries and updated final landform. This document would provide a comprehensive guide to progressive and final rehabilitation of the Quarry and would be subject to the approval of the DPE and ongoing review by Hy-Tec throughout the life of the Quarry.

## 4. LOCAL SETTING

### 4.1 RESIDENCES, VACANT LAND AND LAND USES

#### 4.1.1 Residences and Environmental Monitoring Locations

**Figure 4.1** displays the location of residences in the vicinity of the Quarry and the land owned by the HPC. The large landholding of HPC provides a significant buffer to neighbouring properties, i.e. typically between 1.1km and 3.3km.

Within an approximate 4km radius of the Quarry displayed in **Figure 4.1**, several individual residences are present on larger properties, including but not limited to:

- “Good Forest” – 1km southwest of the Stage 2 Site boundary;
- “Glenroy” – 2.6km north of the Stage 2 Site boundary;
- “Ecclesbourne” – 3.1km west of the Stage 2 Site boundary;
- “Ant Hill” – 3.5km southwest of the Stage 2 Site boundary;
- “Glenleigh” – 3.8km southwest of the Stage 2 Site boundary;
- “Wuthering Heights” – 2.5km south of the Stage 2 Site boundary; and
- “Duddawarra” – 2.7km south of the Stage 2 Site boundary.

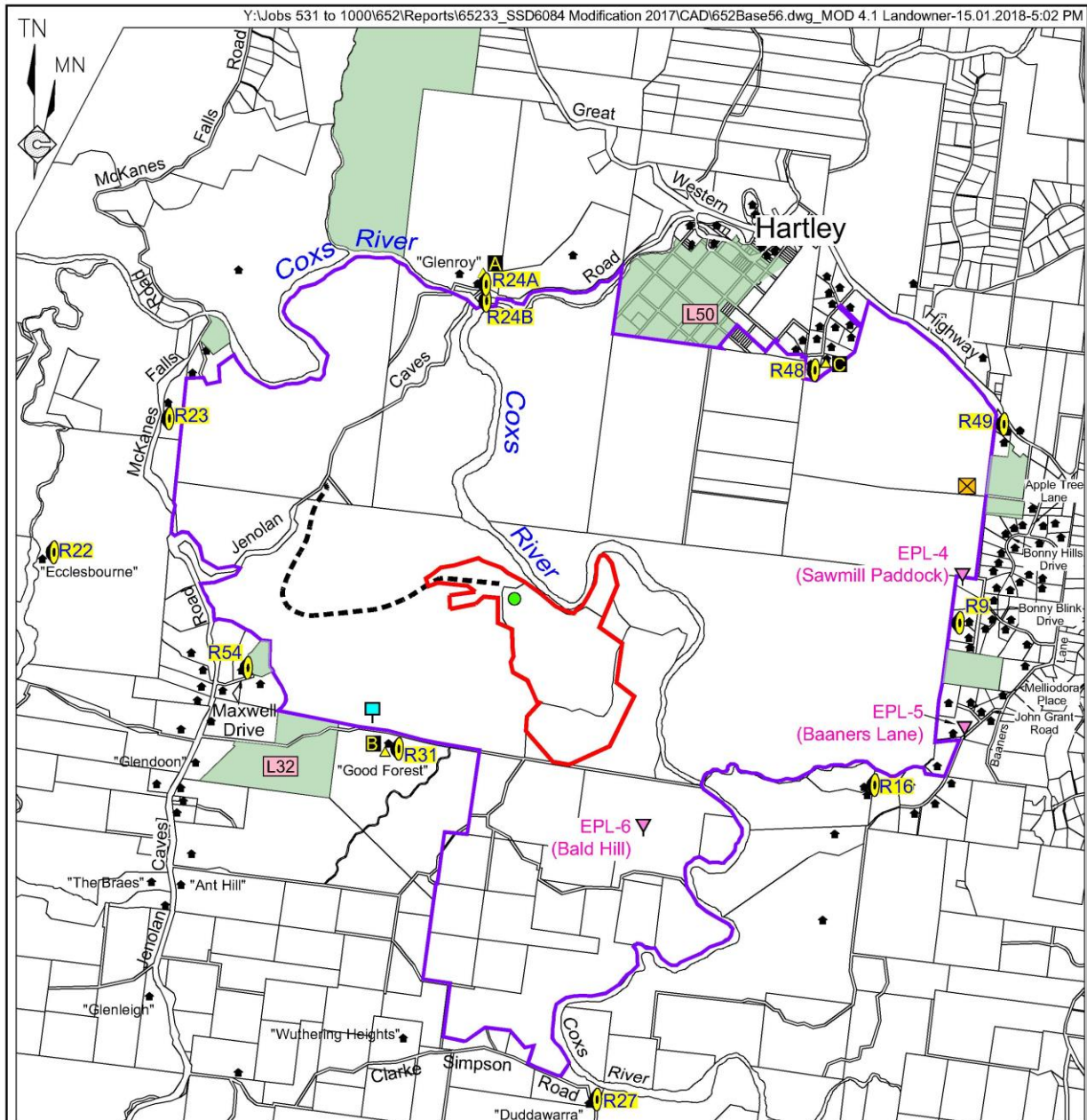
In addition, there are several areas of smaller rural holdings with residences. These are concentrated as follows.

- Residences within the village of Hartley which occur between 2.5km and 3km to the north-northeast and northeast of the extraction area.
- Baaners Lane, Apple Tree Lane, Bonny Hills Drive, Bonny Blink Drive, Melliadora Place and John Grant Road with residences between 2.9km and 4.3km to the east and east-northeast of the Stage 2 Site boundary.
- Various residences on Jenolan Caves Road to the west of the Quarry Site boundary.
- A group of three residences on McKanes Falls Road to the northwest of the Quarry Site boundary.

##### 4.1.1.1 Residences Adjacent to Transport Routes

The only residence located adjacent to the section of Jenolan Caves Road forming part of the primary transport route to Sydney is that on the Glenroy property adjacent to the bridge over the Coxs River. This residence is set back approximately 45m from the road. A second dwelling is located closer to the road (~8m), however, this is not inhabited.

Residences are also located adjacent to Jenolan Caves Road to the south of the Quarry entrance, as well as adjacent to the Great Western Highway.



- REFERENCE
- Quarry Site Boundary
  - - - Quarry Access Road
  - Cadastral Boundary
  - Boundary of Land Owned by Hartley Pastoral Corporation Pty Limited
  - ★ Residence
  - ▽ Air Quality Monitoring Location
  - PM<sub>10</sub> Location
  - ⊠ Blast Monitoring Location
  - ⊙ R16 Residential Assessment Location
  - △ A Noise Monitoring Location
  - L30 Vacant Land Assessment Location
  - Meteorological Station

SCALE 1:55 000 (A4)

0.5 0 0.5 1.0 1.5 2.0 2.5 km

Cadastral Boundary Source: © NSW Department of Finance and Services  
Panorama Avenue Bathurst NSW 2795 www.lpi.nsw.gov.au

Figure 4.1  
RESIDENCES AND  
MONITORING LOCATIONS

#### 4.1.2 Land Uses

The Quarry Site is situated on land zoned RU1 – Primary Production under Lithgow LEP 2014, with the majority of land surrounding the Quarry Site in the same zone. In keeping with this zoning, the HPC-owned properties on which the Quarry is located and the larger properties to the south, west and north are operated as pastoral properties and used primarily for cattle grazing, sheep grazing and the production of cereal and fodder crops.

Land in the vicinity of the Quarry Site and the Quarry Access Road is currently used for minor grazing and short-term industrial machinery storage.

Other notable land uses within the local setting are as follows.

- Conservation Areas - On Lot 31, DP1009967 and to the north of the Quarry Site is an area managed as part of a conservation agreement between HPC and OEH (National Parks & Wildlife Service) for the protection and conservation of habitat for the threatened *Eucalyptus pulverulenta*.
- Rural (Small Holdings) - Within and surrounding the villages of Hartley and Little Hartley to the north and northeast, along Coxs River Road to the east, and along Jenolan Caves Road to the west of the Quarry are smaller lots, many developed with residences under the Rural (Small Holdings) Zone 1(c) of Lithgow LEP 2014.
- Recreation and Tourism - A camping ground used periodically by short-term campers (predominantly on weekends) is located adjacent to the Glenroy Bridge over the Coxs River.

The Coxs River itself is used for various recreation activities such as fishing, hiking and camping, as well as for the amenity value it provides. It is important to note that access to the Coxs River generally traverses private landholdings.

Bed & Breakfast style accommodation is also a feature of the local area, “The Peak at Mt Kanimbla” (26 Megalong Place, Kanimbla) approximately 6km (as the crow flies) from the Quarry being a notable example.

Jenolan Caves Road is also the primary route between Sydney (via the Great Western Highway) and the Jenolan Caves, a significant regional tourist feature.

- Sydney Drinking Water Catchment - The Quarry Site is located within the Mid-Coxs River sub-catchment of the Warragamba Catchment, i.e. the upper reaches of the Sydney Drinking Water Catchment.

## 4.2 TOPOGRAPHY AND DRAINAGE

### 4.2.1 Local Topography

The local topography of the Quarry Site is displayed in **Figure 4.2**. The Quarry is located on the western fringe of the Blue Mountains with steeply sloped valleys and ridges with elevations in excess of 1 050m AHD at the western extent of the Blue Mountains National Park and to the north at Mt York and Hassans Walls. To the west of the Blue Mountains, the topography features gently undulating grazing land within patches of vegetated hills and ridges rising to an elevation between approximately 750m AHD and 850m AHD.



Note: Some boundaries are co-incident and are offset for clarity

REFERENCE

- Quarry Site Boundary
- - - Extraction Area Boundary
- - - Overburden Emplacement Area Boundary
- - - Rehabilitated Area (Offset for Clarity)

SCALE 1:20 000 (A4)

200 0 200 400 600 800 1000 m

Base Photograph Source: CEH Survey - May 2017 & Google Earth - October 2016 (surrounds)

Figure 4.2  
 LOCAL TOPOGRAPHY



The local topography is dominated by the Coxs River which drains to the east and adjoins the Quarry along its northern boundary (see **Figure 4.2**). The Coxs River flows further to the south of the Blue Mountains where it ultimately drains into Lake Burragorang, Sydney's main water supply source. Yorkeys Creek, another dominant topographic feature of the local setting, flows between the secondary processing area and Yorkeys Creek stockpile area where it drains into Coxs River at northwestern corner of the Quarry Site. The topography rises moderately to steeply from both the Coxs River and Yorkeys Creek with a series of ridges and incised gullies features of the local topography, especially to the south and east. Land directly to the south, east and west of the Quarry Site consists mainly of forested ridges and gullies developing to wider predominantly cleared valleys. Land to the north of Coxs River is mainly gently undulating grazing land.

The topography of the Quarry Site itself is illustrated on **Figure 4.3**. The secondary processing area is located on a flat area (elevation approximately 665m AHD) to the immediate south of the Coxs River and east of Yorkeys Creek. The landform rises steeply to the south to an elevation of approximately 835m AHD which forms part of a relatively significant east-west oriented ridge line of the local topography. This ridgeline provides a natural barrier between the secondary processing area and the extraction area as well as to residences to the south of the Quarry Site. This layout is significant as the secondary processing area is the major source of any dust and noise from the operation. Slopes on and immediately surrounding the Quarry Site typically range from less than 5° at the Coxs River bank up to approximately 30°.

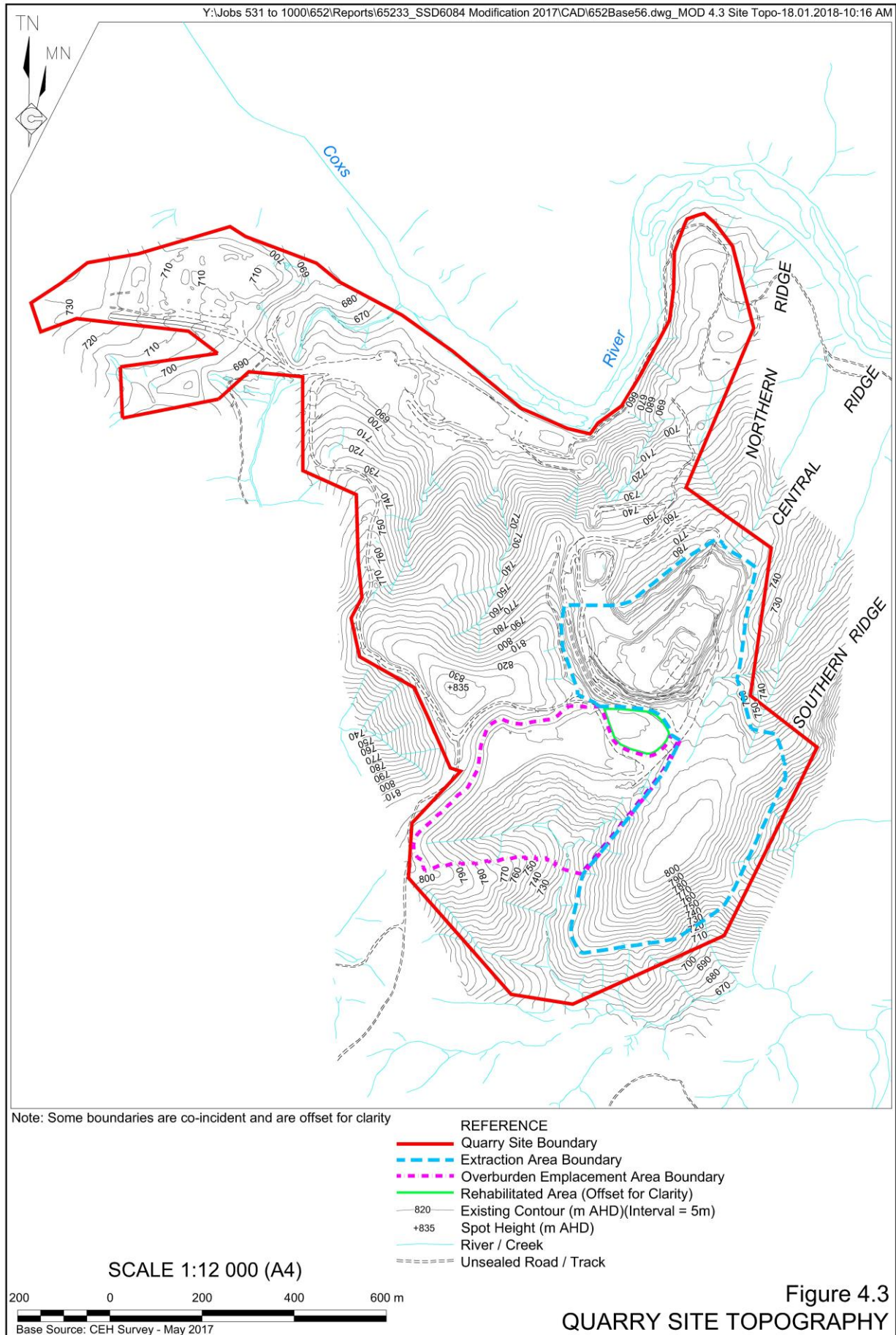
The topography of the Quarry Site includes a series of smaller individual ridges, incised by gullies, through the extraction area. The extraction area has modified the topography of these small ridges although it is noted that the ridge directly to the north of the extraction area was excised from extraction plans and would not be disturbed in order to provide a visual barrier to vantage points to the north. The approved overburden emplacement would extend into two small gullies incised in the main east-west oriented ridge line through the Stage 2 Site.

The Yorkeys Creek stockpile area and Quarry Access Road are located on the cleared and undulating terrain to the west of the Coxs River and Yorkeys Creek.

#### 4.2.2 Catchments and Drainage

Quarry Site is located within the Mid Coxs River catchment of the Hawkesbury-Nepean catchment. The Mid Coxs River catchment also forms part of the Warragamba sub-catchment of the Sydney Drinking Water Catchment, as defined by the *State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011*, which provide the drinking water supply to Greater Metropolitan Sydney.

The Coxs River is the most significant regional drainage feature. Its headwaters are at Gardiners Gap, within Ben Bullen State Forest, from where it flows through the Megalong Valley and parts of the Greater Blue Mountains Area with a catchment of approximately 2 630km<sup>2</sup>. The river flows in a generally southerly direction and joined by 15 main tributaries including the Little, Jenolan, Kedumba, Kowmung and Wollondilly Rivers, before reaching its confluence with the Warragamba River to form Lake Burragorang (behind Warragamba Dam), the largest of Sydney's water supply reservoirs.



## 4.3 METEOROLOGY

### 4.3.1 Introduction

**Table 4.1** provides a brief statistical summary of climate data sourced from the following meteorological stations, chosen based on proximity to the Quarry Site and/or similar geographical context.

- Temperature: Lithgow Birdwood Street (Station # 063224) 1912 to 2006 (closure).
- Rainfall: Kylie Park 1959 to 2009 (Station # 063164).
- Evaporation: Bathurst Agricultural Station (Station # 063005) 1966 to 2013.

A meteorological station has been operated at the Site since 2003, however, temperature, humidity and rainfall data from the established meteorological stations has been used in preference due to the longer periods of monitoring. Wind data collected at the Austen Quarry meteorological station has been used in the generation of a wind data file for the local area which has been incorporated into dispersion (air) and noise modelling) for the Proposal.

**Table 4.1**  
**Climate Data Summary**

|   | Jan   | Feb   | Mar   | Apr  | May  | Jun   | Jul  | Aug   | Sep  | Oct   | Nov   | Dec   | Annual |
|---|-------|-------|-------|------|------|-------|------|-------|------|-------|-------|-------|--------|
| <b>Temperature (°C) Lithgow Birdwood Street (Station # 063224) 1912 to 2006</b>       |       |       |       |      |      |       |      |       |      |       |       |       |        |
| Mean maximum temperature  | 25.5  | 24.7  | 22.4  | 18.4 | 14.3 | 11.1  | 10.4 | 12    | 15.4 | 18.7  | 21.5  | 24.5  | 18.2   |
| Mean minimum temperature  | 11.9  | 12.1  | 10.1  | 6.7  | 3.9  | 1.8   | 0.7  | 1.3   | 3.4  | 6.0   | 8.1   | 10.4  | 6.4    |
| Highest Daily Temperature   | 37.8  | 38.4  | 35.1  | 30.8 | 23.9 | 19.5  | 19.8 | 22.5  | 27.6 | 33.1  | 37.2  | 36.8  | 38.4   |
| Lowest Daily Temperature  | 2.8   | 3.5   | 0.0   | -4.0 | -6.1 | -7.0  | -8.0 | -7.7  | -5.0 | -2.3  | -1.7  | 0.6   | -8.0   |
| <b>Rainfall (mm) Kylie Park 1959 to 2009 (Station # 063049)</b>                       |       |       |       |      |      |       |      |       |      |       |       |       |        |
| Mean monthly rainfall   | 98.6  | 84.7  | 74.1  | 56.5 | 55.1 | 59.6  | 52.2 | 65.0  | 57.4 | 71.3  | 72.5  | 79.6  | 830.6  |
| Highest daily rainfall  | 76.2  | 109.6 | 101.0 | 65.0 | 88.0 | 104.9 | 86.0 | 195.0 | 85.1 | 57.7  | 54.4  | 71.1  | 195.0  |
| <b>Evaporation (mm) Bathurst Agricultural Station (Station # 063005) 1966 to 2017</b> |       |       |       |      |      |       |      |       |      |       |       |       |        |
| Mean daily evaporation  | 6.8   | 5.8   | 4.5   | 2.9  | 1.7  | 1.1   | 1.2  | 1.9   | 2.8  | 4.1   | 5.3   | 6.5   | 3.7    |
| Mean monthly evaporation  | 210.8 | 162.4 | 139.5 | 87.0 | 52.7 | 33.0  | 37.2 | 58.9  | 84.0 | 127.1 | 159.0 | 201.5 | 1350.5 |
| Source: Bureau of Meteorology   |       |       |       |      |      |       |      |       |      |       |       |       |        |

### 4.3.2 Temperature and Humidity

January is the hottest month, having the highest mean temperature of 25.5°C, with November, December, February and March also all with mean maximum temperatures exceeding 20°C and maximum temperatures exceeding 30°C. The lowest temperatures were evident through June to August with the lowest mean temperature in July of 0.7°C.



### 4.3.3 Rainfall

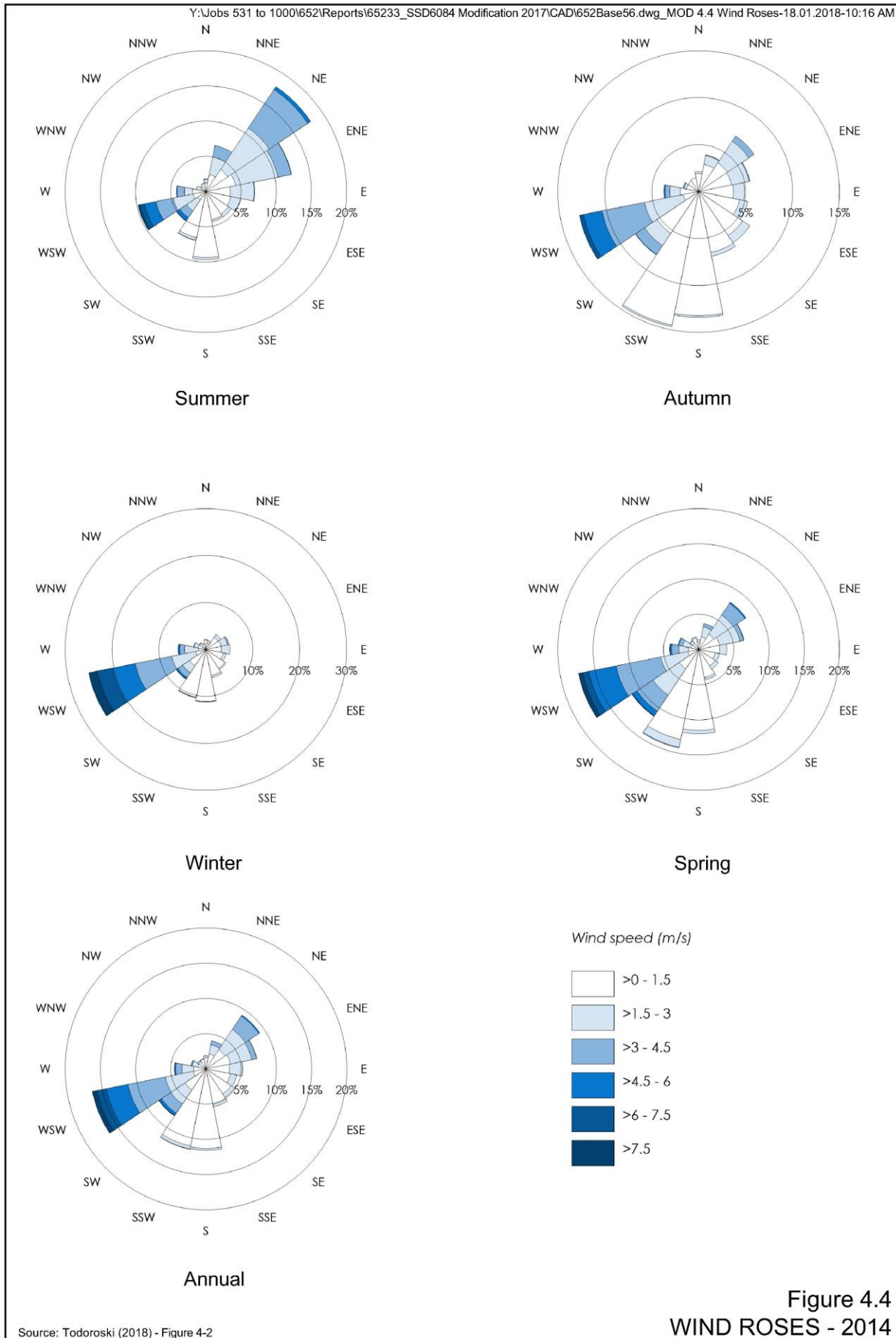
Mean annual rainfall is 830.6mm, with mean rainfall highest from October to March. Statistically, the highest average rainfall occurs in January, however, monthly rainfall is extremely variable, with infrequent, high intensity rainfall events occurring. This is exemplified by the cooler months of May to August which have the lowest mean rainfall, with no rainfall being recorded during these months in some years, but also several of the highest recorded monthly totals.

### 4.3.4 Evaporation

Mean evaporation at the Bathurst Agricultural Station throughout the year is 3.7mm per day or 1 351mm per year. Monthly evaporation varies between 33mm in June and 211mm in January. Mean monthly evaporation is greater than mean monthly rainfall between September and April.

### 4.3.5 Wind

**Figure 4.4** presents a summary of wind patterns generated from meteorological data collected during the 2014 calendar year at the Quarry. The wind roses indicate that on an annual basis, prevailing winds are from the west-southwest with light winds from the south-southwest and south persistent throughout the year. The west-southwest winds are more commonly experienced in winter and spring and autumn with winds from the northeast more prevalent during summer. Little winds from the north, east and southeast are experienced locally throughout the year.



## 5. ENVIRONMENTAL FEATURES, SAFEGUARDS AND EFFECTS

### 5.1 INTRODUCTION

The following subsections provide an overview and assessment of the key environmental issues that have been identified as potential constraints on the proposed modifications. The principal environmental issues, namely traffic and transportation, operational and road traffic noise, air quality and biodiversity are reviewed in detail with a review of all other relevant potential adverse effects provided in Section 5.6.

In each case, the existing environment is briefly described before existing and proposed operational controls and management measures are described. The environmental impacts of the proposed modifications upon the local environment, assuming the adoption of all proposed controls and management measures, are then reviewed.

### 5.2 TRAFFIC AND TRANSPORTATION

#### 5.2.1 Introduction

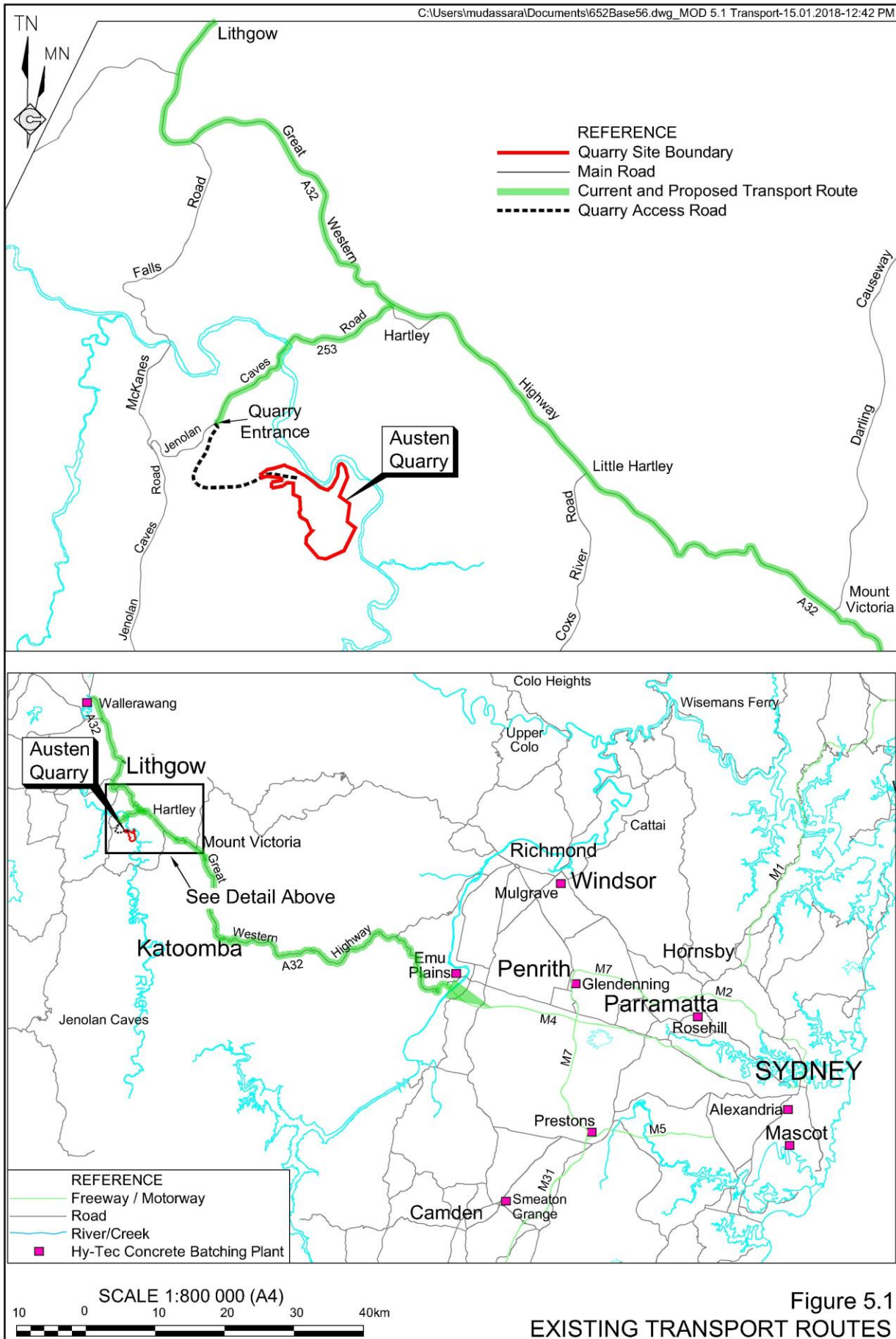
This subsection provides a summary of the Road Transport Impact Assessment that was undertaken by The Transport Planning Partnership (TPPP) to assess potential transport-related impacts, as a result of the proposed modifications. The proposed modification of the approved limit on Quarry product transportation to a maximum of 1.6Mtpa would require an associated increase to the daily maximum and daily average laden truck movements currently approved under SSD 6084. The Road Transport Impact Assessment for the proposed modifications was undertaken by Mr Ken Hollyoak and Ms Doris Lee of TPPP. The assessment is presented in **Appendix 6** and is referred to hereafter as “TPPP (2018)”.

#### 5.2.2 Existing Road Transport Environment

##### 5.2.2.1 Road Network

For the purpose of assessment, the road network used by heavy and light vehicles travelling to and from the Austen Quarry is that displayed in **Figure 5.1**. However, it is noted that vehicles may use other routes as required and dependent on customer requirements.

As described in Section 2.1.7, the majority of product despatch traffic travels towards Sydney via the Great Western Highway, a major arterial road that provides access between Sydney (at Chippendale/Glebe) and Bathurst via Parramatta, Penrith, the Blue Mountains and Lithgow. The Great Western Highway is a State highway and is designated route ‘A32’ through the Blue Mountains to Bathurst. Access from the Great Western Highway to the Quarry Access Road is via Jenolan Caves Road, which is also designated as a State road. This road is designated route ‘253’ and intersects with the Great Western Highway approximately 11km west-northwest of Mount Victoria and 12km southeast of Lithgow. Jenolan Caves Road provides access to both Jenolan Caves and Oberon. Both the Great Western Highway and Jenolan Caves Road are approved 19m B-double routes. The intersection of Jenolan Caves Road with the Great Western Highway (and Blackmans Creek Road) is a four-way priority-controlled intersection with priority for highway traffic.



The Australian and NSW governments are currently funding a \$250 million program of road works between Katoomba and Lithgow. The program is being managed by the NSW Roads and Maritime Services (RMS). The program is designed to improve safety and accessibility along the Great Western Highway. **Figure 5.2** presents the final concept design presented in the Great Western Highway Upgrade Concept Design – Completion report April 2013 for the intersection of the Great Western Highway and Jenolan Caves Road. The final design includes an underpass for Jenolan Caves Road (to provide grade separation) and a revised on-ramp to the highway.

It is noted that in 2016 the intersection of Great Western Highway and Jenolan Caves Road was upgraded under the Hartley Valley to Forty Bends program. The key features of the upgrade at this intersection included the following.

- Widening of sealed shoulder on both sides of the Great Western Highway.
- Provision of a continuous left turn lane from Jenolan Caves Road into the Great Western Highway westbound and a single westbound through lane in the Great Western Highway.
- Increased length of right turn bay in the Great Western Highway into Jenolan Caves Road.
- Relocation of the start of the westbound overtaking lane to the west of Jenolan Caves Road to reduce the number of traffic manoeuvres occurring at the intersection.

The upgraded intersection improves safety as well as reducing traffic delays for vehicles turning right at Jenolan Caves Road to enter Great Western Highway.

Vehicles travelling from the Great Western Highway traverse approximately 4.3km of Jenolan Caves Road to the Quarry entrance. Access from Jenolan Caves Road to the product stockpile areas within the Quarry is achieved via the 3.1km Quarry Access Road commencing at the Quarry entrance. This is a private road constructed specifically to provide access from the Quarry to the main road network. The intersection between the Quarry Access Road and Jenolan Caves Road is an auxiliary right turn (AUR) treatment and auxiliary left turn (AUL) treatment which allow through traffic on Jenolan Caves Road to pass vehicles slowing to turn right or left into the Quarry.

#### 5.2.2.2 Road Conditions

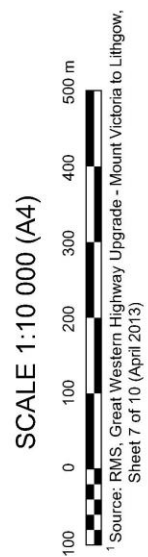
##### Great Western Highway

The section of the Great Western Highway used by vehicles travelling between the Quarry and the Sydney metropolitan area comprises mainly divided roads with two travel lanes in each direction between Lapstone and Katoomba. The section of the Great Western Highway between Katoomba and Mount Victoria is predominantly single lane in each direction with various slow vehicle passing lanes strategically placed in those areas with considerable topographic relief. The recent upgrade to the Great Western Highway between Mount Victoria and Hartley has improved separation of traffic travelling in either direction, widened road shoulders and provided intersection upgrades principally to improve safety along this section of the highway.

Y:\Jobs 531 to 1000\652\Reports\65233\_SSD6084 Modification 2017\CAD\652Base56.dwg\_MOD 5.2 Intersection Design-16.01.2018-12:46 PM



Figure 5.2  
 FINAL CONCEPT DESIGN OF THE  
 INTERSECTION OF JENOLAN CAVES  
 ROAD AND GREAT WESTERN HIGHWAY



The section of the Great Western Highway used by vehicles travelling to and from the Austen Quarry towards Lithgow comprises mainly a single travel lane in each direction with various passing lanes both up and down River Lett Hill. Sections of the highway on River Lett Hill also have centre dividing concrete jersey kerbs. The pavement along this section of the highway is in excellent condition as most of it has recently been upgraded. The pavement is typically approximately 9m wide with 3.5m wide travel lanes and centre and edge line markings. The section of the highway from the top of River Lett Hill to east of Lithgow is referred to as the “Forty Bends”.

### **Jenolan Caves Road**

The 4.3km section of Jenolan Caves Road between the Great Western Highway and the Quarry entrance comprises a single travel lane in each direction with a sealed width of approximately 6.5m, sealed shoulders of variable width and marked centre lines and edge lines. The condition of the road pavement along the section of Jenolan Caves Road between the Great Western Highway and the Quarry Access Road is very good. Jenolan Caves Road crosses the Coxs River approximately 2.2km south of the Great Western Highway over the Glenroy Bridge. The approaches to the northern and southern sides of the bridge were upgraded (funded by Hy-Tec) in late 2012 to remove general depressions between the bridge deck and its approaches that were contributing to impact noise as vehicles entered onto and departed from the bridge. The sign-posted speed limit along the full length of Jenolan Caves Road between the Great Western Highway and the Quarry entrance is 80km/h, with lower advisory speeds at selected locations.

### **Quarry Access Road**

The 3.1km Quarry Access Road has a single travel lane in each direction with a sealed width of approximately 10m. The road is marked with both centre lines and edge lines. The road is in good condition with few sections where the pavement requires maintenance. The Quarry Access Road is fenced for most of its length to prevent stock from the adjoining pastures crossing the road. The sign posted speed limit on the Quarry Access Road is 80km/h.

## **5.2.2.3 Traffic Volumes and Composition**

### **Great Western Highway**

The importance of the Great Western Highway as a link between Sydney and the central west and western New South Wales is underscored by the variety of uses and types of vehicles that use the highway. Uses include as a major arterial road for freight, tourism and commercial purposes. Vehicles travelling through the Blue Mountains comprise light vehicles, motor bikes, vans, 4WDs, vans, mini-buses, cars with caravans, buses, coaches and trucks of varying configurations including B-doubles and road trains.

TTPP (2018) reviewed traffic level data available for the Great Western Highway (1992 to 2005 and 2015 to 2017) and concluded that daily traffic has fluctuated but generally increased by an annual average of approximately two per cent. Traffic volumes on the Great Western Highway between Mt Victoria and Lithgow generally decrease towards the west (8 687 daily vehicles recorded at Hartley in 2017 compared to 11 337 daily vehicles at Mount Victoria). The heavy vehicle composition of total traffic is approximately 20 per cent but also decreases towards the west (TTPP, 2018).

## Jenolan Caves Road

Data on traffic volumes on the Quarry Access Road and Jenolan Caves Road to the north and south of the Quarry Access Road was collected through tube traffic counts between Thursday, 16 February 2017 and Wednesday, 1 March 2017. **Table 5.1** lists the recorded daily traffic volumes at all locations. It should be noted that a ‘trip’ is a one-way movement, so an unladen truck arriving at the Quarry and departing laden with one or more quarry products generates two trips.

**Table 5.1**  
**Surveyed Daily Traffic Levels on Jenolan Caves Road and the Quarry Access Road**

| Day and Date           | Truck Trips (total movements) Per Day          |  |                    |
|------------------------|--|--|--------------------|
|                        | Jenolan Caves Road North of Quarry Access Road | Jenolan Caves Road South of Quarry Access Road | Quarry Access Road |
| Monday                 | 1 534  | 889  | 371                |
| Tuesday                | 1 450  | 884  | 349                |
| Wednesday              | 1 422  | 902  | 302                |
| Thursday               | 1 366  | 882  | 329                |
| Friday                 | 1 678  | 1 097  | 346                |
| Saturday               | 1 657  | 1 374  | 157                |
| Sunday                 | 1 467  | 1 447  | 15                 |
| <b>Average Weekday</b> | <b>1 490</b>                                   | <b>931</b>                                     | <b>339</b>         |

Source: TTPP (2018) - Table 3.4

The data collected in February and March 2017 also established the average weekday daily traffic composition. **Table 5.2** lists the recorded traffic composition, i.e. distinguishing between:

- light vehicles (motor cycles, cars, vans, 4WDs or utilities (including those towing a trailer or caravan);
- single unit “rigid” trucks and buses (with two or four axles); and
- articulated vehicles such as semi-trailers, rigid trucks, B-doubles and road trains.

**Table 5.2**  
**Surveyed Average Weekday Daily Traffic Composition on Jenolan Caves Road and Quarry Access Road**

|                              | Truck Trips (total movements) Per Day (February/March 2017) |    |   |    |                    |    |
|------------------------------|---|----|---|----|--------------------|----|
|                              | Jenolan Caves Road north of Austen Quarry                   |    | Jenolan Caves Road south of Austen Quarry |    | Quarry Access Road |    |
| <b>Vehicles per Weekday</b>  | No.   | %  | No.                                       | %  | No.                | %  |
| Light                        | 1 045   | 70 | 673                                       | 72 | 69                 | 20 |
| Rigid                        | 125   | 8  | 94  | 10 | 35                 | 10 |
| Articulated                  | 317   | 21 | 164                                       | 18 | 232                | 69 |
| <b>Vehicles per Saturday</b> |   |    |   |    |                    |    |
| Light                        | 1 398   | 85 | 1 223                                     | 89 | 31                 | 20 |
| Rigid                        | 135   | 8  | 112                                       | 8  | 12                 | 7  |
| Articulated                  | 115   | 7  | 39  | 3  | 113                | 73 |

Source: Modified after TTPP (2018) – Table 3.5.



The data in **Table 5.2** indicates that the rigid and articulated heavy vehicles on Jenolan Caves Road account for approximately 28 to 29 per cent of the total traffic while approximately 79 per cent of traffic on the Quarry Access Road comprises rigid and articulated heavy vehicles.

Heavy vehicles recorded south of the Quarry Access Road are associated with a range of timber-related industries in Oberon and two quarries near Oberon, namely the Oberon Quarry (Oberon Quarries) and Oberon White Granite Quarry (Mudgee Stone Company). The recorded traffic data for the sites on Jenolan Caves Road also indicate that trucks travel on this section of road 24hrs per day seven days per week.

### **Quarry Access Road**

An average of 339 truck trips (one-way movements) per day were recorded travelling on the Quarry Access Road on the weekdays during the recording period in February/March 2017 (**Table 5.1**). Of these vehicles, approximately 79 per cent were heavy vehicles.

The traffic survey data also indicates that the busiest hours on weekdays for heavy vehicle movements on the Quarry Access Road were between 5:00am and 6:00am and 1:00pm and 2:00pm. These busiest hours did not coincide with the busiest hours on Jenolan Caves Road which typically occurred between 10:00am and 11:00am and between 2:00pm and 3:00pm. This indicates that traffic on the Quarry Access Road peaks earlier in the morning and afternoon than the traffic on Jenolan Caves Road. The peak hours on a Saturday were between 5:00am to 6:00am and between 11:00am and 12:00pm for the Quarry Access Road and were also between 11:00am and 12:00pm on Jenolan Caves Road with an afternoon peak between 2:00pm and 3:00pm.

It is noted that the peak morning hour on the Quarry Access Road is between 5:00am and 6:00am for both weekdays and on Saturdays which demonstrates the importance of morning despatch of products from the Quarry.

#### **5.2.2.4 Road Capacity**

The capacity of a road is defined as the maximum hourly rate at which vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time period under the prevailing roadway, traffic and control conditions. The capacity of a single traffic lane will be affected by factors such as the pavement width and restricted lateral clearances, the presence of heavy vehicles and grades.

Assessment of road capacity is generally determined through consideration of the Level of Service (LOS) which is a qualitative measure describing the operational conditions within a traffic stream as perceived by drivers and/or passengers. LOS A provides the best traffic conditions, with no restriction on desired travel speed or overtaking. LOS B, C and D describe progressively worse traffic conditions. LOS E occurs when traffic conditions are at or close to capacity, and there is virtually no freedom to select desired speeds or to manoeuvre in the traffic stream. The service flow rate for LOS E is taken as the capacity of a lane or roadway.

The LOS criteria for Class II two-lane highways such as Jenolan Caves Road, is defined by the Percentage Time Spent Following (PTSF).

TTPP (2018) estimate that the PTSF for the Jenolan Caves Road would be between 31.4 and 39.5 per cent for the AM and PM weekday peak and Saturday peak periods which is LOS A.

### 5.2.2.5 Intersection Operations and Performance

Two key intersections are relevant to road traffic generated from the Quarry, namely:

- i) Quarry Access Road/Jenolan Caves Road; and
- ii) Jenolan Caves Road /Great Western Highway/Blackmans Creek Road.

Beyond these intersections, vehicles travelling to and from the Austen Quarry are effectively on the Great Western Highway where no turning movements are required.

For vehicles entering Jenolan Caves Road from the Quarry Access Road, the available sight distance is approximately 200m to the north and south. For vehicles entering the Great Western Highway from Jenolan Caves Road, the available sight distance is approximately 200m to the west and 400m to the east.

Surveys of intersection turning movements were undertaken on 16 February 2017 and identified the busiest hours (for all traffic) and the proportion of turning traffic and direction. Traffic volumes on the intersection approaches are displayed in **Table 5.3**.

**Table 5.3**  
**Weekday Peak Hour Traffic at Intersection Approaches (total vehicles/hour)**

| Intersection and Approach                           | AM Peak Hour | PM Peak Hour |
|---|--------------|--------------|
| <b>Jenolan Caves Road and Great Western Highway</b> | 8:15-9:15am  | 3:30-4:30pm  |
| Blackmans Creek Road (North)                        | 4            | 3            |
| Great Western Highway (East)                        | 536          | 619          |
| Jenolan Caves Road (South)                          | 91           | 85           |
| Great Western Highway (West)                        | 469          | 559          |
| <b>Jenolan Caves Road and Quarry Access Road</b>    | 8:15-9:15am  | 3:30-4:30pm  |
| Jenolan Caves Road (North)                          | 83           | 83           |
| Quarry Access Road (South)                          | 24           | 23           |
| Jenolan Caves Road (South)                          | 59           | 70           |

Source: TTPP (2018) – Table 3.8

During the three-hour morning survey periods, the Quarry generated a total of 29 inbound and 25 outbound trips. During the three-hour evening survey period, the Quarry generated a total of 21 inbound and 32 outbound trips. A small number of these trips may have been generated by the lessee of land adjacent to the Quarry Access Road, whose vehicles also use the Quarry Access Road.

Throughout the survey period, all heavy vehicle movements in and out of the Quarry Access Road were to and from the north. Approximately 70 per cent of light vehicles generated by the Austen Quarry travelled to and from the north, and 30 per cent of light vehicles travelled to and from the south.

TTPP (2018) undertook an analysis of the operating performance of both intersections using *SIDRA Intersection 7.0* (SIDRA), a computer-based modelling package which calculates intersection performance characteristics including the degree of saturation, average delays and levels of service.

Both intersections operate at a LOS B or better with the highest average delays being approximately 27 seconds per vehicle and 22 seconds per vehicle for vehicles turning right from Jenolan Caves Road onto the Great Western Highway during the morning and evening peak hours respectively. A significant portion of the delay is that associated with physically negotiating the turn rather than the delay waiting for a gap in the traffic.

Further details of the results of the SIDRA analysis are provided in Appendix C of TTPP (2018).

#### **5.2.2.6 Road Safety**

##### **Jenolan Caves Road**

An appreciation of the safety record of Jenolan Caves Road between the Quarry entrance and the Great Western Highway has been established through reference to validated crash data reported to Police and recorded by the RMS. The most recent available data is for the period from 1 July 2011 to 30 June 2016 and indicates that a total of 11 crashes occurred between the Quarry entrance and the Great Western Highway over that period. TTPP (2018) reviewed the history of crashes on Jenolan Caves Road which indicated that there was no particular location with a particular poor record, but that the speed of vehicles on the bends of the road was often a contributing factor.

##### **Great Western Highway**

Validated crash data reported to Police and recorded by the RMS for the five year period from 1 July 2011 to 30 June 2016 recorded a total of 1 111 crashes on the Great Western Highway between Lapstone and Lithgow. Of these crashes, the most common types included:

- rear-end type crashes (34.2%);
- single vehicles which lost control and left the roadway (31.2%); or
- intersection-type crashes (27.5%).

Approximately 10% of all crashes on the Great Western Highway involved a rigid or articulated truck. No accidents on the Great Western Highway during this period involved Hy-Tec contracted vehicles.

##### **Austen Quarry Traffic**

The Applicant has maintained records of accidents/incidents involving heavy vehicles travelling to and from the Austen Quarry since 2005. These records show that over that period, only one accident has occurred involving a truck travelling from the Quarry and access road. The accident was a result of the car involved travelling on the wrong side of the road.

#### **5.2.2.7 Bus Services**

School bus services are offered before and after school hours by the following bus operators in the vicinity of the Quarry.

- Lithgow Bus Lines – Two school buses operating on Jenolan Caves Road during school pick-up/drop-off peak periods.

- NSW Train Link – One or two school buses operating on Jenolan Caves Road during school hours.
- Blue Mountains Bus Company – One or two buses on a number of routes along the Great Western Highway between Lithgow and the suburbs of the Blue Mountains.

A range of sight-seeing tour buses use the Great Western Highway and Jenolan Caves Road on a regular basis.

### 5.2.3 Future Road Transport Environment

An annual average growth rate of two per cent per annum for traffic on the Great Western Highway was applied for the 2014 EIS and road traffic assessment based on forecasts prepared for the assessment of road works along the highway in 2012. TTPP (2018) considered these forecasts and available traffic counts and concluded that a growth rate of two per cent for both light and heavy vehicles would be robust and was applied for this assessment.

The only planned changes to the road network that are publicly available include the planned Mount Victoria to Lithgow Great Western Highway upgrades that are being managed by RMS. **Figure 5.2** reproduces the final concept design presented in the Great Western Highway Upgrade Concept Design – Completion report April 2013. However, it is noted that in 2016 the intersection was upgraded under the Hartley Valley to Forty Bends upgrade program. The timing for works proposed in **Figure 5.2** is uncertain. This intersection design has not been used for modelling undertaken by TTPP (2018) with the assessment relying on the existing intersection configuration.

Other works proposed along the Great Western Highway between Katoomba and Lithgow involve reduced speed limits in towns, upgrade of various intersections, widening sealed road shoulders, sight distance improvement and installation of safety barriers. In addition, pedestrian and cyclist facilities would also be upgraded along the Great Western Highway, with the provision of new or upgraded pedestrian crossing facilities, footpath and off road shared paths at various locations.

### 5.2.4 Modified Austen Quarry Traffic Generation

The proposed modifications include a change to the limits on daily Quarry product despatch as presented in **Table 5.4**.

**Table 5.4**  
**Proposed Change to Daily Product Despatch Truck Limits**

| Limit   | Current Approval | Proposed |
|---|------------------|----------|
| Daily Maximum Laden Truck Loads Despatched        | 250              | 300      |
| Daily Average Laden Truck Loads Despatched*       | 150              | 200      |
| *Averaged over despatch days in a calendar month. |                  |          |

For the purposes of the transport assessment TTPP (2018) considered two scenarios.

1. Under a ‘peak operations’ scenario, it is estimated that the Quarry would generate 240 laden truck loads or 480 truck trips per day on a weekday and 130 laden truck loads or 260 truck trips on a Saturday. The scenario is considered the peak for normal operations and is predicted to occur on no more than 10 days per year.
2. Under a ‘maximum operations’ scenario the proposed limit of up to 300 laden truck loads or 600 truck trips per day was assessed. The maximum operations scenario is predicted to occur on no more than five days per year and therefore is not a reasonable estimate of usual Quarry operations. This scenario has been included to ensure that potential maximum impacts are assessed.

TTPP (2018) also applied a maximum hourly laden truck despatch capacity of 20 trucks per hour based on an estimate of the physical capacity of truck loading and despatch activities at the Quarry.

The proposed increase to annual Quarry product despatch and the proposed change to the approved hours of operation for product despatch activities would require up to nine additional employees and also increase visitors and contractors. This would increase the total Quarry-related light vehicle movements on the surrounding road network. Based on these assumptions, a worst-case scenario total of 72 light vehicle trips (one-way movements) during weekdays and 40 light vehicle trips on a Saturday has been applied for assessment. It is noted that TTPP (2018) also allowed additional light vehicle movements on the Quarry Access Road to account for non-Quarry traffic accessing land adjacent to the Quarry Access Road. This traffic was also assumed to grow at a rate of two per cent per annum consistent with predictions for other roads in the assessment.

Based on existing annual average weighbridge records, it has been assumed that on average 90% of laden trucks would travel towards Sydney and 10% of laden trucks would travel towards Lithgow. However, to ensure that a worst-case scenario was assessed, TTPP (2018) accounted for all trucks turning right during the maximum operations scenario (i.e. 300 laden trucks in one day and maximum of 20 laden trucks per hour).

## **5.2.5 Management Measures**

Existing approved Quarry product despatch operations are managed under a Traffic Management Plan that incorporates a Driver’s Code of Conduct to manage driver behaviour. The Driver’s Code of Conduct covers requirements of Hy-Tec contracted drivers relating to:

- compliance with all road rules and regulations and the approved operating hours of the Quarry;
- management of the truck and load such as ensuring loads are covered and trucks are cleaned of debris;
- behaviour while driving and consideration of residents adjacent to roads;
- reducing, where safe, noisy driving practices such as use of exhaust brakes; and
- compliance with the Hy-Tec Driver Vehicle Check standard.

The Hy-Tec “Chain of Responsibility: Driver – Vehicle Checks” standard applies at all Hy-Tec quarries and involves all relevant personnel from managers through to drivers. Any person who is involved in consigning, packing, loading, despatching and/or driving any of the Quarry products is required to undertake their tasks in accordance with the standard. It similarly applies to a business which controls the use of a commercial vehicle and receiving goods or freight. An important component of the Standard is a Driver Fatigue Manual.

Given the trucks delivering Quarry products for Hy-Tec enter directly onto a State road (Jenolan Caves Road) and then join the Great Western Highway, also a State road, the maintenance of both roads is funded by the State Government which draws funds from truck registrations and fuel levies. Hy-Tec has an existing agreement (voluntary planning agreement) with Lithgow City Council and would continue to manage contributions to Council in accordance with this agreement. Council has previously acknowledged that following the upgrade of the Glenroy Bridge in 2012 (funded by Hy-Tec), no further works were required at this location.

Under SSD 6084, Hy-Tec has committed to monitor intersection performance at the intersection of the Great Western Highway and Jenolan Caves Road at two-yearly intervals beyond 2022.

Hy-Tec proposes to implement an intersection performance monitoring program, at the intersection of Jenolan Caves Road and the Great Western Highway at two-yearly intervals from 2022 until the interchange displayed in **Figure 5.2** is constructed. This program was a commitment under existing operations. The monitoring would inform an adaptive approach to management under which the data would be used to assess the need to restrict the number of departing trucks during the morning and afternoon peak periods. Hy-Tec is committed to this monitoring, recognising that RMS’s long-term plans for upgrading the intersection would improve the level of service. This monitoring program would involve the following.

- AM and PM peak period traffic movement surveys.
- Analysis of Quarry truck despatch data and assessment of the level of service for the both the AM and PM peak periods.
- Reporting on the results of this monitoring in each annual review for the Quarry.
- If requested, this data would be provided to RMS to assist with planning future upgrades at the intersection.

It is acknowledged that from time to time, incidents may occur involving a truck travelling to or from the Quarry that attract a complaint. Hy-Tec encourages any motorist/resident to record the registration number of the offending truck and report it to the Applicant via its complaint/Head Office line 02 9647 2866. Each complainant can be assured that each complaint will be thoroughly investigated and assessed in accordance to Hy-Tec’s Chain of Responsibility standard. Since operations commenced under SSD 6084, no formal complaints have been received regarding truck traffic on Jenolan Caves Road.

## 5.2.6 Assessment of Environmental Effects

TTPP (2018) made the following assumptions for the assessment of the road capacity and intersection performance under the proposed modifications.

- Traffic levels on the Great Western Highway and Jenolan Caves Road continue to grow at an annual rate of two per cent.
- The upgrades to the intersection of the Great Western Highway and Jenolan Caves Road proposed by RMS that involve an underpass (i.e. grade separation) (see **Figure 5.2**) remain uncertain and therefore cannot be included in modelling. The upgrades completed in 2016 have been incorporated and improve traffic delays at this location.
- Truck composition would remain consistent with normal operations. That is, 90 per cent of trucks dispatched towards Sydney would be articulated vehicles and 10 per cent smaller rigid trucks.

### 5.2.6.1 Road Capacity and Efficiency

TTPP (2018) estimated the Percentage Time Spent Following (PTSF) for the peak operations scenario to predict the expected impacts to road capacity on Jenolan Caves Road in the short term (Year 2022) and the longer term (2035). The results indicate the following.

- For Year 2022, the PTSF for the Jenolan Caves Road would be between 32.1 and 42.1 per cent for the AM and PM weekday peak and Saturday peak periods which is LOS A or LOS B.
- For Year 2035, the PTSF for the Jenolan Caves Road would be between 33.9 and 44.7 per cent for the AM and PM weekday peak and Saturday peak periods which is LOS A or LOS B.

The LOS for the Great Western Highway was estimated based on review of existing conditions relating to travel speeds, vehicle densities and predicted traffic growth. TTPP (2018) predicted that the level of service would decrease as vehicles travelled to the east but remain no lower than LOS C for both Year 2022 and Year 2035.

These results indicate that drivers would continue to experience acceptable levels of service (LOS A to LOS C) when driving along either Jenolan Caves Road or the Great Western Highway under the proposed modifications.

### 5.2.6.2 Intersection Operation

TTPP (2018) undertook a SIDRA analysis of the predicted performance of the intersection of Jenolan Caves Road with the Great Western Highway and for the intersection of Jenolan Caves Road and the Quarry Access Road under the proposed modifications. The analysis was undertaken under future traffic scenarios including both the peak operations and maximum operations scenarios, in the short term (Year 2022) and the longer term (2035).

Under the peak operations scenario, the intersection performance remained acceptable for both intersections. The intersection of Jenolan Caves Road and the Quarry Access Road remained at LOS A with an average delay of 14 seconds per vehicle, while the intersection of Jenolan Caves Road with the Great Western Highway also retained an acceptable level of service for both Year 2022 (LOS C) and Year 2035 (LOS D) with an average delay between 30 and 33 seconds per vehicle. These results indicate that under what would normally be considered peak operations, the intersections would operate satisfactorily in the longer term, noting that LOS D is the upper limit for an acceptable level of service.

Under the maximum operations scenario it was predicted that the intersection of Jenolan Caves Road and the Quarry Access Road would be at LOS A for Year 2022 and LOS B for Year 2035. It was also predicted that the intersection of Jenolan Caves Road with the Great Western Highway would retain an acceptable level of service for Year 2022 (LOS D) but that by Year 2035 the level of service would be unacceptable with an average delay per vehicle of between 62 and 84 seconds (LOS E or LOS F). A sensitivity test of the level of service modelling indicates that there would be an unacceptable level of service for the AM peak period by 2029 and an unacceptable level of service for the PM peak period by 2025. The level of service at the intersection of Jenolan Caves Road with the Great Western Highway would be the subject of the monitoring program described in Section 5.2.5 and an adapted management approach to planning truck despatch would ensure the level of service at this intersection would remain acceptable. It is noted that it is in the interest of Hy-Tec to minimise delays at this intersection and through this maintain the efficiency of transport operations.

### 5.2.6.3 Pedestrians, Cyclists and School Buses

The proposed modifications are not expected to generate any additional demand for pedestrian or cyclist activity. The number of pedestrians walking along or across Jenolan Caves Road in the vicinity of the Quarry would remain negligible. The proposed Quarry product despatch activity would also have a negligible effect on the delays experienced by pedestrians crossing the Great Western Highway.

It is noted that pedestrians and cyclists are likely to benefit from the completed and planned upgrade work along the Great Western Highway that includes elements such as over or underpass crossings, off-road shared paths and widened road shoulders. On the basis of these upgrades proceeding, no additional specific facilities are warranted.

Hy-Tec actively manages product despatch times to avoid peak traffic periods, where possible. This approach also minimises the potential interaction between Quarry traffic and school buses. The approved Driver's Code of Conduct would continue to guide driver behaviour on the local road network including on bus routes.

### 5.2.6.4 Road Safety

Hy-Tec's existing Traffic Management Plan aims to maximise the safety of road users both inside the Quarry and on public roads, and continued compliance with that plan will reduce the risk of incidents associated with the Quarry trucks. Hy-Tec is proud of its record with regards to local road safety and the management of risks associated with the interactions of trucks and other road users.



## 5.2.7 Conclusion

The TTPP (2018) assessment has considered two scenarios for the ongoing product despatch transport activities. The peak operations scenario considered operations at a level representative of likely busy periods. Under these conditions, the road capacity and intersection performance was acceptable under the proposed modifications. Assessment of a maximum operations scenario that included the proposed maximum traffic despatch limit under a worst-case scenario of 100 per cent of vehicles travelling towards Sydney, identified that road capacity and intersection performance would remain acceptable in the short term, but that by 2025, the level of service at the intersection of Jenolan Caves Road and the Great Western Highway would become unacceptable during the PM peak period. Similarly, the level of service at this intersection would become unacceptable during the AM peak period by 2029. The road capacity of both Jenolan Caves Road and the Great Western Highway would remain acceptable under the maximum operations scenario.

It should be noted that the assessed level of service is contingent on a range of factors that are outside of the control of Hy-Tec. That is, the total traffic growth on Jenolan Caves Road and the Great Western Highway would need to continue at two per cent per year and the proposed upgrade to Jenolan Caves Road and the Great Western Highway to provide grade separation would not occur.

The key management measure relating to intersection performance would be the proposed intersection monitoring program described in Section 5.2.5. This program of monitoring for the intersection of Jenolan Caves Road and the Great Western Highway would inform an adaptive management approach to planning Quarry truck despatch, acknowledging that it would be in the interest of Hy-Tec to maintain efficiency of product despatch operations through managing performance at this intersection.

Finally, the continued implementation of the Traffic Management Plan, Driver's Code of Conduct and Chain of Responsibility management system would ensure that road safety would continue to minimise the risks associated with the interactions between truck drivers and other road users, roadside residents and businesses.

## 5.3 OPERATIONAL AND TRANSPORT NOISE

### 5.3.1 Introduction

This subsection provides a summary of the noise impact assessment that was undertaken for the proposed modifications to assess potential noise-related impacts as a result of modified operations. The proposed modification of the approved limit on Quarry product transportation to a maximum of 1.6Mtpa would result in an intensification of operational activities currently approved under SSD 6084, which would result in a change in the noise produced at the Quarry at certain times. In addition, the commencement of product despatch from 4:00am has the potential to disturb the sleep of residents at privately-owned properties. The noise impact assessment for the proposed modifications was undertaken by Mr Rod Linnett of Muller Acoustic Consultants (MAC). The assessment is presented in **Appendix 7** and is referred to hereafter as "MAC (2018)".

## 5.3.2 Existing Acoustic Environment

### 5.3.2.1 Existing Noise Sources and Meteorological Conditions

Existing noise levels in the vicinity of the Quarry Site are influenced by a range of sources including the following.

- Traffic on Jenolan Caves Road and local roads.
- Use of agricultural equipment.
- The flow of water in the Coxs River.
- Environmental sources such as stock, wind in trees or wildlife.
- Noise associated with existing Austen Quarry operations.

The Quarry Site is also subject to a range of potentially noise-enhancing meteorological conditions including light winds in a direction from source to a residence or temperature inversion conditions.

The review of wind conditions at the Quarry in Section 4.3.5 indicates that prevailing (noise-enhancing) winds are from the west-southwest with light winds from the south and south-southwest persistent throughout the year. The winds from the west-southwest are more commonly experienced in winter, spring and autumn with winds from the northeast more prevalent during summer.

Temperature inversion conditions are experienced when warm air high in the atmosphere (stratosphere) traps a layer of cool air between the ground and the warmed air (in the troposphere) and causes sound waves to be refracted from the higher layer and perceived at different locations and in some cases, causes noise levels to be enhanced when compared to neutral conditions. Temperature inversions are generally experienced in the evening/night during stable or light wind conditions (F-G class stability conditions). Temperature inversion conditions have previously been predicted to occur on 60% of winter nights at the Quarry (RWC, 2014).

### 5.3.2.2 Background Noise Levels

MAC (2018) reviewed the background noise levels recorded for the noise impact assessment for the 2014 EIS (RWC, 2014 and Benbow, 2014). The background noise levels presented in **Table 5.5** are based on monitoring undertaken by Benbow (2014) and were assumed for the assessment undertaken by MAC (2018). This is a conservative approach to setting noise limits for assessment as these noise levels predate the Stage 2 Extension Project and were taken at a time when the Quarry contribution to noise levels was not noticeable.

The noise levels in **Table 5.5** were compared with the results of more recent operator-attended noise monitoring for the Quarry to investigate existing noise levels during the morning shoulder period (4:00am to 7:00am). The recent operator-attended monitoring undertaken in October 2017 and December 2017, confirmed that Quarry noise contributions were less than 35dB(A) ( $L_{Aeq,15min}$ ) at all receiver locations for all measurements undertaken during the morning shoulder period (4:00am to 7:00am), daytime period (7:00am to 6:00pm) and evening period (6:00pm to 10:00pm).

**Table 5.5**  
**Background Noise Levels**

| Location*                                     | Measured Background Noise Level (L <sub>A90</sub> ) (dB(A)) |         |       | Measured L <sub>Aeq,15mins</sub> (dB(A)) |         |       |
|---|---|---------|-------|--|---------|-------|
|   | Day   | Evening | Night | Day                                      | Evening | Night |
| Location A<br>220 Jenolan Caves Road          | 39  | 39      | 38    | 63                                       | 58      | 56    |
| Location B<br>770 Jenolan Caves Road          | 27  | 22      | 21    | 59                                       | 54      | 51    |
| Location C<br>66 Dicker Drive, Little Hartley | 35  | 34      | 30    | 47                                       | 46      | 41    |
| Source: Modified after MAC (2018) – Table 4   |   |         |       | * See Figure 4.1                         |         |       |

In addition, noise levels recorded during the morning shoulder period in unattended noise monitoring in September 2017 were reviewed to establish what impact, if any, was occurring as a result of transport activities on the Great Western Highway. MAC (2018) concluded that as background (L<sub>A90</sub>) noise levels were generally in the vicinity of 30dB(A) during the morning shoulder, no additional assessment of morning shoulder criterion was necessary, and the night time criterion was appropriate for assessing impacts during the morning shoulder period (see Section 5.3.5). This is a conservative approach considering that noise levels start to increase between 4:00am and 5:00am due to traffic on the Great Western Highway and the local road network (consistent with the definition of a morning shoulder period) though fluctuate around 30dB(A).

The predictions of the Benbow (2014) assessment were used for the assessment of existing Quarry traffic noise and existing non-Quarry traffic noise. For the purpose of assessment, Residence R24A at 200 Jenolan Caves Road was considered by MAC (2018) to be the most affected from road traffic noise. Existing road noise levels applied by MAC (2018) are presented in **Table 5.6**.

**Table 5.6**  
**Assumed Existing Road Traffic Noise Levels**

| Period*   | Predicted Existing Quarry Road Traffic Noise (dB) | Predicted Existing Non-Quarry Road Traffic Noise (dB) | Predicted Existing Cumulative Road Traffic Noise (dB) |
|---|---|---|---|
| Day (L <sub>Aeq,15hr</sub> )                      | 57.1  | 67.7  | 68.1  |
| Night (L <sub>Aeq,9hr</sub> )                     | 49.3  | 57.5  | 58.1  |
| * Day 7:00am to 10:00pm Night (10:00pm to 7:00am) |   |   |   |
| Source: Modified after MAC (2018) – Table 22      |   |   |   |

### 5.3.3 Potential Impacts

Potential noise impacts associated with Quarry operations relate to blast-related noise, operational noise associated with operation of equipment and processing facilities and road traffic noise.

Potential impacts resulting from the proposed modifications include the following.

- A change in operational noise resulting from the proposed increase to the limit on product despatch from the Quarry due to operations occurring at a higher intensity and/or for longer periods of time.

- A change to traffic road noise levels as a result of increased product despatch activities.
- Potential sleep disturbance due to product despatch activities commencing at 4:00am rather than at 5:00am as occurs under existing approved operations.

Consultation with the owners of the Glenroy property indicates that residents at this location have experienced sleep disturbance from short-term high level noise generated by vehicles crossing the Glenroy Bridge. It should be acknowledged that Hy-Tec is not the only company contributing to traffic on Jenolan Caves Road (approximately 22% of total traffic).

### 5.3.4 Design and Operational Safeguards

The Quarry currently operates in accordance with an approved Noise Management Plan that describes the approved noise management system for the Quarry. This system includes proactive measures to mitigate potential noise impacts from operations. Currently implemented design features and operational safeguards are provided below and would continue to be implemented under the proposed modifications. Where these activities directly mitigate noise diffusion (such as the enclosure of plant equipment) they have been considered during preparation of the noise impact assessment prepared by MAC (2018).

#### Design Features

- No processing equipment other than that described in Section 2.1.4 is proposed with all fixed plant to remain in current locations, i.e. noise from processing operations would remain the same as that currently generated.
- The continued operation of the primary conveyor between the primary crushing station and secondary processing area reduces noise emissions significantly by avoiding the requirement for truck movements between the extraction and processing areas.
- By sequencing the development of the extraction area to reduce the visual exposure of the extraction operations, noise attenuation is also provided.
- Stockpiles and ancillary equipment will be positioned to limit potential noise impacts.
- Ancillary equipment will be enclosed, where feasible.

#### Operational Safeguards

- All approved hours of operation would be strictly adhered to.
- Compliance with the maximum number of truck movements per day nominated in SSD-6084.
- All drivers would be required to sign the Chain of Responsibility, and the Driver's Code of Conduct documentation requiring a high standard of driver performance, avoidance of using exhaust brakes in built-up areas and travel at the required speeds.

- The internal road network would be maintained to their current high standard and if any new roads are proposed these would be constructed to similar standards to limit body noise from empty trucks.
- All equipment on site would be serviced in accordance with Original Equipment Manufacturer (OEM) requirements to ensure sound power levels of each item remains at or below that nominated for noise modelling purposes (see Table 5.1 of Benbow, 2014). This would include ensuring that all product delivery trucks under Hy-Tec responsibility are maintained to meet RMS noise limit requirements.
- Operations at exposed locations and under unfavourable weather conditions would be modified, where necessary, to reduce potential noise-related impacts.
- Maintenance work on all plant and equipment would be confined to approved maintenance hours.

A range of mitigation measures are proposed for the Glenroy property and described in Section 3.4. Hy-Tec has committed to a range of mitigation measures at this location which include the following.

- Planting of trees to screen the view of Jenolan Caves Road from the property and to act as a noise barrier. The timing and suitable species for use in this process would be agreed with the landowners.
- Hy-Tec has agreed to contact RMS to formally request RMS consider reducing the speed limit on the bridge and the approaches to the Glenroy Bridge to 40km/hr. If this is not possible, it would be recommended that advisory speed signs be modified to reflect 40km/hr in this location.
- Regardless of the result of consultation with the RMS, Hy-Tec has updated driver induction process to instruct all transport contractors that they are to limit the use of compression braking and limit their speed on this section of Jenolan Caves Road to 40km/hr, where it remains safe to do so.
- Hy-Tec has agreed to contact the operators of the Oberon Quarry and other known sources of heavy vehicles on Jenolan Caves Road to request that these operations instruct vehicle drivers to show consideration for residents at the property and, if feasible, reduce heavy vehicles speeds to 40km/hr at this location.
- Hy-Tec would also investigate noise mitigation at this property, such as double-glazing of windows.

These measures have not been incorporated into the noise modelling assessment.

### **5.3.5 Monitoring**

The current program of noise monitoring would continue to be undertaken at nominated residences and the results and performance of operations discussed with local residents and landholders, where necessary. As described in Section 3.4, annual unattended noise monitoring would be commenced at the Glenroy property to monitor short term high level noise levels at this location.

### 5.3.6 Assessment Criteria

#### Existing Limits under SSD 6084

Condition 3 of Schedule 3 of SSD-6084 provides the noise criteria for all existing operations at the Quarry. Existing noise limits at all privately-owned residences are provided by **Table 5.7**.

**Table 5.7**  
**Noise Assessment Criteria in SSD 6084**

| Location                       | Day                          | Evening                      | Morning Shoulder             |
|--------------------------------|------------------------------|------------------------------|------------------------------|
|                                | dB L <sub>Aeq</sub> (15 min) | dB L <sub>Aeq</sub> (15 min) | dB L <sub>Aeq</sub> (15 min) |
| All privately-owned residences | 35                           | 35                           | 35                           |

It is noted that Appendix 5 of SSD-6084 identifies conditions under which the noise criteria do not apply, namely:

- a) wind speeds greater than 3m/s at 10m above ground level; or
- b) temperature inversion conditions between 1.5°C and 3°C / 100m and wind speeds greater than 2m/s at 10m above ground level; or
- c) temperature inversion conditions greater than 3°C / 100m.

#### Project Noise Trigger Levels

Section 5.1 of MAC (2018) reviews the appropriate intrusiveness noise criteria and amenity noise criteria that would apply to the assessment of the proposed modifications. In accordance with the Noise Policy for Industry (NPI) (EPA, 2017), the Project Noise Trigger Level (PNTL) to be applied for the purpose of assessment is the more stringent of the project intrusiveness noise levels and project amenity noise levels as presented in **Table 5.8**.

**Table 5.8**  
**Project Noise Trigger Levels**

| Location                                      | Residences for Assessment        | Assessment Period | PNTL LA <sub>eq,15mins</sub> (dB) |
|---|----------------------------------|-------------------|-----------------------------------|
| Location A<br>220 Jenolan Caves Road          | R24A, R24B                       | Day               | 44                                |
|   |                                  | Evening           | 44                                |
|   |                                  | Night             | 43                                |
| Location B<br>770 Jenolan Caves Road          | R9 R16 R22<br>R23 R27 R31<br>R54 | Day               | 40                                |
|   |                                  | Evening           | 35                                |
|   |                                  | Night             | 35                                |
| Location C<br>66 Dicker Drive, Little Hartley | R48 R49                          | Day               | 40                                |
|   |                                  | Evening           | 39                                |
|   |                                  | Night             | 35                                |
| Source: MAC (2018) – Table 7                  |                                  |                   |                                   |

MAC (2018) also assessed low frequency noise factors through review of recent compliance monitoring at the Quarry (MAC, 2017). The NPI requires that where there is a difference of 15dB or more between the measured ‘C’ weighted (dB(C)) and measured ‘A’ weighted (dB(A)) levels, a correction factor for 2dB or 5dB is required, depending on specific circumstances.

MAC (2018) determined that low frequency noise is not a feature at the receiver locations and therefore, low frequency noise modifying factors are not applicable to this assessment.

### Maximum Noise Level Event Assessment

An assessment of maximum noise levels during night time periods provides an indication of the likely sleep disturbance from proposed operations during night time or morning shoulder periods. In accordance with the NPI, where night time noise levels at a residential location exceed:

- an  $L_{Aeq,15min}$  of 40dB(A) or the prevailing RBL plus 5dB (whichever is more stringent); and/or
- an  $L_{Amax}$  of 52 dB(A) or the prevailing RBL plus 15dB (whichever is more stringent)

a maximum noise level event assessment is required. The trigger levels for a maximum noise level event assessment for each residential location considered for the assessment is provided in **Table 5.9**.

**Table 5.9**  
**Maximum Noise Level Event Assessment Trigger Levels**

| Location                     | Residences for Assessment  | $L_{Aeq,15min}$<br>(40dB or RBL + 5dB) | $L_{Amax}$<br>(52dB or RBL + 15dB) |
|------------------------------|----------------------------|--|------------------------------------|
| Location A                   | R24                        | 43                                     | 53                                 |
| Location B                   | R9 R16 R22 R23 R27 R31 R54 | 40                                     | 52                                 |
| Location C                   | R48 R49                    | 40                                     | 52                                 |
| Source: MAC (2018) – Table 8 |                            |  |                                    |

### Road Traffic Noise Criteria

The assessment criteria for the road traffic noise assessment used by MAC (2018) and in accordance with the NSW Road Noise Policy (RNP) (DECCW, 2011) is presented in **Table 5.10**.

Where significant increases to road traffic noise levels occur but remain within the relevant assessment criteria, the RNP specifies that a ‘relative increase criteria’ applies. Consideration of the relative increase to road noise levels are required where the predicted impacts are more than 12dB(A) above existing levels for the relevant averaging period.

**Table 5.10**  
**Road Traffic Noise Assessment Criteria**

| Road Category  | Type of Project / Development  | Total Traffic Noise Criteria <sup>1</sup> |
|--|--|---|
| Freeway/arterial/<br>sub arterial roads                    | Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments | Daytime 60dB $L_{Aeq}(15hour)$            |
|  |  | Night-time 55dB $L_{Aeq}(9hour)$          |
| 1. Daytime 7:00am to 10:00pm, Night-time 10:00pm to 7:00am |  |   |
| Source: MAC (2018) – Table 10                              |  |   |

Finally, in instances where the existing road traffic noise levels exceed the road traffic noise assessment criteria, Section 3.4 of the RNP notes the following in relation to the relative change in noise levels.

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

Based on this guidance, and for the purpose of this assessment, where occupants of residences are affected by additional traffic on existing roads, any increase in traffic noise level that is limited to 2dB(A) is acceptable as this change in noise level is considered to be barely perceptible to the average person.

### 5.3.7 Assessment Methodology

#### Operational Noise Assessment

The operational noise impact assessment was undertaken in accordance with the NPI. MAC (2018) used Brüel and Kjær Predictor Type 7810 (Version 11.10) noise modelling software to develop a noise model and predict noise levels at residences surrounding the Quarry. The model applies the following information to predict noise levels under the proposed modifications.

- Noise generated at relevant sources such as plant and mobile equipment using source data measured at the Quarry (sound power levels are provided in Section 6.2.3 of MAC (2018)).
- Noise enhancing meteorological conditions that may be experienced in the locality including wind and temperature inversion conditions.
- Mitigation such as shielding from barriers or shielding by local topography and/or buildings.

A single worst case operational scenario was modelled based on development during Stage B and the types of equipment, their geographic locations and elevations as displayed in **Figure 5.3** and **Figure 5.4**.

The results of the noise modelling were used to estimate noise levels that would be experienced at the closest privately-owned residences under the proposed modifications, specifically resulting from the proposed increase in production. These noise levels were compared to PTNLs to determine if there would be any exceedance of the relevant criteria under the proposed modifications.



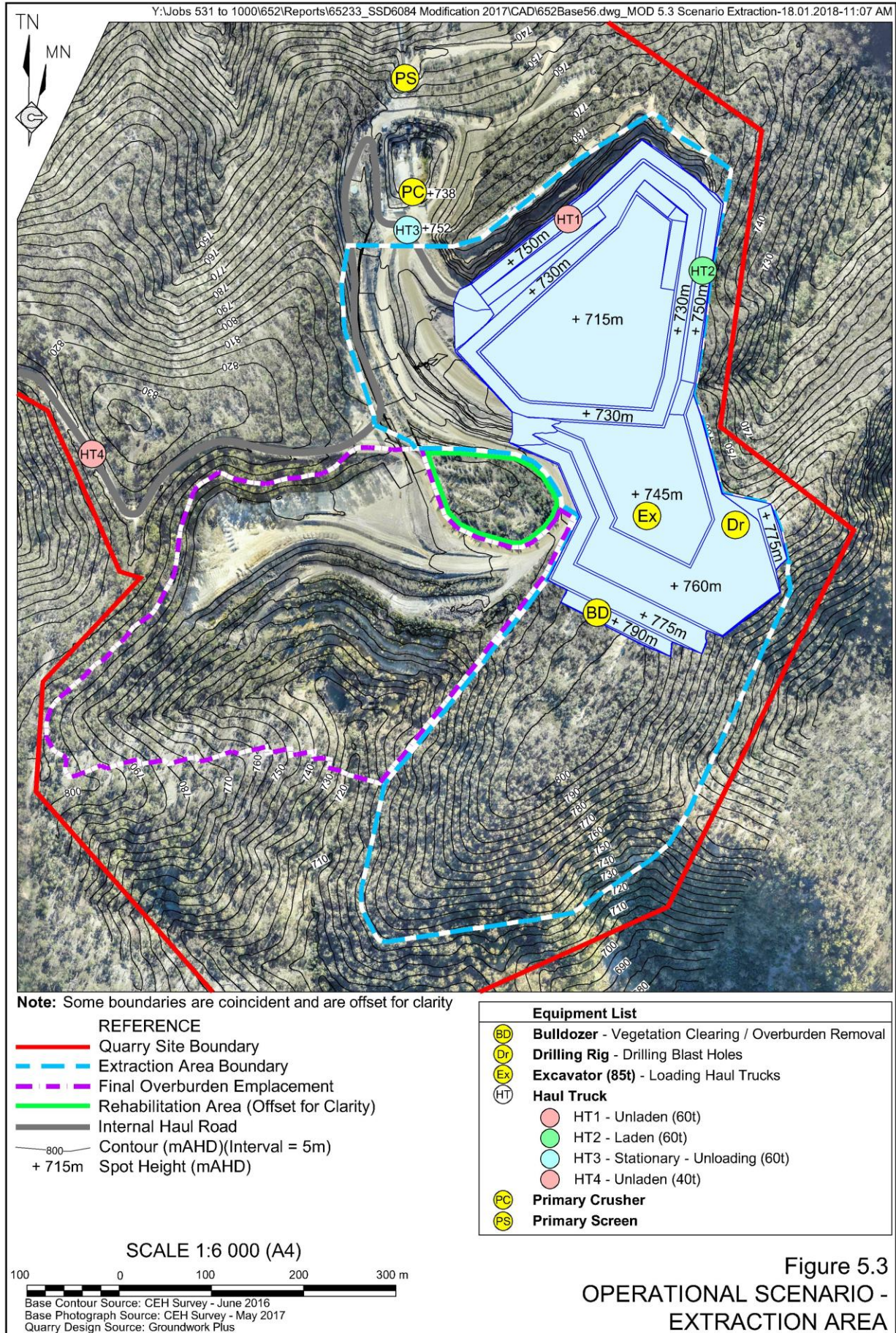
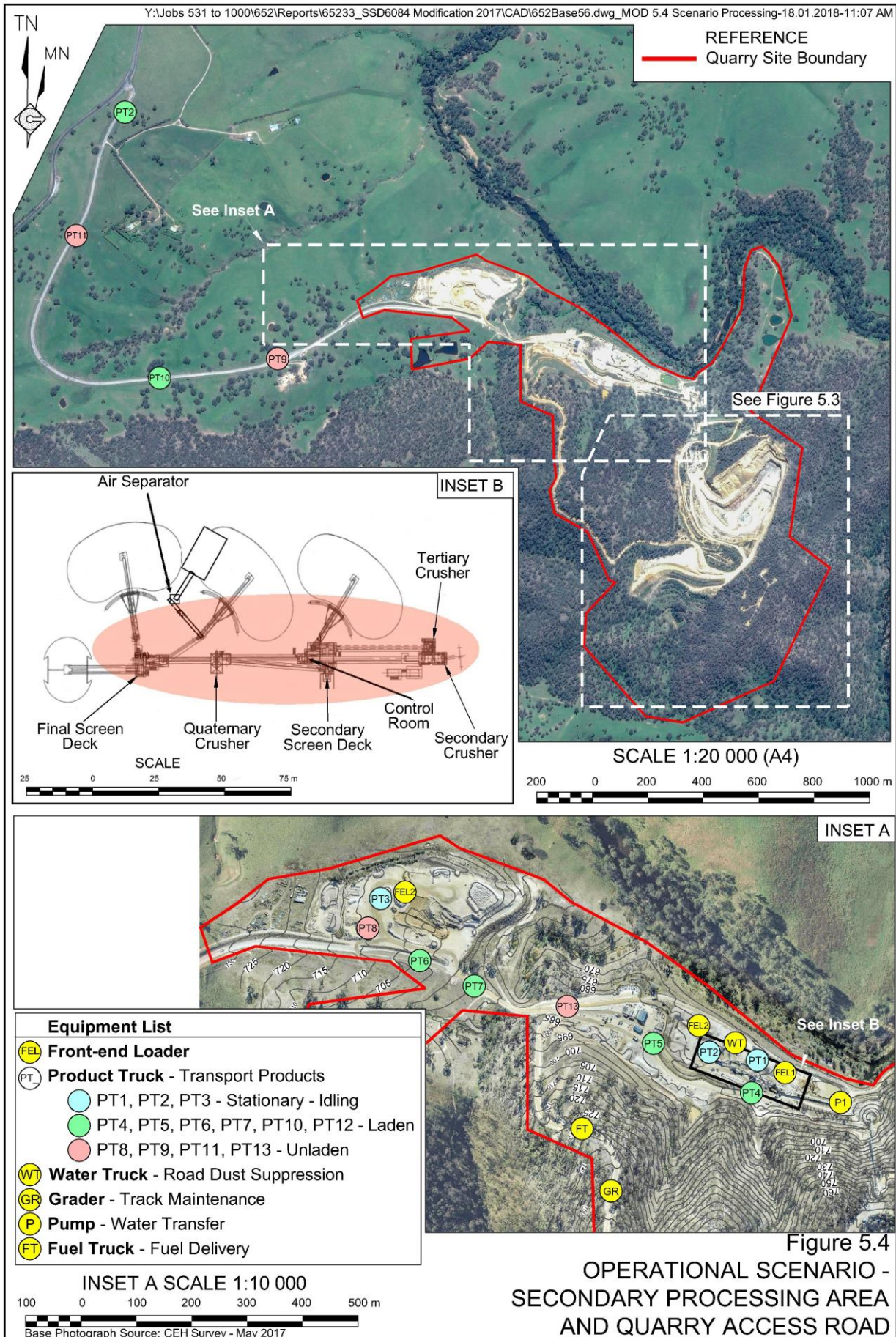


Figure 5.3  
OPERATIONAL SCENARIO -  
EXTRACTION AREA



## Road Traffic Noise Assessment

MAC (2018) used the U.S. Environment Protection Agency's method for predicting the  $L_{Aeq}$  noise levels from road traffic. The methodology is a theoretical traffic noise prediction model which takes into account the following components.

- Maximum vehicle noise levels ( $L_{Amax}$ ) (light and heavy)
- Receiver offset distance
- Passby duration
- Vehicle speed
- Ground absorption (based on the ratio of soft ground and average height of propagation)
- The number of hourly vehicle movements
- Receiver height
- Truck exhaust height
- The height and location of any intervening barriers.

For the purpose of assessment, a maximum of 20 laden trucks (or 40 truck movements) per hour was applied based on the physical capacity of truck despatch at the Quarry.

MAC (2018) assessed road traffic noise levels at the closest and potentially most affected residence along the route between the Quarry and the Great Western Highway. Residence R24A at 200 Jenolan Caves Road, Hartley is located approximately 10m from the centreline of Jenolan Caves Road and this distance was applied for the purpose of the road noise assessment as the distance to a receiver.

### 5.3.8 Assessment of Environmental Effects

#### Operational Noise

Section 7 of MAC (2018) provides a comprehensive summary of noise modelling results and Appendix C of MAC (2018) presents isopleths (or noise contour diagrams) displaying predicted noise levels during calm conditions, prevailing west-southwest wind conditions and temperature inversion conditions. In summary, while noise levels may increase at some privately-owned residences, noise levels under the proposed modification at all times of day, evening, night and morning shoulder period are predicted to remain within the existing noise limit of 35dB(A) at all privately-owned residences surrounding the Quarry. This level is currently considered acceptable and would continue to be applied as a noise limit for operational noise produced by the Quarry.

Noise levels during the morning shoulder period are also predicted to be below the maximum noise level assessment trigger levels (**Table 5.9**), with maximum noise levels ( $L_{MAX}$ ) not predicted to exceed 46dB(A) (during temperature inversion conditions at Residence R31). Therefore, a detailed maximum noise level assessment is not required, and it is concluded that modified operations would not result in sleep disturbance at privately-owned residences surrounding the Quarry.

### Voluntary Mitigation or Acquisition and Vacant Lands

The Voluntary Land Acquisition and Mitigation Policy (NSW Government, 2014) requires an assessment to determine whether predicted cumulative noise levels would trigger voluntary mitigation or land acquisition at privately-owned residences or for more than 25% of any privately-owned land parcels (where the land is vacant, and a dwelling could be built under existing planning controls).

The results of the MAC (2018) noise modelling indicate that the existing criteria of 35dB(A) would be satisfied at all privately-owned residences. Additional review of vacant land and the most impacted 25% of any existing contiguous privately-owned land parcels from the noise contour diagrams presented in Appendix C of MAC (2018) indicates that the VLAMP criteria would not be triggered under the proposed modifications.

### Road Traffic Noise

MAC (2018) assessed road traffic noise levels at the closest and potentially most affected residence along the route between the Quarry and the Great Western Highway. The road noise levels predicted by MAC (2018) at Residence R24A are presented in **Table 5.11**. As the existing and predicted road noise levels for all traffic on the road exceed the assessment criteria, a review of the change in noise level is appropriate. The results predict that the Quarry-related traffic contribution to road noise levels would increase by approximately 0.9dB(A) during the day time (7:00am to 10:00pm) and <0.1dB(A) at night time (10:00pm to 7:00am). The overall change to cumulative road traffic noise levels as a result of the proposed modification for both periods (<0.1dB(A)) would be negligible, with the change in noise imperceptible to the average person.

**Table 5.11**  
**Predicted Road Traffic Noise Levels at Residence R24A**

| Period | Assessment Criteria (dB(A)) | Existing Quarry Traffic Noise (dB(A)) | Future Quarry Traffic Noise (dB(A)) | Existing Non-Quarry Road Traffic Noise (dB(A)) | Existing Road Traffic Noise (dB(A)) | Future Road Traffic Noise (dB(A)) | Change in Noise Level (dB(A)) |
|--------|-----------------------------|---------------------------------------|-------------------------------------|--|-------------------------------------|-----------------------------------|-------------------------------|
| Day    | 60 (L <sub>Aeq,15hr</sub> ) | 57.1                                  | 58.0                                | 67.7   | 68.1                                | 68.1                              | <0.1                          |
| Night  | 55 (L <sub>Aeq,9hr</sub> )  | 49.3                                  | 49.3                                | 57.5   | 58.1                                | 58.1                              | <0.1                          |

Source: MAC (2018) – Table 22

During consultation for the proposed modifications Hy-Tec received feedback concerning potential changes to short term high level noise on Glenroy Bridge. It should be noted that Council has previously acknowledged that following the upgrade of the Glenroy Bridge in 2012 (funded by Hy-Tec), no further works were required at this location. In addition, Hy-Tec is not the only operation that uses Jenolan Caves Road for heavy vehicle transport (see Section 5.2.2.3). It is assumed that the proposed despatch of trucks from 4:00am would result in a similar number of trucks departing the Quarry between that time and 5:00am as are currently departing between 5:00am and 6:00am. No complaints relating to sleep disturbance from early morning truck despatch have been received until this application was proposed and it may reasonably be concluded that similar noise levels would be experienced under the proposed modifications.

As noted in Section 1.7.1, RMS resurfaced the approaches and crossing of the Glenroy Bridge on 8 February 2018 and acknowledged the need to replace signs warning vehicles to limit compression braking in this location. Hy-Tec has also committed to a range of mitigation measures at the Glenroy property to address potential impacts at this location. It is anticipated that these measures would largely resolve potential road noise impacts, where the impact is caused by Hy-Tec contracted drivers. Given that the age and structure of the Glenroy Bridge contribute to the noise impacts experienced at this location, Hy-Tec would support reducing the speed limit for the approach to the bridge to 40km/hr. It is noted that this is a matter for RMS, however, Hy-Tec would contribute to any Council or community-initiated proposal that may be presented to RMS. Regardless, Hy-Tec has updated its driver-induction processes to instruct all drivers to limit compression braking at this location and limit their speed to 40km/hr, where it is safe to do so.

### 5.3.9 Conclusion

Based on the results of MAC (2018) noise impact assessment, it is concluded that under the proposed change to annual product despatch and associated truck levels and assuming that truck loading and despatch operations are occurring from 4:00am on weekdays, noise levels would remain generally consistent with existing approved operations. A negligible change in road traffic noise levels would occur (<0.1dB(A)), however this change in noise level would not be perceptible.

Assuming the continued implementation of design and operational controls and those additional commitments at the Glenroy property, the operational and road traffic noise levels predicted under the proposed modifications would be unlikely to cause sleep disturbance for those residences closest to the Quarry or along the transport route between the Quarry and the Great Western Highway.

## 5.4 AIR QUALITY

### 5.4.1 Introduction

This subsection provides a summary of the air quality impact assessment that was undertaken for the proposed modifications to assess potential air quality impacts, especially dust levels and dispersion patterns, as a result of modified operations. Specifically, modification of the approved limit on Quarry product transportation to a maximum of 1.6Mtpa would result in an intensification of the activities currently approved under SSD 6084, which would result in higher levels of dust produced at the Quarry at certain times. The air quality impact assessment for the proposed modifications was undertaken by Ms Katie Trahair and Mr Phillip Henschke of Todoroski Air Sciences. The assessment is presented in **Appendix 8** and is referred to hereafter as “Todoroski (2018)”.

### 5.4.2 Existing Air Quality Environment

Dust generation is the main air quality issue relevant to the Quarry. **Figure 4.1** displays the Quarry Site in the context of the local rural setting adjacent to grazing lands and vegetated hills and ridges and surrounding privately-owned residences. It is noted that the Quarry is the most

significant source of dust in the local area. However, dust is also generated by grazing activities, vehicles using Jenolan Caves Road and other local roads as well as residential activities such as wood fired heating.

Monitoring of particulate matter (PM<sub>10</sub>) has occurred at the Quarry Site since 14 March 2017, however insufficient data is available to provide sufficient information to characterise the local setting. The available PM<sub>10</sub> data indicates an average of approximately 6.0µg/m<sup>3</sup>, i.e. well below the annual criterion of 30µg/m<sup>3</sup>. All monitoring results are within the relevant criteria and generally consistent with the predictions made in the 2014 EIS.

Deposited dust monitoring has occurred at locations adjacent to the Quarry Site since 2003, with annual average results presented in **Table 5.12**.

**Table 5.12**  
**Historic Deposited Dust Monitoring Results**

| Period (July – June)                              | Location <sup>1</sup>                      |            |                         |  |            |                         |  |            |             |
|---|--|------------|-------------------------|--|------------|-------------------------|--|------------|-------------|
|   | AQD-1 Sawmill Paddock                      |            |                         | AQD-2 Baaners Lane                         |            |                         | AQD-3 Bald Hill                            |            |             |
|   | Insoluble Solids (g/m <sup>2</sup> /month) | Ash        |                         | Insoluble Solids (g/m <sup>2</sup> /month) | Ash        |                         | Insoluble Solids (g/m <sup>2</sup> /month) | Ash        |             |
| g/m <sup>2</sup> /month                           |  | %          | g/m <sup>2</sup> /month |  | %          | g/m <sup>2</sup> /month |  | %          |             |
| 2003-2004   | 0.7  | 0.3        | 42.2                    | 1.2  | 0.5        | 37.6                    | 0.9  | 0.2        | 23.3        |
| 2004-2005   | 0.7  | 0.5        | 42.6                    | 0.7  | 0.3        | 28.2                    | 2.6  | 1.5        | 35.6        |
| 2005-2006   | 2.5  | 1.7        | 69.5                    | 0.7  | 0.4        | 59.4                    | 2.6  | 1.5        | 59.1        |
| 2006-2007   | 2.4  | 0.7        | 30.7                    | 0.5  | 0.4        | 66.0                    | 2.6  | 2.1        | 81.4        |
| 2007-2008   | 2.7  | 1.2        | 44.4                    | 0.7  | 0.4        | 57.1                    | 1.5  | 0.6        | 40.0        |
| 2008-2009   | 4.0  | 0.5        | 11.6                    | 0.6  | 0.4        | 21.2                    | 1.0  | 0.6        | 28.6        |
| 2009-2010   | 2.6  | 1.7        | 66.1                    | 2.1  | 1.9        | 27.3                    | 2.4  | 2.4        | 27.0        |
| 2010-2011   | 0.8  | 0.6        | 69.6                    | 0.4  | 0.2        | 10.6                    | 1.1  | 0.4        | 13.6        |
| 2011-2012   | 0.7  | 0.2        | 35.0                    | 0.4  | 0.1        | 34.7                    | 0.2  | 0.2        | 100         |
| 2012-2013   | 1.1  | 0.4        | 39.4                    | 0.8  | 0.3        | 40.0                    | 0.6  | 0.2        | 36.2        |
| 2013-2014   | 1.2  | 0.4        | 33.3                    | 0.8  | 0.3        | 37.5                    | 0.7  | 0.3        | 42.9        |
| 2014-2015   | 1.1  | 0.6        | 57.1                    | 0.4  | 0.3        | 81.0                    | 0.7  | 0.6        | 34.6        |
| 2015-2016   | 1.6  | 0.4        | 23.5                    | 0.7  | 0.3        | 38.2                    | 0.6  | 0.3        | 48.1        |
| 2016-2017   | 1.1  | 0.7        | 42.8                    | 0.7  | 0.3        | 41.3                    | 0.8  | 0.4        | 44.8        |
| <b>Total Average</b>                              | <b>1.7</b>                                 | <b>0.7</b> | <b>62.8</b>             | <b>0.8</b>                                 | <b>0.4</b> | <b>41.3</b>             | <b>1.3</b>                                 | <b>0.8</b> | <b>43.9</b> |
| Note 1: See <b>Figure 5.2</b> for gauge locations |  |            |                         |  |            |                         |  |            |             |
| Source: Hy-Tec                                    |  |            |                         |  |            |                         |  |            |             |

Todoroski (2018) provides a detailed review of the existing air quality environment including local climatic conditions (also described in Section 4.3). For the purpose of assessment, background data was drawn from the Office of Environment and Heritage (OEH) monitoring stations at Tamworth, Wagga Wagga North and Merriwa and the information available from the Quarry. Background data from other rural areas in NSW is considered relevant as the assessment considers background levels that may not necessarily include contributions from the existing Quarry operations. Background annual air quality levels adopted by Todoroski (2018) for assessment purposes are presented in **Table 5.13**. Background 24-hour concentration data

for PM<sub>10</sub> and PM<sub>2.5</sub> from Merriwa and Wagga Wagga North respectively have been applied in a Level 2 contemporaneous assessment of 24-hour average impacts. The application of assessment criteria is discussed in Section 5.4.7.

**Table 5.13**  
**Adopted Background Air Quality Levels**

| Pollutant         | Averaging Period | Units                   | Value |
|-------------------|------------------|-------------------------|-------|
| PM <sub>10</sub>  | Annual           | µg/m <sup>3</sup>       | 17.2  |
| PM <sub>2.5</sub> | Annual           | µg/m <sup>3</sup>       | 7.5   |
| TSP               | Annual           | µg/m <sup>3</sup>       | 61.9  |
| Deposited Dust    | Annual           | g/m <sup>2</sup> /month | 1.2   |

### 5.4.3 Potential Sources of Air Contaminants

Existing approved operational activities that would generate particulate emissions include the following.

- Extraction activities (ripping, pushing, loading, drilling, blasting, trucks and rock haulage).
- Crushing and screening (dry only).
- Transfer of materials through the use of conveyors.
- Vehicle movements on unsealed roads.
- Product loading and despatch.
- Wind erosion from disturbed areas.

Appendix C of Todoroski (2018) provides an inventory of predicted dust emission from each of these sources (based on various assumptions regarding emission factors, locations and periods of operation or occurrence).

### 5.4.4 Potential Impacts

#### Particulate Matter

Airborne contaminants that can be inhaled into the human respiratory system are classified on the basis on their physical properties such as being gases, vapours or particulate matter. Particulate matter refers to a category of airborne particulates, typically less than 30 microns (µm) in diameter. This type of dust is termed Total Suspended Particulate (TSP).

Emissions of particulate matter less than 10µm (termed PM<sub>10</sub>) and less than 2.5µm (termed PM<sub>2.5</sub>) are considered important pollutants to human health as their ability to penetrate the respiratory system can cause cardiovascular and respiratory diseases, pulmonary and heart diseases, as well as reduced lung capacity.

Particles that settle from the atmosphere and deposits on surfaces are characterised as deposited dust and are typically in the upper size range. The deposition of dust on surfaces may be considered a nuisance and can contribute to reductions in amenity and therefore are considered within the assessment, e.g. dust on window sills or cars.

## Greenhouse Gas and Other Gas Emissions

The primary source of greenhouse gas emissions from the Quarry would be direct emissions as a result of the combustion of diesel by on-site generators and mobile equipment, and also, to a minor extent, emissions from blasting. Greenhouse gases would also be generated indirectly by the production of the diesel fuel consumed at the Quarry.

Although carbon dioxide (CO<sub>2</sub>) would be the principal gas produced, greenhouse gases emitted as a result of the operations may also include carbon monoxide (CO), methane (CH<sub>4</sub>), oxides of nitrogen (NO<sub>x</sub>), SO<sub>2</sub> and non-methane volatile organic compounds (NMVOCs).

### 5.4.5 Design and Operational Safeguards

The Quarry currently operates in accordance with an approved Air Quality Management Plan that describes the design and operational controls and safeguards that are implemented to limit air quality impacts from operations. The following measures are adopted on site and were considered during preparation of the air quality impact assessment, specifically in determining emissions intensity and reduction factors for the assessment.

#### Design Features

- The Northern Ridge within the Quarry area will be retained.
- The primary crushing station is located within the purpose-built depression adjacent to the extraction area below the surrounding ground level. This location limits dust emissions and the distance haul trucks are required to travel from active extraction areas.
- The primary conveyor between the primary crushing station and secondary processing area reduces the distance haul trucks are required to travel.
- Conveyor transfer points are partially enclosed.
- The Quarry Access Road is sealed for approximately 3.1km from Jenolan Caves Road to Yorkeys Creek.

#### Operational Controls and Safeguards

- Surface disturbance activities have been planned to limit the area exposed at any one time.
- Progressive rehabilitation includes initial revegetation to provide a suitable groundcover that limits surface disturbance and the potential for dust lift-off.
- Dust mitigation is incorporated into processing equipment including sprays, covers and enclosures.
- Dust emissions are managed daily through the use of a water truck and particularly during periods of extended dry weather and/or high winds, when higher levels of dust emissions have the potential to occur as a result of quarrying activities.



- All other internal roads are surfaced with well graded materials to limit dust lift-off.
- Exposed areas that are not covered in gravel under dry and windy conditions would be watered (visible dust plumes being the trigger for this action).
- All vehicles travelling on internal unsealed roads are limited to a speed appropriate for the conditions and safety, i.e. less than 40km/hr.
- Load sizes are limited to ensure product does not extend above truck sidewalls.
- Care is taken to avoid spillage during loading.
- Dump heights from trucks, front-end loaders and conveyors are minimised.
- As far as practicable, blasts are scheduled to avoid higher wind conditions, especially when northerly, north-westerly or northeasterly winds prevail (which may result in a plume of particulate matter moving towards the most affected receiver to the southwest).
- Truck queuing, unnecessary idling of trucks and unnecessary trips is reduced through logistical planning, where possible.

Hy-Tec has and would continue to implement the following measures to minimise the emissions of greenhouse gases during the ongoing life of the Quarry.

- Optimise quarry design to minimise:
  - travel distances for equipment; and
  - rehandling of overburden, products and by-products.
- Use mobile equipment which is maintained and serviced in accordance with Original Equipment Manufacturer (OEM) requirements to maximise efficiency.
- Minimise the quarry footprint to reduce land disturbance and travel distances for mobile equipment.
- Optimise the design of the Processing Plant to:
  - maximise the use of gravity to move material throughout the plant reducing the need for pumping; and
  - maximise the use of energy efficient motors in major items of equipment.

As noted above, the use of conveyors to transfer raw materials from the extraction area to secondary processing area reduces the consumption of diesel fuel by haul trucks and therefore greenhouse gas emissions.

#### **5.4.6 Monitoring**

The current program of air quality monitoring, approved under the Air Quality Management Plan would continue to be undertaken and the results and performance of operations discussed with local residents and landholders, where necessary.

### 5.4.7 Assessment Criteria

Condition 10 of Schedule 3 of SSD 6084 describes the air quality assessment criteria for the existing operation with these criteria also recorded in the Air Quality Management Plan. Several conditions of EPL 12323 also refer to air quality although limits are not specified in that licence.

In January 2017, the EPA published an updated version of the guideline *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (EPA, 2016). This document provides updated standard criteria for air quality. The updated criteria for PM<sub>10</sub> is more stringent than that listed in SSD 6084 and the updated criteria also now apply to PM<sub>2.5</sub>. The criteria adopted by Todoroski (2018) for the air quality assessment are presented in **Table 5.14**.

**Table 5.14**  
**Air Quality Assessment Criteria**

| Pollutant                         | Averaging Period | Units                   | Criteria   |
|-----------------------------------|------------------|-------------------------|------------|
| PM <sub>10</sub>                  | 24-hour          | µg/m <sup>3</sup>       | 50         |
|                                   | Annual           | µg/m <sup>3</sup>       | 25         |
| PM <sub>2.5</sub>                 | 24-hour          | µg/m <sup>3</sup>       | 25         |
|                                   | Annual           | µg/m <sup>3</sup>       | 8          |
| TSP                               | Annual           | µg/m <sup>3</sup>       | 90         |
| Deposited Dust                    | Annual           | g/m <sup>2</sup> /month | 2.0 / 4.0* |
| * Incremental / Cumulative impact |                  | Source: EPA (2017)      |            |

Each criterion is based on cumulative values and therefore represents the total level incorporating adopted background levels and predicted incremental values produced by the Quarry.

### 5.4.8 Assessment Methodology

The air quality assessment (Todoroski, 2018) was undertaken in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (EPA, 2017). While the rate of production would increase under the proposed modification, it is not expected that the maximum level would be reached immediately but would gradually occur over time as more employees are hired and production adapts to meet demand. However, this level of production is used as a maximum scenario for the purpose of assessment.

Air dispersion modelling was used to simulate prevailing meteorological conditions, dust sources and intensity as well as mitigating factors such as the use of a water truck to dampen roads during dry conditions. The simulation was used to predict air quality impacts under different meteorological conditions. A single worst case operational scenario was modelled using a snap shot of development during Stage B and the types of equipment and their geographic locations and elevations as displayed in **Figure 5.3** and **Figure 5.4**. The CALPUFF modelling suite was applied as well as meteorological modelling using a combination of predictive model data from The Air Pollution Model (TAPM) and review of surface observations in the CALMET model. More detailed information on modelling methodology is provided in Section 5 of Todoroski (2018).

The results of the dispersion modelling were used to estimate incremental effects resulting from the proposed increase in production. That is, the impact associated with the Quarry alone, without considering background conditions. Cumulative impacts were then estimated by adding the predicted incremental impacts to the adopted background levels.

As the background data for 24-hour PM<sub>2.5</sub> and PM<sub>10</sub> used for the assessment (based on the OEH monitoring station data) includes periods when the standard assessment criteria is breached (i.e. the criteria is exceeded by the adopted background level, regardless of the operation of the Quarry under the proposed changes), Todoroski (2018) assessed 24-hour average PM<sub>2.5</sub> and PM<sub>10</sub> using the Level 2 Contemporaneous Assessment Method provided in the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (EPA, 2017). In this approach the measured background levels are added to the day's corresponding predicted dust level from the proposed changes to establish the number of additional days in a representative year when the criteria would be exceeded as a result of the proposed changes.

#### 5.4.9 Assessment of Environmental Effects

##### Particulate Matter

Section 6 of Todoroski (2018) presents the pollutant concentration isopleths (or contour diagrams) showing predicted incremental (Quarry alone) air quality impacts. **Table 5.15** presents the maximum annual cumulative particulate matter levels predicted at the most affected residences in the local area.

**Table 5.15**  
**Maximum Annual Particulate Matter Levels**

| Pollutant         | Maximum Incremental Impact at Residence | Adopted Background Concentration | Maximum Cumulative Impact at Residence | Criteria | Units                   |
|-------------------|---|----------------------------------|--|----------|-------------------------|
| PM <sub>2.5</sub> | 0.2                                     | 7.5                              | 7.7                                    | 8        | µg/m <sup>3</sup>       |
| PM <sub>10</sub>  | 1.6                                     | 17.2                             | 18.8                                   | 25       | µg/m <sup>3</sup>       |
| TSP               | 3.2                                     | 61.9                             | 65.1                                   | 90       | µg/m <sup>3</sup>       |
| Deposited Dust    | 0.1                                     | 1.2                              | 1.3                                    | 4.0      | g/m <sup>2</sup> /month |

The results of the contemporaneous assessment undertaken for 24-hour average PM<sub>2.5</sub> and PM<sub>10</sub> concentrations at the residences nearest to the Quarry Site indicate that the proposed modifications would result in no additional days (as a result of Quarry operations) when the criteria levels would be exceeded.

##### Vacant Land

Todoroski (2018) reviewed potential 24-hour average PM<sub>10</sub> impacts at the most affected 25% of any vacant land and concluded that there is no privately-owned land parcels which would be impacted and therefore the *NSW Voluntary Land Acquisition and Mitigation Policy* (DPE, 2014) would not apply. It is noted that the proposed changes under the draft policy (dated November 2017) would also not be triggered under the proposed modifications.

## Greenhouse Gas and Other Gas Emissions

The primary source of greenhouse gas emissions from the Quarry would continue to be the combustion of diesel by fixed plant power generation and mobile equipment. Based on the proposed increase to annual limits on Quarry product transport to 1.6Mtpa, greenhouse gas emissions would be likely to increase by a proportional amount (i.e. 45% based on an increase from 1.1Mtpa to 1.6Mtpa). However, as greenhouse gas emissions from the existing approved operations were predicted to be approximately 0.0008% of the total annual estimate for national greenhouse gas emissions (based on 2012 emissions), it is not anticipated that significant greenhouse gas emissions would result from the proposed modifications. It is noted that greenhouse gases would also be generated indirectly through the production of the diesel fuel consumed at the Quarry.

The modified operations would also result in a proportional increase in diesel fumes and blast fumes. However, it is noted that on-site diesel particulate matter emissions are accounted for in the Todoroski (2018) assessment of total particulate emissions. In addition, diesel fumes from Quarry product transport activities would not significantly change in intensity as the proposed modifications would not result in truck convoys or significant traffic delays such that the intensity of any diesel fumes would increase. Finally, the blasting activities would continue to be managed to limit misfires and blasting during unfavourable conditions. The total blasting frequency for the operation would not change from the current limit of one blast event per calendar week.

### 5.4.10 Conclusion

Based on the results of Todoroski (2018) Air Quality Assessment, it is concluded that cumulative particulate matter concentrations and deposited dust levels would not be expected to significantly change as a result of the proposed modifications and would remain within the criteria levels described in the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (EPA, 2017).

## 5.5 BIODIVERSITY

### 5.5.1 Introduction

Niche EH (2018) was commissioned to assess the likely change to offsetting requirements resulting from the proposed modifications, specifically the overall reduction in native vegetation to be cleared from 26.5ha to 24.2ha, an overall decrease in impact over 2.3ha of vegetation that would no longer be disturbed. As described in Section 3.6, the proposed modifications include a minor realignment of the approved extraction area to improve safety in areas where the extraction area narrows. Realigning the eastern boundary of the extraction area would result in an additional 1.1ha of native vegetation that would be removed. In addition, it is proposed that a small area to the west of the overburden emplacement would be disturbed. The approved and proposed boundaries of the extraction area and overburden emplacement are displayed in **Figure 3.4**.

This subsection considers the proposed realignment of the extraction area and minor changes to the overburden emplacement and assesses the significance of additional vegetation clearing required under the proposed modifications.

## 5.5.2 Existing Environment

Niche EH surveyed the approved Quarry layout for the 2014 EIS (RWC, 2014) and Terrestrial Biodiversity Assessment (Niche EH, 2014). Vegetation mapping for this assessment provides an indication of existing vegetation communities and the presence of threatened fauna or flora within the proposed extraction area and overburden emplacement. The vegetation mapping and results of surveys for threatened species from Niche EH (2014) are reproduced as **Figure 5.5** and **Figure 5.6**.

It should be noted that the approved extraction area contains an estimated 721 individual Silver-leaved Mountain Gum plants. These plants were identified in the Niche EH (2014) Terrestrial Biodiversity Assessment and it was confirmed that only 90 of these plants were naturally occurring, with the remaining 631 plants the result of successful propagation by Quarry management.

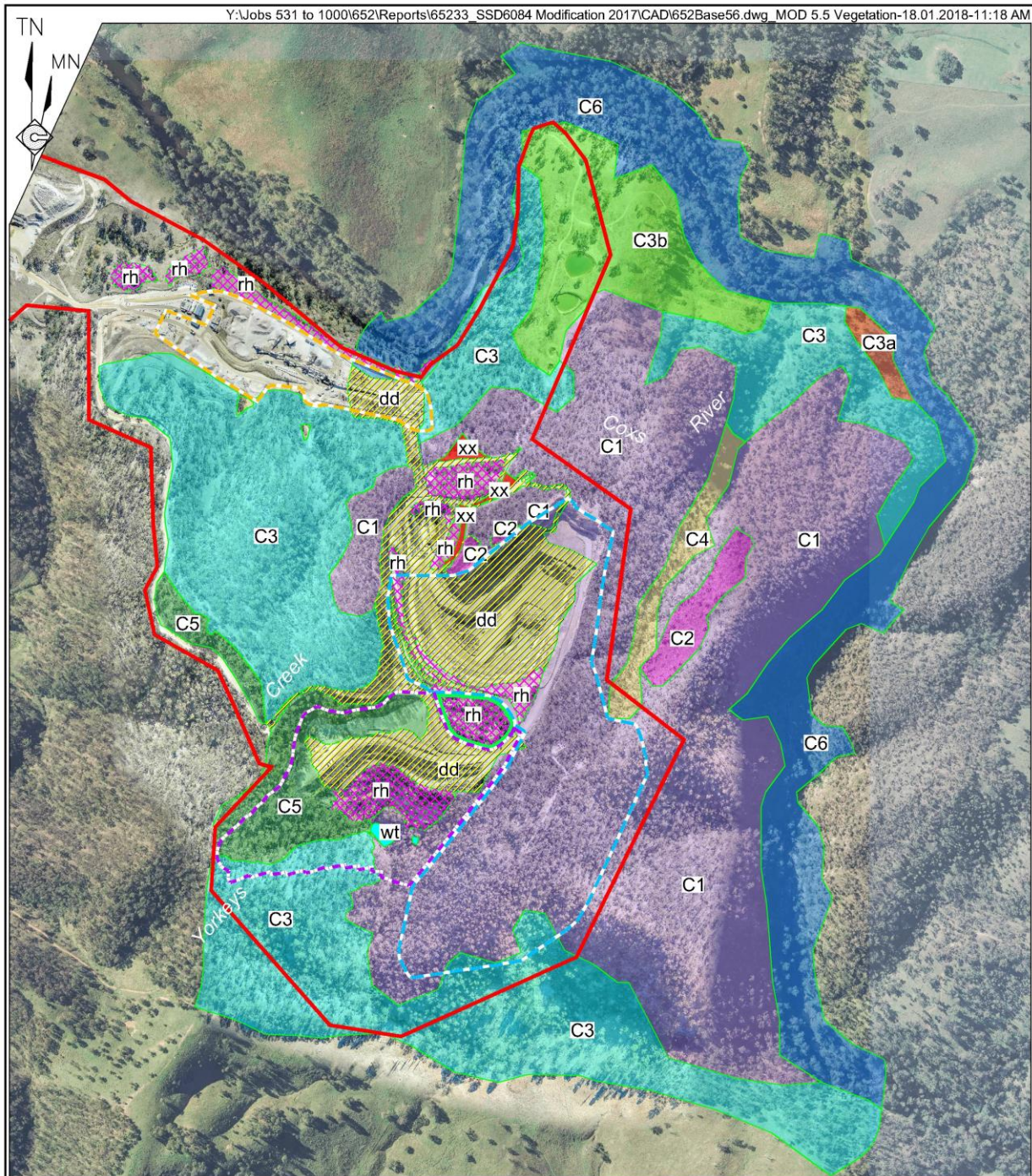
## 5.5.3 Potential Impacts

**Figure 3.4** displays the areas within the existing approved extraction area and overburden emplacement that would be modified under the proposed modifications. As demonstrated in **Figure 3.4**, approximately 1.0ha of Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion and approximately 0.1ha of the Forest Red Gum - Yellow Box woodland of dry gorge slopes, southern Sydney Basin and South Eastern Highlands Bioregion would be disturbed under the proposed modification. This impact is not currently approved under SSD 6084. However, it should also be noted that the following vegetation would no longer be disturbed under the proposed modification

- Approximately 1.3ha of Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion.
- Approximately 2.3ha of Forest Red Gum - Yellow Box woodland of dry gorge slopes, southern Sydney Basin and South Eastern Highlands Bioregion.
- Approximately 0.7ha of Apple Box - Broad-leaved Peppermint dry open forest of the Abercrombie-Tarlo area, South Eastern Highlands Bioregion.
- The number of Silver-leaved Mountain Gum plants to be removed would be reduced to 701 individual plants (of which 611 plants were propagated by Quarry management).

Review of **Figure 5.6** demonstrates that no known threatened flora, threatened fauna or Endangered Ecological Communities would be disturbed within the minor additional areas of disturbance for the proposed modifications.

There is no mechanism under existing guidelines for biodiversity assessment for separate treatment of threatened flora resulting from successful propagation that are later removed. It should however be acknowledged that the biodiversity obligations for the Stage 2 Extension Project under the proposed modifications would include requirements to retire 10 784 species credits for the Silver-leaved Mountain Gum of which approximately 9 398 credits have resulted from impacts to plants successfully planted by Hy-Tec.



Notes 1: Some boundaries are coincident and are offset for clarity  
2: The final site boundary is subject to modification following consultation with landowner (Hartley Pastoral Corporation Pty Limited)

- REFERENCE**
- Quarry Site Boundary
  - - - Extraction Area Boundary
  - - - Overburden Emplacement Area Boundary
  - - - Rehabilitated Area (Offset for Clarity)
  - - - Secondary processing Area

**VEGETATION COMMUNITIES \***

|  |   |
|--|---|
| <span style="background-color: #4682B4; border: 1px solid black; padding: 2px;">C1</span>  | Brittle Gum - Broad-leaved Peppermint open forest (HN570) |
| <span style="background-color: #800080; border: 1px solid black; padding: 2px;">C2</span>  | Silver-leaved Mountain Gum mallee woodland (HN570)        |
| <span style="background-color: #90EE90; border: 1px solid black; padding: 2px;">C3</span>  | Yellow Box - Forest Red Gum grassy open forest (HN527)    |
| <span style="background-color: #FFD700; border: 1px solid black; padding: 2px;">C3a</span> | Yellow Box - Forest Red Gum native grassland (HN527)      |
| <span style="background-color: #FFA500; border: 1px solid black; padding: 2px;">C3b</span> | Yellow Box - Forest Red Gum exotic grassland (HN527)      |
| <span style="background-color: #FF69B4; border: 1px solid black; padding: 2px;">C4</span>  | Rough-barked Apple gully forest (HN527)                   |
| <span style="background-color: #3CB371; border: 1px solid black; padding: 2px;">C5</span>  | Stringybark - Apple Box open forest (HN501)               |
| <span style="background-color: #4169E1; border: 1px solid black; padding: 2px;">C6</span>  | River Oak riparian open forest (HN574)                    |
| <span style="background-color: #FFD700; border: 1px solid black; padding: 2px;">dd</span>  | Disturbed or Excavated                                    |
| <span style="background-color: #800080; border: 1px solid black; padding: 2px;">rh</span>  | Rehabilitation Area                                       |
| <span style="background-color: #00CED1; border: 1px solid black; padding: 2px;">wt</span>  | Pond  |
| <span style="background-color: #800000; border: 1px solid black; padding: 2px;">xx</span>  | Exotic Grassland  |

\* Biometric Vegetation Type of Hawkesbury - Nepean Catchment

SCALE 1:12 000 (A4)



Source: Niche (2014a) - Figure 8

Figure 5.5  
VEGETATION COMMUNITIES  
OF THE QUARRY SITE

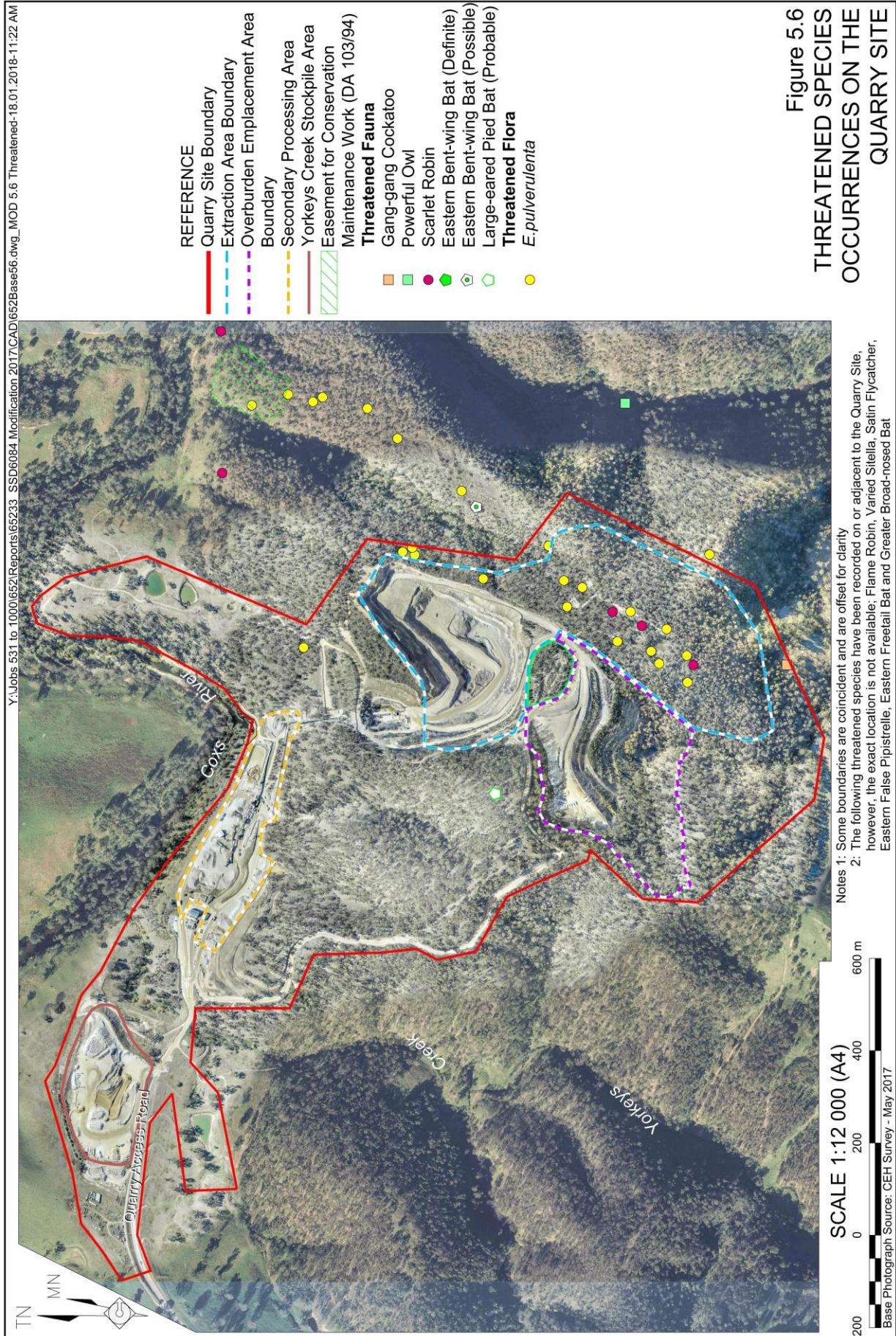


Figure 5.6  
 THREATENED SPECIES  
 OCCURRENCES ON THE  
 QUARRY SITE

In addition, Hy-Tec's previous success replanting the Silver-leaved Mountain Gum is evident from the number of revegetated plants that had been established but are now proposed to be removed as a result of the Stage 2 Extension Project. Of the 701 plants that would be cleared, 611 plants or approximately 87 per cent were planted by Hy-Tec.

#### 5.5.4 Assessment of Environmental Effects

As described in Section 3.6, since commencing operations under SSD 6084, Hy-Tec has observed that lower volumes of overburden material are being produced than were predicted in the 2014 EIS (RWC, 2014). In addition, Hy-Tec has decided to preserve an area of rehabilitated land that would have been extracted under approved operations. The result is that Hy-Tec is able to reduce overall native vegetation clearing in these areas (see **Figure 3.4**). This would reduce potential impacts to habitat and the offsetting obligations under SSD 6084.

Following review of the modified extraction area, it was determined that the eastern boundary of the extraction area should be realigned to improve safety where the extraction area narrowed. This realignment and a minor change to the western boundary of the overburden emplacement would require additional disturbance, not currently approved under SSD 6084. The minor additional areas of disturbance would not impact any known threatened flora, threatened fauna or Endangered Ecological Communities and when considered on balance with the areas that would no longer be disturbed under the proposed modifications, would be a minor change to native vegetation impacts.

The residual impacts to native vegetation and habitat for the Stage 2 Extension Project would be offset in accordance with the relevant legislation. The updated biodiversity offsetting requirements under the proposed modification are discussed in Section 3.7, where it is confirmed that overall biodiversity obligations would be reduced under the proposed modifications.

### 5.6 GENERAL ASSESSMENT OF ENVIRONMENTAL EFFECTS

Hy-Tec considers that the remaining environmental impacts associated with the ongoing operations under SSD 6084, as modified, would remain generally consistent with existing approved operations. It is proposed that there would not be any changes to environmental impacts associated with the following matters as a result of the proposed modification.

- Waste Management
- Visual Amenity
- Aboriginal Cultural Heritage
- Historic Heritage
- Agricultural Resources
- Hazards



### 5.6.1 Blasting

Blasting at the Quarry would continue to be managed under a Blast Management Plan with blast events designed to ensure compliance with the approved blasting criteria provided in Condition 6 of Schedule 2 of SSD 6084 (**Table 5.16**). Blasting would continue to occur no more than once per calendar week in accordance with the blast frequency limit described in Condition 7 of Schedule 2 of SSD 6084.

**Table 5.16**  
**Approved Blasting Criteria**

| Location  | Air Blast Overpressure (dB(Lin Peak)) | Ground Vibration (mm/s) | Allowable Exceedance  |
|---|---------------------------------------|-------------------------|---|
| Any residence on privately-owned land               | 120                                   | 10                      | 0%  |
|   | 115                                   | 5                       | 5% of the total number of blasts over a period of 12 months |
| The most sensitive location within Hartley Village. | NA                                    | 2                       | None  |

MAC (2018) assessed predicted blasting impacts and concluded that airblast overpressure and vibration levels would continue to meet the standard criteria at all assessed residences for blasts up to 170kg Maximum Instantaneous Charge in the extraction area.

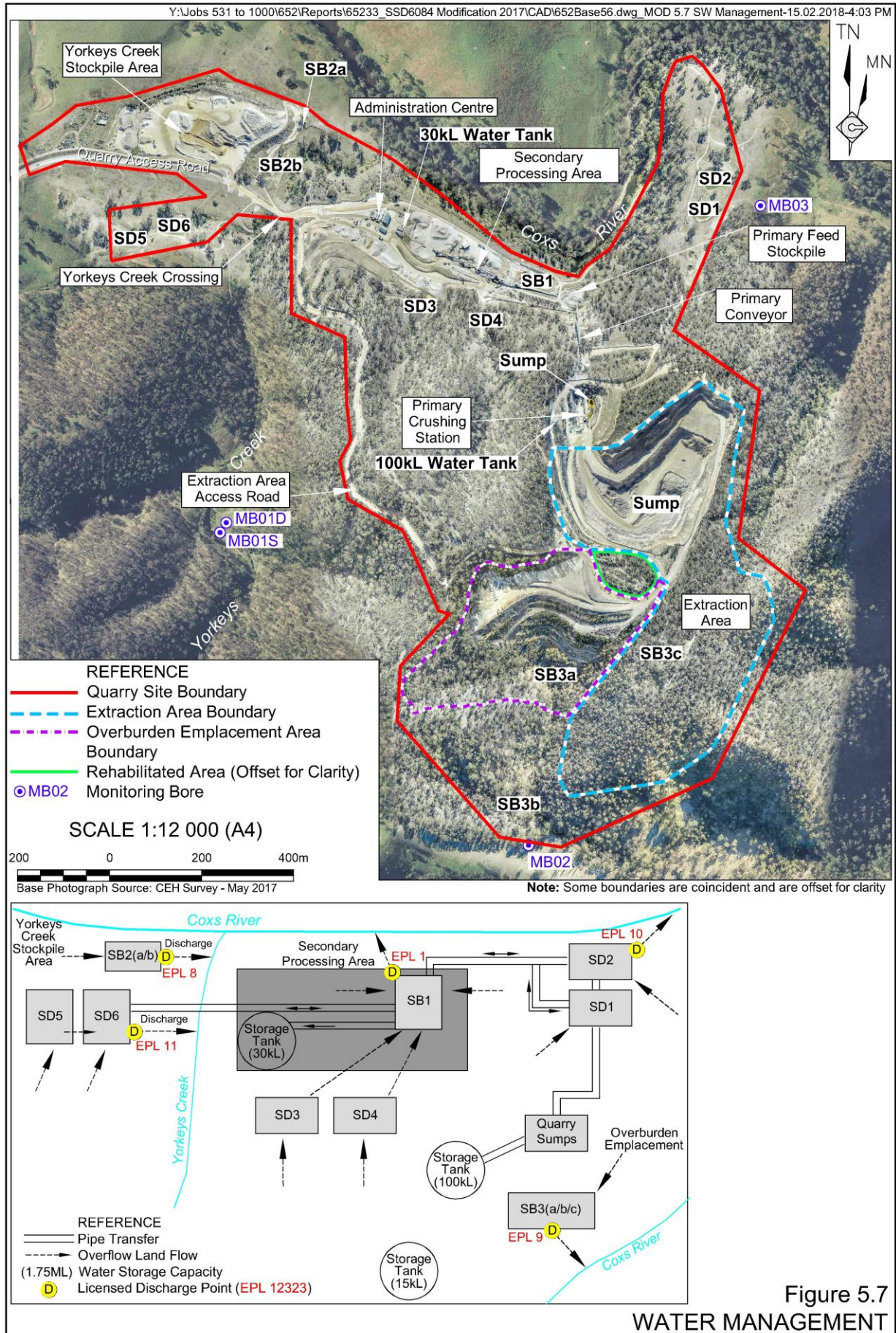
### 5.6.2 Water Resources

Water resources are currently managed in accordance with an approved Water Management Plan (Groundwork Plus, 2017). **Figure 5.7** presents an overview of water management structures at the Quarry, approved under SSD 6084 and in the Water Management Plan.

#### Surface Water

The proposed realignment of the extraction area would not limit the capacity of the extraction area to store surface water runoff during prolonged wet conditions such that discharge events would be required from this location. It is likely that the catchment reporting to sediment basin SB3a/b/c would be reduced through the proposed reduction in the final extent of the overburden emplacement. This in turn may reduce the frequency and volume of discharge from EPL Point 9.

The approved Water Management Plan would be updated under the proposed modifications to reflect the modified extent of the extraction area and overburden emplacement. The implementation of surface water management procedures and erosion and sediment control methods would not change under the proposed modifications. A sustainable water management system has been implemented at the Quarry under SSD 6084, which aims for the current and future operations to be 100 percent self-sufficient for water needs, excluding drinking water supply. This system is based upon capturing rainfall for amenity use (not drinking water) and stormwater run-off for dust suppression and environmental controls.



Surface water management would continue in accordance with the approved mitigation measures described in the Water Management Plant that include the following.

- During the development of the extraction area and overburden emplacement, drainage will convey water from areas of disturbance to sediment basins located within the extraction area and around the Quarry (i.e. SB1, SB2 and SB3) to prevent sediment laden or contaminated runoff leaving the Quarry.
- Sediment basins, including SB1, are constructed and their design holding capacity maintained, to capture all rainfall runoff for a “design” rainfall event (i.e. Type D basins capable of storing a 95th percentile 5-day rainfall event).
- Water supply for use at the Quarry is captured within the extraction area and pre-quarry farm dams (i.e. SD1, SD2, SD5 and SD6). These dams capture water for use on site or released directly, or indirectly (via Yorkeys Creek), into the Coxs River as environmental flows once it has been determined that the water satisfies the water quality requirements provided in EPL 12323.
- Staged development of a sediment basin (SB3b) downstream of the overburden emplacement area footprint to Type-D sizing if required. It is anticipated that the development and size of SB3b will be dependent upon any increased disturbance within the contributing catchment. The timing of the initial development of SB3b will be triggered by the movement of the development onto the southern section of the extraction area and the overburden emplacement, which will be driven by market requirements and will therefore occur progressively.
- Installation of a diversion channel to divert overflows from the clean catchment dam SD5 around SD6 in order gain additional water storage capacity in SD6 to receive additional excess waters captured in SB1.
- Continuing the management of the short fall in the total storage capacity of SB1 by pumping excess waters to other basins (e.g. SD1, SD2 and SD6) that have sufficient excess storage capacity.
- Installation of a diversion bund around SD1, SD2 and SD6 to divert clean overland flows from mixing with potentially contaminated waters from operational areas, which would also maximise the dam’s capacities to treat excess waters captured in SB1 and/or dewatered from the extraction area. Diversion of clean waters will also include contour and diversion drains, perimeter bunds and pipe culverts wherever practicable.
- Installation of Stormwater, Sediment and Erosion Control management measures as shown on Figures 6 to 18 of the *Surface Water Assessment* (Groundwork Plus 2014) prepared for the 2014 EIS.
- In order to implement the plan to eliminate the need for water transfers from SB1 to SD6 that might result in discharges of clean and dirty water to the Coxs River, water transfers from SB1 to SD6 would only occur during dry periods when water is in short supply, required for dust suppression and there is adequate freeboard available in SD6 to reasonably prevent overflow and discharge. During wet periods no water would be transferred from SB1 to SD6 in order to avoid the risk of sediment laden water overflowing to the Coxs River.

- Sediment traps and sediment ponds form part of the Quarry water management system and improve water quality at various points along water drainage networks.
- Excess waters are to be treated in-situ if required within sediment basins SB2a, SB3a and SD2 using a coagulant (i.e. NALCO 8187.15H or similar) to improve water quality prior to pumping out or draining, directly or indirectly (via Yorkeys Creek) into the Coxs River. (Note: NALCO 8187 is a patented coagulant, which is widely used within the water treatment industry).
- Potable water is supplied by Lithgow City Council on an ‘as needs’ basis.
- Sewage treatment for the offices and amenities are comprised of a self-contained activated sludge treatment unit that uses rainwater captured by the on-site infrastructure roof-tops for flush water. No treated effluent is discharged on-site.
- Sewage treatment for the offices and amenities are comprised of a self-contained activated sludge treatment unit that uses rainwater captured by the on-site infrastructures roof-tops for flush water. No treated effluent is discharged on-site.

The surface water monitoring program described in the approved Water Management Plan would continue under the proposed modifications and include monitoring the volume and water quality of water during any discharge.

### Groundwater

The proposed modifications would not change long term predicted impacts to the groundwater setting as the proposed final depth of extraction would remain 685m AHD. As a result, impacts associated with any groundwater drawdown would remain generally consistent with those predicted under approved operations. WAL 37423 permits Hy-Tec to access 20 units (currently 20ML) per annum of groundwater from the *Coxs River Fractured Groundwater Source under the Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources* and accounts for predicted groundwater drawdown once the extraction area intersects with the groundwater table. A monitoring program has been established under the approved Water Management Plan to undertake quarterly estimates of groundwater that is seeping onto the floor of the extraction area. This monitoring program would continue under the proposed modification and provide an indication of groundwater take on a quarterly basis and ensure that the licenced allocation remains sufficient. The monitoring program would also guide adaptive management of groundwater resources during ongoing operations.

Three groundwater monitoring bores were installed in January 2018 in accordance with the groundwater monitoring program described in the approved Water Management Plan at locations displayed on **Figure 5.7**. Monitoring Bore MB01s/d is located to the west of the Quarry and situated between the excavation and Yorkeys Creek. Monitoring Bore MB02 is located between the southern end of the extraction area and Coxs River. Monitoring Bore MB03 is located between the north east of the Quarry and Coxs River. Monitoring Bore MB03 was dry at the time of installation. Water level loggers were installed in bores MB01s/d and MB02 to record water levels at 6-hour intervals. These bores (and Bore MB03 if water is detected) will provide an indication of changes to the groundwater level that may influence any groundwater base flow contribution to Yorkeys Creek and Coxs River.

The exposed surface area in the extraction area would be slightly reduced under the proposed modification, which would result in a minor decrease in water lost to evaporation. However, as extraction proceeds to a final depth of 685m AHD water would continue to discharge to the extraction area (consistent with existing approved operations) and be managed in accordance with the approved water management system.

The surface water, groundwater and water balance monitoring programs approved in the Water Management Plan (Groundwork Plus, 2017) would continue to be implemented under the proposed modifications.

### **5.6.3 Social and Economic Impacts**

Hy-Tec considers that economic benefits from the proposed modifications would result from the initial employment of an additional 15 full-time transport contractors. Operational positions may also increase if it is decided to expand the afternoon and evening roster and an estimate of nine additional employees has been included in the assessment of light vehicle traffic changes as a result of the proposed modification. This would depend on customer demand and timing for delivery. The majority of transport contractors live locally, and therefore some of the flow-on benefits from employment would also be experienced locally. The proposed increase to annual product despatch limits would increase to the quantum of annual contributions paid to Lithgow City Council in the short term compared to existing operations.

It is acknowledged that approval to commence product despatch activities may be perceived by members of the local community as potentially increasing sources of sleep disturbance and noise related to an increase in the approved daily limits for laden truck movements. However, the assessment of traffic and transport, operational noise and road noise as well as air quality indicates that environmental impacts would remain generally consistent with the existing approved operations and it is considered that social amenity would remain largely unchanged.

As noted in Section 3.5, the proposal to commence product despatched activities from 4:00am would provide a direct benefit to transport contractors, the majority of whom reside locally. By allowing drivers to leave the Quarry earlier, they would be less likely to contribute to traffic delays in an easterly direction. It is estimated that this would save drivers approximately one and a half hours on the early morning return journey. As drivers are contracted independently, the ability of drivers to reduce idling time improves the operating efficiency of vehicles and maximises the number of loads that drivers can transport during a single day. This would improve revenue for these operators and provide indirect benefits to the local community through increasing disposable income for these employees.

Concerns expressed by the landowner at the Glenroy property concerning truck noise at the Glenroy Bridge are acknowledged. Through consultation with the landowners, it has been identified that short-term loud noises caused by heavy vehicles crossing the Glenroy Bridge at high speed has in the past caused the residents to be woken during the night. The owners of the Glenroy property permit camping on the property adjacent to the Coxs River. This sleep disturbance has the potential to impact campers in this location. However, it should be noted that Hy-Tec has previously funded improvements at this bridge and Council has acknowledged that no further works would be required at this location. Hy-Tec would support any proposal to reduce to the speed limit for the approach to the bridge to 40km/hr. Feedback from the landowner at Glenroy in the past has been that the speed of vehicles contributes to the noise

impacts. It should also be acknowledged that Hy-Tec is not the only road user in this location, with other sources of heavy vehicles and light traffic to the south of the Quarry also contributing to perceived impacts. A series of mitigation measures would be implemented to manage road noise impacts at this location. These measures have been discussed with the owners of the property and it is anticipated that impacts would be largely resolved, where the noise is caused by Hy-Tec contractors. An ongoing noise monitoring program at this location would provide a record of improved noise levels at this location and would be a trigger for further mitigation.

The reduction to the extent of the overburden emplacement and extraction area would result in benefits to native vegetation conservation which Hy-Tec hopes will be perceived as a positive outcome in the local community.

Finally, the management of operations at the Quarry would also remain largely unchanged. Ongoing community engagement through the Hy-Tec website, blasting notifications and the ease of access to the complaints phone line would continue to provide the local community with access to Quarry management to express any concerns they may have on an ongoing basis.

## 6. EVALUATION AND JUSTIFICATION OF THE MODIFICATION

### 6.1 EVALUATION

#### 6.1.1 Introduction

Evaluation of the proposed modifications is presented through consideration of:

- Section 4.55(2) of the EP&A Act in relation to the permissibility of modifications to development consent for State significant development; and
- Section 4.15(1) of the EP&A Act in relation to the evaluation of applications for development in general.

#### 6.1.2 Section 4.55(2) Considerations (EP&A Act)

As described in Section 1.1, the proposed modifications are being made under Section 4.55(2) of the EP&A Act. Correspondence from DPE dated 16 November 2017 noted that the proposed modifications fall within the scope of this section of the EP&A Act (see **Appendix 2**). Section 4.55(2) of the EP&A Act is provided in full below.

*(2) A consent authority may, on application being made by the applicant or any other person entitled to act on a consent granted by the consent authority and subject to and in accordance with the regulations, modify the consent if:*

- a) it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which consent was originally granted and before that consent as originally granted was modified (if at all), and*
- b) it has consulted with the relevant Minister, public authority or approval body (within the meaning of Division 5) in respect of a condition imposed as a requirement of a concurrence to the consent or in accordance with the general terms of an approval proposed to be granted by the approval body and that Minister, authority or body has not, within 21 days after being consulted, objected to the modification of that consent, and*
- c) it has notified the application in accordance with:*
  - (i) the regulations, if the regulation so require, or*
  - (ii) a development control plan, if the consent authority is a council that has made a development control plan that requires the notification or advertising of applications for modification of a development consent, and*
- d) it has considered any submissions made concerning the proposed modification within the period prescribed by the regulations or provided by the development control plan, as the case may be.*

The following subsections provide an evaluation of the proposed modification against these provisions.

### **Substantially the Same Development**

Under the proposed modifications, the Stage 2 Extension Project would remain ‘substantially’ the same development as that currently approved under SSD 6084 for the following reasons.

- There is no proposed change to the existing extraction methods or equipment and no changes to the methods, configuration or location of fixed processing plant.
- It is not proposed to extend the life of the Quarry (currently approved to 30 June 2050).
- Blasting frequency and blasting hours would not change.
- The only proposed change to operating hours is for truck loading and product despatch activities which would commence at 4:00am rather than the existing approved start time of 5:00am. Operating hours for extraction and processing activities as well as the management of overburden and stockpiling would not change.
- The change in road traffic noise resulting from the proposed modification to daily product despatch traffic limits would be <0.1dB(A), a change in noise that would be difficult for the average person to perceive.
- There would be no additional impacts to threatened flora or fauna as a result of the proposed modification and no new vegetation communities or habitat impacted.
- The proposed change to the description of biodiversity offsetting requirements in terms of biodiversity credits rather than reference to the biodiversity offset area does not change the impact to native vegetation or the ability to offset residual impacts to biodiversity. Rather it allows Hy-Tec greater flexibility to choose the most suitable option(s) to satisfy offsetting obligations. In fact, biodiversity offsetting obligations would be reduced under the proposed modification to the extent of the extraction area and overburden emplacement.
- Environmental management of the Quarry Site and community engagement through blasting notifications and information provided on the Hy-Tec website would remain consistent with existing approved operations.

Finally, it should be noted that the proposed reduction to the extent of the extraction area and overburden emplacement represents a total reduction of 4.3ha of disturbance for the development. Therefore, the proposed modifications would result in an overall net decrease in disturbance and native vegetation clearing.

### **Consultation with the Relevant Minister, Public Authority or Approval Body**

This is a matter for DPE, however it is anticipated that consultation with the relevant government agencies would occur during exhibition of the application and *Statement of Environmental Effects*. As described in Section 1.7.1, Hy-Tec has consulted with Council and the Federal Department of the Environment and Energy during preparation of this *Statement of Environmental Effects*.



### Notification of the Application

It is expected that DPE will notify the relevant parties in accordance with Clause 118 of the *Environmental Planning and Assessment Regulation 2000*.

### Submissions Regarding the Proposal

This is a matter for the DPE to consider. However, Hy-Tec would be pleased to respond to any submissions received by DPE during the assessment process.

### 6.1.3 Section 4.15(1) Considerations (EP&A Act)

Section 4.15(1) of the EP&A Act sets out the matters for consideration by a consent authority when determining an application for development consent.

#### *(1) Matters for consideration—general*

*In determining a development application, a consent authority is to take into consideration such of the following matters as are of relevance to the development the subject of the development application:*

- (a) the provisions of:*
  - (i) any environmental planning instrument, and*
  - (ii) any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Secretary has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved), and*
  - (iii) any development control plan, and*
  - (iiia) any planning agreement that has been entered into under section 93F, or any draft planning agreement that a developer has offered to enter into under section 93F, and*
  - (iv) the regulations (to the extent that they prescribe matters for the purposes of this paragraph), and*
  - (v) any coastal zone management plan (within the meaning of the Coastal Protection Act 1979),*  
*that apply to the land to which the development application relates,*
- (b) the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality,*
- (c) the suitability of the site for the development,*
- (d) any submissions made in accordance with this Act or the regulations,*
- (e) the public interest.*

The following subsections provide an evaluation of the proposed modification against these provisions.

### **Environmental Planning Instruments, Plans and Regulations (Section 79C (1a))**

All relevant environmental planning instruments, plans and regulations were addressed in Section 1.6. In summary, the proposed modification is permissible under the relevant local and State environmental legislation and guidelines.

### **Likely Impacts of the Development (Section 79C (1b))**

Section 4 provides a detailed assessment of the environmental factors potentially impacted by the proposed modifications. The existing design and operational controls and environmental management measures would continue to be implemented to limit potential environmental impacts.

The proposed modifications would contribute to impacts at the intersection of Jenolan Caves Road and Great Western Highway such that the level of service at this intersection is predicted to be unacceptable by 2025 in the PM peak period. This would depend on range of factors that are outside of the control of Hy-Tec, however, Hy-Tec is committed to commence monitoring performance of the intersection beyond 2022 with the results of this monitoring used to plan traffic distribution to mitigate potential delays at this intersection.

Potential impacts associated with short term high level noise resulting from trucks crossing the Glenroy Bridge have been discussed with the landowner of the Glenroy property and a series of mitigation measures have been proposed and agreed by the landowner. In summary, it is anticipated that the following measures would reduce potential impacts at this location.

- Reducing heavy vehicles speeds crossing the Glenroy Bridge to 40km/hr, where it is safe to do so. The landowner has agreed that trucks traveling at an estimated 40km/hr do not cause the noise impacts experienced in the past at this location.
- Tree screening along Jenolan Caves Road at this property to provide a natural noise barrier.
- A commitment to approach the RMS to request that the speed limit at this location be reduced, or failing that, the implementation of 40km/hr advisory speed limits.
- A commitment to approach other known industrial users of Jenolan Caves Road regarding potential noise impacts at this location.
- A commitment to investigate further noise mitigation options such as double glazing of bedroom windows.

It should also be acknowledged that RMS has recently (8 February 2018) resurfaced the bridge, which would have reduced noise generated by trucks at this location. The owners of the Glenroy property have acknowledged Hy-Tec's proactive approach to mitigation at this location.

Other impacts associated with intensified operations such as operational noise and dust are not likely to be noticeable at the closest residences. There would be an overall net positive change due to the realignment of the extraction area and overburden emplacement boundaries. Changes to the wording of offsetting conditions to reflect biodiversity offsetting credits rather than the offset area would not result in additional physical impacts.

### **Suitability of the Site (Section 4.15 (1c))**

Quarrying has been occurring at the location of the Quarry Site since 2002 and the existing operation is approved to continue operating until 30 June 2050.

### **Submissions (Section 4.15 (1d))**

It is anticipated that DPE will take any submissions into consideration during the assessment of this application.

### **The Public Interest (Section 4.15 (1e))**

Hy-Tec considers that the proposed modifications serve the public interest principally as the modifications would permit the ongoing efficient operation of the Austen Quarry. The Quarry provides public benefit through the extraction and sale of concrete aggregates, sand products and a range of other hard rock products that are in high demand for construction activity in the Sydney market. The Quarry provides a source of this material relatively close to the final destination, therefore ensuring the prices for construction activities remain competitive. Hy-Tec is proposing to increase product despatch levels to meet growing customer demand and as described in this document, would continue to operate the Quarry in an environmentally responsible manner. The proposed modifications would increase the rate at which material is extracted and products sold from the Quarry, which would also increase the annual contributions to Council through the existing voluntary planning agreement, as well as the total amounts paid in taxes.

In addition to the benefits from the Quarry products and their uses, the Quarry has an important role in the local community. Spending on local services associated with the Quarry would increase under the proposed modifications and effectively distribute benefits locally. The Quarry currently employs 20 full-time local operational personnel and 45 transportation contractors. This is predicted to increase to 60 transportation contractors under the proposed modification and at full capacity may require an additional nine local operational staff. 10 people are employed as part-time or full-time contractors. Employment of local personnel provides additional flow-on benefits to the local community. As transportation contractors are mostly employed locally, the ability to commence product transportation activities from 4:00am is likely to give these contractors the opportunity to complete an additional journey in one day, improving the cost efficiency of their businesses, including the efficient use of equipment, by removing approximately one and a half hours from a return journey during the morning peak period.

It is therefore concluded that the proposed modifications are in the public interest through the continued efficient operation of the Quarry and the ongoing local economic benefits.

## **6.2 JUSTIFICATION OF THE MODIFICATION**

### **6.2.1 Introduction**

In assessing whether the ongoing development and operation of the Quarry under the proposed modifications is justified, consideration has been given to a wide range of biophysical, social and economic factors, including the predicted residual impacts on the environment together with the potential benefits of the development.

## 6.2.2 Biophysical Considerations

The principal residual biophysical impacts relating to operations under the proposed modifications are summarised in the following subsections.

### Traffic and Transportation

The proposed modification to the approved product despatch limits requires an associated increase to the maximum and average daily laden truck despatch limits. TTPP (2018) applied a worst-case scenario of 300 laden trucks departing the Quarry towards Sydney over one day to assess road capacity and intersection performance along the transport route between the Quarry and the Great Western Highway. It is predicted that the proposed modifications would not change road capacity on Jenolan Caves Road or the Great Western Highway to the extent that the level of service would be unacceptable. In addition, the performance of the intersection of Jenolan Caves Road with the Quarry Access Road would maintain at an acceptable level of service under the proposed modifications. TTPP (2018) modelling of the intersection of Jenolan Caves Road and the Great Western Highway over the life of the Quarry indicates that by 2025 the level of service at this intersection would become unacceptable, principally due to the growth of traffic levels on the Great Western Highway. Hy-Tec has committed to monitoring the performance of this intersection from 2022 under existing conditions of SSD 6084 and would implement this monitoring under the proposed modifications. It is in the interest of Hy-Tec to ensure that this intersection and the product despatch operations of the Quarry are operating efficiently. It is proposed that the results of monitoring at this intersection would be used to plan ongoing Quarry product despatch operations, ensuring that the performance of this intersection is maintained. It should be noted that the performance of the intersection of Jenolan Caves Road and the Great Western Highway would only reach an unacceptable level if:

- the traffic levels on the Great Western Highway grows at the predicted rate of two per cent per annum; and/or
- the final designs for the intersection upgrades proposed by RMS (**Figure 5.2**) do not eventuate.

### Operational and Road Traffic Noise

MAC (2018) assessed the potential changes to noise levels resulting from modified operations and concluded that noise levels would remain within the relevant assessment criteria at all assessed privately-owned residences. In addition, the change to the road traffic noise levels resulting from the proposed increase to daily maximum and average product despatch levels would result in a negligible ( $>0.1\text{dB(A)}$ ) change in road traffic noise between the Quarry entrance and the Great Western Highway.

The potential for short term high level noise caused by vehicles crossing the Glenroy Bridge would be mitigated through a series of measures that have been discussed and agreed with the affected landowner. It has been acknowledged by the landowner that noise impacts at the bridge are less likely to occur if heavy vehicles are travelling at 40km/hr. As a result, Hy-Tec has proactively modified driver induction procedures to ensure that all drivers are limiting the use of compression brakes and limiting speed at this location to 40km/hr where it is safe to do so. It is anticipated that impacts would be largely resolved, where the noise is caused by Hy Tec contractors and ongoing monitoring would provide a trigger for further discussion with the neighbour and mitigation if impacts are resulting from the Quarry operation.

## **Air Quality**

Cumulative air quality was assessed by Todoroski (2018) and it was concluded that cumulative particulate matter concentrations and deposited dust levels would not be expected to significantly change as a result of the proposed modifications and would remain within the approved assessment criteria levels.

## **Biodiversity**

The biodiversity offsetting obligations resulting from the Stage 2 Extension Project were reviewed by Niche EH (2017) in light of the proposed reduction in total extent of the extraction area and the overburden emplacement. Niche EH (2018) confirmed that there would be a decrease in the biodiversity obligations under the proposed modifications (comprising a reduction of 62 ecosystem credits and 308 species credits relating to the Silver-leafed Mountain Gum).

The minor additional areas of disturbance would not impact any known threatened flora, threatened fauna or Endangered Ecological Communities and when considered on balance with the areas that would no longer be disturbed under the proposed modifications, would be a minor change to native vegetation impacts.

## **Other Environmental Impacts**

It is acknowledged that minor changes would be required to management of environmental resources within the Quarry such as the reduction to the size of catchment areas reporting to existing sediment basins. However, it is concluded that the following matters would remain generally consistent with the existing approved operations.

- Blasting and blast management.
- Management of water resources.
- Waste Management
- Visual Amenity
- Aboriginal Cultural Heritage
- Historic Heritage
- Agricultural Resources
- Hazards

### **6.2.3 Social and Economic Considerations**

Hy-Tec considers that the following economic benefits would result from the proposed modifications.

- Employment of an additional 15 transport personnel
- and possible employment of nine additional local operational employees. The majority of transport personnel live locally, and therefore some of the flow-on benefits from employment would also be experienced locally.

- The proposed increase to annual product despatch limits would increase to the quantum of annual contributions paid to Lithgow City Council in the short term compared to existing operations.

The proposal to commence product despatched activities from 4:00am would provide a direct benefit to transport contractors, the majority of whom reside locally. The proposed modification to product despatch hours of operation would improve revenue for these operators and provide indirect benefits to the local community through increasing disposable income for these employees.

Concerns expressed by the landowner at the Glenroy property concerning truck noise at the Glenroy Bridge and historical sleep disturbance are acknowledged and it is noted that this may impact the campers at the property. It is anticipated that impacts would be largely resolved through the proposed mitigation measures, where the noise is caused by Hy Tec contractors. The proposed mitigation has been discussed with the landowner and Hy-Tec has committed to an ongoing monitoring to provide a trigger for further discussion with the landowner and, where necessary, further mitigation if impacts are resulting from the Quarry operation.

However, overall the assessment of traffic and transport, operational noise and road noise as well as air quality impacts indicates that environmental impacts would remain generally consistent with the existing approved operations and it is considered that social amenity would also remain largely unchanged.

The management of operations at the Quarry, including environmental management, would remain largely unchanged. Ongoing community engagement through the Hy-Tec website, blasting notifications and the ease of access to the complaints phone line would continue to provide the local community with access to Quarry management to express any concerns they may have on an ongoing basis.

#### **6.2.4 Consequences of Not Proceeding with the Proposed Modifications**

The consequences of not proceeding with the proposed modifications have been considered for each component of the proposed modifications as follows.

- By foregoing the proposed increase the annual product sales, Hy-Tec would fail to meet customer demands and to win new business opportunities to supply construction works in the Sydney market. It would be likely that these demands would need to be satisfied by an operator more distant from the concrete plant or construction site than the Quarry (making the delivery cost component and construction works in general more expensive) or the demand would be met by a ‘greenfield’ development, which would result in new impacts associated with a new development, including to native vegetation and from noise and dust. Delays to delivery of these products, both during the construction works and through limits on annual despatch, may result in delays for the delivery of vital infrastructure in the greater metropolitan areas of Sydney.

Likewise, predicted impacts at the intersection of Jenolan Caves Road and Great Western Highway and the predicted minor changes to operational noise, road traffic noise and dust emissions would be avoided.

- The proposed change to the approved hours of operations for truck loading and product transport activities (commencing from 4:00am) would allow Hy-Tec greater flexibility to satisfy customer demands for early morning delivery of products and would potentially reduce the contribution of trucks to peak period delays and resultant decrease in greenhouse gas emissions. It is also noted that the greater flexibility would directly benefit transportation contractors and the efficiency of their businesses. If this component of the proposed modifications does not proceed, Quarry trucks would continue to contribute to peak period delays as morning peak hours extend during weekdays. Minor changes to operational noise and road traffic noise levels would also be avoided.
- If the proposed modification to the boundary of the extraction area and overburden emplacement did not proceed, Hy-Tec would continue to extract material and stockpile overburden within existing boundaries and the opportunity to limit approved disturbance would be foregone.
- A modification to the wording of conditions relating to biodiversity offsetting obligations to reflect biodiversity credits only rather than the currently approved biodiversity offset strategy would not materially affect the satisfaction of offsetting obligations in accordance with the biodiversity conservation legislation in NSW. However, the proposed modification to the wording of these conditions would provide Hy-Tec with the flexibility to choose from the options available under the current legislation to satisfy offsetting obligations.

### 6.2.5 Objects of the Environmental Planning and Assessment Act 1979

The EP&A Act provides the framework for the assessment and approval of development in NSW. This subsection provides a justification for the proposed modifications based on review of the objects of the EP&A Act, which include the following.

(a) *to encourage:*

- (i) *the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,*
- (ii) *the promotion and co-ordination of the orderly and economic use and development of land,*
- (iii) *the protection, provision and co-ordination of communication and utility services,*
- (iv) *the provision of land for public purposes,*
- (v) *the provision and co-ordination of community services and facilities, and*
- (vi) *the protection of the environment, including the protection and conservation of native animals and plants, including threatened species and ecological communities, and their habitats, and*
- (vii) *ecologically sustainable development, and*

- (viii) the provision and maintenance of affordable housing, and*
- (b) to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and*
- (c) to provide increased opportunity for public involvement and participation in environmental planning and assessment.*

The proposed modification would not limit the achievement of these objects.

The proposed modifications would provide Hy-Tec with the flexibility to continue operations in an orderly and economically efficient manner. This includes through increased annual product despatch to satisfy customer requirements, a reduction in total land disturbed for the operation based on review of existing operations and through improved flexibility to choose options, currently available under biodiversity conservation legislation, to satisfy the biodiversity offsetting obligations of the development.

Additional impacts at the intersection of Jenolan Caves Road and the Great Western Highway are predicted to occur from 2025, however Hy-Tec has proposed a program of monitoring and adaptive management of changes to the level of service at this intersection. This is considered a proactive approach to managing potential impacts at this location.

Environmental management at the Quarry would also continue in a manner generally consistent with the existing approved operation and consistent with Hy-Tec's reputation for environmental and social responsibility.

Ongoing operations under the proposed modifications would remain generally consistent with the existing approved operations and therefore would remain consistent with the principles of ecologically sustainable development.

### **6.3 CONCLUSION**

Existing operations under SSD 6084 have been occurring for more than 16 months with these activities adding to Hy-Tec's considerable experience operating the Quarry. This experience and consideration of the existing market for the products of the Quarry have led to the conclusion that the proposed modifications to annual product despatch limits and hours of operations for product loading and despatch would improve Hy-Tec's ability to satisfy customer requirements. The proposed modifications have been designed to ensure that this continues in an environmentally and socially responsible manner with Hy-Tec proactively addressing the concerns of the landowners of the Glenroy property in direct consultation with them. This assessment has identified that potential impacts to performance of the intersection of Jenolan Caves Road and the Great Western Highway may occur by 2025, however it is proposed that any impacts would be managed through a proactive and adaptive management approach in consultation with the relevant government agencies. Short term high level noise impacts at the Glenroy bridge would largely be mitigated and managed through ongoing monitoring and consultation with the relevant landowner

Hy-Tec takes its environmental responsibilities seriously and based on existing extraction operations, has committed to reducing the extent of the extraction area and overburden emplacement. It has also been decided that a parcel of land that has previously been



rehabilitated would be retained between the extraction area and overburden emplacement. This component of the proposed modifications would reduce the overall disturbance for the development and reduce the native vegetation that would need to be cleared for the Stage 2 Extension Project.

Finally, Hy-Tec is requesting an update to the wording of conditions concerning biodiversity offsetting obligations to reflect the opportunities available under recently commenced biodiversity conservation legislation. This would provide greater flexibility to satisfy these commitments. It is noted that the biodiversity offsetting obligations would be reduced as a result of the proposed modifications. This is a direct result of the proposed reduction in total disturbance required for the development of the extraction area and overburden emplacement.

It is common for operations to identify and seek efficiencies as development progresses. In this instance, the operating environment has brought on the need for change, with the increased customer demand and the recently experienced changes in peak traffic periods prompting the proposed modifications. However, Hy-Tec is also taking this opportunity to improve management of native vegetation and biodiversity offsetting requirements for the operation. On balance, Hy-Tec considers that the proposed modifications would permit the ongoing efficient and environmentally and socially responsible operation of the Austen Quarry.

## 7. REFERENCES

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- VGT Environmental Compliance Solutions (2017).** *Annual Review of the Austen Quarry, Hartley.* Prepared by VGT on behalf of Hy-Tec Industries Pty Limited.