MONARO ROCK

ABN: 11 634 425 862

Environmental Impact Statement

for the

Monaro Rock Quarry

Development Application No. SSD- 27223807

Prepared by:

RWCorkery&co

August 2025



ACKNOWLEDGEMENT

R.W. Corkery & Co. acknowledge and pay our respects to the Traditional Custodians of the lands in NSW and Australia on which our projects are located. We value the knowledge, advice and involvement of the Elders and extended Aboriginal community that contribute to our Projects and extend our respect to all Aboriginal and Torres Strait Islander peoples.

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Prepared for:

Monaro Rock Pty Ltd
ABN: 11 634 425 862

Telephone: (02) 6297 3325

9 Bowen Place
QUEANBEYAN WEST NSW 2620

Prepared by:

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

Telephone: (02) 9985 8511
Email: admin@rwcorkery.com
Postal: PO Box 1796
CHATSWOOD NSW 2057

Sydney | Orange | Townsville

Sydney
Suite 12.01, 1-5 Railway Street
CHATSWOOD NSW 2067

Orange
62 Hill Street
ORANGE NSW 2800

Ref No. 1023/03 August 2025

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EIS Declaration

Project details

Project name:	Monaro Rock Quarry
Application number:	SSD-27223807
Address of the land in respect of which the development application is made:	See **Table 3.2**

Applicant details

Applicant name:	Monaro Rock Pty Ltd
Applicant address:	9 Bowen Place, QUEANBEYAN WEST NSW 2620

Details of person by whom this EIS was prepared

Name:	Nicholas Warren
Address:	Suite 12.01, 1-5 Railway Street CHATSWOOD NSW 2067
Professional qualifications:	BSc, MBus, MEnvSc

Declaration by registered environmental assessment practitioner

Name:	Nicholas Warren
Registration number:	REAP80051, IA11106
Organisation registered with:	R.W. Corkery & Co. Pty Limited

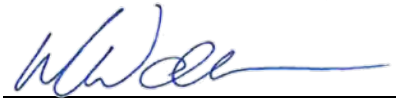
Declaration

The undersigned declares that this EIS:

- has been prepared in accordance with the Environmental Planning and Assessment Regulation 2021;
- contains all available information relevant to the environmental assessment of the development, activity or infrastructure to which the EIS relates;
- does not contain information that is false or misleading;
- addresses the Planning Secretary's environmental assessment requirements (SEARs) for the project;
- identifies and addresses the relevant statutory requirements for the project, including any relevant matters for consideration in environmental planning instruments;
- has been prepared having regard to the Department's State Significant Development Guidelines - Preparing an Environmental Impact Statement;
- contains a simple and easy to understand summary of the project as a whole, having regard to the economic, environmental and social impacts of the project and the principles of ecologically sustainable development;
- contains a consolidated description of the project in a single chapter of the EIS;
- contains an accurate summary of the findings of any community engagement; and
- contains an accurate summary of the detailed technical assessment of the impacts of the project as a whole.

EIS Author Signature: 

EIS Author Name: Nicholas Warren Date: 12 August 2025

REAP Signature: 

REAP Name: Nicholas Warren Date: 12 August 2025

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SPECIALIST CONSULTANT STUDIES

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Appendix B Air Quality Impact Assessment *Northstar Air Quality Pty Ltd*
Appendix C Human Health Risk Assessment *Environmental Risk Sciences Pty Ltd*
Appendix D Noise and Vibration Impact Assessment *Octave Acoustics Pty Ltd*
Appendix E Flyrock Assessment *Fromble Corp Pty Ltd*
Appendix F Visibility Assessment *R.W. Corkery & Co. Pty Limited*
Appendix G Biodiversity Development Assessment Report *Capital Ecology Pty Ltd*
Appendix H Aboriginal Cultural Heritage and Archaeological Report *Past Traces Heritage Consultants Pty Ltd*
Appendix I Road Transport Assessment *The Transport Planning Partnership Pty Ltd*
Appendix J Soil and Land Capability Assessment *Strategic Environmental and Engineering Consulting*
Appendix K Surface Water Management Report *Strategic Environmental and Engineering Consulting*

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Appendix N Social Impact Assessment Report *Landscape Research+ Communications*

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Acronyms

ACT	Australian Capital Territory
AHD	Australian Height Datum
AHIP	Aboriginal Heritage Impact Permit
ALUM	Australian Land Use and Management
AMZMEC	Australian Minerals and Energy Council
ANZECC	Australia and New Zealand Environment and Conservation Council
AS	Australian Standards
ACHAR	Aboriginal Cultural Heritage Assessment Report
AQIA	Air Quality Impact Assessment
BAL	Bushfire Attack Level
BAM	Biodiversity Assessment Method
BC Act	*Biodiversity Conservation Act 2016*
BDAR	Biodiversity Development Assessment Report
BE	Bachelor of Engineering
BFPL	Bush Fire Prone Land
BSc	Bachelor of Science
CBA	Cost–Benefit Analysis
CCAA	Cement, Concrete and Aggregates Association
CCC	Community Consultative Committee
CEnvP-E	Certified Environmental Practitioner – Ecology
CMT	Culturally Modified Tree
CPESC	Certified Professional in Erosion and Sediment Control
CPSS	Certified Professional Soil Scientist
DA	Development Application
DEC	Department of Environment and Conservation
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DPHI	Department of Planning, Housing and Infrastructure
DPIE	Department of Planning, Industry and Environment
DPE	Department of Planning and Environment
EDC	Estimated Development Cost

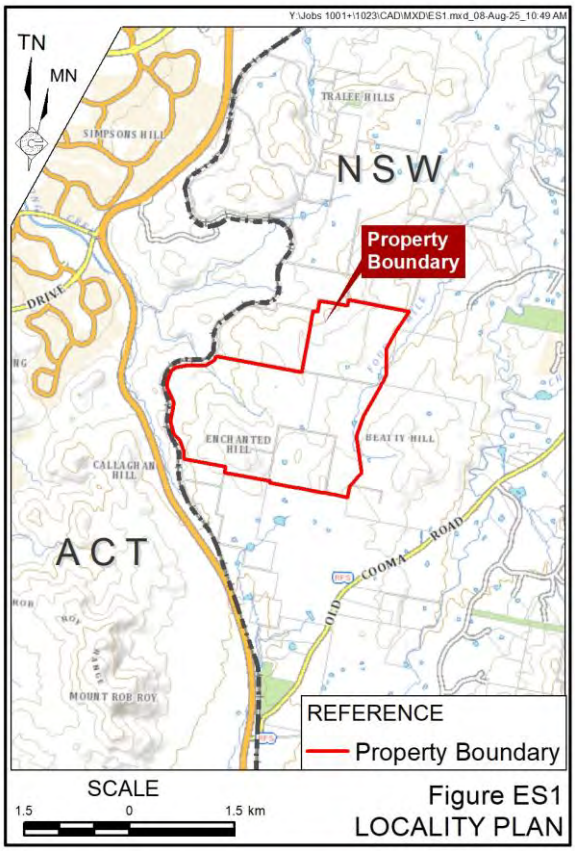
EIS	Environmental Impact Statement
ENM	Excavated Natural Material
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Reg.	Environmental Planning and Assessment Regulation
EPA	Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPL	Environment Protection Licence
EPSDD	Environment, Planning and Sustainable Development Directorate
ESD	Ecologically Sustainable Development
GVA	Gross Value Added
HHRA	Human Health Risk Assessment
IBRA	Interim Biogeographic Regionalisation for Australia
JHR	John Holland Rail
LEA	Local Effects Analysis
LEP	Local Environmental Plan
LGA	Local Government Area
LSPS	Local Strategic Planning Statement
LUCRA	Land Use Conflict Risk Assessment
MBA	Master of Business Administration
MBus	Master of Business
MDB	Murray Darling Basin
MEng	Master of Engineering
MEIANZ	Member of the Environment Institute of Australia and New Zealand
MEnvSc	Master of Environmental Science
MHRDC	Maximum Harvestable Right Dam Capacity
MIEAust	Member of the Institution of Engineers Australia
MNES	Matters of National Environmental Significance
MoU	Memorandum of Understanding
Mt	Million tonnes
Mtpa	Million tonnes per annum
NRAR	Natural Resources Access Regulator
NSW	New South Wales
PAD	Potential Archaeological Deposit
PCT	Plant Community Type

PhD	Doctor of Philosophy
POEO Act	*Protection of the Environment Operations Act 1997*
QPR	Qualified Professional Researcher
RAP	Registered Aboriginal Party
RCS	Respirable Crystalline Silica
REAP	Registered Environmental Assessment Practitioner
RWC	R.W. Corkery & Co. Pty Limited
SAII	Serious and Irreversible Impact
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SIA	Social Impact Assessment
SSD	State Significant Development
TARP	Trigger Action Response Plan
TCCS	Transport Canberra and City Services
TfNSW	Transport for NSW
tpa	Tonnes per annum
TSR	Travelling Stock Reserve
VENM	Virgin Excavated Natural Material
VLAMP	Voluntary Land Acquisition and Mitigation Policy
WAL	Water Access Licence
WM Act	*Water Management Act 2000*
WSP	Water Sharing Plan

Executive Summary

Introduction

Monaro Rock Pty Ltd (the Applicant) proposes to construct and operate the Monaro Rock Quarry (the Project), a hard rock quarry, on land located in Royalla, approximately 5km north of the intersection of the Monaro Highway and Old Cooma Road. The Project lies adjacent to the border separating New South Wales (NSW) and the Australian Capital Territory (ACT) (**Figure ES1**).



The Project would produce a range of high-quality aggregates and road construction materials to meet the anticipated increasing demand experienced in the Queanbeyan-Palerang and ACT regions over the next 30 years. Activities that would occur within the Project Site include site establishment and construction, quarrying, processing, product despatch and progressive and final rehabilitation as well as a range of ancillary activities.

The Project has been designed with its primary access road (the Quarry Access Road) traversing the NSW/ACT border and entering the public road network at the Monaro Highway. The development application for the Project (SSD-27223807) seeks approval only for activities within NSW. Although there are several references to the activities within the ACT and impacts have been assessed cumulatively, a separate application will be submitted to the ACT Government for the construction and use of land within the ACT.

The Project has been designed to address issues raised by the local community and all levels of government to maximise the benefits to the local community and NSW more broadly.

Key activities would include:

- occasional blasting to fragment the in-situ resource;
- loading of material onto haul trucks for relocation to the processing plant;
- crushing and shaping of the material at the processing plant;
- temporary storage of products within the Project Site; and
- despatch of products to customers via the public road network.

In addition to these standard hard rock extraction activities, the Project would also include the:

- importation virgin excavated natural material (VENM) and excavated natural material (ENM);
- importation, storage, and processing of concrete waste material;

- operation of a concrete batching plant (including importation of raw materials) and despatch of concrete; and
- operation of an asphalt plant (including the importation of raw materials) and despatch of asphalt.

The Project would include the following components (displayed on **Figures ES2** and **ES3**).

- Staged production increases from 100,000tpa to 1Mtpa, using mobile and fixed processing plants.
- Extraction operations using drill-and--blast methods with raw materials hauled to processing facilities.
- Processing of aggregates and road base materials using crushers, screeners, and a pugmill.
- Concrete recycling to repurpose up to 20,000tpa of inert construction waste.
- Asphalt production facility with capacity of up to 50,000m^3 annually and 300m^3 per day using various delivery and agitator vehicles.
- Dedicated Quarry Access Road (~4km), including sealed and unsealed sections, noise and dust mitigation measures, and a crossing of the disused railway line (**Figure ES4**).
- Heavy vehicle transport limited to up to 200 heavy vehicle loads per day and no more than 25 loads in an hour. All product transport and heavy vehicle use for ancillary activities (except concrete despatch) would be included in these limits.
- Despatch of no more than 50 concrete agitator loads per day.
- Ancillary infrastructure and mobile equipment supporting extraction, site maintenance, dust control and stockpile operations.
- Design and operation in accordance with best practice, incorporating enclosures, dust collectors and traffic management to minimise impacts.

The life of the Project would be between 30 to 35 years, including an initial 6-month construction period. For the purposes of development approval, a Project life of 35 years is being sought. A further period of three to five years of rehabilitation would be required for rehabilitation processes.

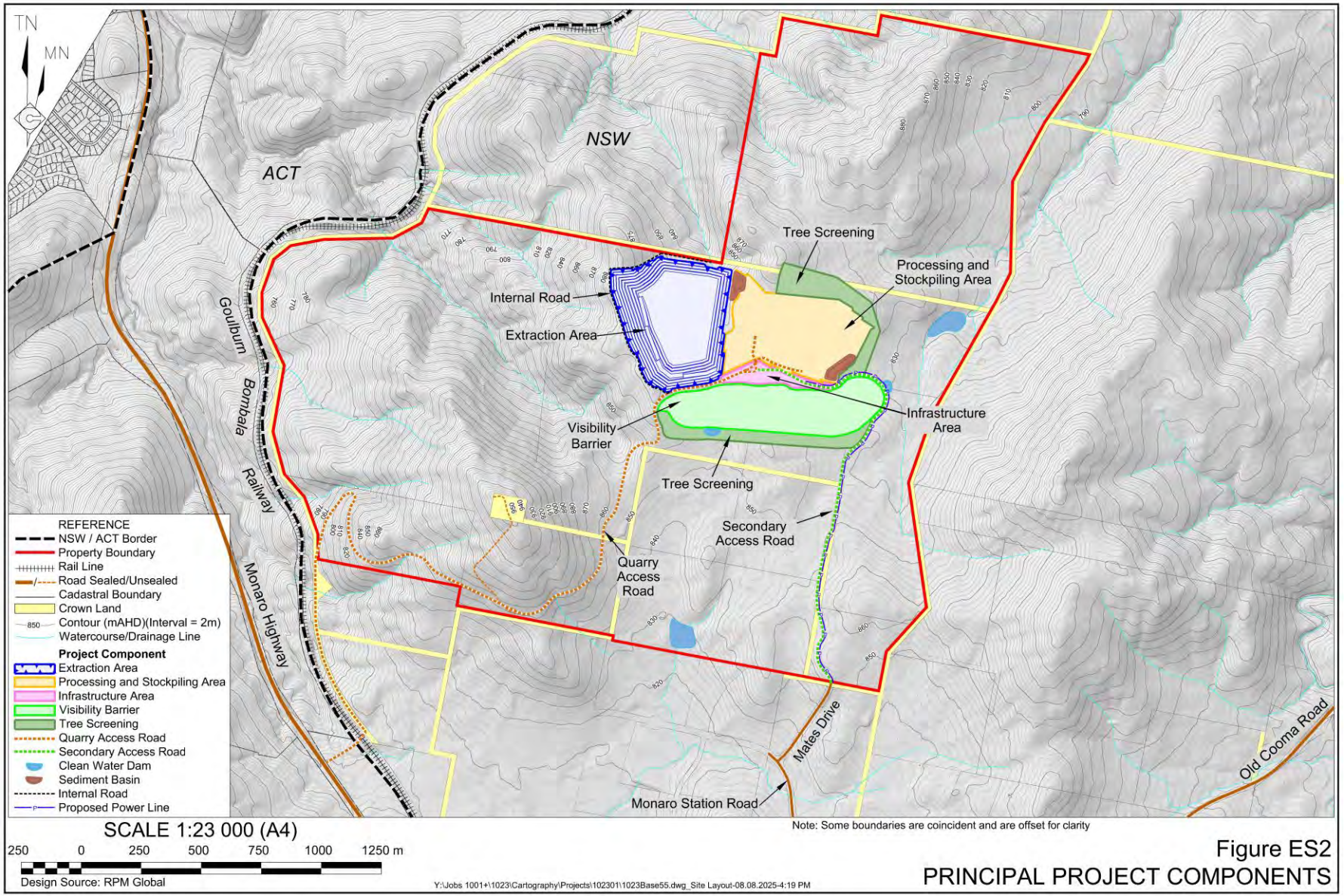
Project Background

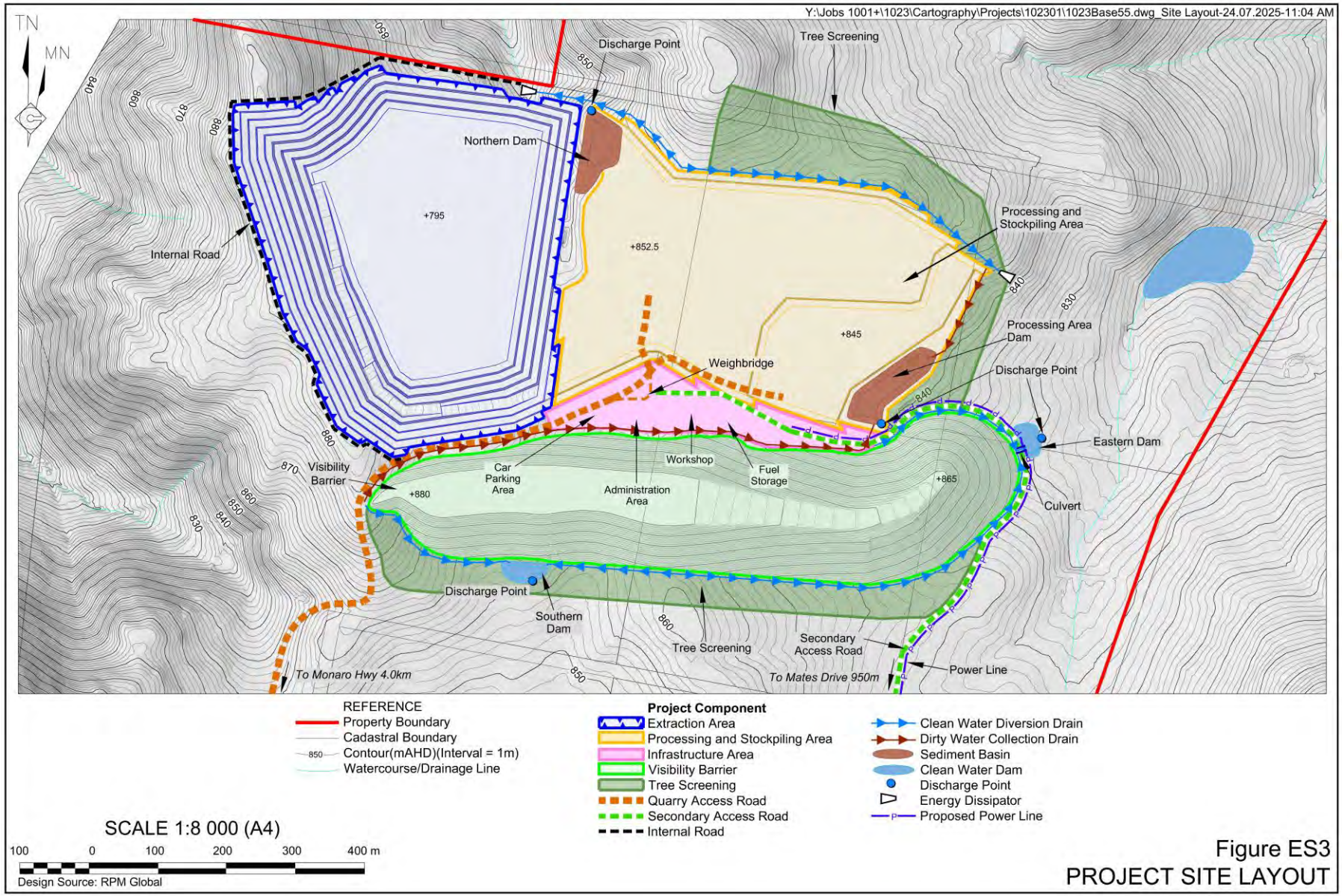
The target resource within the Project Site comprises rhyodacite rock of the Deakin Volcanics. The volcanic unit underlies the western extent of the Project Site, while the eastern extent is underlain by Colinton Volcanics. The two units are separated by the Royalla Fault, which trends NNE-SSW and show minimal surface displacement.

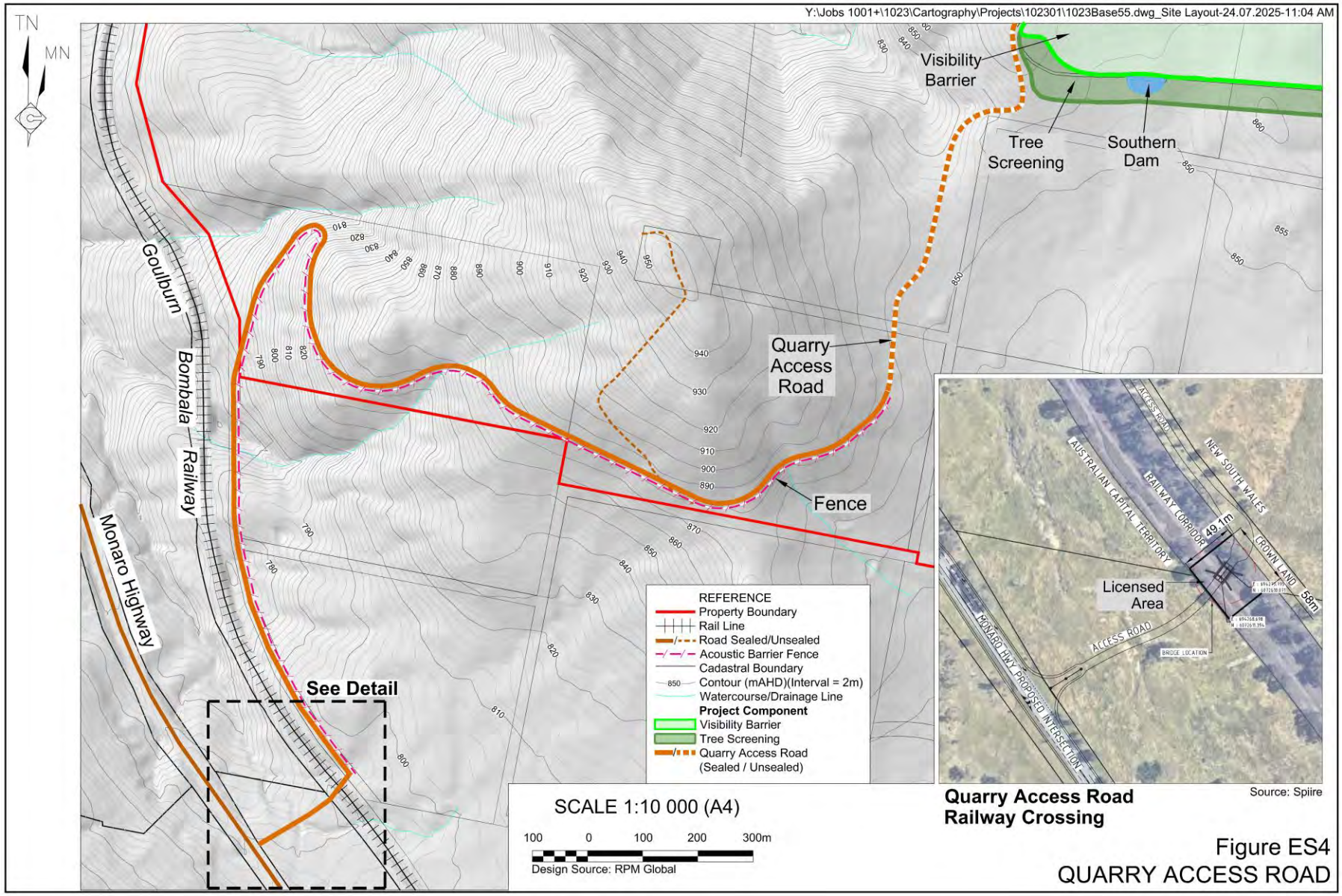
Geological investigations, including magnetic surveys, diamond drilling and percussion drilling, have identified a high-quality hard rock resource beneath the Project Site. The resource occurs in three weathering domains – highly weathered, moderately weathered, and slightly weathered/fresh rock. The latter two are suitable for aggregate production, while the highly weathered zone would be used in road construction and the Project infrastructure.

The resource has been calculated to comprise approximately 31.1Mt of extractable material, including:

- 25.5Mt of fresh and slightly weathered rock;
- 2.4Mt of moderately weathered rock; and
- 3.3Mt of highly weathered rock.


TN
MN
ACT
NSW
Goulburn Bombala Railway
Monaro Highway
Tree Screening
Processing and Stockpiling Area
Internal Road
Extraction Area
Infrastructure Area
Visibility Barrier
Tree Screening
Secondary Access Road
Quarry Access Road
Mates Drive
Old Cooma Road
Monaro Station Road
REFERENCE
NSW / ACT Border
Property Boundary
Rail Line
Road Sealed/Unsealed
Cadastral Boundary
Crown Land
Contour (mAHD)(Interval = 2m)
Watercourse/Drainage Line
Project Component
Extraction Area
Processing and Stockpiling Area
Infrastructure Area
Visibility Barrier
Tree Screening
Quarry Access Road
Secondary Access Road
Clean Water Dam
Sediment Basin
Internal Road
Proposed Power Line
SCALE 1:23 000 (A4)
250 0 250 500 750 1000 1250 m
Design Source: RPM Global
Y:\Jobs 1001+\1023\Cartography\Projects\102301\1023Base55.dwg_Site Layout-08.08.2025-4:19 PM
Note: Some boundaries are coincident and are offset for clarity
Figure ES2
PRINCIPAL PROJECT COMPONENTS


Y:\Jobs 1001+\1023\Cartography\Projects\102301\1023Base55.dwg_Site Layout-24.07.2025-11:04 AM
TN
MN
Discharge Point
Tree Screening
Northern Dam
+795
+852.5
+845
Internal Road
Processing and Stockpiling Area
Processing Area Dam
Weighbridge
Discharge Point
Eastern Dam
Visibility Barrier
Car Parking Area
Administration Area
Workshop
Fuel Storage
+880
+865
Culvert
Discharge Point
Southern Dam
Tree Screening
Secondary Access Road
Power Line
To Monaro Hwy 4.0km
To Mates Drive 950m
REFERENCE
Property Boundary
Cadastral Boundary
Contour(mAHD)(Interval = 1m)
Watercourse/Drainage Line
Project Component
Extraction Area
Processing and Stockpiling Area
Infrastructure Area
Visibility Barrier
Tree Screening
Quarry Access Road
Secondary Access Road
Internal Road
Clean Water Diversion Drain
Dirty Water Collection Drain
Sediment Basin
Clean Water Dam
Discharge Point
Energy Dissipator
Proposed Power Line
SCALE 1:8 000 (A4)
100 0 100 200 300 400 m
Design Source: RPM Global
Figure ES3
PROJECT SITE LAYOUT


Y:\Jobs 1001+\1023\Cartography\Projects\102301\1023Base55.dwg_Site Layout-24.07.2025-11:04 AM
TN
MN
Visibility Barrier
Tree Screening
Southern Dam
Quarry Access Road
Fence
Goulburn
Bombala
Railway
Monaro Highway
See Detail
REFERENCE
Property Boundary
Rail Line
Road Sealed/Unsealed
Acoustic Barrier Fence
Cadastral Boundary
Contour (mAHD)(Interval = 2m)
Watercourse/Drainage Line
Project Component
Visibility Barrier
Tree Screening
Quarry Access Road
(Sealed / Unsealed)
SCALE 1:10 000 (A4)
100 0 100 200 300m
Design Source: RPM Global
AUSTRALIAN CAPITAL TERRITORY
NEW SOUTH WALES
RAILWAY CORRIDOR
49.1m
CROWN LAND
58m
Licensed Area
ACCESS ROAD
MONARO HWY PROPOSED INTERSECTION
BRIDGE LOCATION
Source: Spiire
Quarry Access Road
Railway Crossing
Figure ES4
QUARRY ACCESS ROAD

A range of Quarry products would be produced to meet construction industry demand, including concrete aggregates, manufactured sand, low-grade aggregates, non-specified pavement materials, gabion rock, and crusher fines. Saleable product would be tailored to customer requirements.

Need for the Project

An assessment of the Economic Need for the Project was prepared by EcoRoc (2025) and considered existing and projected demand for hard rock aggregates to 2050 as well as known supply opportunities.

Demand was forecast based on projected population growth with a derived demand per capita assumed of 4.2t of hard rock aggregates per person per year then applied. This assumption does not take into account building trends provided anecdotally that indicate growing use of concrete formwork for residential construction to replace historic brick or wooden materials. The forecast annual demand for hard rock quarry products is approximately 2.3Mtpa (million tonnes per annum) in 2025 and is forecast to grow to approximately 3.3Mtpa by 2050.

There are four existing hard rock quarries within a nominal 30km radius of the Project. The Heidelberg-owned Williamsdale quarry, the Holcim-owned Cooma Road quarry, and the Boral-owned Mugga No. 1 and Hall quarries are all currently operating and servicing the local region. The most recently approved is the Williamsdale Quarry, which was approved 25 years ago in 2000. These quarries currently have the collective ability to supply 2.5Mtpa of hard rock aggregates to the region. However, they represent an ever-dwindling resource and some are approaching exhaustion of their resource with little opportunity for extension or prolonged operation.

A supply and demand balance was prepared by EcoRoc (2025) that considered several future scenarios and was subject to sensitivity analysis under various alternative supply and demand scenarios.

- Under the scenario where the Project is not approved shortfalls in supply are expected in 2030 and reach a cumulative volume of the 25 years tk 2050 of 41Mt.
- Under the scenario where approval is granted for the Project, supply shortfalls are expected from 2031 with the cumulative shortfall volume reaching 23Mt.
- Under a third scenario where extension is approved at the Williamsdale Quarry for an additional 17Mt, a cumulative shortfall of 6Mt by 2050 remains.

Figure ES5 presents the forecast annual supply and demand balance for Scenario 1 and Scenario 2.

The analysis indicates that when fully operational, the Monaro Rock Quarry would have the capacity to supply 30-35% of local demand for aggregates. Another supply source would likely be needed to meet the projected shortfall and to support development in the region.

Without the project, it may be expected that the delivered price for aggregates would increase due to the need to source these materials from outside the region.

Development of the quarry is considered to be in the wider community's interest, because it:

a) would provide an essential resource for local building, construction, and other infrastructure, which is limited in local availability and supply;

b) would reduce the need for future costly replacement imports of aggregates from outside the region (for example; the NSW Southern Highlands); and

c) is the last of the known greenfield hard rock deposits in the greater Canberra region, where sufficient quantity and quality of resources exist and are economically viable to extract.

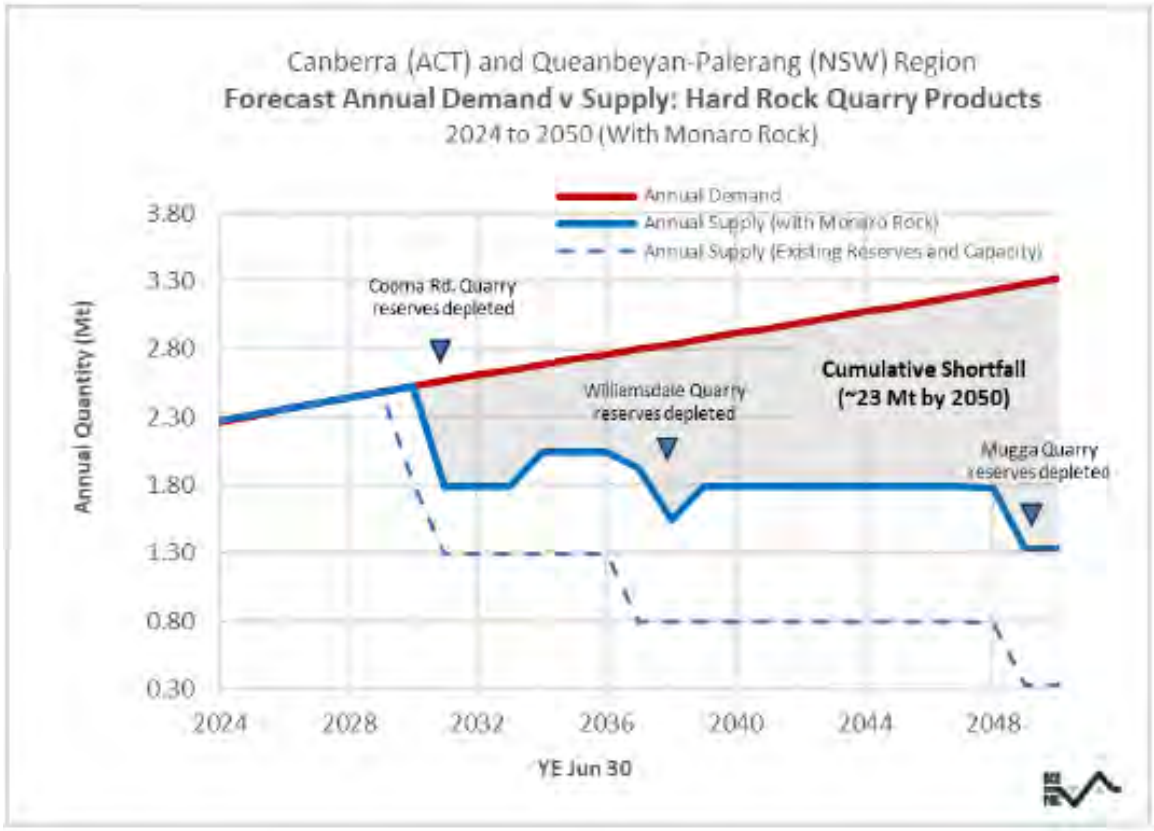


Figure ES5
Forecast Annual Demand Versus Supply FY2024 To FY2050

The Applicant

Monaro Rock is a joint venture between two locally owned and operated Australian businesses – The McPherson Family and the Ferreira Family. The MacPhersons operate Monaro Mix Specified Concrete Pty Limited (Monaro Mix), which supplies concrete and concrete pumping services via three batching plants located throughout the Queanbeyan-Palerang Local Government Area and the broader ACT region. The Ferreira family are directors of Pacific Formwork Pty Limited and Precast Projects Pty Ltd, which provide high-quality formwork and precast concrete products to major construction projects in the same region.

Together, the directors of Monaro Rock bring more than 75 years of combined experience in construction materials, concrete manufacturing, and infrastructure development. Their businesses currently employ more than 250 staff, most of whom reside locally.

The Applicant is seeking to gain greater confidence and control of the supply chain for raw materials to ensure the reliability of supply, the quality of materials and increased certainty regarding costs.

The Quarry is being developed to secure a reliable and cost-effective supply of raw material for their existing operations and to meet growing demand across the ACT and surrounding areas. By vertically integrating aggregate production into their supply chain, the Applicant aims to strengthen quality control, manage delivery timeframes, and reduce dependence on external sources of raw materials.

Monaro Rock's directors have longstanding relationships with the Queanbeyan and ACT communities and maintain a commitment to supporting regional development, contributing to local employment, and delivery infrastructure essential to the built environment.

Objectives of the Project

The Applicant's objectives in developing and operating the Project are to:

1. secure access to a strategically located and long-term hard rock resource that would provide a range of high-quality aggregates and road construction materials for use in the Queanbeyan-Palerang and ACT regions;
2. maximise efficient resource recovery within the defined Extraction Area;
3. undertake activities in an environmentally responsible manner to meet all relevant criteria and satisfy reasonable community expectations;
4. develop the operation in a manner that is considerate of the wide variety of local land uses and community amenity;
5. ensure the health of its workforce and the surrounding community is not adversely affected;
6. provide a stimulus to the local economy by increasing local employment levels and supply opportunities; and
7. operate in a cost-effective manner.

Approvals Required

The *Environmental Planning and Assessment Act 1979* (EP&A Act) provides the framework for the assessment and determination of development applications in NSW. As the Monaro Rock Quarry involves extractive industry operations, The Project is classified as a State Significant Development under Clause 7 of Schedule 1 of the *State Environmental Planning Policy (SEPP)(Planning Systems) 2021*. Accordingly, the following approvals are required to enable the Project to proceed.

- Development Consent under the EP&A Act as the Project is classified as State Significant Development.
- Environmental Protection Licence (EPL) from the NSW EPA under the *Protection of the Environment Operations Act 1997* to regulate pollution risks.
- A Water Access License (WAL) under the *Water Management Act 2000* for groundwater extraction.

The following approvals would also be required for activities within the ACT.

- ACT Development Approval – Required under the *ACT Planning Act 2023* for construction and use of the Quarry Access Road within the ACT.
- Works Approval from the National Capital Authority – Required under the *Australian Capital Territory (Planning and Land Management) Act 1988* for works within the Monaro Highway corridor.

Approval is also likely to be required under the Environment Protection and *Biodiversity Conservation Act 1999* due to potential impacts on matters of national environmental significance. A referral to the Commonwealth Department of Climate Change, Energy, the Environment and Water is being finalised.

Planning Agreement

The Applicant has commenced negotiations with Queanbeyan-Palerang Regional Council (Council) to establish a Planning Agreement. The Planning Agreements will include the payment of a 12.5c/t contribution to be managed by Council for distribution as follows.

- Contributions towards projects established by Community Management Committees established under Section 355 of the Local Government Act 1993. It is expected that these groups would be focused on local community halls and support or sponsor events or projects managed by committees associated with each hall.

- The funding would be directed to Community Management Committees located in Royalla, Fernleigh Park and Googong.
- Contributions to a community fund for support of community led projects that may include local environmental regeneration projects such as those managed by local Landcare groups.
- Procedures for implementation of the above.

Council has indicated its support for the proposed mechanism with final terms and an agreement expected to be finalised prior to determination of the Project.

Description of the Project

Site Establishment and Construction

Initial site establishment works would prepare the Project Site for operations and construction of key infrastructure to support the development such as road and operating areas. These activities would occur over approximately six month period and include the following.

- Surveying and marking of all disturbance boundaries.
- Formalise initial access to the Quarry via the Secondary Access Road that joins the public road network at Mates Drive, Royalla
- Construction of sediment basins and water management infrastructure.
- Establishment of a temporary office and amenities.
- Planting of tubestock in designated tree screening areas.
- Vegetation clearing and soil stripping in designated areas.
- Establishment of buildings and operating areas within the Infrastructure Area
- Construction of the Quarry Access Road, railway bridge crossing and intersection with the Monaro Highway.
- Installation of power supply infrastructure.
- Initial extraction and processing using mobile plant.
- Assembly/installation of the mobile processing plant and related infrastructure

Project Development and Staging

Development of the Project would be staged to allow for the progressive development of the site including vegetation clearing and the ramping up of operations as site infrastructure is developed.

Each of the key components of the Project Site has been staged for the purpose of the EIS, however it is noted that stage progression is not expected to be the same for each component and would depend on a number of factors including customer requirements, market conditions and geological constraints.

Quarrying Operations

Quarrying would be undertaken using conventional hard rock extraction techniques to produce high-quality aggregates. The process would involve:

- drill and blast operations to fragment rhyodacite rock;
- load and haul of material to processing areas;
- crushing and screening to produce a range of aggregate products; and
- stockpiling and despatch of products via the Quarry Access Road.

The Extraction Area would be developed in four stages, reaching a final depth of 795m AHD and covering approximately 21.1ha.

Processing Operations

Processing would be staged to align with production growth and would incorporate both mobile and fixed plant infrastructure. Processing activities would include the following.

- Mobile processing plant during early operations.
- Commissioning of a fixed processing plant once production reaches a target of 750,000tpa, if not before.
- Use of a pugmill for road base production and a pre-coat plant.

Ancillary Infrastructure

Additional infrastructure would be developed for activities that are ancillary to the production of hard rock aggregates. This would include the following.

- A conventional concrete batching plant to produce premix concrete.
- An asphalt plant to produce asphalt for road construction and maintenance
- A concrete recycling facility for processing of waste concrete.

Project Site Access and Transportation

The Project would be supported by dedicated access infrastructure that would include the following key components.

- A 4.0km Quarry Access Road connecting the Project Site to the Monaro Highway, incorporating a 2.7km sealed section and acoustic barrier.
- Secondary access via Mates Drive and Monaro Station Road for light vehicles or use in an emergency.
- The bulk of quarry products would be despatched from the Project Site using truck and dog trailers of various configurations, with smaller or larger capacity vehicles used depending on customer requirements.
- The majority of heavy vehicles would turn right on to Monaro Highway when exiting the Project Site, however some vehicle may turn left, depending on customer requirements.
- Up to 200 heavy vehicle loads per day and no more than 25 laden loads to be despatched per hour.
- Despatch of no more than 50 concrete agitator loads per day.
- All transport movements monitored and managed via weighbridge systems.

Waste Management

Waste generated during operations would be managed in accordance with environmental best practice.

Production by-products such as highly weathered material, scalps or fines would be used for on-site construction needs or stored within the Visibility Barrier, from where they may be used in the future for blending to produce road base.

Non-production waste management would involve:

- removal of all non-production waste by licensed contractors;
- on-site segregation and management of recyclable materials; and
- storage and disposal of waste oil and maintenance consumables in accordance with EPA guidelines.

Water Supply and Management

Water would be sourced and managed to support operational needs while minimising environmental impacts. Water management infrastructure for the Project is included in **Figure ES6**. The system would include the following elements.

- Water to support operations would be sourced on-site from harvestable rights dams, sediment basins, and a production bore but may also be supplemented by external sources.
- The estimated annual water demand would include up to 25ML per year for dust suppression and up to 9ML for concrete production as well as water lost to infiltration and evaporation from water storage infrastructure.
- Water management infrastructure would include clean water and sediment basins (dirty water), diversion bunds and drains, and water tanks.

Utilities and Services

Essential services would be installed to support safe and reliable operations. These include:

- power supplied via private connection to the local grid;
- communications via mobile and two-way radio;
- sewage managed via septic or biocycle systems; and
- explosives brought on-site only for blasting days and handled by licensed contractors.

Final Landform and Land Uses

The Visibility Barrier and upper extraction benches will be progressively revegetated with trees and shrubs, designed to blend with the surrounding landscape and reduce long-term visual effects of terminal quarry walls.

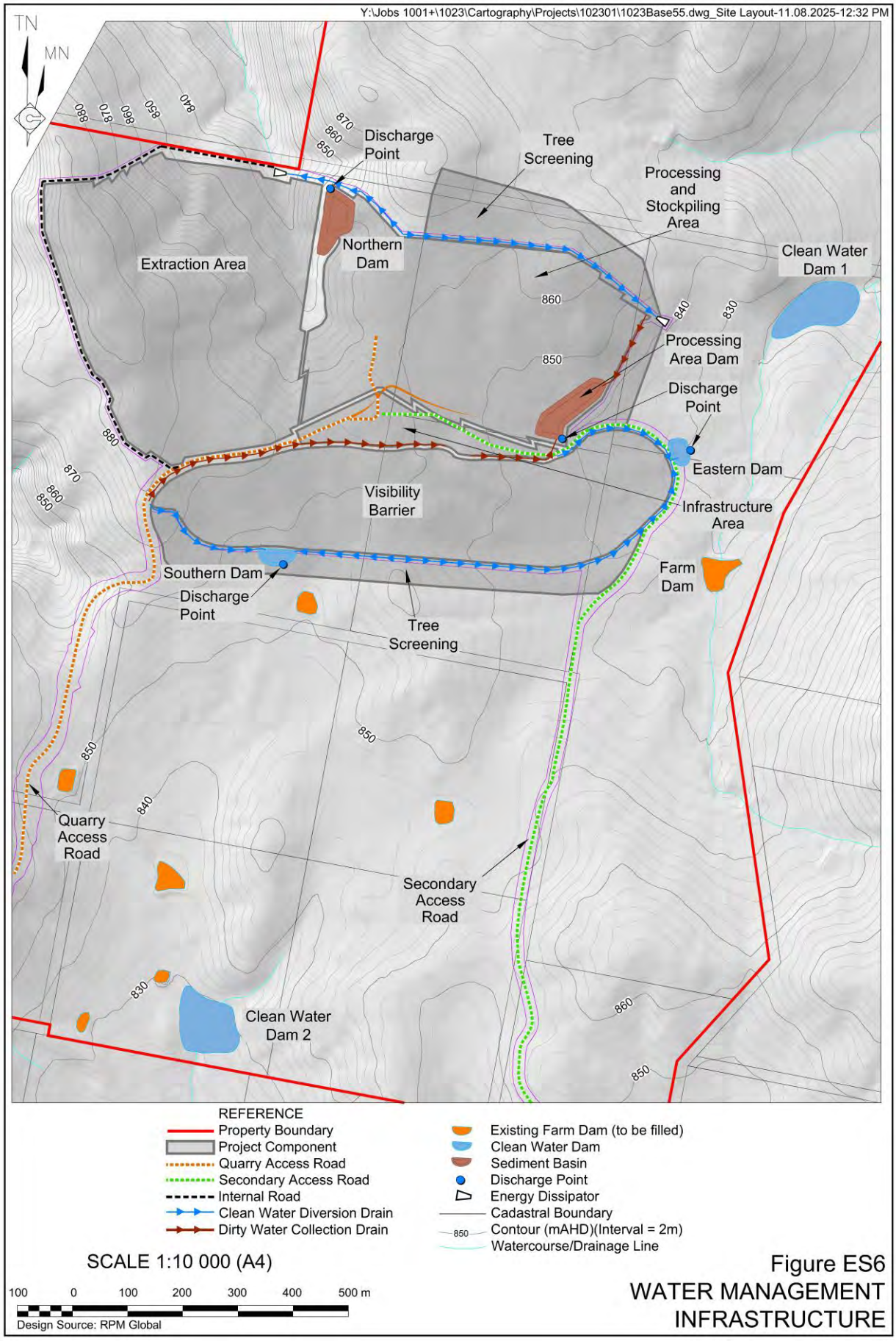
The proposed final landform is presented in **Figure ES7** and would include a stable final void that would collect water over time, forming an open water feature at approximately 800m AHD. Surrounding areas will be progressively rehabilitated to support a mix of native vegetation and pasture, enabling future land uses such as grazing and biodiversity conservation. Infrastructure and stockpiling areas will be reshaped and covered with topsoil to support pasture establishment and low-impact agricultural use.

Rehabilitation will be guided by a Biodiversity and Rehabilitation Management Plan, with clear performance criteria and monitoring to ensure satisfactory outcomes.

Alternatives Considered

Key actions undertaken to avoid or minimise impacts include the following.

- The extraction footprint was refined to avoid high-quality Box-Gum Woodland, Pink-tailed Legless Lizard habitat, and culturally significant Aboriginal sites. The final Project Site excludes areas of dense and good condition vegetation and has been positioned to take advantage of natural topographic features such as Beatty Hill to provide visual and acoustic shielding.
- Multiple access options were assessed, with the final Quarry Access Road alignment selected to minimise proximity to residences, avoid sensitive ecological areas, and respond to community preferences. Although more complex and expensive, the chosen alignment would separate heavy vehicle movements from local traffic and reduce noise and amenity impacts.


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TN
MN
Discharge Point
Tree Screening
Processing and Stockpiling Area
Clean Water Dam 1
Extraction Area
Northern Dam
Processing Area Dam
Discharge Point
Eastern Dam
Infrastructure Area
Visibility Barrier
Southern Dam
Discharge Point
Farm Dam
Tree Screening
Quarry Access Road
Secondary Access Road
Clean Water Dam 2
REFERENCE
Property Boundary
Project Component
Quarry Access Road
Secondary Access Road
Internal Road
Clean Water Diversion Drain
Dirty Water Collection Drain
Existing Farm Dam (to be filled)
Clean Water Dam
Sediment Basin
Discharge Point
Energy Dissipator
Cadastral Boundary
Contour (mAHD)(Interval = 2m)
Watercourse/Drainage Line
SCALE 1:10 000 (A4)
100 0 100 200 300 400 500 m
Design Source: RPM Global
Figure ES6
WATER MANAGEMENT INFRASTRUCTURE

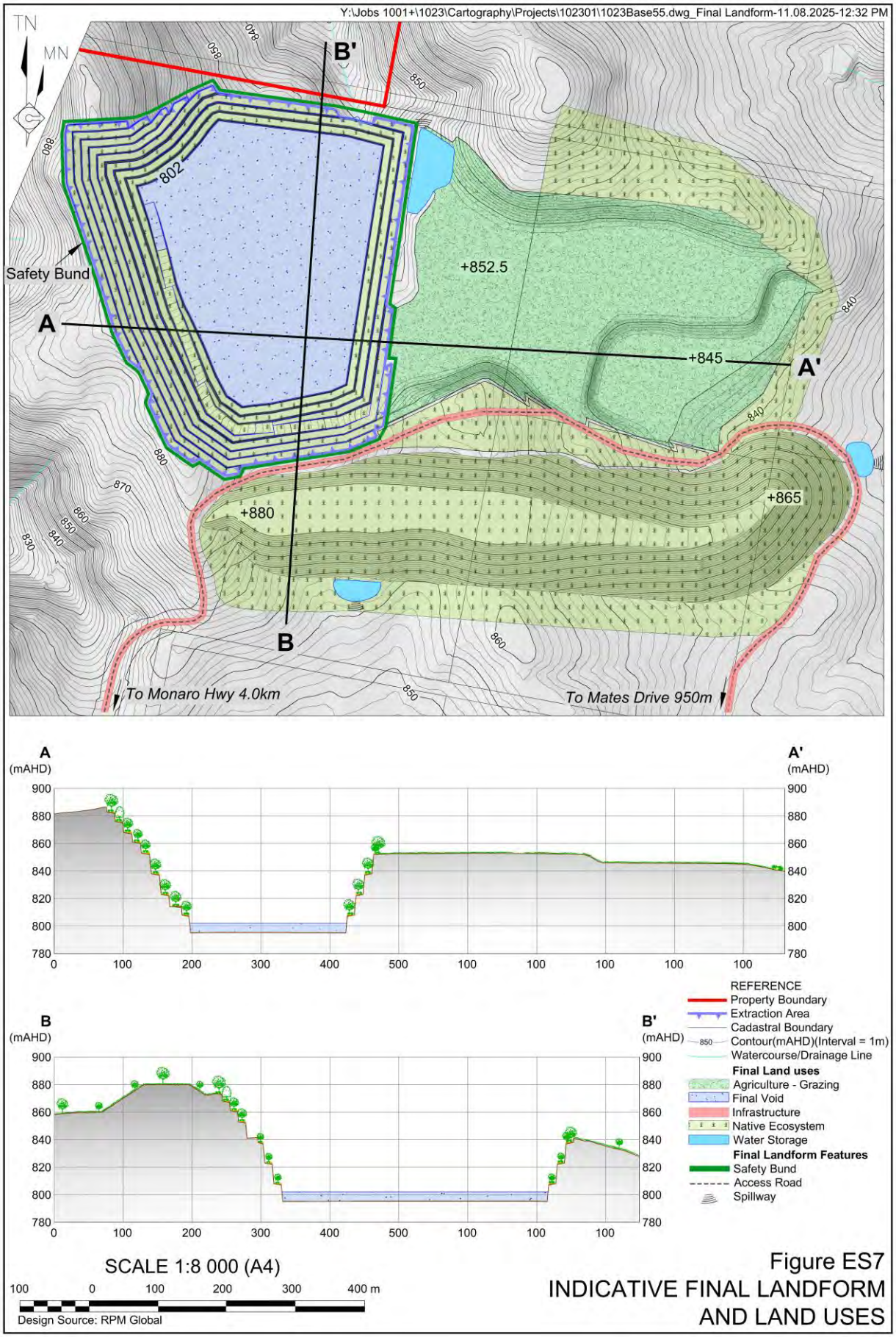


Figure ES7
INDICATIVE FINAL LANDFORM AND LAND USES

- The Visibility Barrier was strategically located and staged to provide immediate and long-term screening of operational areas. Its southern face would be progressively vegetated to mitigate visual impacts from public vantage points and nearby dwellings.
- The Project would be developed in stages, allowing for progressive clearing, infrastructure installation, and production ramp-up. This approach would limit the extent of disturbance at any one time and enable adaptive management based on environmental monitoring and operational needs.

Community Engagement

The Applicant is committed to ensuring that the Project delivers meaningful benefits to the local community and region, including employment opportunities, infrastructure improvements, and transparent communication throughout the life of the Project.

Since 2021, the Applicant has undertaken extensive engagement with landholders, community members, Aboriginal stakeholders, and government agencies. This engagement has included community information sessions, newsletters, virtual meetings, site tours, and direct consultation with Registered Aboriginal Parties (RAPs). In addition, engagement for the preparation of the Social Impact Assessment has provided additional information on community expectations, concerns and preferences. Feedback from these activities has directly informed the Project's design and environmental management strategies.

Key issues raised during consultation included concerns about air quality, noise, blasting impacts, water availability, traffic, and visual amenity. Economic and social concerns such as property values, mental wellbeing, and trust in planning processes were also acknowledged and addressed through the EIS and supporting studies.

The Applicant would continue to engage proactively with stakeholders through a Community Consultative Committee, regular updates via newsletters and its website, and direct contact with neighbours. All relevant documentation, including environmental management plans and monitoring data, would be made publicly available to ensure transparency and accountability.

This commitment to ongoing, respectful engagement reflects the Applicant's dedication to operating responsibly.

Environmental Assessment and Management

Environmental Setting

The Project Site is located in a landscape of rolling hills and incised gullies, with elevations ranging from approximately 850 to 955 metres above sea level. Drainage flows eastward into Four Mile Creek and northward into Monks Gully, both of which ultimately connect to the Murrumbidgee River system.

Climate data from nearby Bureau of Meteorology stations indicate a temperate climate, with average annual rainfall of 657.5 mm and mean daily evaporation of 2.8 mm. January is typically the hottest month (mean max 29.4°C), while July is the coldest (mean min 0.1°C). Wind modelling shows dominant north-westerly and northerly winds year-round, with seasonal variations.

Air Quality

The Air Quality Impact Assessment (AQIA) prepared by Northstar Air Quality Pty Ltd (2025) concluded that the Project would comply with all relevant air quality criteria for particulate matter (PM), odour, and respirable crystalline silica (RCS). With the

proposed mitigation and monitoring measures in place, the Project is not expected to result in unacceptable impacts to surrounding sensitive receptors.

The assessment considered emissions from extraction, processing, concrete and asphalt production, and vehicle movements. Dispersion modelling was undertaken for two operational scenarios using conservative assumptions and worst-case meteorological conditions with results predicted at a range of private residences (see **Figure ES8**).

Key findings included:

- Annual average concentrations of PM_{10}, $PM_{2.5}$, TSP, and dust deposition were below applicable NSW EPA criteria at all receptor locations.
- 24-hour average PM_{10} levels did not exceed the relevant criteria under either scenario.
- One additional exceedance of the 24-hour $PM_{2.5}$ criterion was predicted at two residences, occurring during background conditions already close to the threshold.
- Odour concentrations were well below detection thresholds, indicating no nuisance impacts.
- RCS concentrations were significantly below the adopted criterion of 3 µg/m³, even under conservative assumptions.

Predicted maximum impacts for 24-hr PM_{10} and $PM_{2.5}$ under Scenario 2 are presented in **Figure ES9**.

Mitigation measures include water carts, dust suppressants, enclosed loading systems, and real-time air quality monitoring.

The outcomes of the AQIA reflect the siting of the Project at a distance of approximately 1.5km from the closest private residence and with topographic features including hills and ridgelines influencing likely dust dispersion.

A comprehensive Air Quality Management System will be implemented, including real-time air quality monitoring with proactive and reactive management applied. Management measures would include the use of water carts, dust suppressants, plant enclosures, transport limits, and tree screening. With these controls in place, the Project is expected to comply with all relevant air quality criteria and maintain acceptable amenity levels for surrounding residences. Management of air quality risks on an ongoing basis would ensure that dust levels are kept to an acceptable level and that health risks associated with particulate matter and respirable crystalline silica remain low and acceptable.

Greenhouse Gas

The greenhouse gas assessment prepared by Northstar Air Quality Pty Ltd (2025) concluded that the Project would generate a very small proportion of Australia's and NSW's total greenhouse gas (GHG) emissions. With proposed mitigation measures in place, the Project is not expected to contribute significantly to climate change or breach any relevant policy thresholds.

The assessment considered Scope 1, 2, and 3 emissions from fuel use, electricity consumption, material transport, and employee travel. Total Scope 1 emissions were estimated at approximately 19,532 tonnes of CO_2-equivalent per year, representing less than 0.005% of Australia's and less than 0.002% of NSW's annual emissions.

Key findings included:

- Scope 1 emissions primarily result from diesel use in quarrying and transport operations.
- Scope 2 emissions relate to electricity consumption, primarily for concrete batching.
- Scope 3 emissions include upstream fuel production and employee travel.

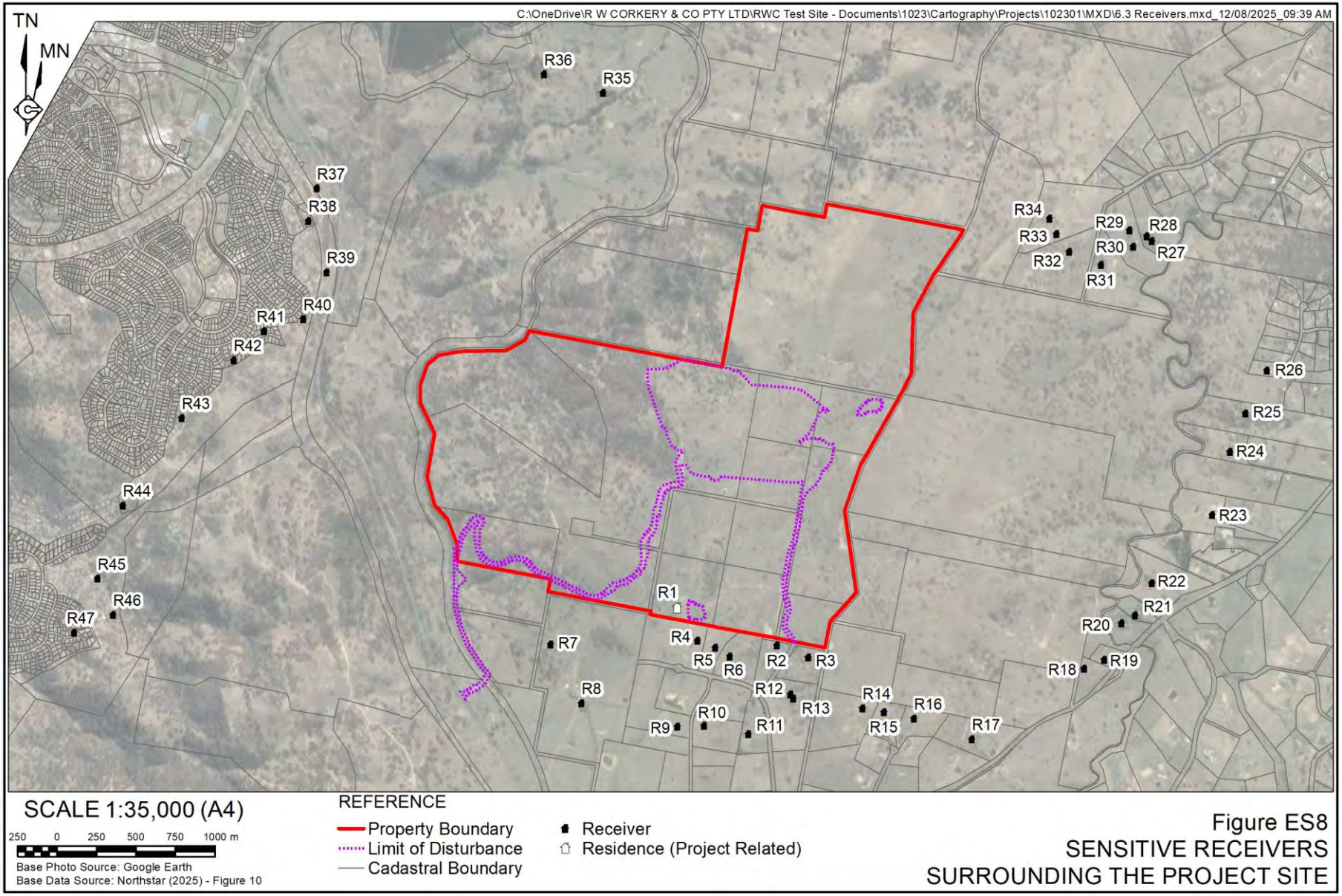


Figure ES8
SENSITIVE RECEIVERS
SURROUNDING THE PROJECT SITE

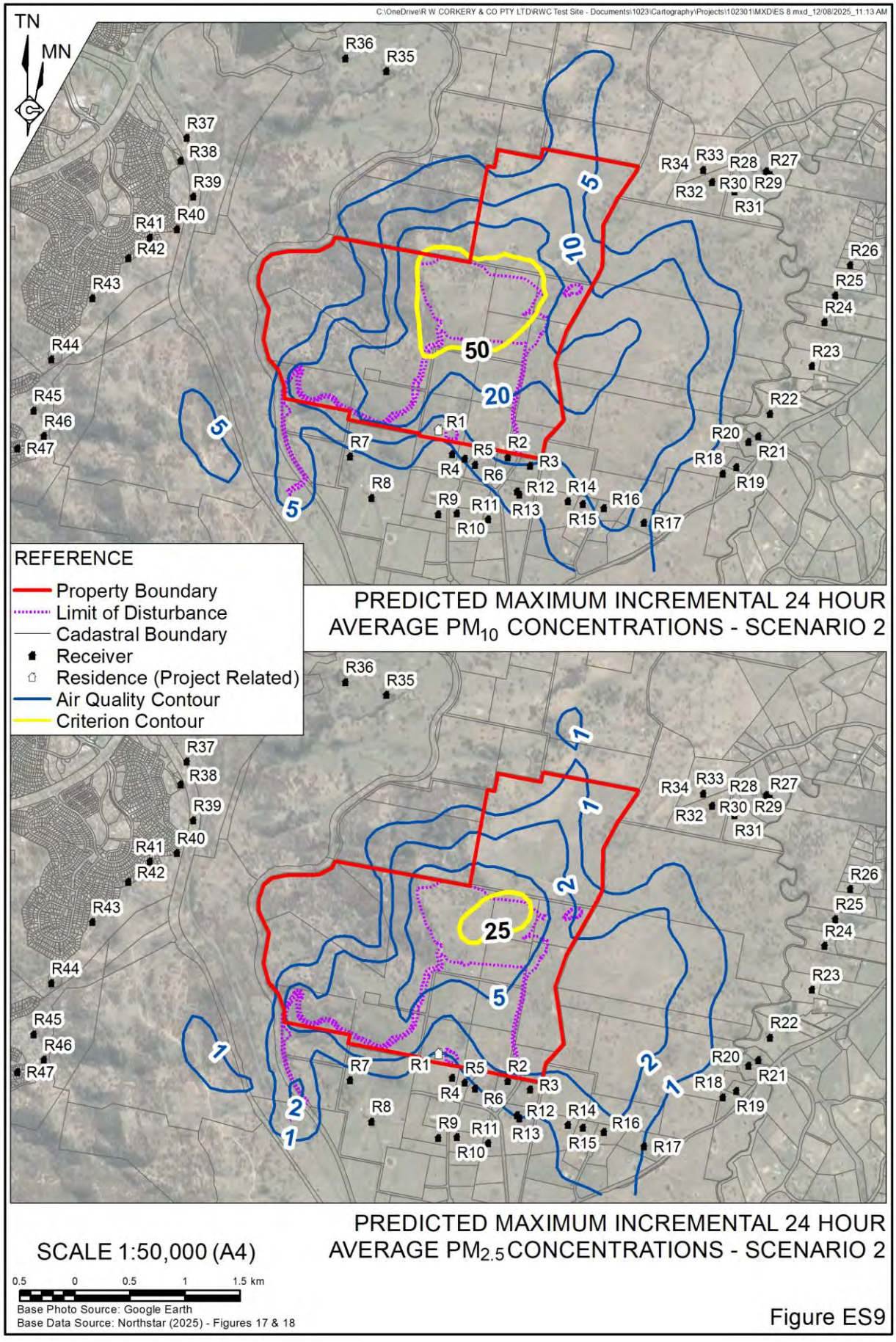

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TN
MN
R36
R35
R37
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R34
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R5
R6
R7
R8
R9
R10
R11
R12
R13
R14
R15
R16
R17
50
20
10
5
5
5
REFERENCE
Property Boundary
Limit of Disturbance
Cadastral Boundary
Receiver
Residence (Project Related)
Air Quality Contour
Criterion Contour
PREDICTED MAXIMUM INCREMENTAL 24 HOUR AVERAGE PM_{10} CONCENTRATIONS - SCENARIO 2
25
5
2
1
1
1
2
1
2
1
7
PREDICTED MAXIMUM INCREMENTAL 24 HOUR AVERAGE $PM_{2.5}$ CONCENTRATIONS - SCENARIO 2
SCALE 1:50,000 (A4)
0.5 0 0.5 1 1.5 km
Base Photo Source: Google Earth
Base Data Source: Northstar (2025) - Figures 17 & 18

Figure ES9

Mitigation measures include:

- Efficient vehicle operation and route optimisation.
- Use of lower-emission fuels and regular maintenance of equipment.
- Potential transition to grid-supplied or renewable electricity sources.

The Project would be regulated under the NSW EPA Climate Change Policy 2023 and any future requirements would be addressed through the Environmental Protection Licence (EPL).

Human Health

The Human Health Risk Assessment (HHRA) prepared by EnRisks Pty Ltd (2025) concluded that the Project poses no unacceptable risks to public health, including from respirable crystalline silica (RCS). Predicted concentrations of particulate matter and RCS at nearby residences were found to be well below national and international health-based guidelines, even under conservative assumptions.

The assessment considered potential exposure pathways including inhalation, ingestion, and dermal contact, with a focus on air emissions from quarrying, concrete/asphalt production, and vehicle movements. Key pollutants assessed included $PM_{2.5}$, PM_{10}, and RCS, with modelling based on worst-case operational scenarios.

Key findings included:

- Predicted annual average $PM_{2.5}$ and PM_{10} concentrations at all receptor locations comply with NEPM health-based guidelines.
- RCS concentrations were conservatively modelled assuming both 40% and 100% silica content in $PM_{2.5}$, with cumulative values remaining 20 to 75 times below silicosis guidelines.
- Community health characteristics were broadly consistent with NSW averages, with no elevated vulnerability identified.
- Uncertainty analysis confirmed that even under stricter international guidelines, health risks remain low and acceptable.

Mitigation measures include:

- Dust suppression via water carts, progressive rehabilitation, and equipment maintenance.
- Air quality monitoring with laboratory analysis of RCS concentrations.
- Regulation under SafeWork NSW,, the NSW Resources Regulator, and the NSW EPA.

The HHRA concluded that the Project would not result in discernible changes to existing air quality or pose health risks to surrounding residents, provided the proposed dust control measures are implemented. EnRisks (2025) concluded that the Project poses a low and acceptable risk to human health.

Noise, Vibration and Blasting

The Noise and Blasting Assessment prepared by Octave Acoustics Pty Ltd (2025) and the Preliminary Flyrock Assessment by Fromble Corp Pty Ltd (2025) concluded that the Project would comply with all relevant NSW and ACT criteria for operational noise, construction noise, vibration, and blasting impacts. Predicted levels at nearby residences remain below guideline thresholds under both standard and noise-enhancing conditions.

Key findings included:

- Operational noise levels are predicted to remain below EPA criteria at all residences during both daytime and early morning operations. Modelling outcomes for Scenario 2 of operations are presented in **Figure ES10**.

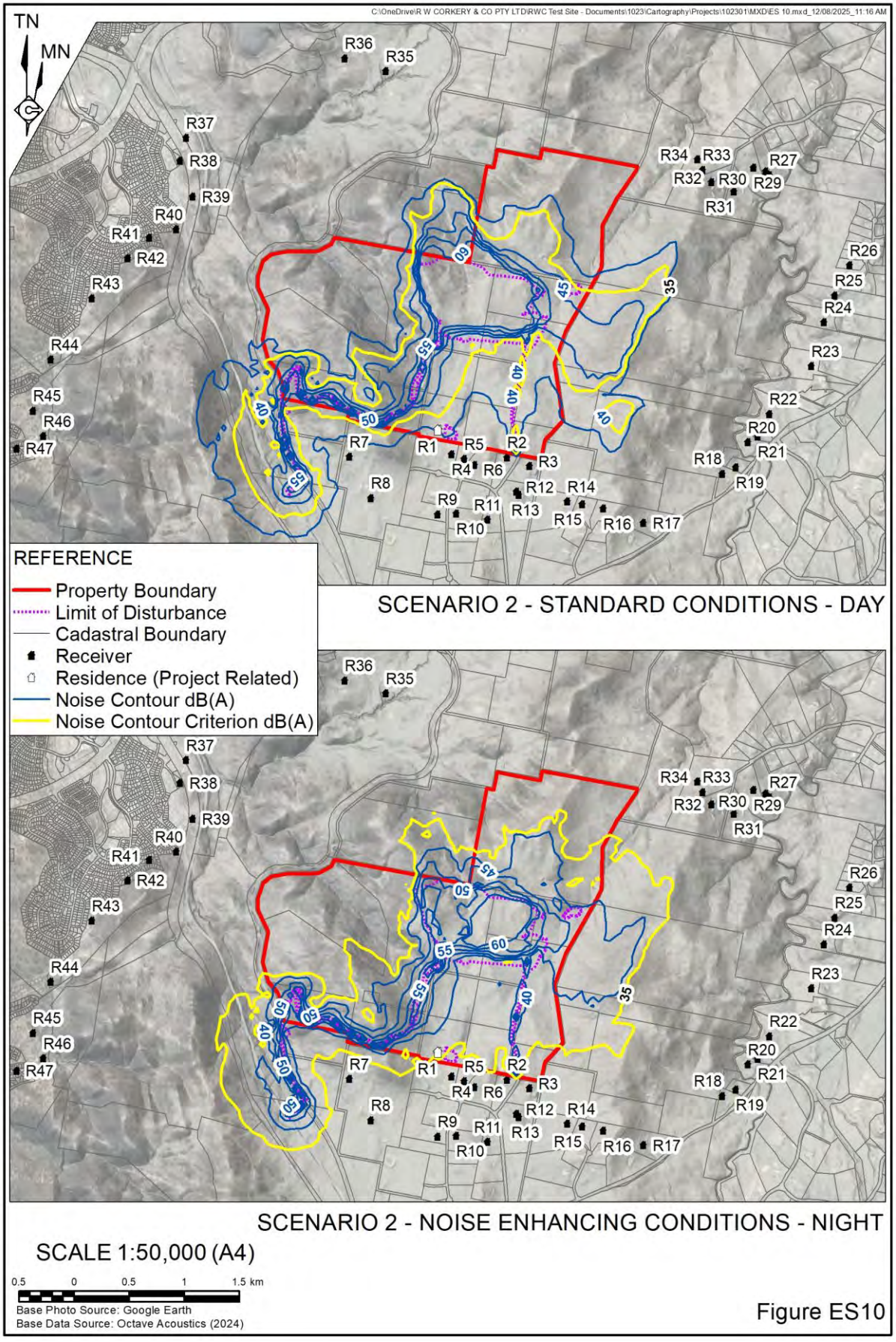

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TN
MN
REFERENCE
Property Boundary
Limit of Disturbance
Cadastral Boundary
Receiver
Residence (Project Related)
Noise Contour dB(A)
Noise Contour Criterion dB(A)
SCENARIO 2 - STANDARD CONDITIONS - DAY
SCENARIO 2 - NOISE ENHANCING CONDITIONS - NIGHT
SCALE 1:50,000 (A4)
0.5 0 0.5 1 1.5 km
Base Photo Source: Google Earth
Base Data Source: Octave Acoustics (2024)

Figure ES10

- Noise from the Quarry Access Road construction may exceed the noise-affected level at some receivers but remains below the highly affected threshold.
- The Project would not trigger Voluntary Land Acquisition and Mitigation Policy thresholds.
- Blasting impacts, including ground vibration and airblast overpressure, comply with human comfort and building damage criteria.
- Flyrock risks are low, with clearance zones maintained within the site boundary and vertical throw well below aviation safety thresholds.
- There would be no intrusive impacts associated with road noise, maximum noise levels and limited risk of sleep disturbance.

Specific mitigation measures include:

- Construction of a 3 m high acoustic barrier along the access road.
- Equipment selection and maintenance to meet sound power limits.
- Blast management protocols including community notification, clearance zones, and blast planning.

With these safeguards, the Project is expected to operate within acceptable noise and vibration limits, with minimal disruption to surrounding communities.

A Noise Management System would be established for the Project that describes both proactive and reactive management of noise-related risks. A Blast Management System would also be implemented for the Project

The outcomes do not mean that the community would not hear or experience the effects of noise and blasting from time to time. However, the operation would satisfy the requirements of the NSW Government with regards to the environmentally responsible operation of the Project. The management of noise and blasting risks would occur over the life of the Project with regular monitoring published on the Company website and in annual reporting for the Project.

Visibility

The Visual Impact Assessment (VIA) prepared by R.W. Corkery & Co. Pty Limited (2025) concluded that the Project would result in low to moderate visual impacts, with effective mitigation measures in place to reduce visibility from surrounding residences and public vantage points.

The assessment considered the Project's visual catchment, meaning the locations form which views would be possible. Spatial modelling, site inspections, and photomontage analysis were completed for six representative locations. The visual catchment of the operating area of the Project Site are presented in **Figure ES11** and the visual catchment on of the Quarry Access Road is presented in **Figure ES12**.

Key findings included:

- Limited visibility of operational areas from most public roads due to topography and vegetation.
- Partial views of the Quarry Access Road and Visibility Barrier from residences in Royalla, Fernleigh Park, and near Enchanted Hill.
- No direct views of extraction areas from the closest residence (Location F), though vehicle movements may be visible.

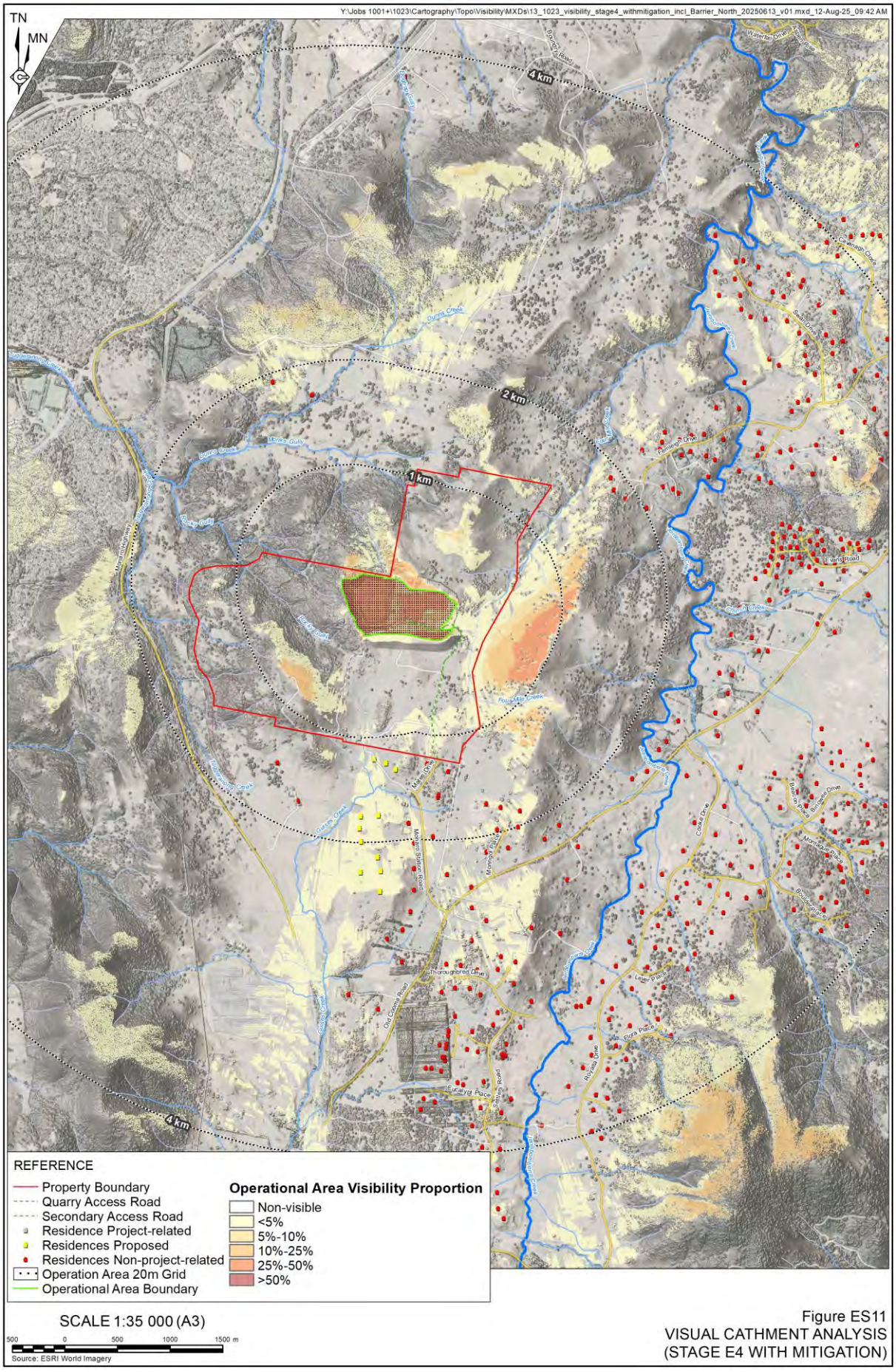


Figure ES11
VISUAL CATHMENT ANALYSIS
(STAGE E4 WITH MITIGATION)

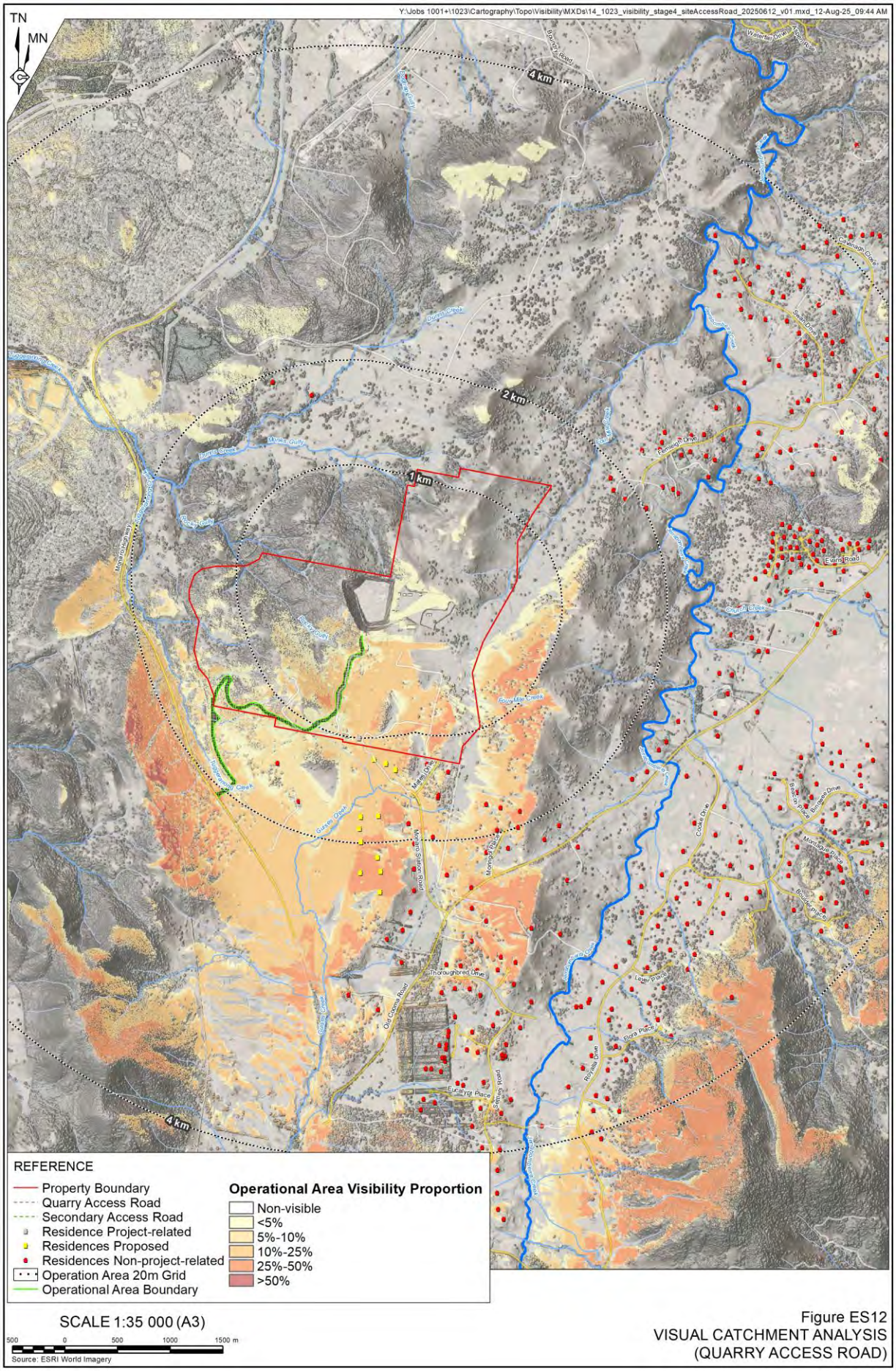


Figure ES12
VISUAL CATCHMENT ANALYSIS
(QUARRY ACCESS ROAD)

Mitigation measures include:

- Construction of a Visibility Barrier to 880m AHD with progressive revegetation.
- Installation of a 3dm acoustic fence along sealed sections of the Quarry Access Road.
- Delayed vegetation clearing and strategic planting to retain screening.
- Directional lighting to prevent nuisance during early morning and evening operations.
- Implementation of a Biodiversity and Rehabilitation Management Plan and Blast Management Plan to address visual clutter, dust, and fume visibility.

The VIA found that residual visual impacts would be low to moderate, depending on location and elevation. the Project is expected to result in limited substantive long-term impacts to visual amenity, provided vegetation establishment and maintenance are successful.

Overall, the Project is considered visually acceptable, with mitigation measures expected to maintain rural character and minimise long-term impacts to visual amenity.

Biodiversity

The Biodiversity Assessment prepared by Capital Ecology Pty Ltd (2025) concluded that the Project would result in the removal of native vegetation and habitat for several threatened species, including critically endangered Box-Gum Woodland. These impacts have been assessed in accordance with the NSW Biodiversity Assessment Method and would be offset under the Biodiversity Offset Scheme.

Key findings included:

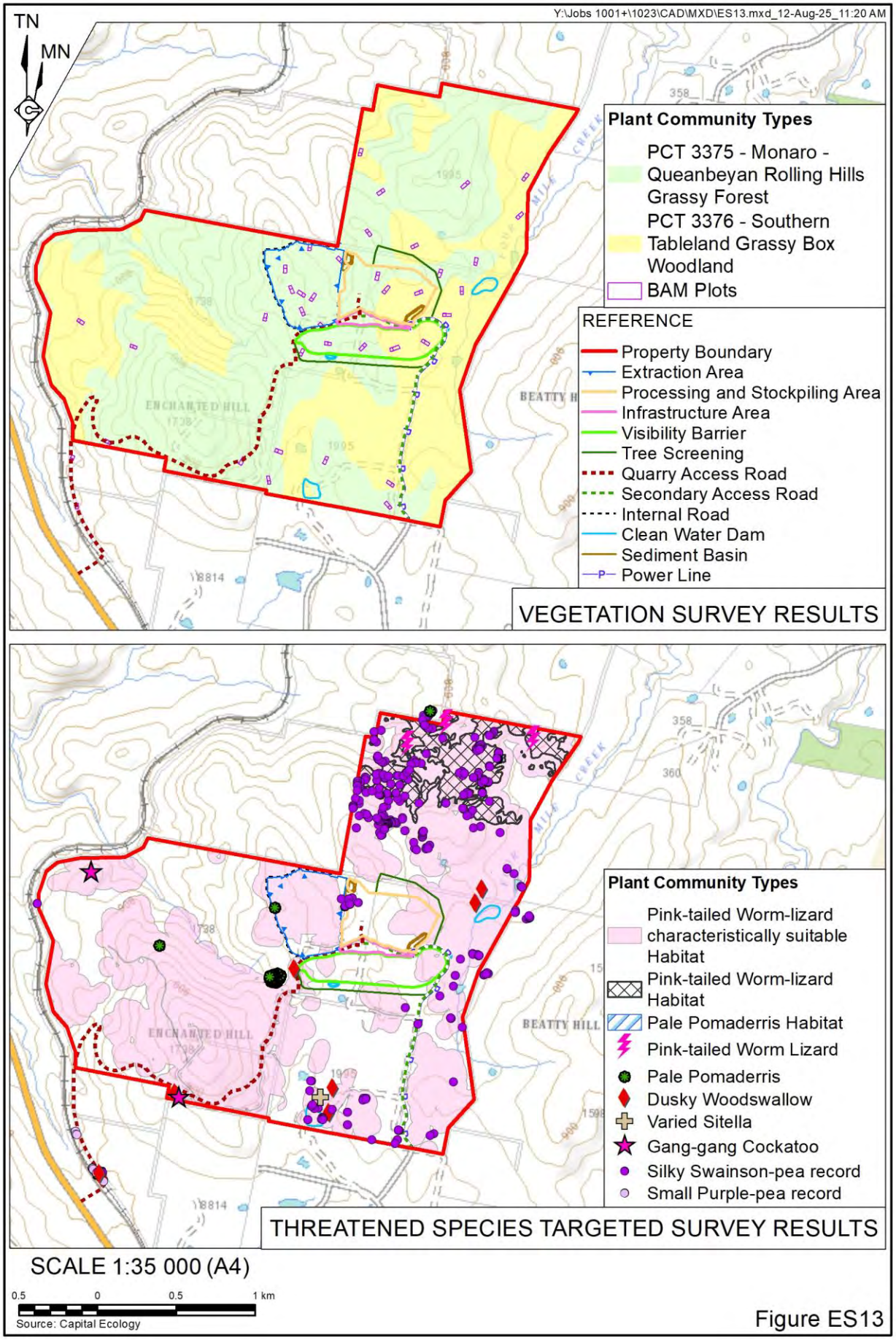
- Approximately 77.83 ha of native vegetation would be cleared, including 22.44 ha of Box-Gum Woodland listed as critically endangered under both NSW and Commonwealth legislation.
- Habitat for threatened flora and fauna—including Pink-tailed Legless Lizard, Key's Matchstick Grasshopper, Small Purple-pea, and Gang-gang Cockatoo—would be directly and indirectly impacted.
- No known occupied habitat for the Pink-tailed Legless Lizard would be disturbed.
- The Project would likely require approval under the EPBC Act due to significant impacts on Matters of National Environmental Significance.

The outcomes of native vegetation and targeted threatened species ecological field survey are presented in **Figure ES13**.

The outcomes of the Mitigation and management measures include:

- Avoidance of high-quality vegetation and threatened species habitat during design.
- Vegetation clearing protocols, fauna relocation, and progressive rehabilitation.
- Annual monitoring of revegetation success, weed and feral animal control, and threatened species populations.
- Establishment or purchase of biodiversity credits to offset residual impacts.

Residual impacts of the Project would be offset in accordance with the NSW Biodiversity Offsetting Scheme which would see the conservation of habitat in perpetuity. The Applicant may establish a Biodiversity Stewardship Site on land adjacent the Project Site to meet this obligation. Other options to satisfy the obligation include the purchase of credits directly from landowners that hold Biodiversity Stewardship Sites or the payment of a contribution to the Biodiversity Conservation Fund. The final biodiversity offsetting strategy would be established post-approval.


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TN
MN
Plant Community Types
PCT 3375 - Monaro - Queanbeyan Rolling Hills Grassy Forest
PCT 3376 - Southern Tableland Grassy Box Woodland
BAM Plots
REFERENCE
Property Boundary
Extraction Area
Processing and Stockpiling Area
Infrastructure Area
Visibility Barrier
Tree Screening
Quarry Access Road
Secondary Access Road
Internal Road
Clean Water Dam
Sediment Basin
Power Line
VEGETATION SURVEY RESULTS
Plant Community Types
Pink-tailed Worm-lizard characteristically suitable Habitat
Pink-tailed Worm-lizard Habitat
Pale Pomaderris Habitat
Pink-tailed Worm Lizard
Pale Pomaderris
Dusky Woodswallow
Varied Sitella
Gang-gang Cockatoo
Silky Swainson-pea record
Small Purple-pea record
THREATENED SPECIES TARGETED SURVEY RESULTS
SCALE 1:35 000 (A4)
0.5 0 0.5 1 km
Source: Capital Ecology
Figure ES13

With avoidance, mitigation, and offsetting measures in place, the Project is considered to satisfy relevant biodiversity legislation and policies.

Aboriginal Cultural Heritage

The Aboriginal Cultural Heritage Assessment prepared by Past Traces Pty Ltd (2025), in consultation with Registered Aboriginal Parties (RAPs), concluded that the Project would not result in unacceptable impacts to Aboriginal cultural heritage, provided that recommended mitigation and management measures are implemented. The assessment identified a range of Aboriginal objects and areas of potential archaeological deposit (PAD), with two culturally modified trees considered to be of high significance.

Key findings included:

- A total of 32 Aboriginal heritage items were recorded, including isolated artefacts, artefact scatters, PADs, and two culturally modified trees (a ring tree and a scarred tree). The location of Aboriginal heritage sites is presented in **Figure ES14**.
- The ring tree and scarred tree were avoided through redesign of the Extraction Area and would be protected with buffer fencing.
- Of the sites identified, 19 occur within the Project Site and would be impacted. Each of the sites is consistent with the predictive model prepared by Past Traces (2025) and while the cultural significance of these sites remains high, most are considered common and of low scientific value.
- 13 sites would not be impacted and would be fenced off during construction activities to avoid inadvertent impact.
- No objections were raised by RAPs regarding the survey results or proposed mitigation measures.
- The assessment was conducted in accordance with NSW heritage guidelines and included consultation with 23 RAPs.

Mitigation measures include:

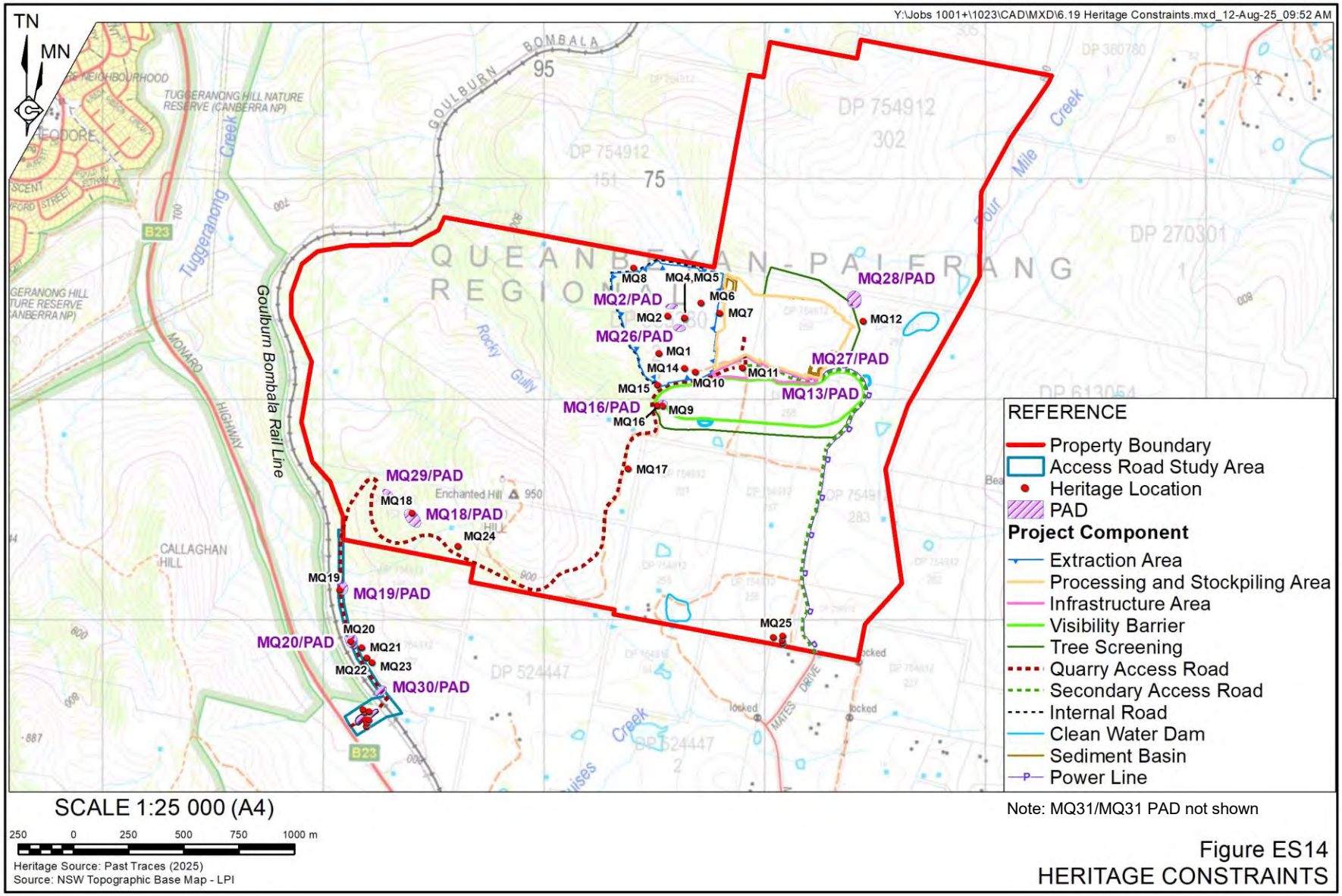
- Salvage collection and subsurface investigation of artefact scatters and PADs within the disturbance footprint.
- Installation of 10 m buffer fencing around high-significance sites and PADs adjacent to works.
- Return of artefacts to country following analysis, in accordance with RAP preferences.
- Ongoing consultation and inclusion of Aboriginal heritage sites in site inductions and construction mapping.

With these measures in place, the Project would be considered acceptable from an Aboriginal heritage perspective. No further investigations are required unless the disturbance footprint is expanded or unexpected objects are enc With these safeguards and redesigns in place, the Project is not expected to result in significant impacts to Aboriginal cultural heritage.

Historic Heritage

The Project Site is not listed on the State Heritage Register, nor does it contain any known historical archaeological relics. Heritage NSW confirmed that no referral or further assessment is required.

A single historic heritage site was identified in the ACT within the area proposed for the Quarry Access Road. The site consisted of bricks and other rubble estimated to have been remaining from the original railway line construction. It was concluded that this site was not significant and would not warrant inclusion on a heritage register.


Y:\Jobs 1001+\1023\CAD\MXD\6.19 Heritage Constraints.mxd_12-Aug-25_09:52 AM
TN
MN
QUEANBEYAN-PALERANG REGIONAL
Goulburn Bombala Rail Line
Tuggeranong Creek
Rocky Gully
Four Mile Creek
MQ8
MQ4,MQ5
MQ6
MQ7
MQ2/PAD
MQ2
MQ26/PAD
MQ1
MQ14
MQ15
MQ10
MQ11
MQ28/PAD
MQ12
MQ27/PAD
MQ13/PAD
MQ16/PAD
MQ9
MQ16
MQ17
MQ29/PAD
MQ18
MQ18/PAD
MQ24
Enchanted Hill
CALLAGHAN HILL
MQ19
MQ19/PAD
MQ20
MQ20/PAD
MQ21
MQ22
MQ23
MQ30/PAD
MQ25
B23
REFERENCE
Property Boundary
Access Road Study Area
Heritage Location
PAD
Project Component
Extraction Area
Processing and Stockpiling Area
Infrastructure Area
Visibility Barrier
Tree Screening
Quarry Access Road
Secondary Access Road
Internal Road
Clean Water Dam
Sediment Basin
Power Line
SCALE 1:25 000 (A4)
250 0 250 500 750 1000 m
Heritage Source: Past Traces (2025)
Source: NSW Topographic Base Map - LPI
Note: MQ31/MQ31 PAD not shown
Figure ES14
HERITAGE CONSTRAINTS

Traffic and transport

The Road Transport Assessment prepared by The Transport Planning Partnership Pty Ltd (TTPP) (2025) concluded that the Project would generate additional traffic movements on the Monaro Highway and surrounding roads, but these increases would remain within acceptable limits and would not compromise road safety or efficiency. The proposed Quarry Access Road and intersection with Monaro Highway were assessed as having adequate capacity and safe operating conditions under future peak-hour scenarios.

Key findings included:

- The Project would generate up to 500 heavy vehicle movements per day, including haulage trucks and concrete dispatch vehicles.
- Peak-hour traffic volumes on Monaro Highway would increase by less than 2.2%, with Level of Service (LOS) remaining acceptable under 2041 conditions.
- The proposed Monaro Highway / Quarry Access Road intersection would operate with LOS B to D, with no delays to through traffic and no queue overflow.
- Construction traffic impacts would be minor and temporary, with volumes well below thresholds for residential amenity or road capacity concerns.

Mitigation measures include:

- Construction of a dedicated Quarry Access Road and intersection designed to Austroads standards, with safe sight distances and turning lanes.
- Implementation of a Traffic Management Plan and Driver's Code of Conduct, covering speed limits, route compliance, load covering, and behaviour near sensitive areas.
- Oversize loads to be transported during daylight hours only, with appropriate permits and routing via Monaro Highway.

The Project would be subject to regulation by Transport for NSW, ACT TCCS, and Queanbeyan-Palerang Regional Council, with a Road Safety Audit to be completed prior to construction.

Overall, it is considered that the proposed transportation activities of the Project would remain within the capacity of the road network and would not result in substantial delays during peak hour periods. Traffic safety risks would be managed through the design of the proposed intersection and through the management of driver behaviour through a Drivers Code of Conduct. It is accepted that during certain busy periods, transport operations would have to adapt to traffic congestion along the transport route, however the same impacts apply to all road users during these periods. These times may be managed by pre-planning and coordination of transport requirements.

It is acknowledged that although risks associated with transport-related conflict on local roads in Royalla, Fernleigh Park and Googong would largely be avoided through the selected location of the Quarry Access Road, vehicles travelling from these areas may experience Project traffic if they enter the Monaro Highway. Despite this, the configuration of the Quarry Access Road and the intersection with the Monaro Highway remains the preferred access option.

Soil and land capability

The Soil and Land Capability Assessment prepared by Strategic Environmental and Engineering Consulting (SEEC) (2025a) concluded that the Project Site comprises mostly low to moderate capability soils, with limitations for high-impact land uses. Soils are generally acidic, low in fertility, and moderately to highly dispersible, but suitable for rehabilitation with appropriate management.

Key findings included:

- Soils range from Class III to Class VII, with most areas classified as Class V to VI, suitable for grazing and conservation but not intensive agriculture.
- Topsoil is generally shallow and stony, with low cation exchange capacity and limited nutrient retention.
- No contamination was identified, and salinity and sodicity levels were low or absent.

Mitigation measures include:

- Stripping and stockpiling topsoil and subsoil separately, with erosion controls and vegetation cover.
- Use of lime and organic fertilisers to improve soil structure and fertility for rehabilitation.
- Progressive rehabilitation and monitoring of soil condition and vegetation cover.

The Project is expected to maintain soil health and land capability, supporting long-term rehabilitation and land use compatibility.

Risks of conflict or impact to other land uses in the locality would be minor and unlikely to occur, however, where these land uses relate to the value placed on local amenity, impacts may be experienced by the community. These impacts are recognised and would be mitigated as much as practical.

Surface Water Resources

The Surface Water Assessment prepared by SEEC (2025b) concluded that the Project would not result in significant impacts to downstream water quality or flow regimes, provided the proposed water management system is implemented. A schematic of the water balance assessment is presented in **Figure ES15** that presents how water would be transferred across the Project Site.

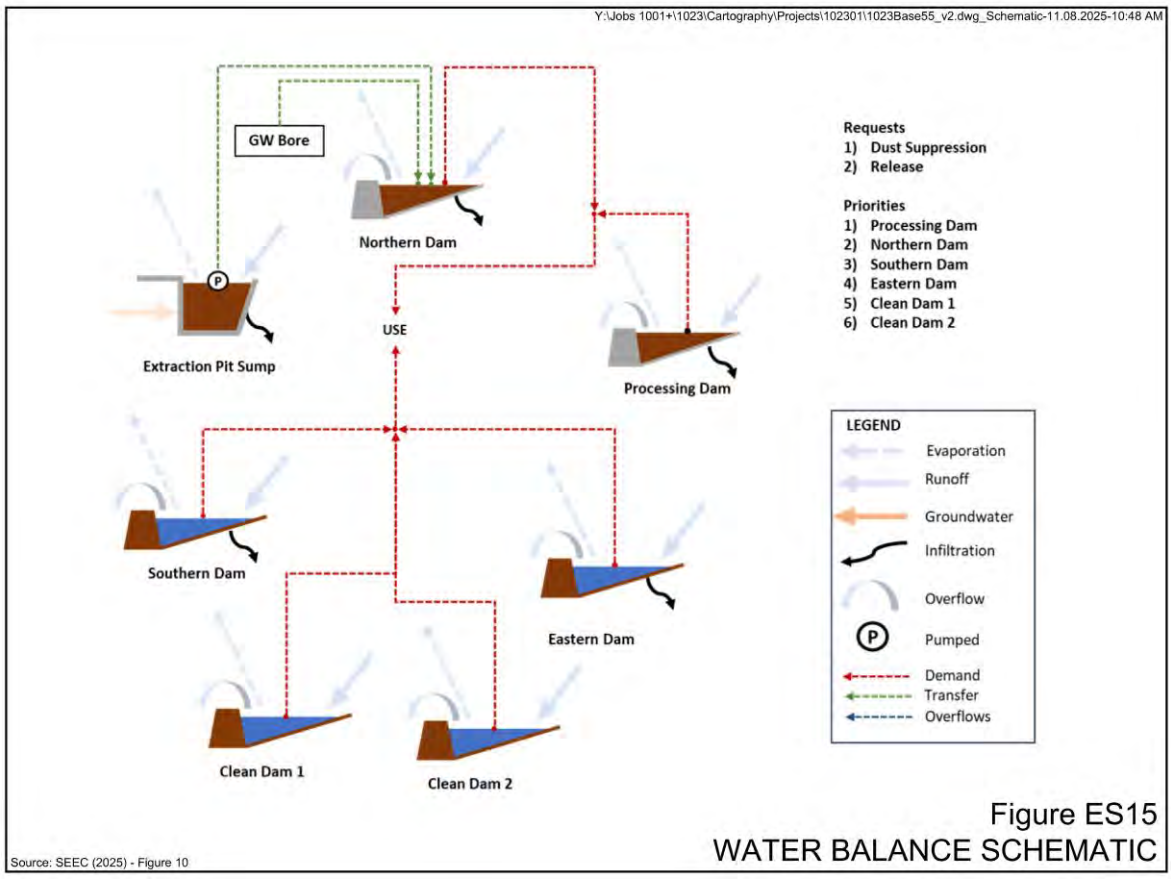


Figure ES15
WATER BALANCE SCHEMATIC

The Project Site has been designed to include erosion and sediment controls that would support the management of water. The Project would generate sediment-laden runoff which would be directed to sediment dams within the Project Site. The accumulated water would either be used for dust suppression and watering of rehabilitated areas, or tested, and if necessary treated, to ensure that it meets the required water quality criteria, prior to controlled discharge after rainfall events through the Project's proposed licensed discharge point(s). As a result, the Project would not have a significant impact on surface water quality in downstream environments.

Water demand for the Project would be met by rainfall and runoff captured on site, and supplemented by a groundwater bore, and during the final extraction stage, by groundwater inflows to the extraction area. This proposed water management strategy of capture, re-use and recycling provides for the efficient use of water resources whilst simultaneously reducing the likelihood of uncontrolled discharge from the Project Site.

During dry periods, water supply via rainfall runoff would be limited and active management of water sources may be required and/or water intensive uses such as concrete batching curtailed. Water supply for dust suppression would be reliable and prioritised.

Mitigation measures include:

- Construction of clean and dirty water dams, diversion drains, and sediment basins.
- Use of flocculants and water quality testing prior to discharge.
- Implementation of a Water Management Plan and monitoring of water quality and infrastructure.

The Project would be regulated under the Water Management Act 2000 and the Murrumbidgee Unregulated River Water Sources WSP, with harvestable rights and discharge limits managed through an EPL.

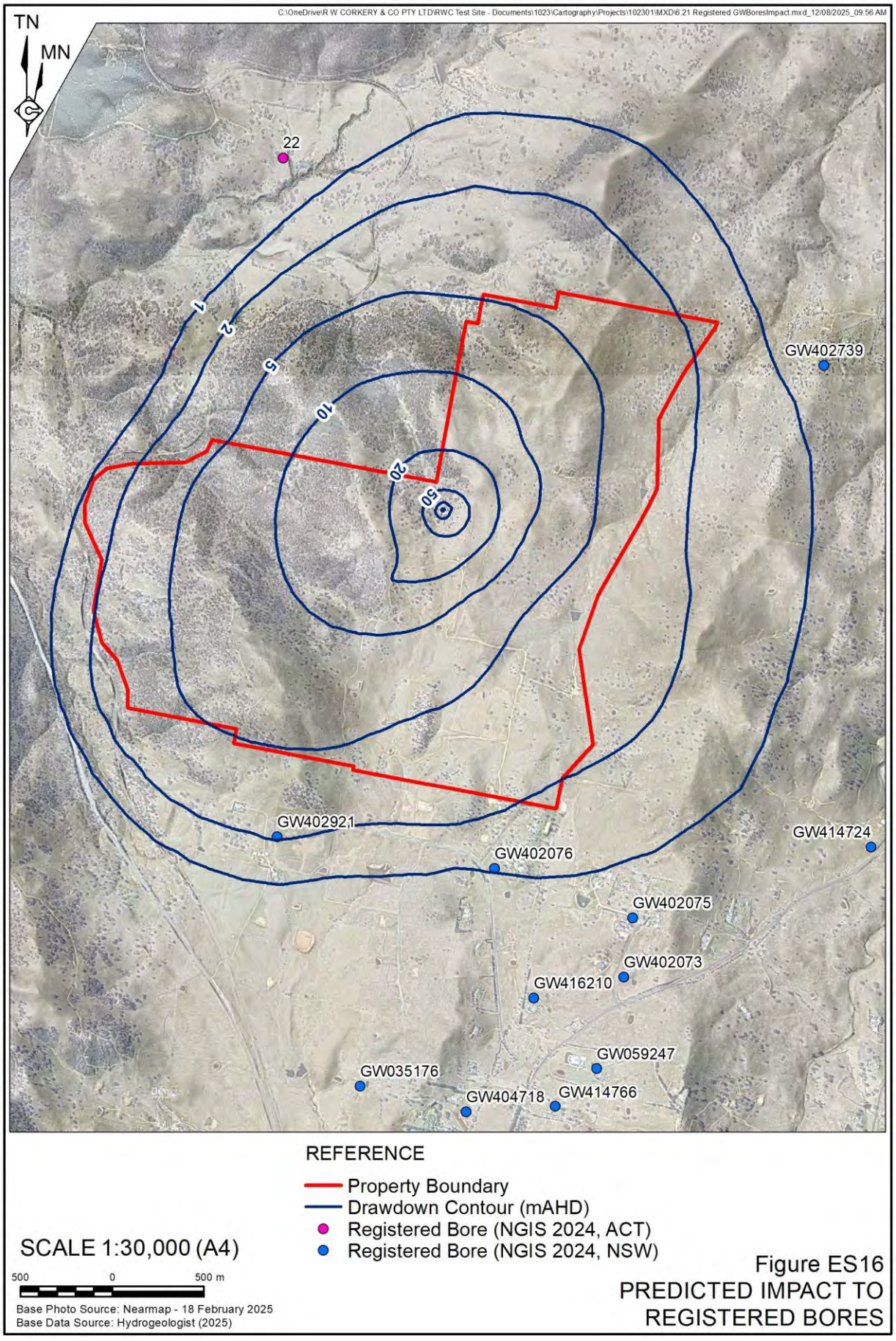
Groundwater Resources

A numerical groundwater model has been developed by Hydrogeologist (2025) to replicate the groundwater setting and predict changes to groundwater setting as a result of the development of the Extraction Area for the Project. The groundwater model is considered fit for the purpose of predicting groundwater impacts in this locality and this has been confirmed through independent peer review.

Groundwater modelling predictions of drawdown in the vicinity of the Project Site are presented in **Figure ES16**. The assessment identified the potential for aquifer drawdown to exceed the *NSW Aquifer Interference Policy's* Minimal Impact Considerations threshold (2m) at one registered private bore. However, this prediction is considered conservative, and it is unlikely that the predicted impacts would occur. Regardless, should access be granted, the Applicant would monitor water levels in the bore and if impacts from the Project are identified, make good provisions would be triggered. The make good provisions available to the landowner would be agreed in consultation, however options for make good would be described in the Groundwater Management Plan for the operation.

Impacts to groundwater dependent ecosystems are not expected and there would be no change to groundwater quality or the beneficial use category of the groundwater source beyond 40m from the Project Site.

The Project would require up to 42.4ML per year of groundwater from the Lachlan Fold Belt MBD Groundwater Source of the Water Sharing Plan for the Lachlan Fold Belt MBD (Other) Management Zone Groundwater Sources. The Applicant is in the process of securing the necessary entitlements.


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Registered Bore (NGIS 2024, ACT)
Registered Bore (NGIS 2024, NSW)
SCALE 1:30,000 (A4)
500 0 500 m
Base Photo Source: Nearmap - 18 February 2025
Base Data Source: Hydrogeologist (2025)
Figure ES16
PREDICTED IMPACT TO
REGISTERED BORES

Proposed mitigation measures include:

- A Groundwater Management Plan would be prepared and implemented for the Project that would include management and mitigation measures including triggers for reactive management and the protocols to be followed in the event of a groundwater incident.
- A groundwater monitoring program would be established that would record any changes to the groundwater setting (groundwater levels and quality) and inform reactive management.
- Groundwater take from the use of a production bore and groundwater inflows would be monitored.

With the implementation of the proposed management and mitigation measures, the Project is considered a low risk to groundwater systems in the vicinity of the Project Site

Hazards

Assessment of potential hazards including bush fire risks and the use of hazardous materials concluded that the Project presents low to moderate risks assuming standard safeguards are implemented.

Key findings included:

- The Project Site has been mapped as bush fire prone with areas of Vegetation Category 1 (high risk) and Vegetation Category 3 (medium risk). The Project Site was assessed to have a bush fire attack level of BAL-29, requiring a 24m Asset Protection Zone and may include a 10m outer protection zone.
- No explosives would be stored on site with all requirements delivered by licensed mobile unit on the day of a blast event.
- Potentially hazardous materials identified under the *Australian Code for the Transport for Dangerous Goods by Road & Rail Edition 7.8* (National Transport Commission, 2022) that would be transported to and stored within the Project Site would be limited to diesel fuel. Diesel is a Class 9 dangerous good Mitigation measures include:
- Preparation of a Emergency Management and Evacuation Management Plan to support bushfire preparedness.
- Strategic vegetation management and fire-fighting equipment kept on-site.
- Any bulk diesel or other hydrocarbons would be stored within a self-bunded storage tank or trailer that meet the requirements of *AS1940 The storage and handling of flammable and combustible liquids*. Bunding would have the capacity to hold 110% of the total storage capacity of the tank or trailer.
- No storage of explosives with all blasting materials delivered and used on the same day.

With these measures, the Project is expected to operate safely with low risk to public safety and environmental assets.

Economic Impacts

The Economic Impact Assessment prepared by Gillespie Economics (2025) concluded that the Project would deliver a substantial net economic benefit to New South Wales and generate meaningful local uplift for the Queanbeyan-Palerang region.

The assessment considered both statewide and regional impacts, including net production value, employment, supplier expenditure, and residual environmental costs. It applied a Cost-Benefit Analysis

(CBA) and Local Effects Analysis (LEA) consistent with NSW Treasury guidelines and the EP&A Act.

Key findings included:

- The Project would deliver a net social benefit to NSW of $41 million (present value) at a 7% discount rate, with robust outcomes under all tested sensitivities
- Minimal residual costs to NSW given compliance with all required guidance, with only the mitigation of low levels of greenhouse gas emissions representing a residual cost to NSW.
- All other environmental and infrastructure impacts would be internalised via mitigation, offsets, or direct funding.
- The Project would generate substantial economic uplift for the Queanbeyan-Palerang LGA including:
  - 30 direct jobs (20 quarry, 10 transport), with 12 filled by existing residents;
  - $782,000 in new annual wages retained locally;
  - $9.5 million in supplier expenditure retained in the Queanbeyan-Palerang LGA each year; and
  - 53 total jobs supported across the region (including flow-on effects).

The assessment found no significant adverse impacts on housing, wages, or infrastructure demand. Recommended strategies to maximise local benefits and manage residual risks include the following.

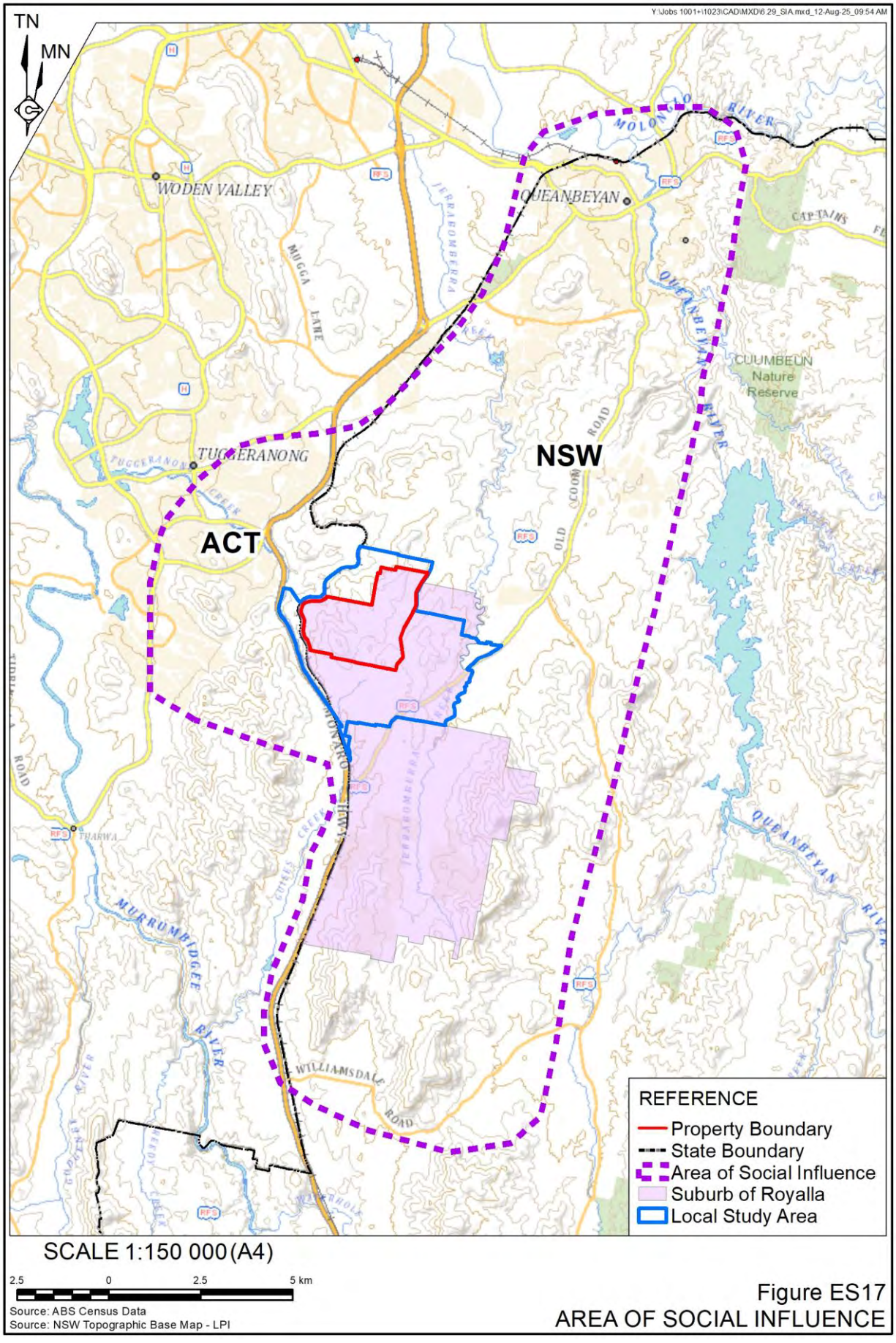
- Local employment strategies, targeting suitably skilled local residents.
- Local procurement policies that prioritise regional suppliers where cost and quality criteria are met.
- An investment fund provided through a Planning Agreement fund to support local community initiatives (see Section 2.7).
- Ongoing stakeholder engagement through regional business forums and workforce training programs.

Overall, the Project was assessed as economically efficient, socially beneficial, and regionally valuable. It is expected to contribute positively to both State welfare and local economic resilience, with most externalities either mitigated or immaterial in scale.

Social Impacts

The Social Impact Assessment prepared by Landscape Research+ Communications (Landscape) (2025) in accordance with the *NSW Social Impact Assessment Guideline* (2023). The SIA provides a detailed, evidence-based assessment of social risks, benefits and community values, ensuring that affected communities have been heard and their concerns addressed through robust planning and responsive management frameworks. The Project would result in a range of social impacts, both positive and negative, across the construction, operation, and closure phases.

An Area of Social Influence (see **Figure ES17**) was developed for the assessment based on social baseline data, the outcomes of engagement and information gathered on the broader geographic area in which direct, indirect or cumulative impacts may be experienced. The Area of Social Influence includes Fernleigh Park, Googong, and parts of Tuggeranong in the ACT. A Local Study Area was further defined as the area that has the greatest potential to experience social impacts. For the Project, these relate to changes to visual outlook, noise, dust, traffic and landscape character.


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MUGGA LANE
TUGGERANONG
NSW
ACT
OLD COOMA ROAD
THARWA
MURRUMBIDGEE RIVER
WILLIAMSDALE ROAD
REFERENCE
Property Boundary
State Boundary
Area of Social Influence
Suburb of Royalla
Local Study Area
SCALE 1:150 000 (A4)
2.5 0 2.5 5 km
Source: ABS Census Data
Source: NSW Topographic Base Map - LPI
Figure ES17
AREA OF SOCIAL INFLUENCE

The SIA demonstrates that the proposed Project would be developed in a socially responsible manner, with no residual impacts considered unacceptable. While some residual impacts would remain following the implementation of mitigation measures, these are expected to be managed to reduce risks as much as is practical.

The Project has been refined to take into consideration community preferences with a comprehensive consideration of alternatives, and changes to the Project or commitments made to avoid social impacts including proximity to residences, risks of traffic conflict, biodiversity and Aboriginal heritage impact avoidance and commitments to comprehensive environmental management over the life of the Project.

It is appreciated that physical impacts can have social outcomes, and the SIA has demonstrated how social risks have been mitigated either through environmental or economic management or social impact management directly targeted at identified risks. While technical assessments and risk analyses suggested that the residual impacts of the Project are acceptable, these assessment outcomes are not expected to satisfy all community members.

A range of mitigations committed to in the EIS resulting from various supporting technical studies would improve social outcomes. The SIA (Landscape, 2025) identified a suite of targeted mitigation and enhancement measures to address residual social impacts and support positive community outcomes. These measures respond directly to stakeholder concerns and technical findings and are distinct from design features that shaped the SIA's impact predictions.

- Regular opportunities for community input, with annual public meetings and a Community Consultative Committee (CCC) meeting every six months to share updates and hear feedback.
- Clear communication and complaints handling, with a formal protocol in place to track concerns, ensure timely responses, and report outcomes transparently.
- Support for local infrastructure and community-led initiatives through a Planning Agreement with Council that directs contribution based on production outcomes at the Project.

The Royalla community expressed strong and enduring concerns based on experience with impacts from existing quarries, a perceived lack of regulatory enforcement and a broader sense of loss of control over local change. This had resulted in low community confidence in the Applicant and regulators alike, regardless of the predicted technical impact levels. These concerns have not been dismissed. Social acceptability would depend not only on compliance with best practice standards, but on the credibility, transparency and responsiveness of future engagement and adaptive management processes.

The Applicant has committed to a comprehensive and transparent approach to stakeholder engagement throughout the life of the Project. This includes the development and implementation of a *Stakeholder and Community Engagement Strategy and Plan* to promote openness, dialogue, reliable monitoring, and regular reporting.

While the SIA concludes that residual impacts can be managed to an acceptable level from a regulatory and technical perspective, it is recognised that social acceptability remains contested and that the burden lies with the Applicant to earn, and maintain, community trust over the life of the Project.

Evaluation and Justification of the Project

The Project has been designed with a strong emphasis on impact avoidance, minimisation, and mitigation. The Project has been subject to thorough review to identify reasonable alternatives. Principal of these is selection of the final configuration of the alignment of the Quarry Access Road. The Applicant has demonstrated a commitment to responsible development through detailed planning, stakeholder engagement, and the integration of best-practice environmental management. Should the Project proceed, these measures would ensure that impacts are managed to a level consistent with statutory requirements and community expectations.

Compliance with the statutory requirements within NSW has been demonstrated including that the Project would be developed to be consistent with the Objects of the EP&A Act and would not compromise the achievement of rural and environmental conservation zoning objectives.

Engagement commenced in 2021 and continued through multiple stages of Project refinement, with feedback directly informing the design and mitigation strategies. The Applicant has taken a strong approach to engagement through the preparation of the EIS and using the outcomes of these processes to inform design of the Project and impact assessment with assessments relating to human health risks, the need for the Project and the cost benefits analysis presented in the Economic Assessment all commissioned in response to concerns raised by the community. This is reflective of the Applicant's desire to demonstrate to the community that the Project represents an excellent opportunity for the region. The Project reflects a balance between regional development needs and community preferences and would proceed with a commitment to responsible environmental management and meaningful stakeholder engagement.

A rigorous analysis of biophysical, social, and economic factors has been presented. The Project would be developed in a manner consistent with the principles of ecologically sustainable development by placing a strong emphasis on risk identification and adaptive management as well as ensuing that the benefits of the Project would be distributed locally through a Planning Agreement. High-value ecological and cultural features have been avoided, including areas of Box-Gum Woodland and a culturally modified ring tree.

Cumulative impacts have been addressed by direct consideration of risks associated with existing quarries in the region as well as any other industrial developments. The Project is unique in that components would be developed in two different States and require separate approval for the development and operation of the single Project. Equally, planning and development guidance in the ACT and NSW varies and the assessment has had to consider possible impacts or management requirements in each State. The assessment has demonstrated that on a cumulative basis impacts would be acceptable.

The Applicant would implement a comprehensive environmental management program that includes strategies and plans to guide development and environmental management processes including monitoring, reporting and independent auditing. These measures reflect the Applicant's commitment to regulatory compliance, environmental stewardship, and transparent communication. The compliance framework would be reviewed periodically to ensure alignment with evolving conditions, community expectations, and statutory obligations.

Suitability of the Site

The suitability of the Project Site is demonstrated by the following features.

- The site's physical characteristics and underlying geology make it well-suited to long-term quarrying operations, with minimal constraints to extraction, inf rastructure, or rehabilitation
- The Project is consistent with applicable zoning provisions and aligns with regional and local planning strategies that support extractive industry development
- Environmental assessments confirm that the Project Site can accommodate the proposed development with appropriate safeguards in place to manage biodiversity, water, and amenity impacts.
- The site and design of the Monaro Rock Quarry Project were selected following a comprehensive alternatives assessment, which considered multiple extraction areas, access routes, infrastructure configurations, and operational staging options. The preferred design reflects a balance between resource quality, environmental protection, community feedback, and long-term operational viability.
- Principal to this consideration is the separation distance between the operational areas and privately-owned residences. Not only does the 1.5km buffer afford a level of natural mitigation of noise and air quality outcomes, changes to outlook and visual impacts are associated with distant views mitigated by existing topographic features.
- The selection of the final configuration of the Quarry Access Road was informed by many factors including design and construction complexity, distance, cost and planning risk, however the most determinative factor was feedback from the community that supported any opportunity to separate heavy vehicle traffic from private residences.

Consequences of Not Proceeding

If the Project does not proceed, the primary consequence would be the lost opportunity to develop a strategically located hard rock quarry with ancillary activities that support the construction and infrastructure sectors with the Queanbeyan-Palerang and ACT regions. The Project has been designed to supply high-quality hard rock, concrete, asphalt, and recycled materials, and its absence would likely increase reliance on more distant or less suitable sources, with associated environmental and economic costs.

Existing hard rock resource and approaching exhaustion and demand for construction material is expected to continue to grow as population increases and building methods transition to more structural concrete formwork. An assessment of the Economic Need for the Project has identified that without any new hard rock quarry approvals, demand would exceed supply from existing reserves from 2029 onwards, with a cumulative shortfall of resource of approximately 41Mt by 2050.

The Project would deliver significant regional benefits, including the creation of 14–20 full-time jobs and an additional 10 transport-related roles, with a strong focus on local employment. Local procurement strategies and a Planning Agreement with Council would further support community infrastructure, environmental regeneration, and economic resilience. Without the Project, these employment and investment opportunities would not materialise, potentially impacting regional growth and the viability of local businesses.

The Project also represents a significant investment in sustainable resource development, with integrated water management, progressive rehabilitation, and adaptive environmental monitoring. Its refusal could discourage future investment in responsibly managed extractive industries in the region, limiting the potential for further exploration and development.

While not proceeding would avoid some residual environmental and social impacts, these have been assessed as low and manageable with the proposed safeguards. On balance, the Project offers an opportunity to meet regional demand for construction materials while delivering lasting economic, environmental, and social benefits.

Public Interest

The Project is expected to deliver a net social benefit of $41 million to New South Wales, with most environmental and infrastructure costs internalised. At the local level, it would support 30 direct jobs, retain approximately $782,000 in wages annually, and generate $9.5 million in supplier expenditure within the Queanbeyan-Palerang region. These benefits are expected to contribute to regional economic resilience and employment diversity.

While some community opposition exists, the Project has been refined in response to feedback from residents and government agencies. Key changes include the adoption of a dedicated Monaro Highway access route, construction of visibility and acoustic barriers, and the establishment of a Community Consultative Committee to support ongoing engagement. The Project also includes a suite of management plans to guide proactive and reactive responses, with worst-case scenarios modelled for key risks and contingency protocols in place to address remaining uncertainties.

On balance, the Project is considered to be in the public interest. It represents an efficient and responsible use of land and resources, offering lasting benefits to the region while maintaining a strong commitment to environmental protection and community engagement.

Conclusion

The Project represents a ‘greenfield’ quarry development in a location that has not seen a new quarry approval in over 25 years. A supply and demand analysis for the region has indicated there is a need for a new source of hard rock resources in coming years. The Project would satisfy 30-35% of local demand for aggregates in the long term with future shortfalls in supply expected, even with the Project in place. Regardless, the proposed change in land use from existing rural residential and agricultural land use to an industrial land use represents a significant change for some members of the community. The Project represents a source of amenity impacts that are not currently experienced or that have been present for some time and have become habituated (such as existing quarries or traffic on the Monaro Highway). Proposed changes in the local area represent a change that may be perceived by the community as beyond their control.

The Project has been designed in accordance with modern quarrying standards and incorporates feedback from community engagement and government agencies to minimise impacts and enhance outcomes. The Project Site is ideally located to provide a buffer to privately-owned residences and permit access to the Property that avoids traffic-related conflict on local roads. Decisions on Project design and operations have been made with consideration of community input with the community preferences a determinative input to the final location of the Quarry Access Road. The Project would provide a reliable, long-term supply of high-quality construction materials to support infrastructure and housing development in the Queanbeyan-Palerang and ACT regions. It would also deliver direct employment for up to 30 people and stimulate

local supply opportunities, contributing to the economic resilience of the Queanbeyan-Palerang region. A Planning Agreement with Council would further support community led initiatives.

Environmental assessments have demonstrated that the Project can be developed and operated in a manner that satisfies relevant statutory criteria. Key design refinements such as the selection of the access road alignment, avoidance of high-value vegetation and a culturally significant ring tree, reflect the Applicant's commitment to environmentally responsible development. Community concerns were raised regarding cumulative impacts, particularly in relation to traffic and amenity. However, technical assessments confirm that the Project would comply with all relevant requirements. Environmental monitoring, adaptive management and regular reporting would ensure that any unexpected issues are addressed transparently and effectively.

While technical assessments and risk analyses suggested that the residual impacts of the Project are acceptable, these assessment outcomes are not expected to satisfy all community members. It is recognised that social acceptability remains contested and that the burden lies with the Applicant to earn and maintain community trust over the life of the Project.

Should it be approved, the Project would represent a modern and responsible approach to resource development that would deliver substantial economic and social benefits while maintaining a strong commitment to environmental best practice.

Section 1

Introduction

PREAMBLE

This section introduces the Monaro Rock Quarry Project and provides:

- *an outline and scope of the document;*
- *an introduction to the Applicant, Monaro Rock Pty Ltd;*
- *relevant background information to the Project;*
- *information on the approvals process;*
- *an overview of the proposed operations, including the objectives and strategies to avoid and minimise Project-related impacts; and*
- *the personnel involved in the design of the Project, document preparation and Specialist Consultant investigations and assessments.*

1.1 Scope

Monaro Rock Pty Ltd (Monaro Rock or the Applicant) proposes to construct and operate the Monaro Rock Quarry (the Project) involving the extraction and processing of hard rock material for use in construction and infrastructure projects within the Queanbeyan-Palerang and the ACT regions. The subject property covers approximately 545ha of land (the Project Site) located in Royalla, approximately 5km north of the intersection of the Monaro Highway and Old Cooma Road (see **Figure 1.1**).

This document describes all components of the Project and provides information on the key environmental issues addressed in the design and assessment of the Project. This *Environmental Impact Statement* (EIS) has been prepared in accordance with the provisions of Part 4, Division 4.7 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) given the Project is classified as State Significant Development.

This EIS describes the proposed vegetation clearing, soil removal, hard rock extraction, processing, product transportation and staged rehabilitation activities within the Project Site for the life of the Project. Mitigation measures and management controls Monaro Rock would adopt in order to avoid or reduce potential impacts within and surrounding the Project are also provided. The residual impact(s) are described together with the proposed monitoring programs that would be undertaken to assess the ongoing environmental performance of the Project.

The information presented in this document covers all aspects of the planning, development, operation, rehabilitation, environmental management and monitoring for the Project at a level of detail consistent with industry standards, the scale of the proposed operations and the potential for environmental impacts. These aspects are presented in a manner that addresses the specific Secretary's Environmental Assessment Requirements (SEARs) issued by the then Department of Planning and Environment (DPE) and the requirements of other State and Commonwealth government agencies and Queanbeyan-Palerang Regional Council (Council), together with the issues raised during the community consultation process.

A copy of the SEARs is presented as **Appendix 1**. Coverage of the SEARs and the relevant requirements of the consulted State and Commonwealth government agencies and Council within this EIS is presented as **Appendix 2**.

The Project has been designed with its primary access road (the Quarry Access Road) traversing the NSW/ACT border and entering the public road network at the Monaro Highway. The development application for the Project (SSD-27223807) seeks approval only for activities within NSW (under the EP&A Act). Although there are several references to the activities within the ACT and impacts have been assessed cumulatively, a separate application will be submitted to the ACT Government for the construction and use of land within the ACT (under the ACT *Planning Act 2023*). The use of the term 'Project' in this EIS refers to all the activities in NSW and the ACT.

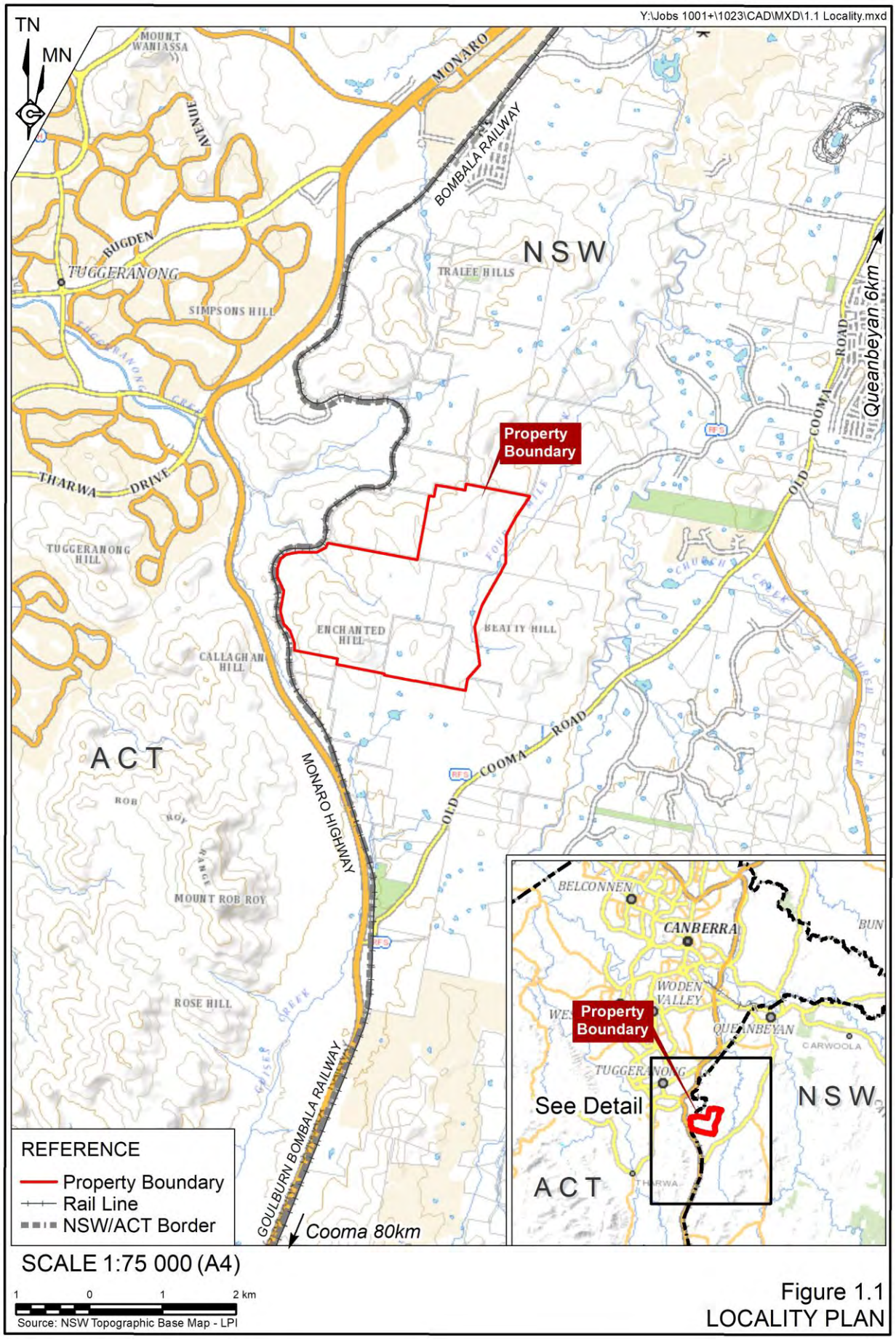


Figure 1.1
LOCALITY PLAN

1.2 Format of the Report

The EIS has been compiled and structured generally in accordance with a document issued by the then DPE in December 2022 entitled "*State Significant Development Guidelines –Preparing an Environmental Impact Statement"*. The EIS has been compiled in a single volume which includes an executive summary, seven sections of text, a reference section, glossary, and a set of Appendices. The EIS has been structured as follows.

Section 1: introduces the Project, the Applicant and Project Site, and provides relevant background information. Information is provided on the intended management of the Quarry together with information on the management of investigations for the EIS.

Section 2: presents the strategic context for the Project with respect to State and local planning documentation, surrounding land ownership, land uses, surrounding infrastructure and other extraction operations.

Section 3: describes the Project is sufficient detail to provide an understanding of all activities and to consider environmental risks. The proposed staged extraction and processing, product despatch, hours of operation, infrastructure and services, water and waste management, rehabilitation activities and the biodiversity offset strategy for the Project are presented in this section.

Section 4: presents the statutory context for the Project.

Section 5: presents the results of the engagement that has been undertaken with near neighbours, the surrounding community, government agencies and other relevant stakeholders.

Section 6: presents the environmental setting of the Project Site, including information on topography and meteorology. This section also describes the existing environment, proposed management, assessment of potential impacts and maintenance / monitoring requirements for all relevant environmental issues.

Section 7: evaluates the merits of the Project in terms of biophysical, economic and social considerations, the goals and guidelines of Ecologically Sustainable Development, and its strategic context. The evaluation also documents how the design of the Project would satisfy relevant statutory requirements and community views about the Project.

Section 8: references the various source documents referred to for information and data used during the preparation of the EIS.

Appendices: present the following additional information.

1. Copy of the Secretary's Environmental Assessment Requirements.
2. The coverage of issues arising from the SEARs and of consulted government agencies and other stakeholders.
3. Analysis of Environmental Risk
4. Correspondence from Council regarding a Planning Agreement
5. Community Engagement Materials
6. Mitigation Measures Summary
7. Correspondence from the ACT Government regarding the proposed intersection configuration.

This EIS has been prepared with input from a team of specialist consultants that produced a number of specialist assessment reports. Their reports have been included as appendices to this EIS. The titles and authors of these reports are listed in Section 1.7. The contents of these reports are summarised into the appropriate section(s) of the EIS.

1.3 The Applicant and the Project Site

1.3.1 The Applicant

Monaro Rock Pty Ltd (Monaro Rock) is a joint venture between the McPherson family and the Ferreira family. The McPherson family owns and operates Monaro Mix Specified Concrete Pty Limited (Monaro Mix), which currently operates three premix concrete batching plants and supplies concrete and concrete pumping services within the Queanbeyan-Palerang Local Government Area (LGA) and throughout the ACT region. The Ferreira family are directors of Pacific Formwork Pty Limited and Precast Projects Pty Ltd which offers formwork services and precast concrete products to the building industry within the Queanbeyan-Palerang LGA and throughout the ACT region.

Through their associated companies, the directors of Monaro Rock have a combined 75 years of experience in local and independent operations within Queanbeyan and the surrounding area and currently employ approximately 250 personnel. The Quarry development is intended to directly supply the operations of its parent companies as well as other construction and infrastructure projects in the region. The Applicant is seeking to gain greater confidence and control of the supply chain for raw materials to ensure the reliability of supply, the quality of materials and increased certainty regarding costs.

1.3.2 The Project Site

Figure 1.2 presents the lots located wholly or partially within the Project Site and its proposed access. The land on which the operational areas of the Project Site are situated is owned by the Applicant. The Quarry Access Road traverses freehold land owned by the Applicant and Crown land. The Quarry Access Road would traverse the infrastructure corridor for the dis-used Goulburn Bombala Railway Line that is managed by the Transport Asset Holding Entity of NSW. Consent has been provided from all private and public landowners for the lodgement of the development application and EIS. The Applicant also has an agreement with the private lease-holder of Tuggeranong Block 1414 which comprises the land between the railway line and the Monaro Highway within the ACT. Additional detail regarding land ownership within and in the vicinity of the Project Site is provided in Section 2.4.3.

Table 1.1 presents the land nominated for use and comprising the schedule of lands for the purpose of development consent within NSW.

Table 1.1
Schedule of Lands (NSW)

Component	Deposited Plan	Lot
Project Site and Quarry Access Road	555380	2
	754912	6, 152, 255, 256, 257, 258, 259, 282, 283, 301, 302
	Various unformed Crown road reserves.	
Rail Overbridge	1244966	5403

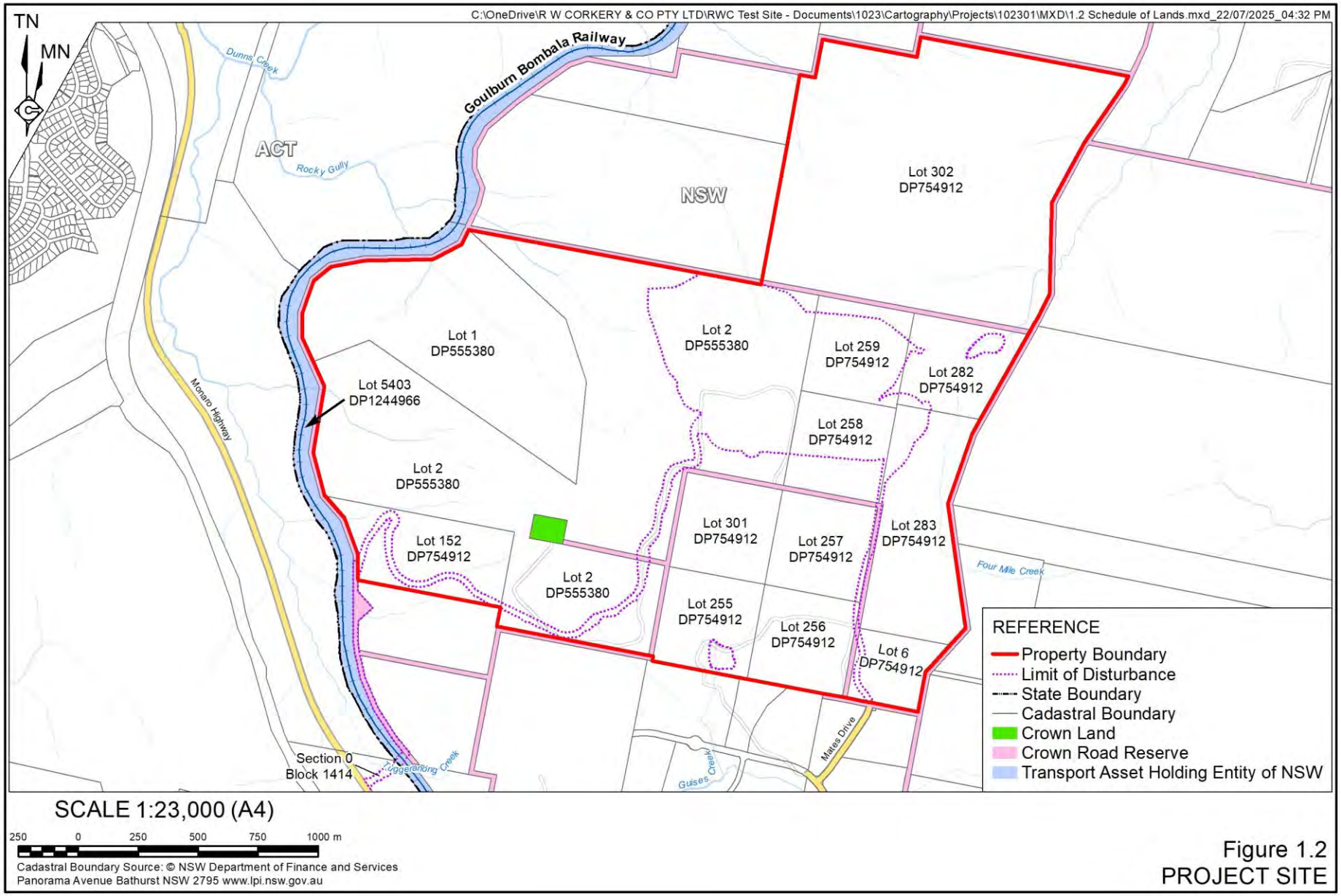


Figure 1.2
PROJECT SITE

1.4 Project Background

The demand for crushed hard rock construction materials within Queanbeyan-Palerang LGA and the Canberra Region has experienced strong growth in recent years, underpinned by continued growth in the construction market. Existing regional demand will be further expanded by a number of large regional infrastructure projects including the proposed upgrade to the Barton Highway, Light Rail Stage 2 and the Snowy Hydro 2.0 development. The Project Site is located strategically near the regional centres of Queanbeyan and Tuggeranong with the Canberra CBD located approximately 25km to the north. With demand for hard rock materials forecast to grow in the future, the hard rock resource within the Project Site would provide a range of quality products to local and regional markets. These products would include concrete and construction aggregates, road construction materials and select fill.

The suitability of the resource has been confirmed in a resource assessment commissioned by the Applicant in 2019 involving the use of historic site data and data obtained during a high-resolution ground magnetic survey and multiple drilling programs. The results of this assessment indicate an estimated fresh hard rock resource of over 25.5 million tonnes, a moderately weathered hard rock resource of over 2.4 million tonnes and a highly weathered hard rock resource of over 3.3 million tonnes. Therefore, the identified resource within the Project Site represents a significant, high-quality resource that is capable of being extracted and processed to supply local and regional markets. As a result, the resource is highly significant in the regional context. More information on the need for the Project is provided in Section 2.2.

1.5 Project Objectives

The Applicant's objectives in developing and operating the Project are to:

1. secure access to a strategically located and long-term hard rock resource that would provide a range of high-quality aggregates and road construction materials for use in the Queanbeyan-Palerang and ACT regions;
2. maximise efficient resource recovery within the defined Extraction Area;
3. undertake activities in an environmentally responsible manner to meet all relevant criteria and satisfy reasonable community expectations;
4. develop the operation in a manner that is considerate of the wide variety of local land uses and community amenity;
5. ensure the health of its workforce and the surrounding community is not adversely affected;
6. provide a stimulus to the local economy by increasing local employment levels and supply opportunities; and
7. operate in a cost-efficient manner.

1.6 Key Strategies to Avoid/Minimise Impacts

Section 6 presents a range of measures to avoid, manage, mitigate and monitor potential Project-related impacts. In summary, however, the following key strategies have been adopted during the design process for the Project to avoid and minimise Project-related impacts.

- Early and consistent consultation with the surrounding community and relevant government agencies and stakeholders to ensure that the Applicant and the Project team had a detailed understanding of the expectations of key stakeholders throughout the design phase for the Project.
- The steps taken by the Applicant to consider the best location and configuration of the Project Site is described in Section 2.7. Through this process, the Applicant has:
  - adjusted the location and scale of the operation to suit to local setting;
  - reduced the area designated for extraction and the total resource to avoid impacts to sites that were significant to the local Aboriginal community;
  - adjusted water management practices to ensure water supply certainty for the Project without reducing the ability of the community to access groundwater and surface water resources; and
  - undertaken a comprehensive analysis of alternative Quarry Access Road arrangements including concept design, ecological and Aboriginal heritage constraints analysis; social amenity (noise, dust and visual) constraint analysis.

  This process was designed to balance the needs of the Project with social amenity, development cost and feasibility considerations. The decision to use the Monaro Highway as the primary access for vehicles for the Project was principally made on the basis that it provided the best alternative option to avoid impacts to the local community including social risks associated with sense of place and to avoid possible transport-related conflicts.
- Operational areas of the Project Site would be located at least 1.5km from the nearest private residence. This distance would provide a level of mitigation to environmental impacts including for dust dispersion, noise propagation and groundwater drawdown risks.
- A Visibility Barrier would be constructed to the south of operational areas to provide screening of views from locations to the south of the Project Site. The barrier would be constructed pre-dominantly with highly weathered materials sourced from the site.
- A 3m fence would be constructed along 2.7km of the Quarry Access Road to mitigate noise and air quality risks for residents to the south of the Project.
- The Applicant has engaged recognised experts to complete assessments of key aspects of the Project to ensure that the Project as designed would comply with relevant regulatory standards and requirements, as well as reasonable community expectations.

1.7 Management of Investigations

This document has been prepared by a team within R.W. Corkery & Co. Pty Limited ("RWC") managed by Mr Nick Warren (BSc, MBus, MEnvSc), Principal Environmental Consultant. Mr Warren is a Registered Environmental Assessment Practitioner (REAP) in NSW (Registration Number 1876). The EIS has been prepared with the assistance of Mr Jack Flanagan (BSc, MEnvSc), Senior Environmental Consultant, Dr Grace Scullett-Dean (BSc (Hons), PhD), Environmental Consultant, Ms Tailey Goninon (B Marine and Antarctic Sc (Governance)), Environmental Consultant, and Ms Brittni Nicol (BSc (Geol, Geophys, Geog)), Environmental Consultant.

Mr Peter Hewson (Group General Manager) of Monaro Mix provided information in relation to the proposed quarry operations and management of the Project.

Mr Graham Lee of Graham Lee & Associates Pty Ltd undertook the Resource Assessment for the Project. Mr Michael Yelf of RPM Global Pty Ltd undertook the design of the extraction area and resource calculations for the Project. Ms Chelsea Corcoran of Spiire Australia Pty Ltd led the design of the Quarry Access Road, rail overbridge and intersection with the Monaro Highway.

The following consultancy firms were commissioned by the Applicant to undertake specialist consultant assessments for the Project.

Appendix A: **Assessment of Economic Need**
Ecoroc Consulting Engineers Pty Ltd
Dugald Gray (BEng(Mining), MBA) – Principal Engineer

Appendix B: **Air Quality Impact Assessment**
Northstar Air Quality Pty Ltd
Dr. Martin Doyle (PhD, BSc (Hons)) – Company Director

Appendix C: **Human Health Risk Assessment**
Environmental Risk Sciences Pty Ltd
Dr Jackie Wright (PhD (Public Health, Health and Environment), BE(Hons)) – Principal/Director

Appendix D: **Noise and Vibration Impact Assessment**
Octave Acoustics Pty Ltd
Robin Brown (BEng(Mech)) – Director

Appendix E: **Flyrock Assessment**
Fromble Corp Pty Ltd
Mike Humphreys (B.Sc. (Hons) (Mining Eng.), Ph.D. (Mining Eng.)) – Principal Drill and Blast Specialist

Appendix F: **Visual Impact Assessment**
R.W. Corkery & Co. Pty Limited
Dr Mudassar Arsalan (PhD Geography, Data Science) – Senior Consultant – Geospatial Analysis and Modelling
Mr Nick Warren (BSc, MBus, MEnvSc), Principal Environmental Consultant – Impact Assessment

Appendix G: **Biodiversity Development Assessment Report**
Capital Ecology Pty Ltd
Robert Speirs (BAppSc (Ecology, DipPM, MEIANZ, CEnvP-E, BAM Assessor) – Director / Principal Ecologist
Dr. Sam Reid (PhD (Ecology), BSc (Hons), BAM Assessor) – Senior Ecologist

Appendix H: **Aboriginal Cultural Heritage and Archaeological Report**
Past Traces Heritage Consultants Pty Ltd
Lyn O'Brien (BA(Hons)) – Director

Appendix I: **Road Transport Assessment**
The Transport Planning Partnership Pty Ltd
Penny Dalton (BE (Civil)(Hons) MIEAust CPEng) – Associate Director

Appendix J: **Soil and Land Capability Assessment**
Strategic Environmental and Engineering Consulting
Andrew Macleod (BSc (Hons), CPESC CPSS) – Director and Principal Soil Conservationist

Appendix K: **Surface Water Management Report**
Strategic Environmental and Engineering Consulting
Bill Johnson (M.Eng (Civ/Env), B.Eng. (Civ.)) – Director and Principal Engineer

Appendix L: **Groundwater Impact Assessment**
Hydrogeologist.com.au
Daniel Barclay (B. App. Sc. (Hons)) – Director / Principal Hydrogeologist

Appendix M: **Economic Assessment**
Gillespie Economics
Dr. Rob Gillespie (PhD (Economics), MEc, MPlan, BSc, BEc) – Principal

Appendix N: **Social Impact Assessment Report**
Landscape Research+Communications
Jane Seaborn (BA QPR Social Researcher) – Principal Consultant

Section 2

Strategic Context

PREAMBLE

This section identifies the key strategic issues that are relevant to the assessment of the Project, including a review of:

- *the need for the Project;*
- *strategic support and justification provided by key government strategies policies and plans;*
- *key features of the Project Site and surrounds;*
- *potential cumulative impacts;*
- *existing and proposed agreements; and*
- *feasible alternatives considered and rejected.*

2.1 Strategic Support and Project Justification

2.1.1 Introduction

This section outlines the need for the Project and identifies the key strategic issues that are relevant to the assessment and evaluation of the Project. In particular, it emphasises the importance of the Project and its resource to the South East and Tablelands Region and the Canberra Region. The principal planning documents and their key themes that are relevant to the Project justification are described, followed by a description of the key features and cumulative impacts of the Project. This section concludes with a summary of the strategic support for the Project.

2.2 Need for the Project

2.2.1 Introduction

The SEARs for the Project require the EIS to include an assessment of the significance of the resource. A description of the geology and quantum of the identified resource is provided in Section 3.3. An *Assessment of Economic Need* for the Project was undertaken by Ecoroc Pty Ltd (Ecoroc) and is presented as **Appendix A** and hereafter referred to Ecoroc (2025). The following subsections provide a summary of Ecoroc (2025) and presents the Project in the context of the demand for the hard rock resource in the ACT-Queanbeyan-Palerang Region and existing and proposed supply opportunities.

2.2.2 Resource

The target resource to be extracted from the extraction area is rhyodacitic ignimbrite, which occurs within a Silurian age geological unit referred to as the Deakin Volcanics. The Deakin Volcanics comprise a southwest-dipping sequence of interbedded rhyodacitic ignimbrite, tuff, tuffaceous shale and minor quartz sandstones and volcanic breccia which typically show reddish brown alteration. The target resource has been assessed as being of high quality for concrete production that would be suitable for a range of applications in both construction and infrastructure projects.

Not all hard rock types are suitable for aggregate production, as there are a wide range of characteristics the rock must meet when crushed (i.e. strength, density, and durability). A targeted resource assessment has defined three domains within the Extraction Area, defined by the level of weathered of the in-situ rock resource. More information on the targeted resource is provided in Section 3.3.

2.2.3 Demand

Ecoroc (2025) completed a detailed assessment of the projected demand for hard rock aggregates in the ACT and Queanbeyan-Palerang region over the period to 2050. Demand was projected based on population growth projections and published assumptions for construction material demand adjusted for the Queanbeyan Palerang Local Government Area (LGA) and the ACT.

2.2.3.1 Hard Rock Aggregates Uses

Aggregates are essential materials in construction, as they are often used as an ingredient in composite materials including concrete, masonry products (e.g. pipes, blocks, panels, pavers), asphalt and bitumen sealed road surfaces, or on their own in uses such as rail ballast, roadbase, drainage media, landscaping, and other uses.

Aggregates are predominantly used as inputs in building and construction, and therefore, demand closely matches the level of building and construction industry activity. The document Building a Sustainable NSW prepared by the Cement, Concrete and Aggregates Association (CCAA, 2023) states that on average, new homes require approximately 110t of aggregates, highways use approximately 14,000t of aggregates per kilometre, and high-rise buildings use up to 1,000t of aggregates per floor.

2.2.3.2 Population Growth

Due to the role that aggregates play in the residential and infrastructure construction industry, the demand is directly linked to population growth. Ecoroc (2025) analysed ACT Population Projections 2022 to 2060, ACT Government and NSW Population Projections Queanbeyan-Palerang LGA, 2021 to 2041 to gain insight into the projected population growth in the ACT and the Queanbeyan-Palerang Region between 2025 and 2050. **Table 2.1** displays the forecast population growth (in five year intervals) in the ACT and the Queanbeyan-Palerang Region respectively.

Table 2.1
Forecast Population Growth in the ACT and Queanbeyan-Palerang Region 2024-2050

Population	Qty (YE June)	2024	2025	2030	2035	2040	2045	2050
ACT	Million (M)	0.47	0.48	0.53	0.57	0.61	0.65	0.70
Queanbeyan-Palerang	M	0.07	0.07	0.07	0.08	0.08	0.09	0.09
Total	M	0.54	0.55	0.60	0.65	0.69	0.74	0.79
Note: NSW Population Projections extend to 2041. To complete the series to 2050, the rate at 2041 (~1.31% pa) has been applied.								
Source: Ecoroc (2025) – Modified after Table 2-1								

In summary, the ACT population is forecast to grow by approximately 220,000 people and the Queanbeyan-Palerang Region population is forecast to grow by approximately 20,000 people by 2050.

2.2.3.3 Forecast Demand

To understand the forecast demand for aggregates in the region, Ecoroc (2025) determined the average hard rock demand per capita. Various state and national publications that presented estimates of demand per capita for various construction materials were analysed and then compared to construction statistics for the ACT and Queanbeyan-Palerang LGA as well as data for existing supply sources for the region. Ecoroc (2025) derived a demand per capita of 4.2 tonnes of hard rock quarry products per year from FY 2025 to FY 2050 (Ecoroc 2025). The assumptions and calculations used to calculate the demand are presented in Table 6-1 of **Appendix A**.

The annual forecast demand for hard rock aggregates was then calculated as the product of the population forecasts by government, and a demand per capita estimate for hard rock aggregates of 4.2tpa, as illustrated in **Figure 2.1** (Ecoroc 2025). The forecast annual demand for hard rock quarry products is approximately 2.3Mtpa (million tonnes per annum) in 2025, and is forecast to grow to approximately 3.3Mtpa by 2050.

Figure 2.2 illustrates the forecast increase in demand between 2025 and 2050 cumulatively. In summary, the cumulative demand for hard rock quarry products in the ACT and Queanbeyan-Palerang Region is forecast to increase by 73Mt.

Table 2.2 presents the key demand forecast metrics for the period of 2025-2050.

Table 2.2
Cumulative Hard Rock Demand and Per Capita Demand FY 2025 to 2050

Project Hard Rock Demand	Unit	ACT	Queanbeyan-Palerang Region	Total
Annual Demand (Average)	Mtpa	2.5	0.3	2.8
Cumulative Hard Rock Demand	Mt	64.6	8.7	73.3
Cumulative Demand Per Capita	Mt	15.4	2.1	17.5
Per Capita Demand	tpa	4.2	4.2	4.2
Note: Table may not add due to rounding				
Source: Ecoroc (2025) – modified after Table 6-2				

It is important to note that the cumulative demand may be higher or lower in actuality due to either higher or lower population growth occurs, or if the demand per capita differs significantly from the 4.2tpa estimate. To address possible variation, a sensitivity analysis was completed by Ecoroc (2025) and is summarised in Section 2.2.6.

2.2.4 Supply

2.2.4.1 Hard Rock Sources and Reserve Estimates

There are four existing hard rock quarries within a nominal 30km radius of the Project. The Heidelberg-owned Williamsdale quarry, the Holcim-owned Cooma Road quarry, and the Boral-owned Mugga No. 1 and Hall quarries are all currently operating and servicing the local region. The most recently approved is the Williamsdale Quarry, which was approved 25 years ago in 2000. **Figure 2.3** presents the four existing quarries and the Project and their distance from Canberra.

Ecoroc (2025) utilised publicly available information including the existing quarries annual production limits and resource estimates published in historical EIS documents to predict the remaining reserves. Ecoroc (2025) estimated that a hard rock reserve inventory of approximately 34 Mt remains for the four operating quarries. **Table 2.3** presents the breakdown of each quarries predicted remaining reserves.

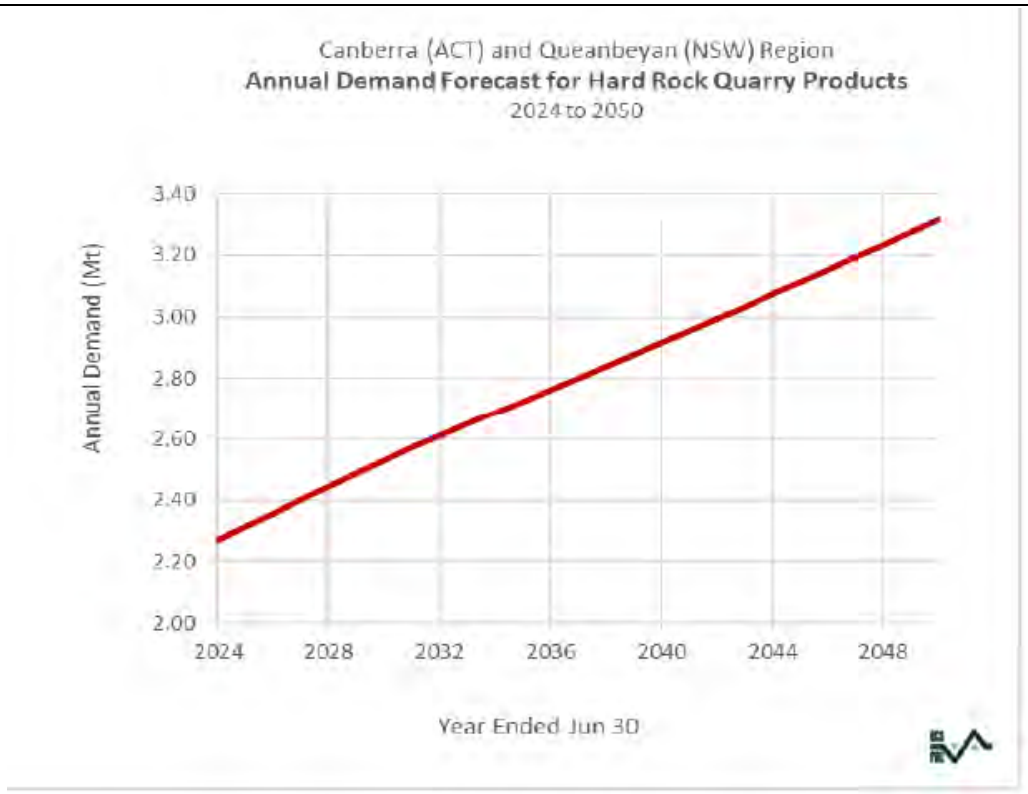


Figure 2.1
FORECAST ANNUAL DEMAND for HARD ROCK QUARRY PRODUCTS (2025-2050)

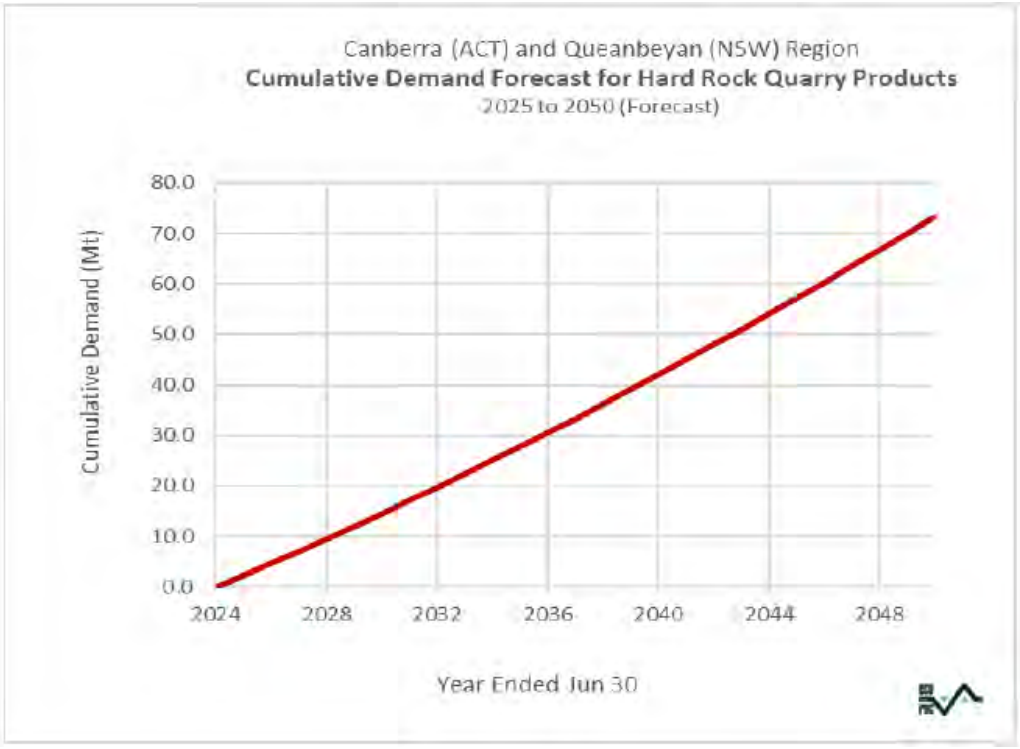


Figure 2.2
FORECAST CUMULATIVE DEMAND For HARD ROCK QUARRY PRODUCTS (2025-2050)

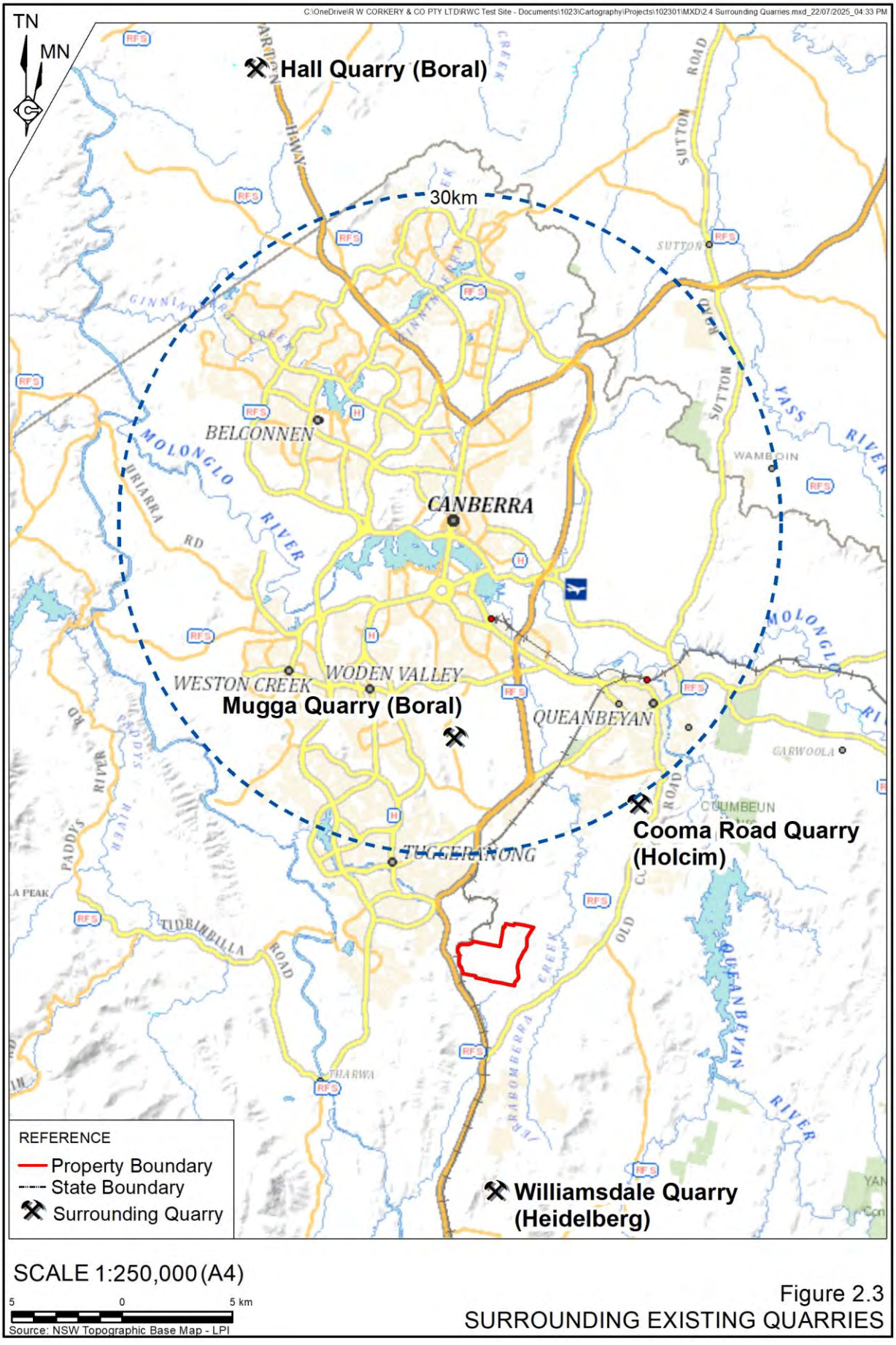


Figure 2.3
SURROUNDING EXISTING QUARRIES

Table 2.3
Estimate of Remaining Reserves at Surrounding Hard Rock Quarries

Quarry	Annual Supply Limit (Mtpa)	Estimated Remaining Reserve (Mt)
Cooma Rd. Quarry (Holcim)	1.2	6.5
Mugga Quarry (Boral)	0.45	11.0
Hall Quarry (Boral)	0.35	10.0
Williamsdale Quarry (Heidelberg)	0.5	6.2
Total Hard Rock Reserves Inventory	2.5	33.7
Source: Ecoroc (2025) – Modified after Table 7-2		

2.2.4.2 Alternative Suppliers

Apart from the Project, there are four alternative supply options to service the ACT and Queanbeyan-Palerang Region projected increase in population. The four options are detailed below.

- Undeveloped greenfield sites – another greenfield hard rock quarry could potentially assist in meeting the demand for aggregates in the region, however, there are no such projects currently the subject of a development application.
- Existing brownfield site extensions – any of the currently active hard rock quarries in the region could potentially assist in meeting the demand if they were to extend into adjoining or deeper resources, however, there is no project of this kind currently approved.
- Importation of aggregates from distant sites – Importing materials from distant hard rock quarries within the Goulburn-Marulan region could assist in meeting the demand, however, this would be costly due to the greater transport distance.
- Recycled materials (e.g. construction and demolition wastes, industrial wastes) – using recycled materials to assist in meeting demand is potentially useful, however, recycled materials are already in high demand and considered as a supplementary source rather than competition. Additionally, the use of recycled aggregates is limited by engineering specifications and prudency. It is considered that recycled materials would be unable to replace the need for additional hard rock aggregates.

In summary, Ecoroc (2025) determined that none of the above alternative suppliers would be effective in meeting the growing demand for hard rock aggregates in the ACT and Queanbeyan-Palerang Region.

2.2.5 Supply and Demand Balance

Ecoroc (2025) completed a supply and demand balance using the projected demand presented in **Table 2.2** and the projected supply presented in **Table 2.3**.

In order to provide a comprehensive picture of the supply and demand in the region and how the Project could impact that balance, Ecoroc (2025) analysed three potential scenarios. The three scenarios are briefly described below.

1. Existing quarries continue operations with no new project approvals.
2. Monaro Rock Quarry gets approval and commences operations in the late 2020's.
3. Monaro Rock Quarry gets approval and the Williamsdale Quarry gets approval for an extension.

A detailed analysis of each scenario is presented in Section 8 of Ecoroc (2025) (see **Appendix A)**.

Scenario 1

Scenario 1 represents the continuation of current operations in the ACT and Queanbeyan-Palerang Region and no new approvals. **Figure 2.4** presents the forecast annual demand vs supply for Scenario 1. There is a cumulative shortfall between 2024 and 2050 of approximately 41Mt (Ecoroc 2025).

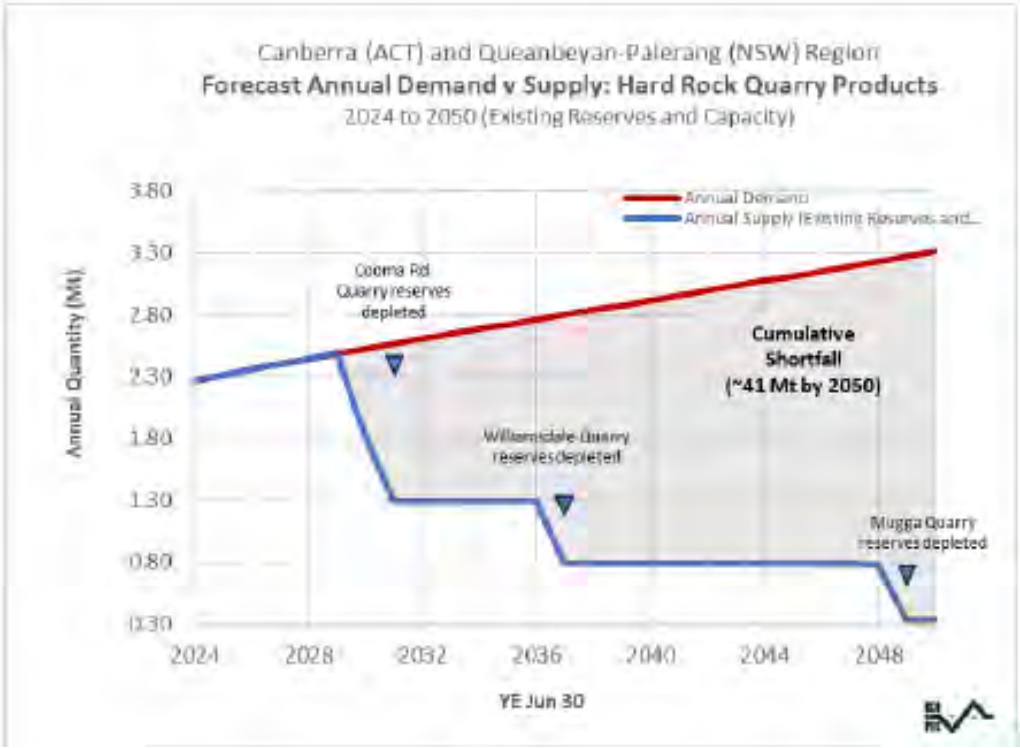


Figure 2.4
FORECAST ANNUAL DEMAND v SUPPLY FY 2024 to FY 2050

Scenario 2

Scenario 2 represents the approval of the Project and the impact that it would have on the supply and demand balance. **Figure 2.5** presents the forecast annual demand versus supply for Scenario 2. It is evident that even with the Project operating at full capacity, there remains a cumulative shortfall between 2024 and 2050 of approximately 23Mt (Ecoroc 2025).

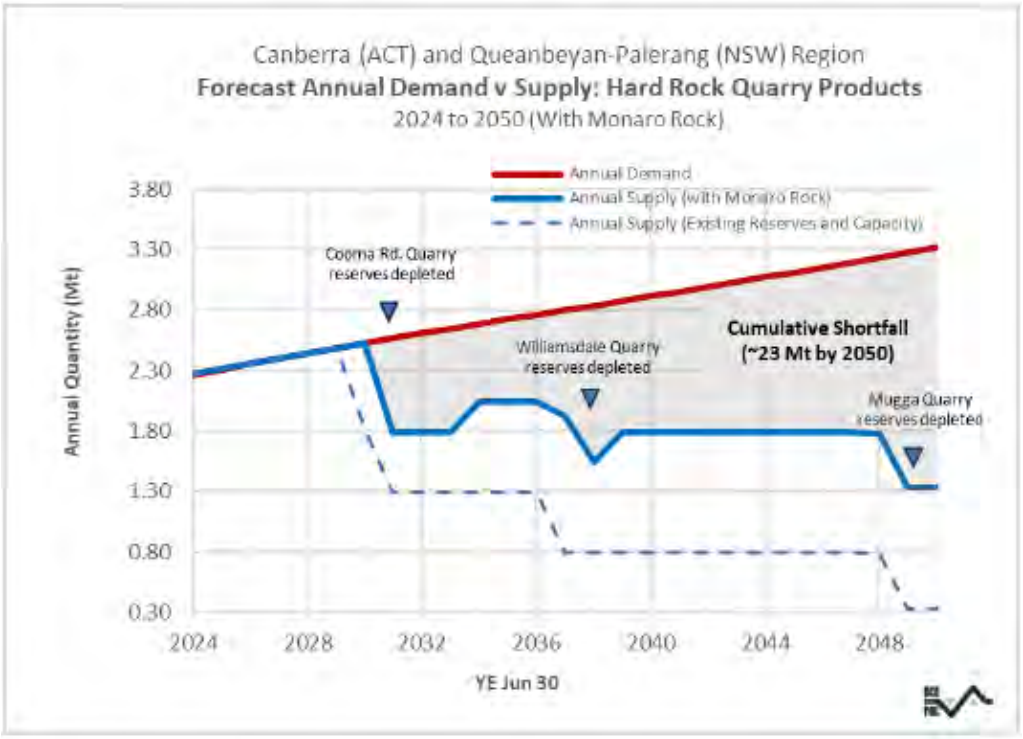


Figure 2.5
FORECAST ANNUAL DEMAND v SUPPLY FY 2024 to FY 2050 (with Monaro Rock Project)

Scenario 3

This scenario assumes that an extension is granted to the existing Williamsdale Quarry that approves access to an additional 17Mt resource. This assumption was included as the Williamsdale Quarry is the only existing quarry with known access to a feasible additional resource at its current location (subject to the relevant approvals). Under this scenario there remains a shortfall of 6Mt.

2.2.6 Supply Sensitivity Analysis

The supply and demand balance scenarios analysed by Ecoroc (2025) are reliant on a number of assumptions regarding population growth, product demand and the capacity of the surrounding quarries. To test these assumptions, Ecoroc (2025) completed a sensitivity analysis that assesses the implications on supply and demand if the circumstances differ significantly from those assumed. Three alternative assumptions were analysed and are summarised in relation to Scenario 2 in the below subsections. Further details on each analysis are available in Section 8.5 of **Appendix A**.

Reduced Demand

The first sensitivity analysis considers the chance that the demand for aggregates is 10% less than forecast. This could occur as a result of the following circumstances.

a) population forecasts turned out to be lower than the medium series forecasts prepared by the ACT and NSW governments; and/or

b) housing, other buildings, roads and other civil infrastructure development targets were not able to be achieved because of policy failure or moribund economic conditions for example; and/ or

c) recycled aggregates accounted for say 15 to 20% of demand for hard rock aggregates, rather than the present estimate of 12% (section 7.7.4); and/or

d) growth in the use of concrete was curtailed by competition from other building materials such as steel, timber or non-quarry composite materials.

Ecoroc (2025) found that if, due to any of the above circumstances, the demand was 10% lower than forecast, the cumulative demand would be reduced to 67Mt. In Scenario 2, this would still result in a cumulative shortfall in local supply of 17Mt.

Increased Reserves

The second sensitivity analysis considers a circumstance where the four local existing hard rock quarries have an existing reserve that is 25% higher than the estimate originally used by Ecoroc (2025). An additional 25% of remaining reserve would result in additional 8.5Mt of hard rock product. Referring to the average annual aggregate demand of 2.8Mtpa, this would allow for approximately three years of additional supply, meaning there would still be a shortfall after those three years (Ecoroc 2025).

Increased Capacity of Existing Quarries

The third sensitivity analysis looked at the possibility of any of the existing quarries seeking an extension to their current operations. Based on existing approvals, the four quarries have a maximum combined annual production capacity estimated at around 3.0Mtpa, and a combined practical sustainable annual capacity of around 2.5Mtpa. Due to the maturity of most of the quarries and factors such as capital costs associated with an extension, Ecoroc (2025) determined that Williamsdale Quarry is the most likely of the four to seek an extension.

Scenario 3 analysed the impact that the addition of a Williamsdale Quarry extension would have on the supply and demand balance alongside Monaro Rock. Ecoroc (2025) determined that if the annual quarry capacity was increased by 40%, the annual production could go from 0.6Mtpa to 1Mtpa, which would still result in a significant shortfall.

2.3 Planning Context

2.3.1 Introduction

The NSW and ACT Governments have published a range of planning documents that collectively provide the basis for government strategic planning for NSW and the ACT. Central to many of these documents is the recognition that the construction of housing, non-residential buildings, roads and other engineered infrastructure relies on construction materials provided by the extractive industry sector. The planning documents that are relevant to the Project and how each of those documents provides strategic support to the Project are outlined in the following subsections.

2.3.2 Planning Documents

2.3.2.1 Queanbeyan-Palerang Regional Council Local Strategic Planning Statement

The *Queanbeyan-Palerang Regional Council Local Strategic Planning Statement 2020* (QPRC LSPS, 2020) lists a range of planning priorities for the Local Government Area (LGA).

Planning Priority 5 is to *"…consider the environmental impacts of future development."* Specific outcomes under Planning Priority 5 include minimising the impacts of development upon the natural environment. The activities included in the Project have been designed in such a manner to ensure environmental impacts are minimised. Identification and assessment of these potential impacts along with proposed ameliorative and mitigation measures are detailed in Section 6.

Planning Priority 7 is to "…*actively promote and implement sound resource conservation and good environmental practice*." Specific outcomes under Planning Priority 7 include ensuring that extractive industries are protected from land-use conflict, and ensuring they are undertaken in a sustainable manner. The Project has been located to avoid any land use conflicts and limit possible environmental impacts for the local community.

2.3.2.2 South East and Tableland Regional Plan 2036

The *South East and Tableland Regional Plan 2036* has as its vision:

> *A borderless region in Australia's most geographically diverse natural environment with the nation's capital at its heart*

The document ties regional planning for the South East and Tableland Region with its proximity to Canberra, and specifically to the concept of a borderless region. This is underpinned by the *ACT-NSW Memorandum of Understanding (MoU) on Regional Collaboration* that was signed in 2018 and which has a priority to take a regional approach to infrastructure, transport and economic development. In practice, the Project would be an example of a borderless operation as it would involve extractive activity within NSW with the delivery of materials crossing into the Canberra region with final destinations in both regions. The concrete produced by the Quarry would also be used across both regions to support the development of public and private infrastructure.

Direction 13 is to "*manage the ongoing use of mineral resources*". The activities included in the Project have been designed to ensure that the Project will continue to be operated in an economical and sustainable manner in accordance with this Direction.

Goal 2 is to facilitate "*a diverse environment interconnected by biodiversity corridors*". The Project has been designed to minimise impacts to biodiversity through the mitigation framework of "avoid, minimise, offset". Parts of the Project Site are identified as a "South East and Tablelands Corridors" under the *South East and Tableland Regional Plan 2036*. A Biodiversity Development Assessment Report (BDAR) for the Project was prepared by Capital Ecology Pty Ltd (Capital Ecology) and is presented as **Appendix G** and hereafter referred to as Capital Ecology (2025). Capital Ecology (2025) assessed the likelihood that the Project would have an impact on the potential biodiversity corridor, and determined that due to previously cleared and impediments to connectivity, the Project is not likely to have prescribed impact on the connectivity of different areas of habitat.

Goal 4 is to support "*Environmentally sustainable housing choices*" which focuses on delivering greater housing supply. As discussed in Section 2.2.3, new homes require approximately 110t of aggregates. The Project would directly assist in this goal by providing a new local supply of aggregates.

2.3.2.3 Queanbeyan-Palerang Regional Economic Development Strategy 2018-2022 (2023 Update)

The *Queanbeyan-Palerang Regional Economic Development Strategy 2018 – 2022* outlines a plan to drive sustainable economic growth in the Queanbeyan-Palerang region by leveraging its proximity to Canberra, skilled workforce, and diverse economy. The strategy focuses on economic diversification, improved infrastructure, workforce development, innovation, and regional collaboration.

One major aim of this strategy is to increase the connectivity throughout Queanbeyan-Palerang through road and rail logistics efficiency improvements. As discussed in Section 2.2.3, construction of highways requires approximately 14,000t of aggregates per kilometre. In order to develop further transportation connectivity in the region, a capable local supply chain of construction materials is required. The products of the Project could directly assist in this aim by ensuring that a local supply of aggregates is available.

Additionally, the 2023 update to the *Queanbeyan-Palerang Regional Economic Development Strategy 2018 – 2022* lists construction as one of key industries in the region, with $423 million Gross Value Added (GVA) in 2020 and 4,024 jobs supported in 2021. The Project would support keeping the regions construction industry more local and cost-effective, therefore continuing to drive economic growth.

2.3.2.4 Queanbeyan Residential and Economic Strategy 2015 - 2031

The *Queanbeyan Residential and Economic Strategy 2015 – 2031* focuses on managing urban growth and economic development in the Queanbeyan area. Its primary objectives include ensuring sufficient residential and employment land to accommodate projected population growth.

One major theme throughout is the need to accommodate 10,000 new dwellings in the 25 years following 2008 due to a growing population. As discussed in Section 2.2.3, the Project would directly assist in the construction of new residential dwellings in the Queanbeyan region through the extended provision of locally sourced hard rock aggregates.

Another theme throughout this strategy is facilitating the creation of more local jobs. The Project would generate between 14 and 20 fulltime employees and a further 10 employees for transportation activities. Therefore, the Project is anticipated to provide more people with the opportunity to find work in the extractive industry locally.

This strategy also recognises the need to create and maintain buffer zones between existing/potential industrial areas and residential areas. The Project has been designed to maintain a distance from residential properties in all directions. The closest residential receiver is approximately 1,500m from the Quarry Site.

Similarly to the *South East and Tableland Regional Plan 2036*, this strategy emphasises the need to maintain and protect green corridors. As discussed in Section 2.3.2.2, the Project is not anticipated to have prescribed impacts on regional or local biodiversity corridors (Capital Ecology, 2025).

Additionally, a number of potential constraints for development applications in the region are listed for consideration. These include the following concerns relevant to the Project.

- Potential Aboriginal archaeological deposits – An Aboriginal Cultural Heritage Assessment was completed by Past Traces (2025). The Extraction Area was redesigned to avoid items of high significance, including a culturally modified ring tree. Section 6 goes into further details regarding the impacts to Aboriginal heritage.
- Bushfire prone land – The Project Site largely falls over exclusion zones within the NSW Rural Fire Service Bush Fire Prone Land (BFPL) mapping. The risk of bushfire (either being caused by the Project or the Project being impacted by bushfire) is considered low.
- Scenic protection – A Visual Impact Assessment has been prepared for the Project by RWC. The outcomes of this assessment are presented in Section 6.6 and the report reproduced as **Appendix F**. A visual amenity barrier would be constructed as part of the development to obscure views of the Infrastructure Area and the Processing and Stockpiling Area. Minor views of the upper benches of the Extraction Area may be visible from some vantage points, however these would be completed early in each stage of development and subject to rehabilitation to ensure that vegetation was established that covered terminal faces. The upper benches of the Extraction Area have been designed to be shorter than normally expected, so that vegetation would cover them sooner.

2.4 Key Features of the Region

2.4.1 Introduction

The key features within the area surrounding the Project Area that could affect or be affected by the Project include the proximity to residences, surrounding land uses and land ownership, and the surrounding natural and built features.

2.4.2 Surrounding Land Uses

Figure 2.6 displays the land zoning within the Project Site. The Project Site is partially zoned C2 – Environmental Conservation and partially RU2 – Rural Landscape. Extractive industries are permissible with development consent in each of these zones, by virtue of Clause 2.9(3) of the State Environmental Planning Policy (Resources and Energy) 2021 (Resources and Energy SEPP). A discussion of the objectives of each land use zone is presented in Section 4.2.2, however **Figure 2.7** presents an analysis of tree density within the Project Site, relative to the land zoning. It is clear from this figure that although there is a higher density of trees within the section of the Project Site that is zoned C2 – Environmental Conservation, when compared to the land to the west, it is clear that the higher density and better condition vegetation has been avoided.

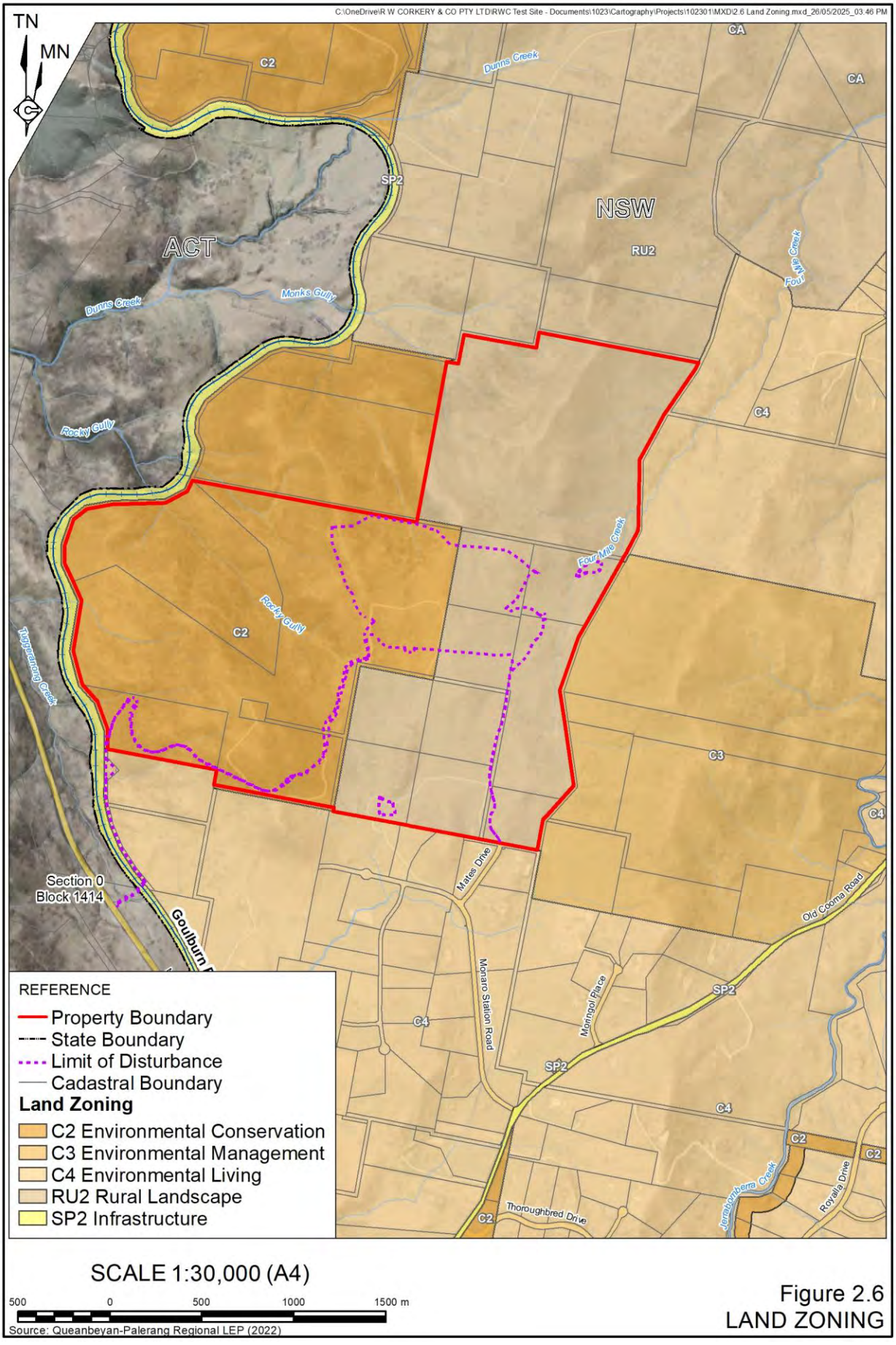


Figure 2.6
LAND ZONING

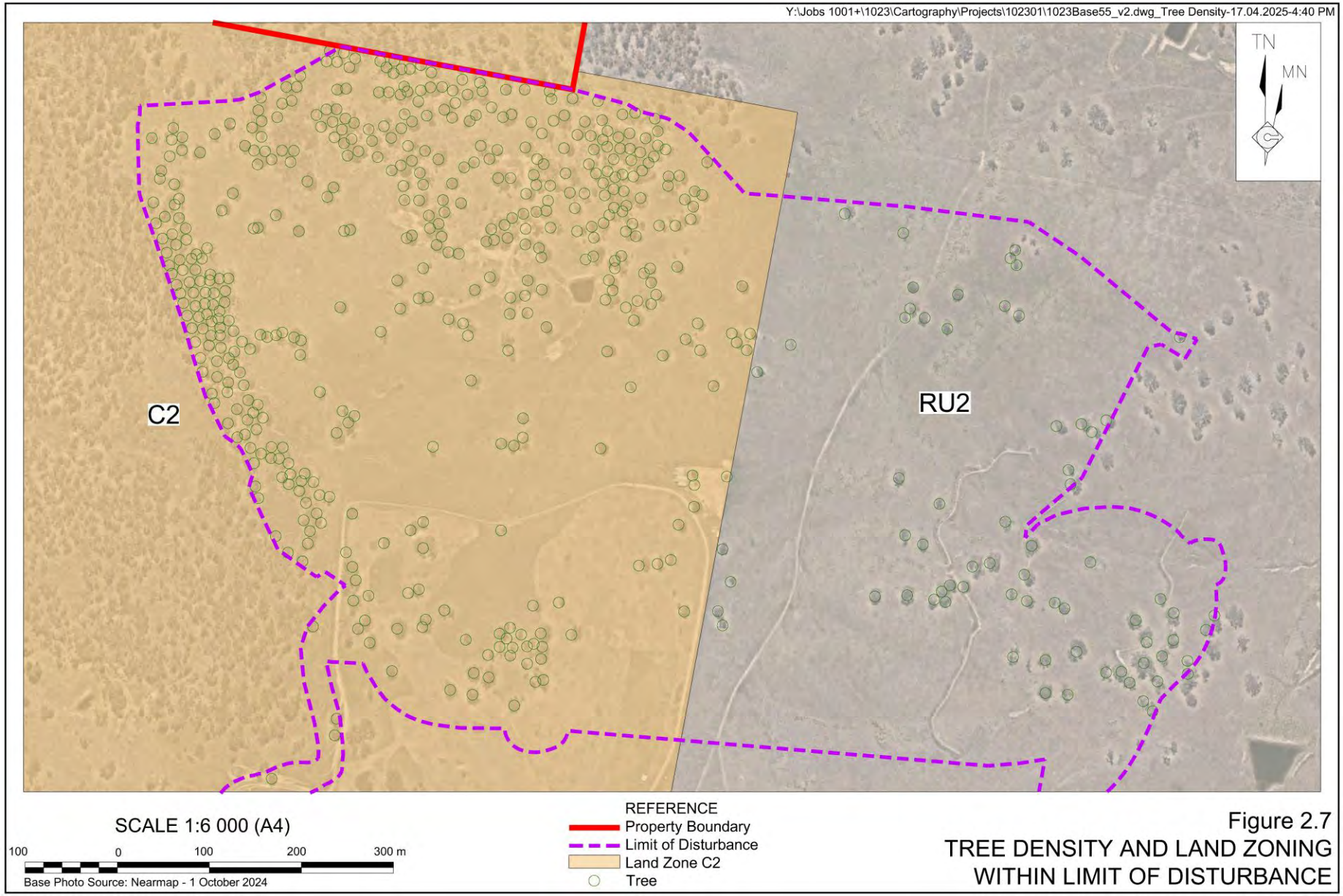


Figure 2.7
TREE DENSITY AND LAND ZONING
WITHIN LIMIT OF DISTURBANCE

Figure 2.8 displays the land uses surrounding the Project Site sourced from Australian Land Use and Management (ALUM). It is noted that this information is broad in nature and may have changed and that landowners may also not agree with the characterisation of their property. Land uses surrounding the Project Site predominantly comprise the following.

- Grazing – native vegetation
- Grazing – modified pastures
- Residential and farm infrastructure
- Transport and communication
- Rivers

A rural residential subdivision has recently been approved to the south of the Project Site. Given the proximity of privately-owned residences within 2km of the Project Site, potential constraints include noise and vibration, air quality (including health) and visibility.

Major public infrastructure within the area surrounding the Project Site includes the Monaro Highway and Old Cooma Road. Additionally, the Goulburn Bombala Railway runs parallel to the Monaro Highway immediately to the west of the Project Site. Passenger services ceased in 1989 with some tourist-based service running since that time, however, these services have also now ceased due to the deterioration of the line.

A communications tower is located at the peak of Enchanted Hill to the southwest of the Project Site. The proposed Quarry Access Road would pass nearby this tower. The Project does not represent a constraint to the ongoing use of this tower for communications. Access to the communications tower is currently provided by farm tracks and would be continued, when needed, during development and operation of the Project.

2.4.3 Land Ownership

Figure 2.9 displays the land ownership within and surrounding the Project Site.

The land on which the Project Site is situated is owned by the Applicant. The Quarry Access Road traverses freehold land owned by the Applicant and Crown Land. The Applicant has a land use agreement with the private lease-holder that controls the land within the ACT between the railway line and the Monaro Highway.

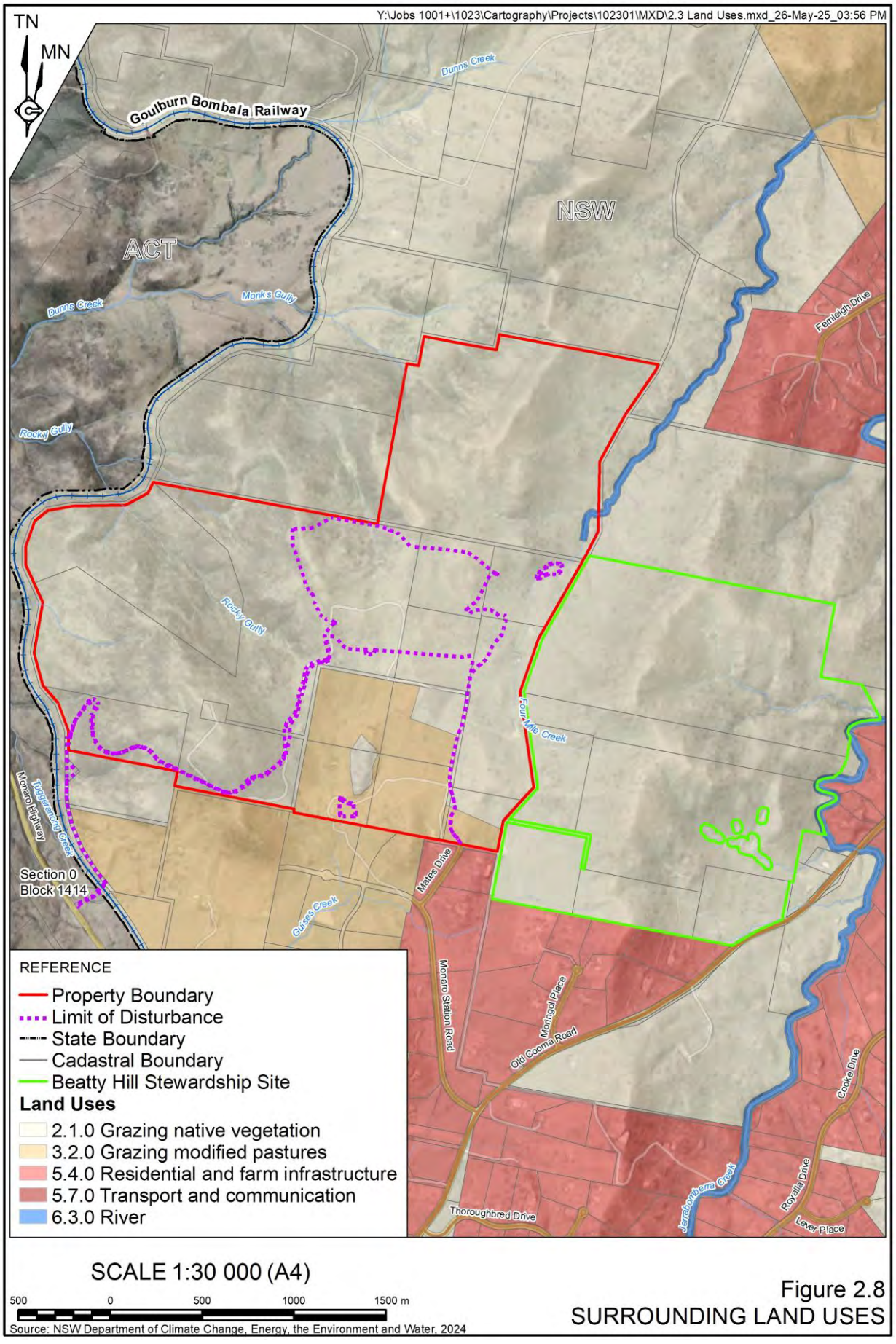
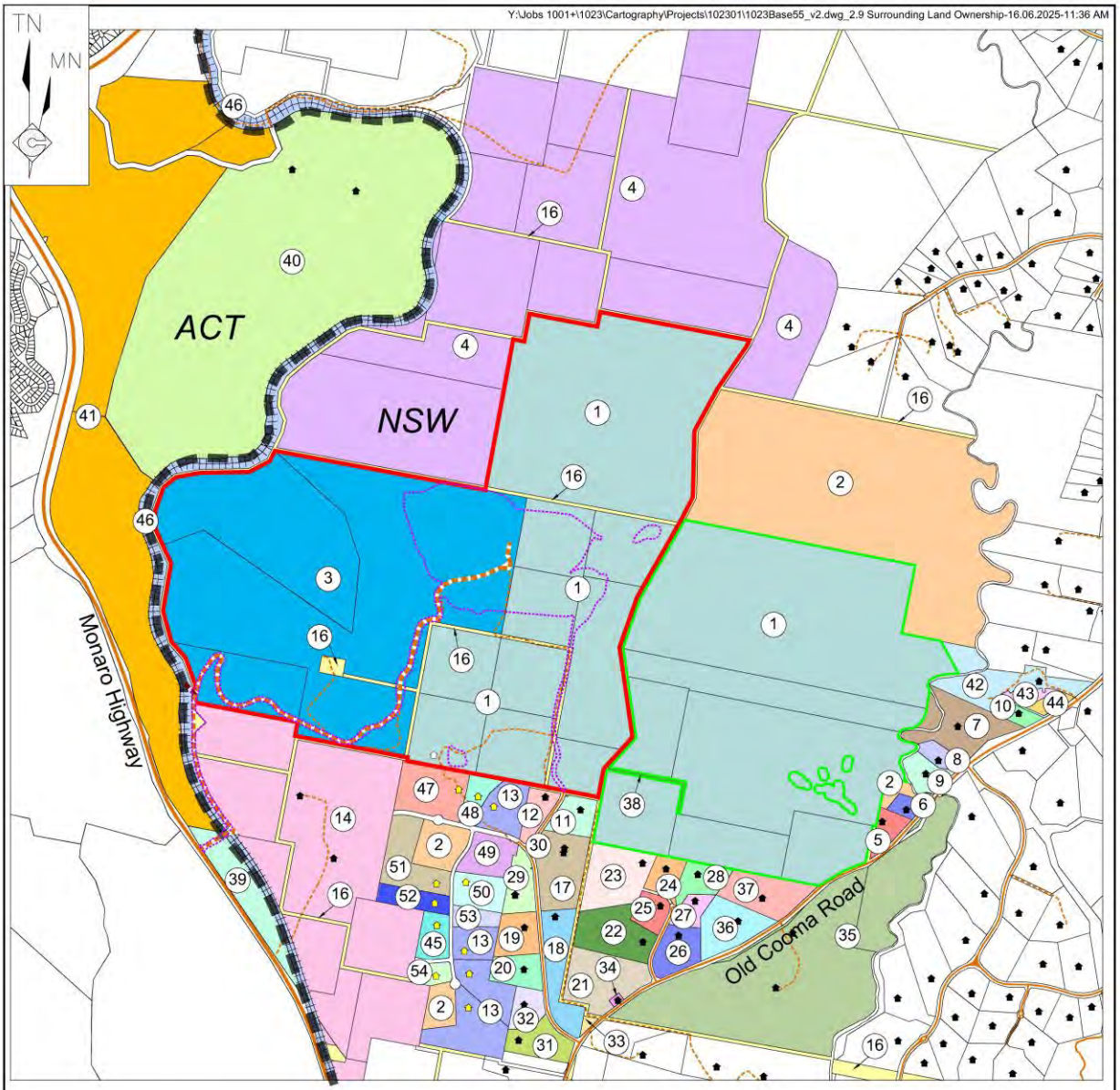


Figure 2.8
SURROUNDING LAND USES



REFERENCE
- Property Boundary
- NSW/ACT Border
- Cadastral Boundary
- Limit of Disturbance
- Beatty Hill Stewardship Site
- Crown Land
- Rail Line
- Road Sealed/Unsealed
- Residence
- Residence (Proposed)
- Residence (Project Related)

Ref	Landowner
1	THE APPLICANT
2	COMMUNITY ASSOCIATION
3	THE APPLICANT
13	BRINDABELLA PROPERTY GROUP PTY LTD
16	NSW CROWN LAND
30	NEIGHBOURHOOD ASSOCIATION
34	QUEANBEYAN CITY COUNCIL
38	THE APPLICANT
39	PRL PROPERTIES PTY LIMITED
41	ACT CROWN LAND
46	TRANSPORT ASSET HOLDING ENTITY OF NSW
◯	ALL OTHER LAND IS PRIVATELY OWNED

SCALE 1:40 000 (A4)

0.5 0 0.5 1.0 1.5 km

Cadastral Boundary Source: © NSW Department of Finance and Services
Panorama Avenue Bathurst NSW 2795 www.lpi.nsw.gov.au NSW
NSW Land Ownership Source: Dye Durham Terrain - June 2025

Figure 2.9
LAND OWNERSHIP AND SURROUNDING RESIDENCES

2.4.4 Natural and Built Features

Most of the land in the Queanbeyan-Palerang LGA is classified as grazing modified pastures or residential and farm infrastructure on NSW land use mapping[1]. All land in the Project Site area is classified as grazing modified pastures as shown on **Figure 2.8** Transport infrastructure includes the Monaro Highway east of the Project Site, Old Cooma Road to the south and the Goulburn Bombala Railway as outlined in Section 2.4.3. Areas classified as Canberra Nature Park are located immediately west of the Project Site over the NSW/ACT border. Areas of residential and farm infrastructure are located northeast, south and southeast of the Project Site, and a proposed rural residential subdivision is located south of the Project Site as outlined in Section 2.4.3. Small patches of land classified for use as a reservoir/dam are scattered on all sides of the Project Site, with one small reservoir located near the eastern Project Site boundary.

2.5 Risks and Hazards

2.5.1 Introduction

The environmental setting of the Project determines the likely risk of impact and the presence of hazards or other factors that must be considered in environmental impact assessment. Information of local setting may be drawn from publicly available records or from consultation with key stakeholders. The processes used for engagement with local stakeholders are described in Section 5 and key features of the environmental setting is described in Section 6.1. The following presents a summary of key environmental risks identified through risk assessment and key features relating to hazards, climate change and bushfire risk.

2.5.2 Risk Assessment

Appendix 3 presents the analysis of risk prepared for the environmental aspects of the Project.

In summary the following high and medium risk outcomes have been assessed assuming the implementation of standard mitigation measures. These risks have been the subject of targeted assessment for the Project with the outcomes presented in Section 6. The key strategies to avoid or minimise impacts that are described in Section 1.6 we developed with the aim of mitigating these risks.

High Risk Outcomes

- Clearing of native vegetation within the Project Area resulting in significant impacts upon habitat for terrestrial fauna species, threatened or rare native vegetation or vegetation communities and biodiversity values.
- Extraction operations resulting in indirect impacts to fauna communities due to noise / blasting.
- Removal or destruction of identified Aboriginal sites and/or artefacts within the development area causing a loss of Aboriginal cultural heritage values and reduction of in situ archaeological record.

[1] https://data.nsw.gov.au/data/dataset/nsw-landuse-2017

- Interception of the groundwater table by extraction operations and a production bore causing groundwater drawdown and reduced availability of groundwater for existing groundwater users.

Medium Risk Outcomes

- Emissions of respirable crystalline silica from extraction and processing operations resulting in risks to the health and/or amenity of occupants within surrounding privately-owned residences.
- Noise from construction of site infrastructure (excluding the Quarry Access Road), amenity barriers, vegetation clearing and soil stripping resulting in amenity impacts at surrounding privately-owned residences.
- Noise from construction of the Quarry Access Road resulting in amenity impacts at surrounding privately-owned residences.
- Noise generated by the transportation of extracted and/or processed rock within the extraction area resulting in amenity impacts at other surrounding privately-owned residences.
- Inappropriate maintenance/management of weeds and pest species that impedes successful rehabilitation.
- Construction of Project Site infrastructure and amenity barriers resulting in amenity impacts to views from privately-owned residences.
- Views of extraction and processing operations resulting in amenity impacts to views from privately-owned residences
- Views of road trucks using the Quarry Access Road resulting in amenity impacts to views from privately-owned residences
- Capture of surface water from local catchments causing a reduction in flows in surrounding watercourses.
- Interception of the groundwater table by extraction operations and a production bore causing groundwater drawdown and reduced baseflow contribution to local watercourses within the Murrumbidgee Catchment
- Noise, vibration, dust, traffic, and/or visual amenity impacts generated by the Project causing social amenity impacts.
- Noise, vibration, dust, traffic, and/or visual amenity impacts generated by the Project causing mental health and anxiety risks for the local community.
- Fire initiated within the Project Site (caused by bush fire or ignition of flammable liquids) that may impact on-site or off-site vegetation or infrastructure.

2.5.3 Hazardous Materials

Section 6.14 presents an assessment of hazards associated with the Project. There are no known existing hazards within the Project Site that has historically been used for grazing activities. The key public safety hazards associated with the Project include the transport, storage, handling and use of any hazardous or dangerous good such as diesel fuel or explosives.

2.5.4 Climate Change

Climate projections for the South East and Tablelands Region are provided in the *South East and Tablelands Climate Change Snapshot* report (DCCEEW, 2024a). Projections extend to the near future (to 2050) and the far future (to 2090). In summary, the region is expected to experience the following climate trends (DCCEEW, 2024a).

- An overall increase in temperature with an increased number of hot days and decreased number of cold nights.
- Rainfall seasonality would change, with decreased rainfall all year round in both the near and far future.
- Fire risk would increase, with an increase in both average fire weather and the number of days with severe fire weather in summer and spring.

The outcomes of a greenhouse gas assessment for the Project are described in Section 6.3.

2.5.5 Bushfire

A review of the NSW National Parks and Wildlife Service fire history mapping[2], which has a state-wide spatial record of fires since 1902, determined that the Project Site is situated on land which has historically experienced wildfires over the periods 1951 – 1952 and 1984 – 1985.

The NSW Rural Fire Service provides mapping of bush fire prone land[3] (BFPL) which shows that most of the Queanbeyan-Palerang Area ranges from low to high risk of bushfire with large patches of exclusion zones. The Project Site largely falls over exclusion zones, with both low and high-risk areas to the west, northwest and north of Enchanted Hill towards the western Project Site boundary.

Threats from fire includes grass fires in grassland and bushfire in bushland. Given the large areas of exclusion zone, the moderate annual rainfall of 620mm (Section 6.1.3) and the history of previous fires, the risk of bushfire (either being caused by the Project or the Project being impacted by bushfire) is considered low.

Planning for bushfire protection, emergency management and evacuation procedures would be managed in accordance with the Quarry's *Emergency Management Plan*, which would be prepared should the Project be approved.

[2] https://data.nsw.gov.au/data/dataset/fire-history-wildfires-and-prescribed-burns-1e8b6
[3] https://data.nsw.gov.au/data/dataset/nsw-bush-fire-prone-land

2.6 Cumulative Impacts

The Royalla Solar Farm is the only known industry in the vicinity of the Project Site, located approximately 2.5km to the southwest (see **Figure 2.1**).

Quarrying operations to the north (the Cooma Road Quarry and Mugga (Symonston) Quarry) and to the south (Williamsdale Quarry) are not close enough to result in discernible cumulative amenity impacts (i.e. impacts associated with noise, air quality, blasting or views of operations). Traffic generated by the Williamsdale Quarry using the Monaro Highway would have a cumulative impact of traffic levels on that highway. It is estimated that up to 5% of traffic may use Old Cooma Road for transport operations associated with the Project (only when accessing customers in Royalla and Googong). Therefore, it is highly unlikely that traffic generated by the Cooma Road Quarry would use similar routes to that used by the Project.

2.7 Planning Agreement

The Applicant has commenced negotiations with Queanbeyan-Palerang Regional Council to establish a Planning Agreement. The Planning Agreements will include the payment of a 12.5c/t contribution to be managed by Council for distribution as follows.

- Contributions towards projects established by Community Management Committees established under Section 355 of the *Local Government Act 1993*. It is expected that these groups would be focused on local community halls and support or sponsor events or projects managed by committees associated with each hall.
- The funding would be directed to Community Management Committees located in Royalla, Fernleigh Park and Googong.
- Contributions to a community fund for support of community led projects that may include local environmental regeneration projects such as those managed by local Landcare groups.
- Procedures for implementation of the above.

Appendix 4 provides a copy of correspondence received from Council in July 2025 indicating support for the proposed mechanism for the funding and distribution of the Applicant's contributions towards community-generated programs that support the local projects. The Applicant anticipates that the terms of the planning agreement would be agreed following exhibition of the EIS and would prefer to have the Planning Agreements publicly exhibited and formally adopted prior to the determination of the Project.

2.8 Alternatives Considered

2.8.1 Introduction

During the design of the Project, the Applicant examined a range of alternatives for a number of Project components before deciding upon the location, scale and form of the proposed Project as presented within this EIS. The following subsections outline the feasible alternatives considered for these components and the reasons for not proceeding with the various alternative(s) and proceeding with the preferred alternative for each component.

The consequences of not proceeding with the Project are presented in Section 7.7.

2.8.2 Extraction Area Boundaries

Figure 2.10 displays the initial investigation area considered across the property owned by the Applicant. Some records of previous geological investigation were available in this area to inform planning. Geological logging and analysis was used to narrow down areas for potential extraction. Early in investigations it was identified that the resource on the eastern side of the Royalla Fault (comprising the Colinton Volcanics) would not produce an aggregate with properties needed by the construction industry. These areas were therefore removed from consideration.

Three potential extraction area targets were identified from initial investigation as presented in **Figure 2.11**. Additional exploration was undertaken in the form of diamond core drilling and high-resolution ground magnetics survey. Investigation of these areas concluded the following.

- Extraction Area Option A was rejected due to the potential for views of the operation from within the ACT, occurrence of occupied Pink-tailed Legless Lizard habitat, occurrence of the highest density Silky Swainson-pea populations and difficulty with access to the northern section of the property.
- Extraction Area Option B was considered the best opportunity as it represented extraction within a defined ridge and processing activities would be separated from neighbours. It was also characterised by a low occurrence of threatened flora and fauna habitat. However, this area contained good condition Box-Gum Woodland along its eastern extent.
- Extraction Area Option C had the best prospects for access to the public road network, however would have required development within a narrow gully, was known to contain good condition Box Gum Woodland and was in close proximity to neighbours and the existing communications tower.

Accordingly, Extraction Area Option B was further investigated. The opportunity for existing topographic features such as Beatty Hill and Enchanted Hill to provide natural mitigation for possible noise or visual amenity impacts was also considered at this time.

The extent of the extraction area was further refined through exploration drilling, comprising diamond core, percussion and overburden drilling. **Figure 2.12** presents the progressive refinement of the extraction area that incorporated the following considerations.

- The outcomes of biodiversity field survey were used to define the western boundary of the extraction area and avoid the clearing of good condition vegetation, where feasible. This process was informed by analysis of vegetation density that is presented in **Figure 2.7**.
- Biodiversity field surveys were also used to avoid Box-Gum Woodland vegetation in determining the location of the Processing and Stockpiling Area and the Visibility Barrier.
- The final Extraction Area boundary was determined after removal of a small area in the northwestern corner to avoid a culturally modified ring tree. Consultation with Aboriginal stakeholders indicated that the tree was considered significant, and the disturbance footprint of the Project was modified to avoid this location. This modification removed approximately 2Mt of resource from the final Project design. An additional culturally modified scar tree was avoided through an adjustment to the western end of the Visibility Barrier.

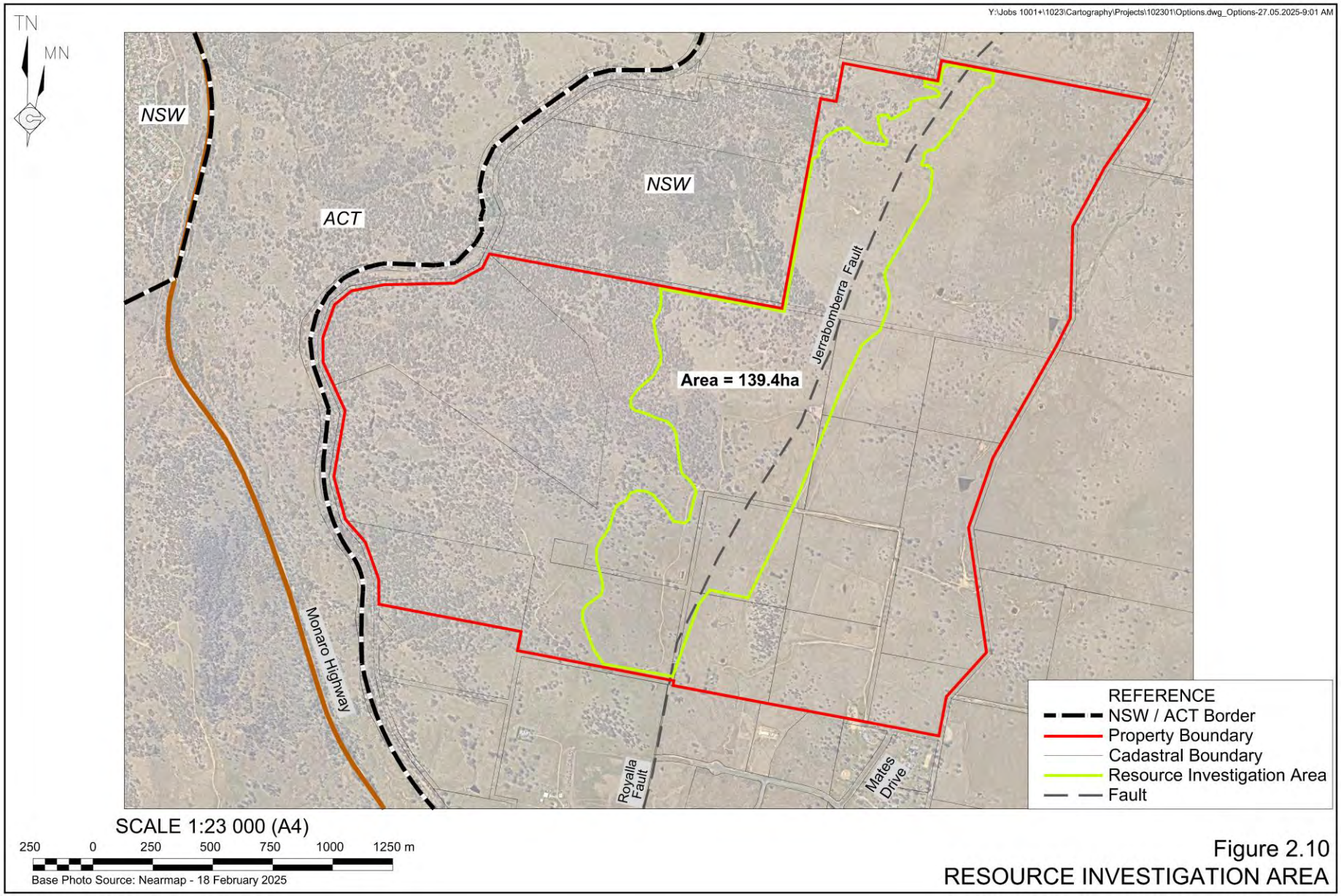


Figure 2.10
RESOURCE INVESTIGATION AREA

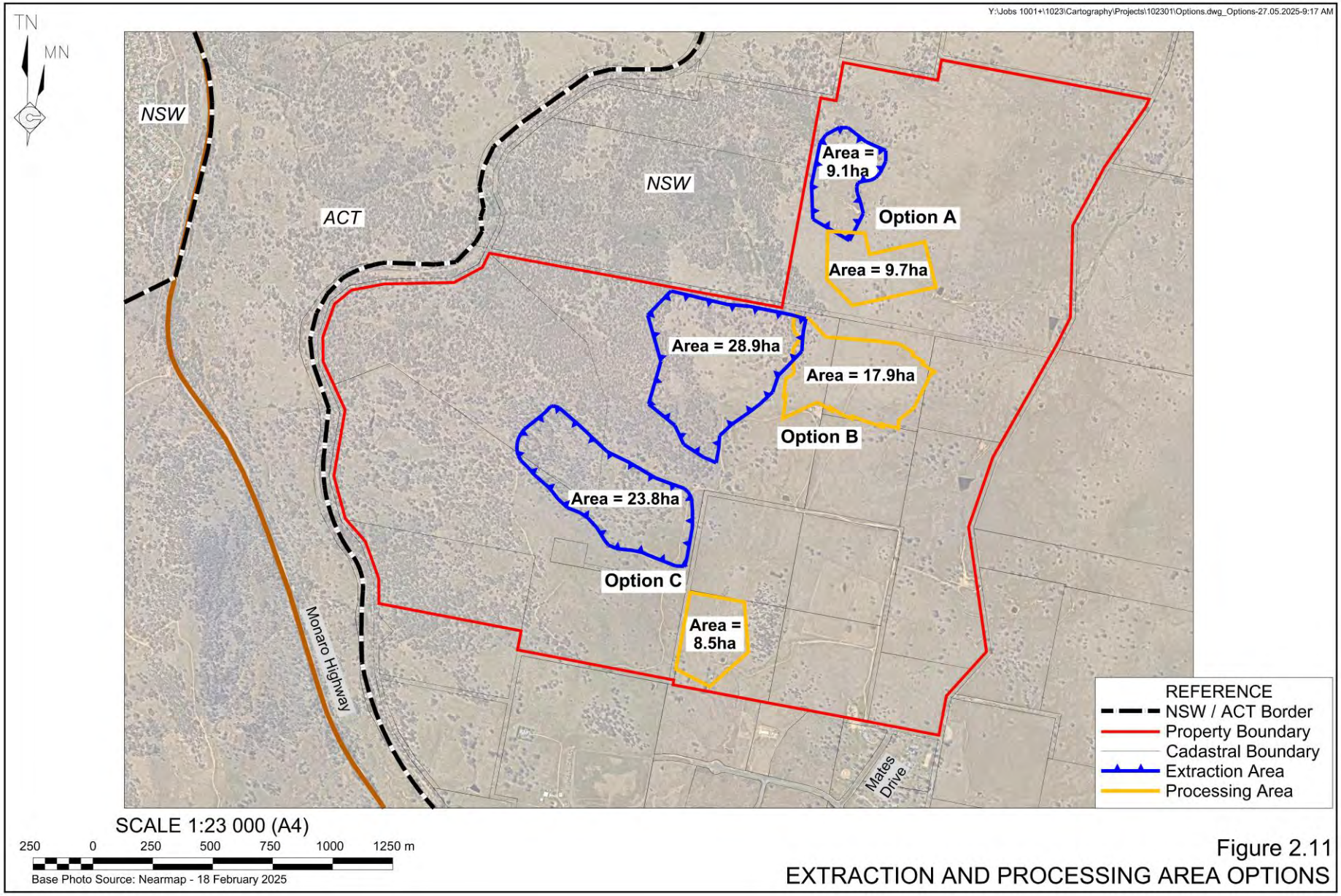


Figure 2.11
EXTRACTION AND PROCESSING AREA OPTIONS

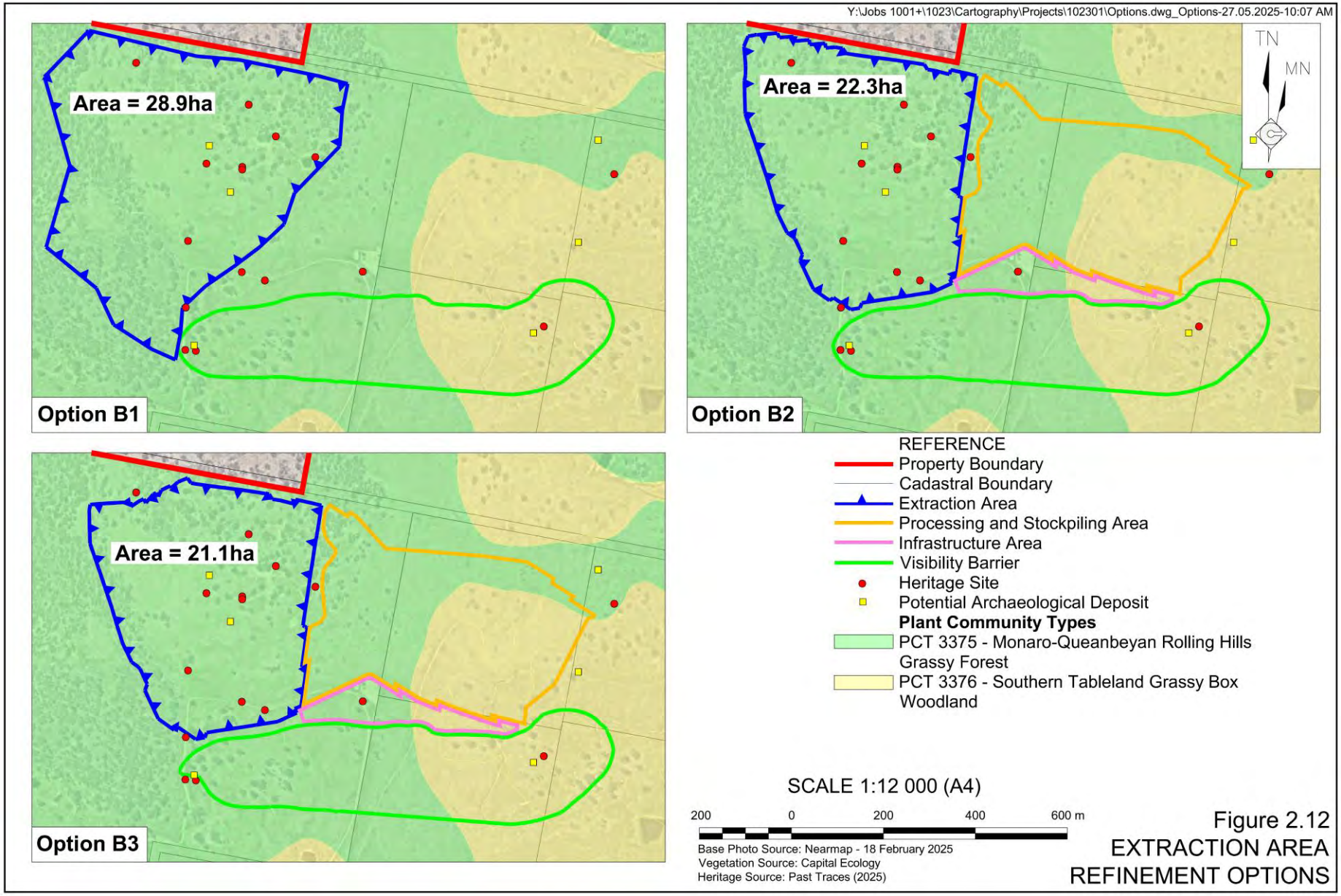


Figure 2.12
EXTRACTION AREA
REFINEMENT OPTIONS

2.8.3 Visibility Barrier

The location and size of the Visibility Barrier was adjusted throughout the Project design process to reflect Project access requirements, mitigation requirements or operational requirements. **Figure 2.13** presents the options considered for this component of the Project. The final design was selected based on:

- the final Quarry Access Road design;
- the outcomes of visual amenity analysis that demonstrated that the design would mitigate possible view of the Project;
- opportunities to avoid impacts to Box-Gum Woodland; and
- the need to balance visual mitigation with potential material storage and use needs for the operation.

2.8.4 Project Access

A range of options were considered to provide access to the Project Site. **Figure 2.14** presents a summary of the options that were considered in planning. The majority of these options were dismissed on the basis of:

- the length of road required to be constructed;
- biodiversity impacts, including to high quality Box-Gum Woodland;
- complexity of the path, including the terrain and the need to cross drainage features; and
- the need to use private or public land for which access was not or could not be granted;

During community consultation, members of the community expressed a clear preference for transportation activities to avoid the use of Mates Drive and Monaro Station Road. While some use of these roads would occur during construction and for light vehicles during operations, heavy vehicle access for product transportation is not a preference of the Applicant.

Two options were considered in detail and a conceptual design developed to consider which alternative was preferred (as presented in **Figure 2.15**). The detailed analysis undertaken of these options is summarised in **Table 2.4**.

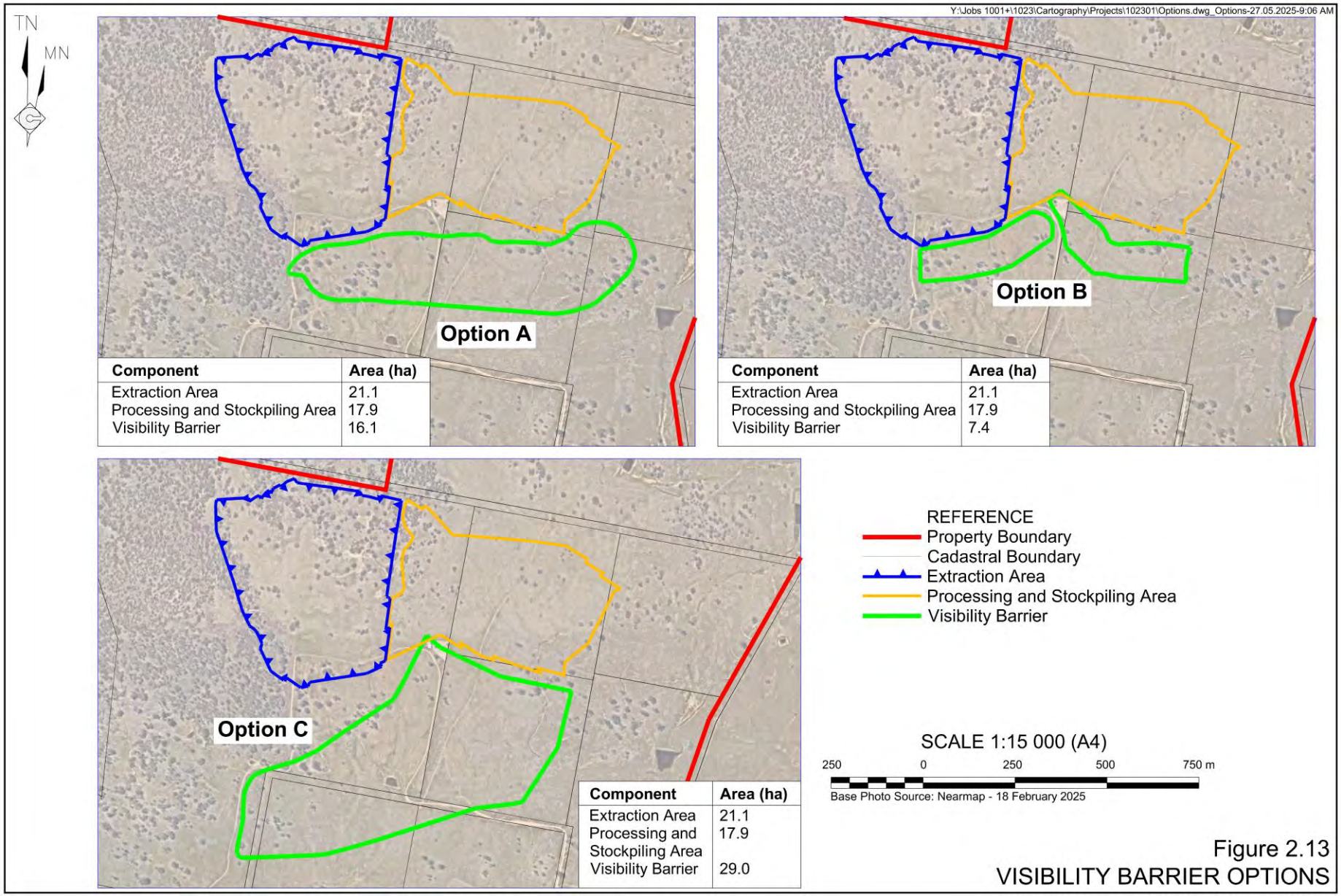


Figure 2.13
VISIBILITY BARRIER OPTIONS

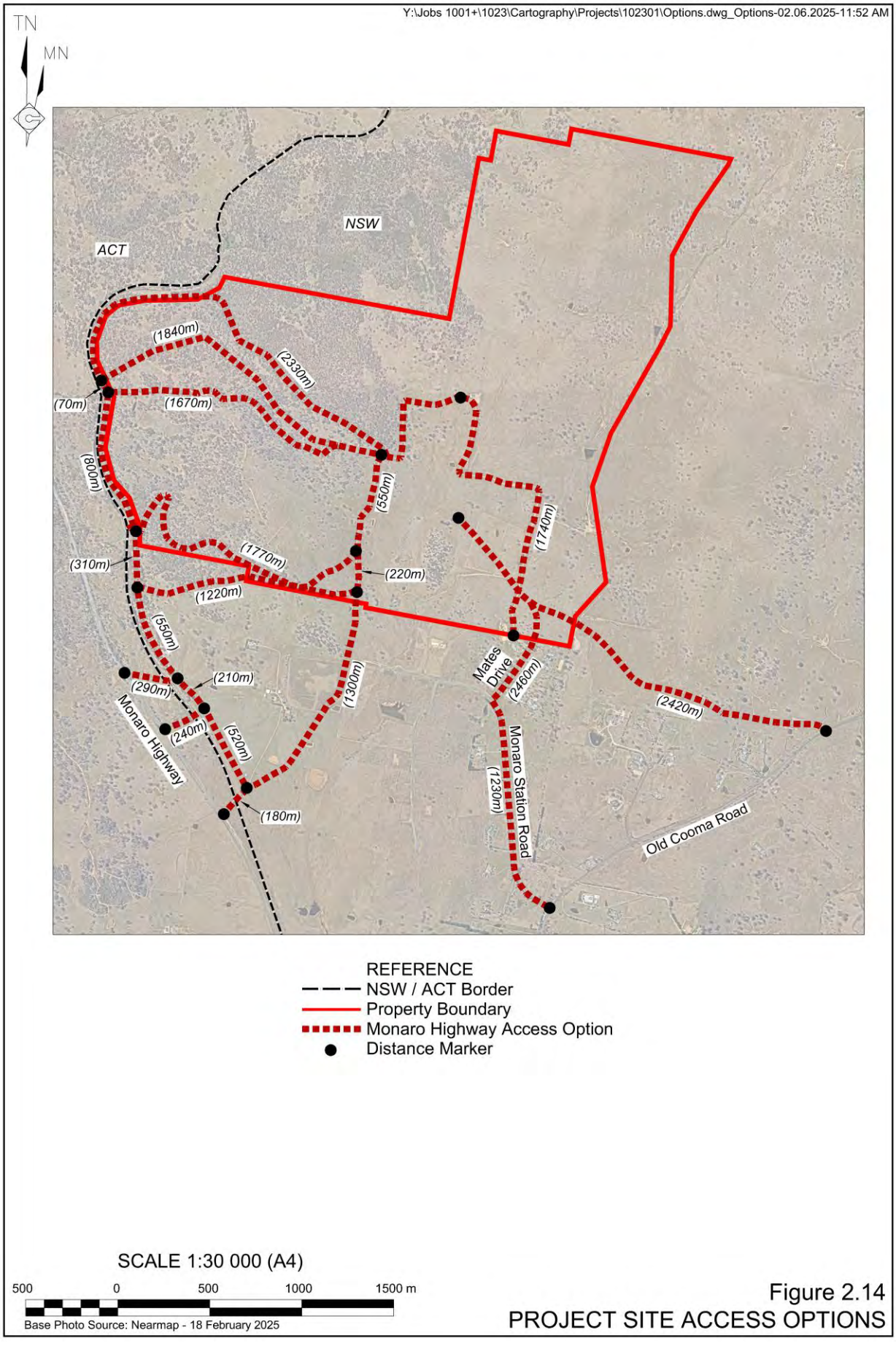


Figure 2.14
PROJECT SITE ACCESS OPTIONS

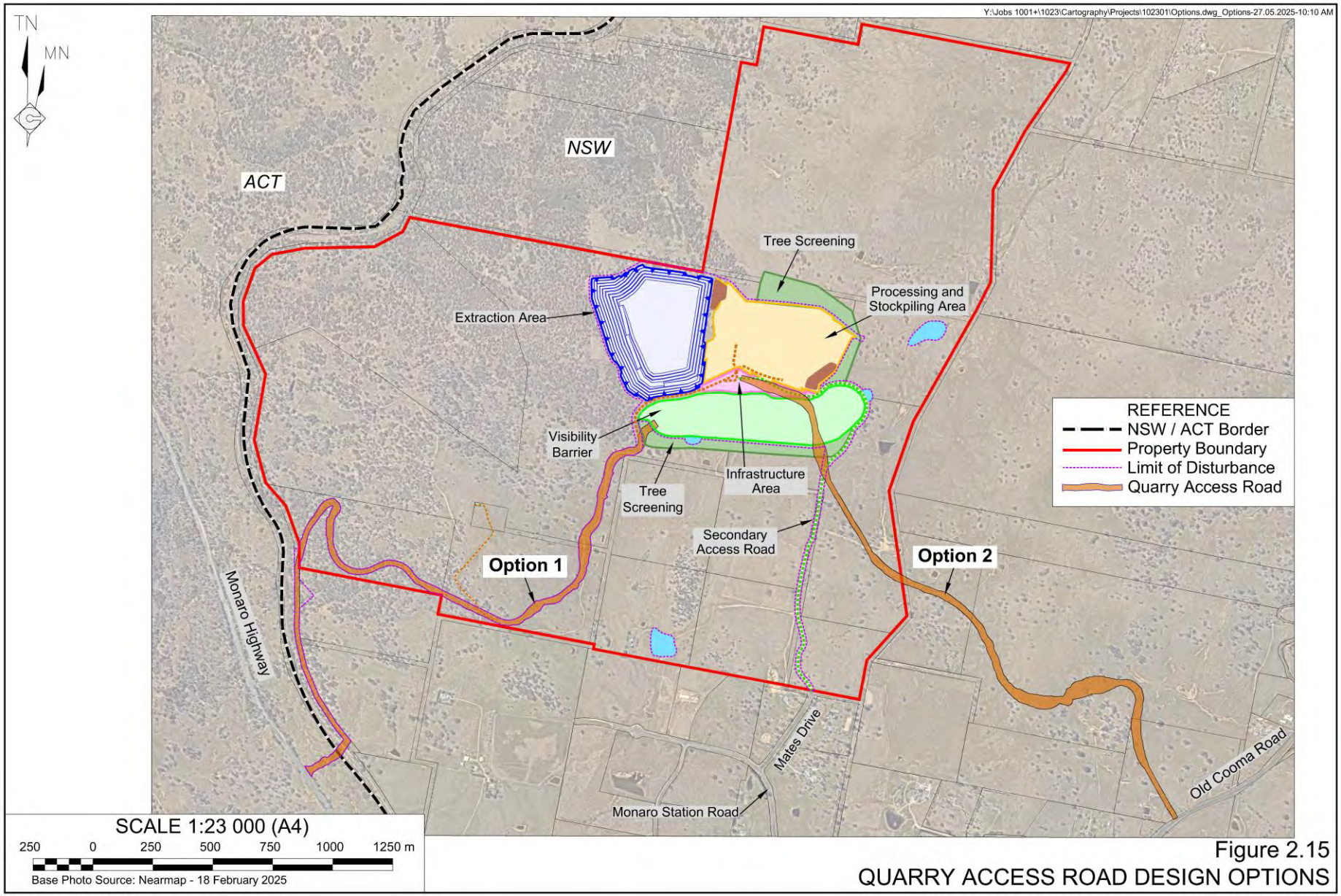


Figure 2.15
QUARRY ACCESS ROAD DESIGN OPTIONS

Table 2.4
Matters Considered for Public Road Access

Matter Considered	Monaro Highway	Old Cooma Road
Proximity to residences	Transportation activities would occur away from the majority of Royalla residences. Mitigation would be required along the route to mitigate amenity impacts. Longer transportation operating hours may be possible due to reduced amenity impact and reduced heavy vehicle interaction with local community traffic.	Would pass closer to private properties and therefore require a higher level of mitigation for views, noise generation and dust dispersion.
Community feedback	During community consultation, members of the community expressed a clear preference for transportation activities to directly access the Monaro Highway. This would separate transportation from where the majority of residences were located.	Community feedback focused on avoiding the use of Mates Drive and Monaro Station Road that intersects with Old Cooma Road.
Road Safety	100km/hr speed limit at intersection with possible interactions with peak hour traffic and seasonal delays.	100km/hr speed limit at intersection with possible interactions with local residents. Grade at intersection would require a slow entry of heavy vehicles to the road network that may result in road user frustration and risk-taking behaviour.
Biodiversity and Aboriginal heritage constraints	Good condition vegetation to be impacted that includes Box-Gum Woodland and threatened flora (in rail corridor). Impacts to some culturally significant artefacts that would need to be removed.	Good condition vegetation to be impacted that includes a larger area of Box-Gum Woodland and possible Pink-tailed Worm Lizard habitat (on Beatty Hill). Impacts to some culturally significant artefacts that would need to be removed.
Amenity impacts	Fewer residences in proximity to the road. Distant views of the road from some residences. Road would skirt one private land-holding along Crown road. Limited views of the road from public vantage points.	Closer proximity to residents may result in higher noise and air quality impacts. Views of the road likely from private residences and vehicles travelling on Old Cooma Road.
Planning approval risks	Requires approval in NSW for most of the operation but approval in the ACT for the construction of a short road and intersection. Approval from the National Capital Authority required for works that impact the Monaro highway	Approval for the Project rests wholly in NSW including for the road and intersection construction and use.
Road authority	Liaison with TfNSW for the rail crossing overbridge and TCCS in the ACT for access to the Monaro Highway.	Liaison with TfNSW and Council for the use of Old Cooma Road towards the Monaro Highway.
Configuration of Public Roads	Direct access to major highway that would also see substantial freight traffic. Three lanes at intersection location with some widening required.	Direct access to major arterial road that would see some freight traffic. Two lanes with widening likely required.
Complexity	Access would require the following. • Construction and use of an access road that would need to be sealed in some sections. • A complex switch back to navigate steep areas of Enchanted Hill. • Access along a portion of Crown road. • Crossing of the non-functioning Goulburn Bomballa Rail Line including a rail crossing overbridge to ensure grade separation. • Construction and use of a short road and intersection to access the Monaro Highway.	Access would require the following. • Construction and use of an access road that would need to be sealed in some sections. • Areas of substantial cut and fill to navigate Beatty Hill including crossing a small section of swampy land. • Construction and use of an intersection to turn right on to Old Cooma Road.

Table 2.4 (Cont'd)
Matters Considered for Public Road Access

Matter Considered	Monaro Highway	Old Cooma Road
Cost to construct and use	Due to the complexity of the design and components the cost to construct would be higher.	High but reduced cost to construct based on fewer components. Likely requirement to pay ongoing road maintenance contributions to Council for use of Old Cooma Road.
Landowner agreements	The road would require the use of land owned by the Applicant, Crown land, land managed by TfNSW and a private land-holding in the ACT.	Would use land owned by the Applicant only.
Terrain	Longer road that crosses complex terrain. Switch back required to navigate Enchanted Hill.	Long (but slightly shorter) road that crosses complex terrain and some swampy areas.

The final option for the Quarry Access Road, rail crossing overbridge and intersection with the Monaro Highway was selected for the Project. While the matters presented in **Table 2.4** support both options in different ways, the primary driver for the selection of access arrangements was the separation of transport activities from community and the likely long-term benefit of this option for the Applicant and the community, despite the higher cost to construct and complexity in development.

It is noted that the majority of Beatty Hill has since been set aside for conservation purposes under a Biodiversity Stewardship Agreement. This agreement was finalised following confirmation of the access arrangements for the Project.

2.8.5 Rate of Extraction

Careful consideration of the proposed rate of extraction was undertaken. While many projects of this nature propose only a maximum extraction rate, the Applicant proposes to stage this component of the Project. This approach has been selected:

- in recognition of the fact that the Applicant would develop supply contracts over time (in addition to its parent companies);
- to provide the community with realistic expectations of operational intensity and associated environmental impacts; and
- to permit the Applicant to progressively clear vegetation and develop infrastructure as it is needed for the Project.

The Applicant is confident that the quality of the resource, its marketing and the relationship and service benefits of a locally owned and operated supply would permit a high rate of growth for the operation.

During planning for the Project, the maximum rate of extraction was increased from 750,000tpa to 1Mtpa. This decision was made in response to market feedback that indicated extended demand at a higher level.

2.8.6 Location and Configuration of Processing Equipment

Various configurations and locations of processing equipment have been considered during the preparation of the EIS. The proposed strategy would utilise mobile processing equipment during Stage 1. During Stage 2, a fixed processing plant would be installed within the processing and stockpiling area adjacent to the extraction area.

A staged approach has been chosen to ensure that processing equipment is not in excess of what is required for the rate of extraction. The rate of extraction and subsequent noise generation and dust dispersion would be commensurate with the progressive development of the Project and ensure that impacts are not excessive. Processing operations would be appropriately shielded (e.g. cut into the existing landform) to ensure that impacts to amenity are minimised.

Section 3

Project Description

PREAMBLE

This section outlines the plans for the proposed development and operation of the Project within a structure consistent with requirements identified in Appendix B to the State Significant Development Guidelines (DPE, 2022). A Project Overview is provided in tabular form and the Project Site is described, followed by sections on the geology, layout and design, proposed activities, timing, staging and proposed progressive and final rehabilitation.

The Project is described in sufficient detail to provide the reader with an overall understanding of the nature and extent of the activities proposed, to establish the limits of the development that would be given force throughout condition of consent and to enable an assessment of the potential impacts of the Project on the surrounding environment.

Details of the safeguards, mitigation measures and operational procedures that the Applicant would implement to protect and manage noise, groundwater, surface water, flora, fauna, air quality, visibility, cultural and historic heritage, soils and other components of the local environment are presented in Section 6 of this document.

3.1 Introduction

3.1.1 Project Overview

The Project would comprise a standard hard rock quarry development. Key activities would include:

- occasional blasting to fragment the in-situ resource;
- loading of material onto haul trucks for relocation to the processing plant;
- crushing and shaping of the material at the processing plant;
- temporary storage of products within the Project Site; and
- despatch of products to customers via the public road network.

In addition to these standard hard rock extraction activities, the Project would also include the:

- importation virgin excavated natural material (VENM) and excavated natural material (ENM);
- importation, storage, and processing of concrete waste material;
- operation of a concrete batching plant (including importation of raw materials) and despatch of concrete; and
- operation of an asphalt plant (including the importation of raw materials) and despatch of asphalt.

The principal components of the Project Site are presented in **Figure 3.1** and include the proposed:

- Extraction Area that would be developed in four stages within an area of approximately 21.1ha and to approximately 87mbgl (a final floor elevation of 795m AHD);
- Processing and Stockpiling Area that would be developed in three stages covering an area of approximately 17.9ha;
- Infrastructure Area comprising administration buildings, weighbridge, car parking area, fuel storage, and workshop within an area of approximately 2.7ha;
- Quarry Access Road that would extend over approximately 4.0kms and connect the Project Site to the public road network via the Monaro Highway;
- Visibility Barrier that would be developed in two stages within an area of approximately 16.1ha; and
- Tree Screening Areas comprising vegetation intended to act as a further visual barrier.

Associated with these components would be additional infrastructure to support the Project.

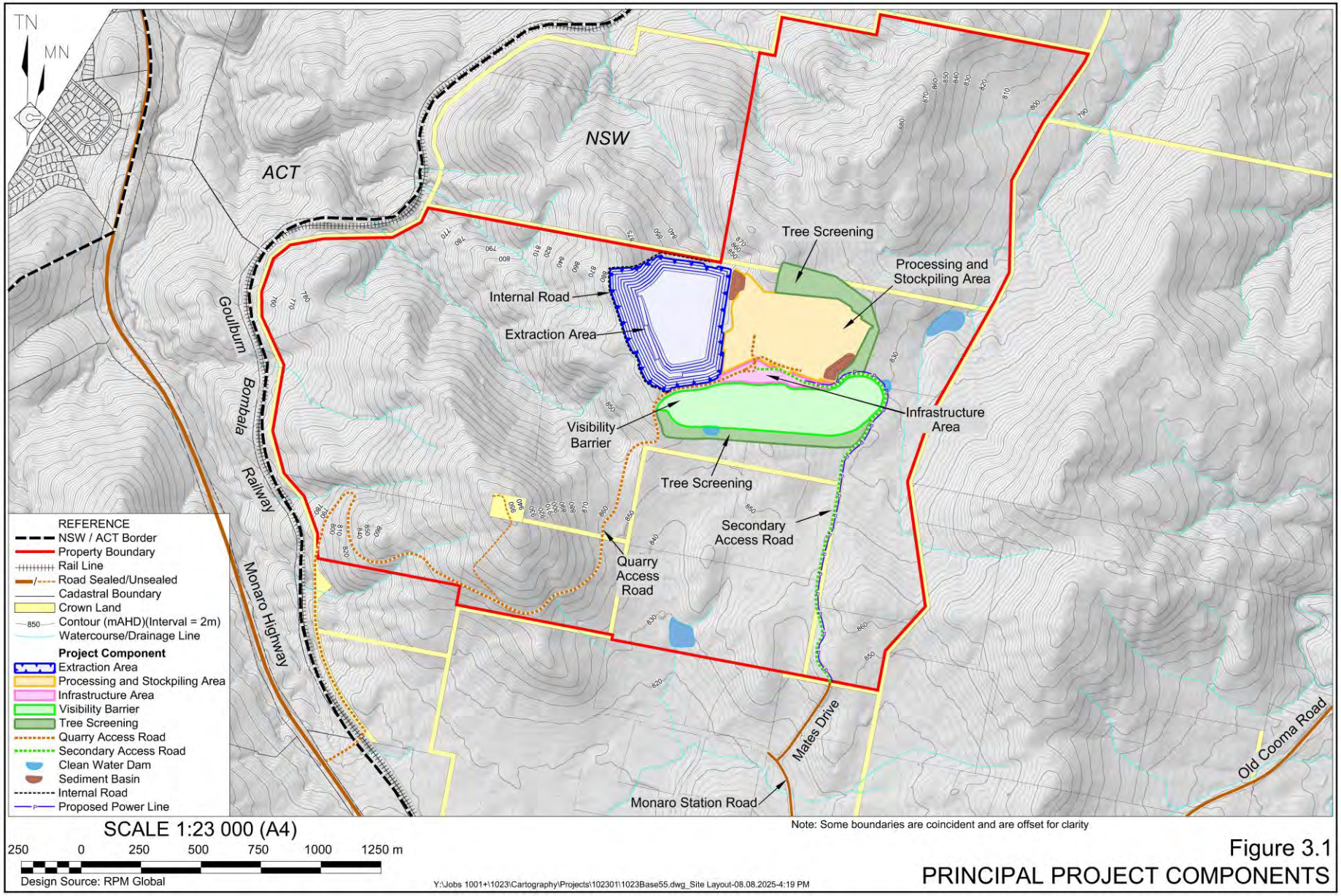


Figure 3.1
PRINCIPAL PROJECT COMPONENTS

A detailed Project Site layout is presented in **Figure 3.2** and an overview of key Project elements is provided in **Table 3.1**.

Table 3.1
Project Overview

Project Element	Description
Infrastructure	Project-related infrastructure includes an Extraction Area, Processing and Stockpiling Area, Visibility Barrier, Infrastructure Area and sediment and erosion control infrastructure.
Project Site	An area of approximately 67.6ha which would incorporate all quarrying-related infrastructure.
Limit of Disturbance	An area of approximately 78.7ha that incorporates the Project Site and access roads. It is defined as the area in which the surface would be disturbed or used for quarrying activities and transportation. The limit of any vegetation clearing for the Project.
Resource	Approximately 27.9Mt of high quality rhyodacite resource has been defined in the Extraction Area. Testing of the material indicates it is a high quality resource ideal for concrete production amongst other uses.
Overburden	Approximately 3.3Mt of highly weathered material would be generated by the Project and would be used to construct Project Site components, incorporated in road base products for sale to customers, or used for rehabilitation works.
Extraction Method	Conventional drill, blast, load and haul methods that are standard in the quarrying industry.
Processing	Crushing and screening of hard rock material would produce a range of Quarry products. Processing would initially be undertaken using a mobile processing plant before the commissioning of fixed processing plant later in the Project Life.
Annual Production	Progressive ramp up of production to a limit of no greater than 1,000,000tpa.
Material Importation	Virgin excavated natural material (VENM) or excavated natural material (ENM) would be imported to support site establishment (such as road construction) and may be imported on an ongoing basis to support rehabilitation of the Project Site. No more than 150,000tpa of VENM/ENM would be imported. Waste concrete would be imported to the Project Site for recycling and reuse in road base or similar products. No more than 20,000t of concrete would be recycled each year.
Project Site Access	All products would be despatched via a dedicated Quarry Access Road. The road would be approximately 4.0km from the weighbridge to its intersection with the Monaro Highway. It would feature a 2.7km sealed section and include a railway bridge crossing. A dedicated intersection with the Monaro Highway would be constructed to permit access to the Quarry and for heavy vehicle transport activities.
Secondary Access	Secondary access to the Project Site (for light vehicles) would be provided by an unsealed Secondary Access Road extending approximately 1.5km from the Infrastructure Area to its intersection with Mates Drive.
Infrastructure Area	An Infrastructure Area would include administration buildings (i.e. site office, lunch and bathroom facilities), car parking areas, a weighbridge, a stand-alone Workshop and a dedicated fuel storage and refuelling area.
Ancillary Infrastructure	Additional infrastructure for use in activities that are ancillary to aggregate production would be developed. These activities would include the production of up to 50,000m^3 per annum of pre-mix concrete and 50,000tpa of asphalt.
Product Transportation	Transportation of Quarry products involving a maximum of 25 laden heavy vehicles per hour and no more than 200 laden heavy vehicles per day and 50 concrete agitators per day.
Project Life	Ongoing operations for a period of 30 to 35 years from the commencement of operations.

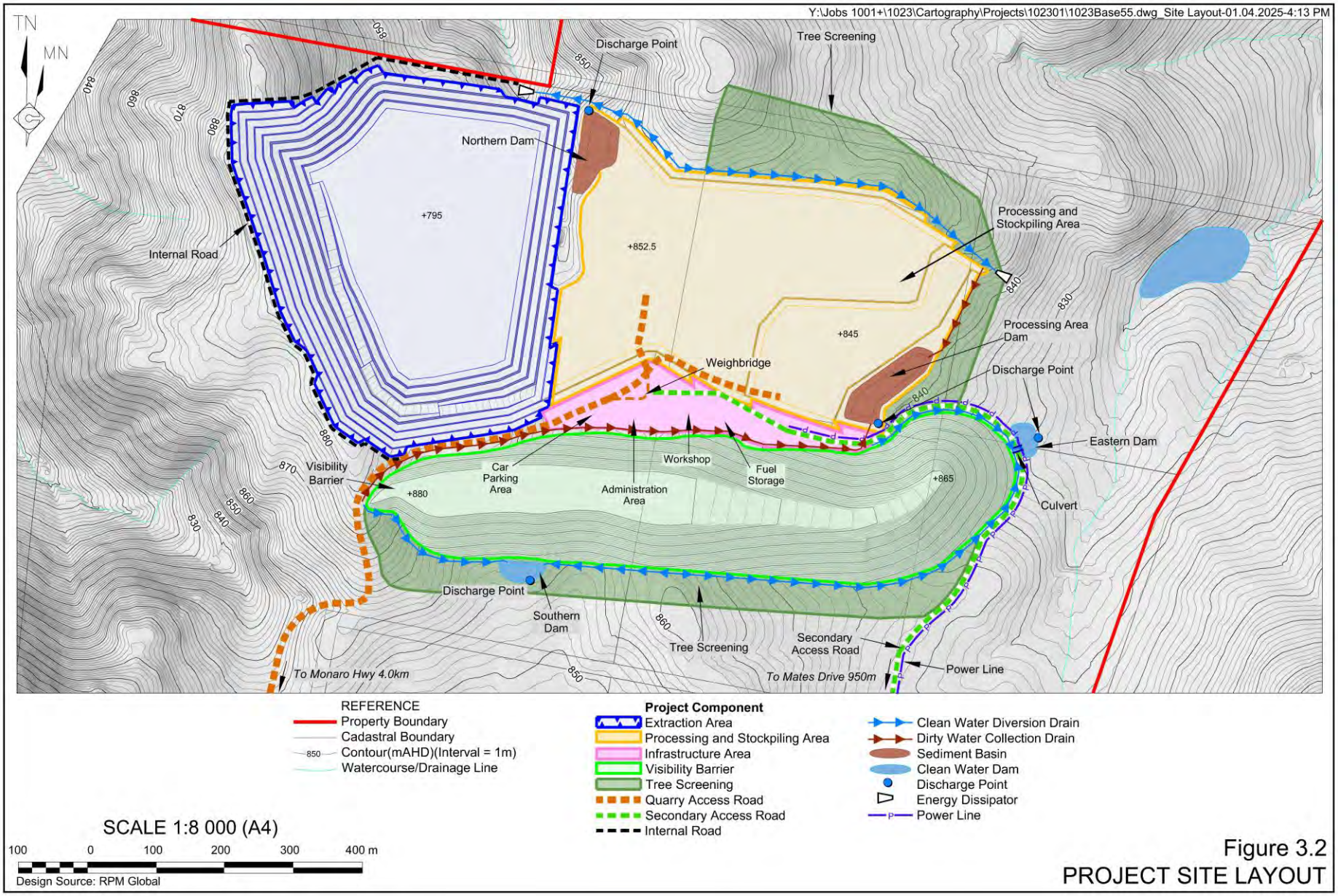


Figure 3.2
PROJECT SITE LAYOUT

3.1.2 Approvals Required

Based upon the current design of the Project and understanding of the relevant environmental issues, the Project would require the following approvals from the NSW Government to proceed.

- Development Consent from the Minister for Planning and Public Spaces, their delegate, or the Independent Planning Commission as the Project is classified as a "State Significant Development" under Clause 7 of Schedule 1 of the *State Environmental Planning Policy (Planning Systems) 2021* (Planning Systems SEPP).
- An Environment Protection Licence (EPL) from the NSW Environment Protection Authority, under Section 47 of the *Protection of the Environment Operations Act 1997* (POEO Act) for extractive activities.
- A Water Access Licence (WAL) would be required for the take of groundwater associated with use of a production bore and dewatering of the extraction area once the groundwater table is intercepted. A WAL within the Lachlan Fold Belt MDB Groundwater Source specified under the *Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2020* will be secured with a share equivalent to 45ML.

The following approvals would be required for transport activities involving the section of the Quarry Access Road that crosses into the ACT and intersects the Monaro Highway. These approvals do not form part of this State Significant development application but are included here for reference and for an understanding of the cumulative impacts of the development.

- Development approval under the ACT *Planning Act 2023* for the construction and use of a short road and an intersection with the Monaro Highway.
- A Works Approval from the National Capital Authority for works within the road corridor of the Monaro Highway in accordance with Section 12 of the *Australian Capital Territory (Planning and Land Management) Act 1988*.

Approval is likely to be required from the Commonwealth Minister for the Environment given the Project is considered likely to be a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Assessment of the Project under the EPBC Act will be undertaken in accordance with bilateral agreement between the Commonwealth Government and the NSW Government and does not form part of this State Significant development application.

3.2 Project Site

The Project Site is the location of all quarrying-related infrastructure as presented on **Figure 3.2**.

The proposed limit of disturbance would cover an area of approximately 79.2ha and includes the Project Site, Quarry Access Road and Secondary Access Road. It incorporates all Project-related infrastructure including access to the Project Site and sets a limit for physical disturbance or

clearing of land. It is noted that the boundary of the disturbance area nominates the maximum extent within which operational disturbance would be confined and that not all land within this area would necessarily be disturbed.

Table 3.2 presents the lots (or land parcels) within which the Project Site and its access would be located (wholly or partially).

Table 3.2
Application Area Land Titles

Deposited Plan	Lot
New South Wales	
555380	1, 2
754912	6, 152, 255, 256, 257, 258, 259, 282, 283, 301, 302
1019607	7002
1244966[1]	5403
Various unnamed Crown roads within the Property Boundary and proposed access to the Quarry.	
Australian Capital Territory[2]	
Tuggeranong Block 1414	
Note 1: This title refers to the railway corridor for the Goulbourn Bombala Railway (not currently operating)	
Note 2: A separate approval is required for aspects of the Quarry Access Road that are located within the ACT.	

3.3 Geology and Resource Assessment

3.3.1 Local Geology

Figure 3.3 displays the local geology within and surrounding the Project Site. The Project Site is underlain by two discrete geological units, as follows.

- The Deakin Volcanics – This volcanic sequence underlies the western extent of the Project Site and principally comprises interbedded volcaniclastic and sedimentary units.
- The Colinton Volcanics – This volcanic sequence underlies the eastern extent of the Project Site and principally comprises massive and foliated dacitic ignimbrite.

The Deakin Volcanics and the Colinton Volcanics are separated by the Royalla Fault which is marked by a juxtaposition of the strongly foliated dacitic tuff of the Colinton Volcanics against the thickly bedded rhyodacite of the Deakin Volcanics. The Royalla Fault Zone is an NNE-SSW trending zone which may be up to approximately 100m in width in the vicinity of the Project Site.

There is little surface evidence of actual fault displacement, or fault related activity, within the Royalla Fault Zone with the principal observable feature being the change from the heavily sheared outcrops of the Colinton Volcanics to the east to the blocky outcrops of the Deakin Volcanics to the west.

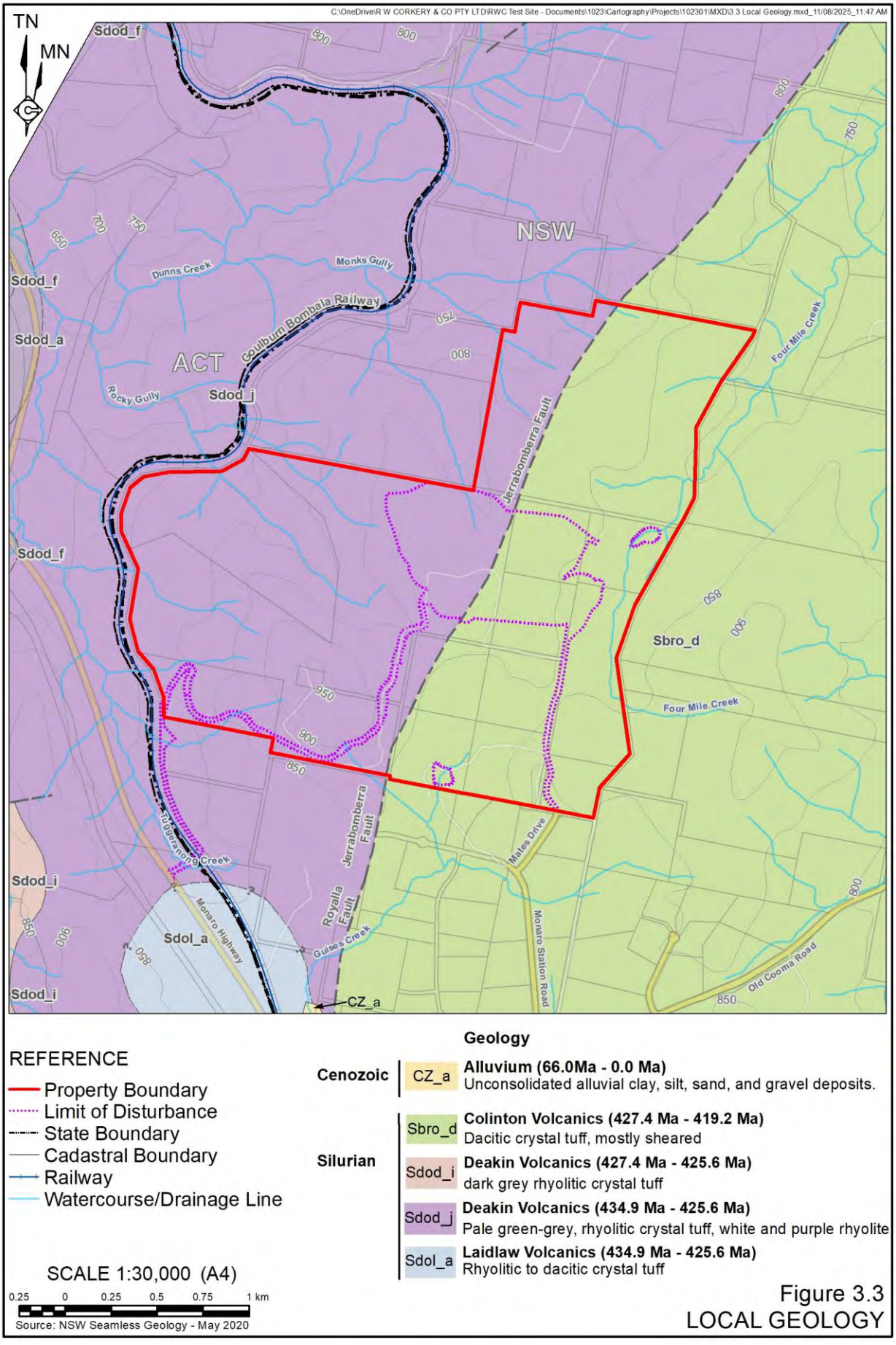


Figure 3.3
LOCAL GEOLOGY

3.3.2 Project Site Geology

The targeted resource beneath the Project Site comprises the rhyodacite units of the Deakin Volcanics. All units and major structures have a strong NNE-SSW trend. Extensive geological investigations were undertaken to define the extent of the targeted resource within the Project Site including the following.

- Ground Magnetic Survey – A survey to assist in understanding the geological properties and structures within the Project Site and to inform the positioning of drill holes in subsequent drilling programs.
- Diamond Core Drilling – Drilling of six diamond core drill holes to test various geological features and to obtain rock samples for testing. All holes were drilled using HQ3 equipment (61mm core diameter) and were angled at 60° to the west to an average depth of approximately 50m below ground level (bgl).
- Percussion Drilling – Drilling of nine percussion drill holes to infill geological understanding between the diamond core drill holes. All holes were angled at 60° to the west to an average depth of approximately 50mbgl.
- Overburden Drilling – Drilling of 73 shallow vertical drill holes to a depth of between 6mbgl and 24mbgl to assess the depth of weathering.

All drill holes were geologically logged, and magnetic susceptibility was recorded for each 1m interval. Magnetic susceptibility is a proxy for rock quality, with good quality rock having a magnetic susceptibility of approximately double that of lower quality rock. Petrographic assessment of the rhyodacite resource was also undertaken.

As a result of the geological investigations, three weathering domains have been identified within the Project Site, as follows.

- **Highly Weathered Zone**

  This zone comprises highly weathered material with material suitable for use in non-specified road pavement products or the construction of Project components such as the Visibility Barrier. Highly weathered material typically extends from the ground surface to less than 6mbgl, however, the depth of highly weathered material ranges from 1mblg to 11mbgl within the proposed limit of extraction.

- **Moderately Weathered Zone**

  This zone comprises moderately weathered material suitable for use in low-grade aggregates. Moderately weathered material typically extends from the base of the highly weathered material to between approximately <5mbgl and 29mbgl within the proposed limit of extraction.

- **Slightly Weathered and Fresh Zone**

  The slightly weathered and fresh material extends from the base of the moderately weathered material to the bottom of the proposed limit of extraction and comprises good quality rock suitable for use in concrete aggregates.

Figure 3.4 presents the location of the diamond and percussion drill holes within the Project Site and the modelled surfaces of the various weathering domains.

It is noted that the depth to the top of the slightly weathered rock varies within the proposed limit of extraction. It is likely that variation in resource quality would be experienced in some areas of the Extraction Area. Deeper zones of extensive weathering encountered in this location can likely be attributed to a faulted/sheared zone which extends to approximately 10mbgl.

3.3.3 Resource

It is estimated that a total of approximately 31.1Mt of material would be recovered from within the proposed limit of extraction and the footprint of the processing and stockpiling area. This material would comprise approximately:

- 25.5Mt of fresh / slightly weathered rock;
- 2.4Mt of moderately weathered rock; and
- 3.3Mt of highly weathered material.

It is anticipated that fresh rock and slightly or moderately weathered rock would be used in aggregate products. The highly weathered material would be used to construct Project components such as the Visibility Barrier and the Quarry Access Road or incorporated in low value products. **Table 3.3** presents a breakdown of the material to be recovered and/or used within the Project Site during the life of the Project.

Table 3.3
Estimated Resource within the Project Site

Stage	Fresh / Slightly Weathered Rock (t)	Moderately Weathered Rock (t)	Highly Weathered		Total (t)
			(t)	(m^3) *	
Project Material Generation					
Extraction Area					
Stage E1	2,567,933	350,095	270,341	103,977	3,188,369
Stage E2	2,095,272	480,471	278,835	107,244	2,854,578
Stage E3	2,166,111	694,602	336,807	129,541	3,197,520
Stage E4	18,637,543	609,098	193,130	74,281	19,439,771
Processing and Stockpiling Area					
Stage P1	11,104	89,113	790,005	303,848	890,222
Stage P2/P3	-	168,262	1,388,162	533,908	1,556,424
Sub-total	**25,477,963**	**2,391,641**	**3,257,280**	**1,252,799**	**31,126,884**
Project Material Use					
Visibility Barrier					
Stage V1	-	-	-1,445,179	-555,838	-1,445,179
Stage V2	-	-	-4,003,241	1,539,706	-4,003,241
Other					
Roads and Dams	-	-	-50,000	-19,230	-50,000
Sub-total	-	-	**-5,498,417**	**-2,114776**	**-5,498,417**
Material Balance					
Total	**25,477,963**	**2,391,641**	**-2,191,137**	**-842,745**	

* Densities have been based on 2.6 t/m^3 for fresh and weathered rock based on material testing and petrological studies (Lee, 2025).

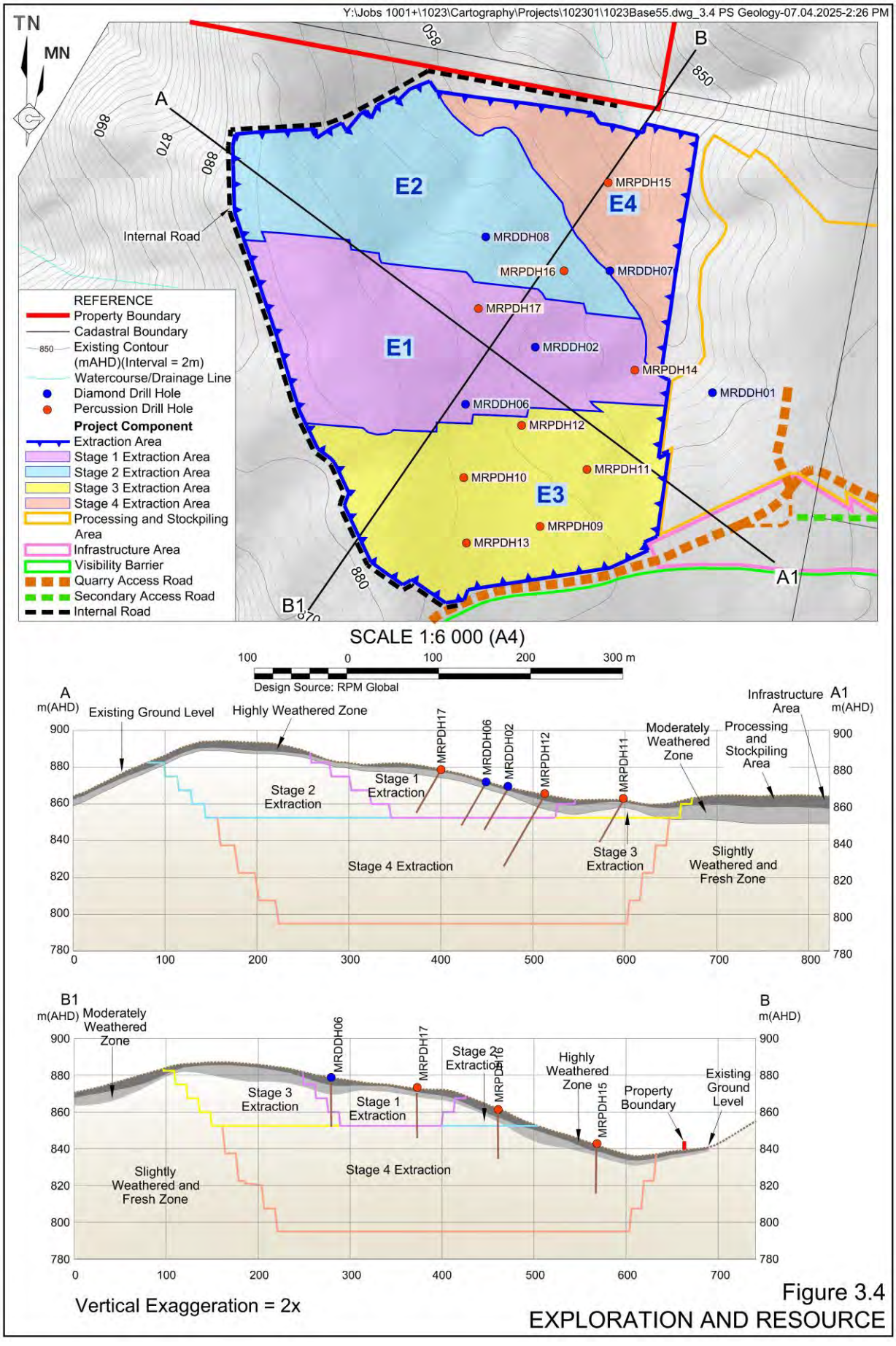


Figure 3.4
EXPLORATION AND RESOURCE

3.3.4 Quarry Products

The principal products that would be produced by the Applicant would include the following.

- Concrete aggregates (typically 5mm to 20mm).
- Manufactured sand for use in the production of concrete.
- Low-grade aggregates.
- Non-specified road pavement products.
- Gabion rock for use in gabion baskets, retaining walls and drainage applications (typically 150mm to 300mm).

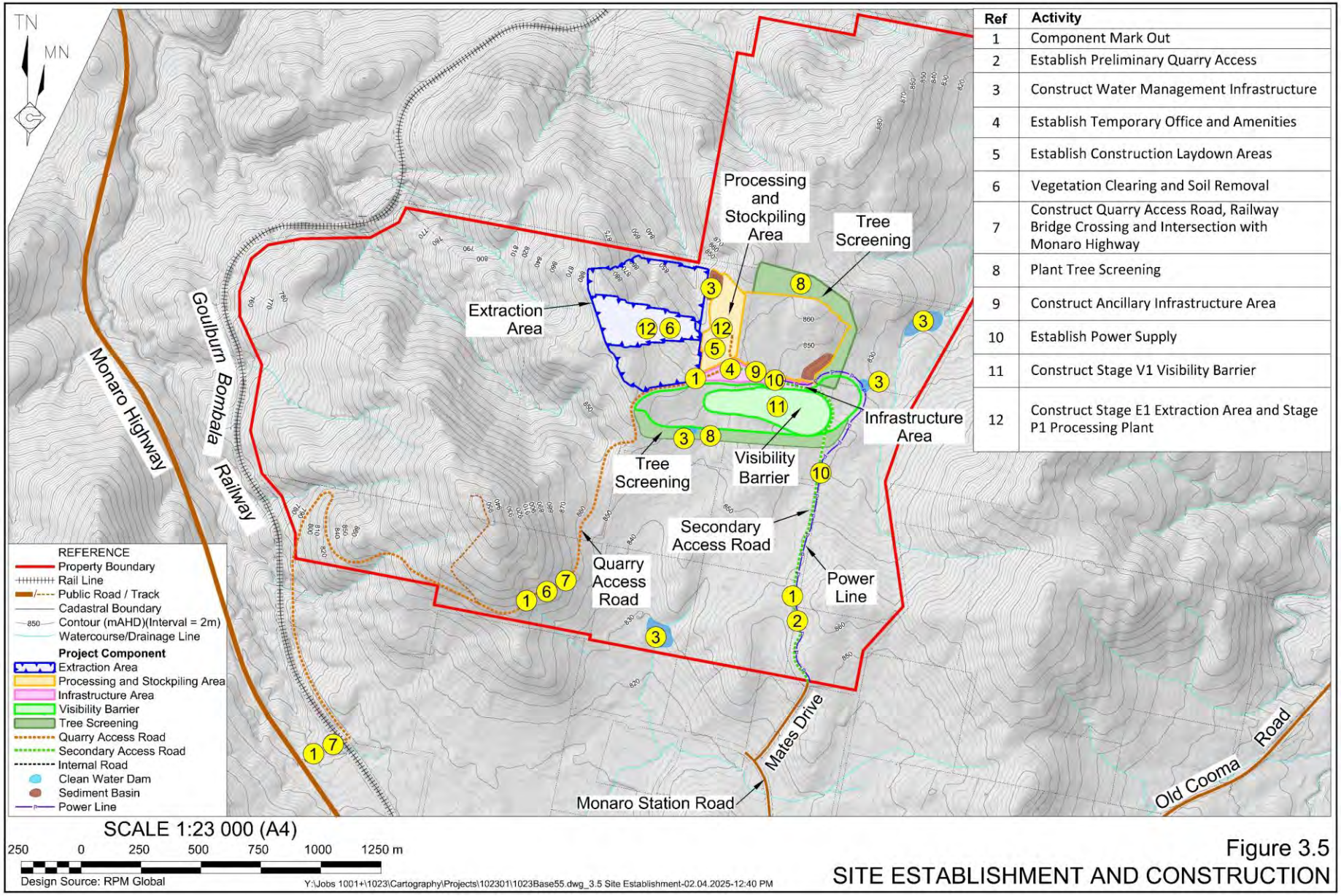
It is anticipated that crusher fines and scalps would comprise approximately 10% of all throughput. Where possible fines and scalps would be incorporated into "all-in" non-specified road pavement products and therefore are considered to represent saleable product. Other products may be prepared to suit customer needs.

3.4 Site Establishment and Construction

3.4.1 Introduction

During the first six months following Project commencement, a range of site establishment and construction activities would be undertaken within the Project Site to enable processing and product despatch to commence. **Figure 3.5** presents the area to be developed during this stage and indicative activities that would occur. The principal activities to be undertaken during this stage would be as follows.

1. Survey and marking out of all component areas to be disturbed during site establishment.
2. Formalise initial access to the Quarry via the Secondary Access Road that joins the public road network at Mates Drive, Royalla.
3. Construction of sediment basins and associated water management infrastructure.
4. Construction of a temporary office and amenities area to support construction of the Quarry Access Road and site establishment
5. Planting of tubestock in the Tree Screen Area.
6. Progressive vegetation clearing and timber removal as well as the removal of soil and loose bush rock within the proposed areas for the Stage E1 Extraction Area, Stage P1 Processing and Stockpiling Area, Infrastructure Area and Quarry Access Road.
7. Establishment of administration buildings (i.e. site office, lunch and bathroom amenities), car park, weighbridge, Workshop and fuel storage within the proposed Infrastructure Area.



Ref	Activity
1	Component Mark Out
2	Establish Preliminary Quarry Access
3	Construct Water Management Infrastructure
4	Establish Temporary Office and Amenities
5	Establish Construction Laydown Areas
6	Vegetation Clearing and Soil Removal
7	Construct Quarry Access Road, Railway Bridge Crossing and Intersection with Monaro Highway
8	Plant Tree Screening
9	Construct Ancillary Infrastructure Area
10	Establish Power Supply
11	Construct Stage V1 Visibility Barrier
12	Construct Stage E1 Extraction Area and Stage P1 Processing Plant

Figure 3.5
SITE ESTABLISHMENT AND CONSTRUCTION

8. Construction of the Quarry Access Road and its intersection with the Monaro Highway (see Section 3.8.1).
9. Installation / construction of power lines to provide power to the Administration Area.
10. Commencement of extraction and processing within the Stage E1 Extraction Area.
11. Assembly/installation of the mobile processing plant and related infrastructure initially within the Stage E1 Extraction Area.

Details of each of the above activity are described in the following subsection.

3.4.2 Site Establishment and Construction Activities

Component Mark Out

Prior to the commencement of any vegetation clearing or earthworks, the Applicant would commission a registered surveyor to survey and physically mark out the approved areas to be disturbed during site establishment using appropriately labelled and highly visible survey markers. Survey markers would be positioned at the corners of all component areas and along boundaries at distance / spacing that allows visibility of the next marker. Each of the surveyed locations would be displayed on all relevant plans / figures within the Environmental Management Plans and Sub-Plans prepared for the Project.

All personnel would be made aware of the approved areas of disturbance and the significance of not disturbing any area beyond the approved areas.

Preliminary Quarry Access

A Secondary Access Road would be established by formalising an existing unsealed road that enters the public road network at Mates Drive, Royalla. The alignment of the road would be altered to intersect directly with Mates Drive and the road would be widened to a uniform 6m width in the location indicated on **Figure 3.5**. The Secondary Access Road would be used during this period to transport mobile equipment and construction materials required for site establishment to the Project Site. Permits would be sought for any oversized or overmass vehicles in consultation for Council. Once this activity is completed, use of the Secondary Access Road would be limited to light vehicles only or for emergency access or exit of the Project Site.

All earthmoving equipment, components of the processing plant, construction materials and consumables would be delivered to the Project Site by either low loader, trucks/semi-trailers or tankers.

Water Management Infrastructure

During the early stages of site establishment and construction, temporary erosion and sediment controls, such as sediment fences, hay bales, etc., would be installed to manage sediment-laden runoff from cleared areas and constructed landforms, pending their stabilisation and vegetation. These areas would include the Quarry Access Road and associated batters and the initial stage of extraction area development. The Northern Dam would be constructed to capture any runoff from within the Project Site.

Diversion bunds would be constructed to direct runoff from the undisturbed areas away from disturbed areas and downslope to receiving watercourses. These bunds would be constructed by pushing from within the disturbance area to avoid disturbance on the undisturbed side of the bund.

Temporary Office and Amenities

A temporary office and amenities area would be established within the Project Site to support construction of the Quarry Access Road and site establishment.

Construction Laydown Area

An area dedicated to the temporary storage of equipment and materials to be used during site establishment activities, would be established and used until the completion of construction works.

The initial laydown area would be located in the vicinity of the Project Site within land that would be developed for the Processing and Stockpiling Area.

Vegetation Clearing and Soil Removal

During site establishment vegetation, topsoil and highly weathered material would be removed from the following.

- Stage E1 Extraction Area
- Stage P1 Processing Area
- Stage V1 Visibility Barrier

Vegetation clearing in areas to be developed during site establishment would be either chainsaw felled or cleared using a bulldozer or excavator. The initial area disturbed would be kept to a minimum to provide sufficient area for the progressive construction of each Quarry component. The opportunity for the collection of available seed for rehabilitation purposes would occur immediately after the native vegetation is felled. The bulk of the felled trees would be mulched with the mulch either used on site or any excess removed from Project Site.

The soil in each area cleared during site establishment would be stripped following the removal of the larger vegetation. The Applicant would remove approximately 0.15m to 0.20m of topsoil, where present, focussing on the recovery of seed-bearing material. All topsoil recovered from the areas disturbed during site establishment would be pushed to the edge of disturbed areas where it would be temporarily stockpiled in windrows prior to use in progressive rehabilitation activities.

During site establishment, highly and moderately weathered material would also be progressively pushed up to the edge of the active disturbance areas using a bulldozer or excavator to provide access to the targeted resource. This material would be loaded to haul trucks and used to progressively construct Project components such as the Stage V1 Visibility Barrier and the Quarry Access Road.

Quarry Access Road and Intersection Construction

The Quarry Access Road and its intersection with the Monaro Highway would be constructed to provide the long-term access to the Project Site. Section 3.8.1 provides further details of the design and construction of the Quarry Access Road.

Construction materials for use in road construction would be sourced from the Project Site where possible or imported to the Project Site. Cut and fill batters would be constructed using loose weathered materials. Following landform construction, the slopes would be stabilised with vegetation.

Tree Screen

Planting of tubestock would be undertaken during site establishment within the designated Tree Screening Area to the north of the proposed Processing and Stockpiling Area. Activities would involve the following.

- Installation of silt-stop fencing downslope of the planting area, as required.
- Creation of contour rows (aligning ridges and furrows at approximately 2m intervals parallel to topographic contours), if required.
- Planting of tubestock endemic to the area. Areas planted with tubestock would be watered periodically to ensure the successful establishment of vegetation cover.

Infrastructure Area

The Applicant would utilise an area of approximately 2.7ha immediately to the south of the Stage P1 Processing and Stockpiling Area to place Project infrastructure, namely the:

- site office;
- site amenities (i.e. lunch and bathroom facilities);
- car park;
- weighbridge;
- workshop; and
- fuel storage.

This area would be configured in a manner that would limit potential interaction between Quarry internal haul road operations, expedite product transport operations and separate light and heavy vehicle traffic.

Power Supply

Private powerlines would be constructed to supply power to the Project Site to connect with the Infrastructure Area and provide power to the site office, weighbridge, Workshop and staff amenities. It is proposed that this service would be provided to the Project Site from a connection to the existing 11kV power supply located adjacent to Old Cooma Road and via Mates Drive.

Stage V1 Visibility Barrier

The Stage V1 visibility barrier would initially be stripped of vegetation and topsoil, which would be relocated for use in progressive rehabilitation activities. The southern facing slopes would be constructed first, and the barrier progressively constructed to the north. This would enable the southern faces to be stabilised and revegetated as soon as practical. It is estimated that 1,060,346t of highly weathered material would be generated from the Stage E1 Extraction Area and the Stage P1 Processing Area which would be used to commence development of the barrier. This volume would be sufficient to provide the visual mitigation required at this stage of the development. Moderately weathered material or material imported to the Project Site may be used to supplement initial construction of the barrier.

Stage E1 Extraction Area and Stage P1 Processing Plant

Extraction of the highly and moderately weathered materials would continue in the Stage E1 Extraction Area until suitable slightly weathered and fresh materials are exposed. While this material would mostly be removed using free dig methods, some blasting may be required during site establishment to fragment and extract this material.

Limited quantities of partially weathered material would be processed for sale and despatch during site establishment. A nominal limit of 100,000t of material is expected to be despatched.

Processing during site establishment would be undertaken with mobile processing plant within the Stage E1 Extraction Area until such time as the Stage P1 Processing Plant area has been established.

3.5 Project Site Development and Staging

3.5.1 Introduction

Development of the Project would be staged to allow for the progressive development of the site including vegetation clearing and the ramping up of operations as site infrastructure is developed. These are indicative long-term development plans and during the life of the Project may vary in response to customer demand and requirements, localised geology and market conditions. Project planning would occur continually, but generally on a 12-month basis, to identify progressive development targets, ensure consistency with the broader long-term plans, ensure safe access to operating areas, and to identify where areas have reached terminal development and can begin being rehabilitated.

Indicative staging of operations is described in the following subsections and presented in **Figure 3.6**. It is noted that the timing of stages for the various components of the Project would not necessarily align.

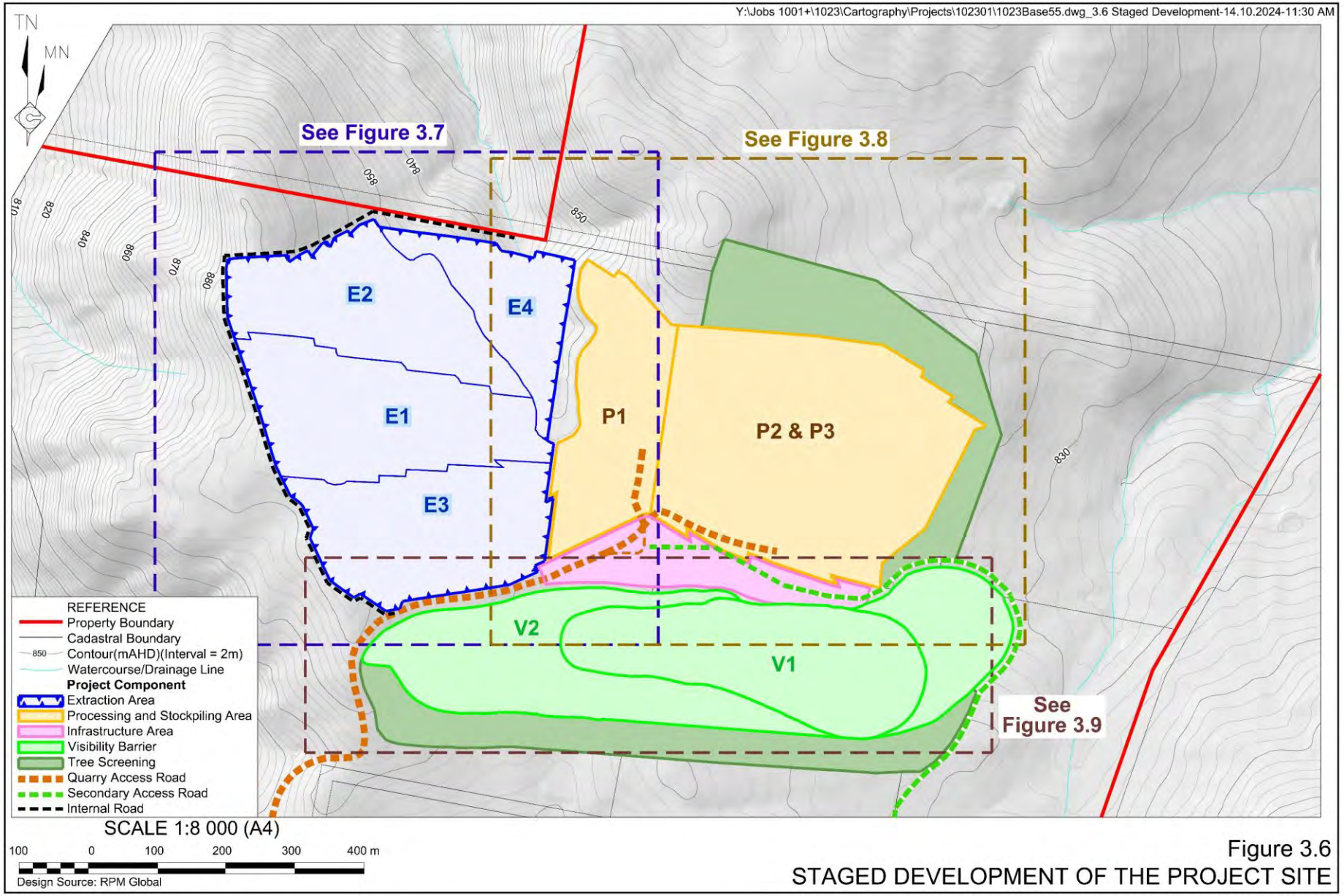


Figure 3.6
STAGED DEVELOPMENT OF THE PROJECT SITE

3.5.2 Extraction Area Design and Staging

3.5.2.1 General Specifications

The Extraction Area would be developed within an area of approximately 21.1ha and extraction would be undertaken across four stages (i.e. Stages E1, E2, E3, and E4) (**Figure 3.7**). The final depth of the extraction area would be no greater than 795m AHD.

The extraction area has been designed assuming the following general specifications.

- Upper Face Height: 5m
- Lower Face Height: 10m to 15m
- Operational Bench Width: 16m to 40m
- Terminal Bench Width: 5m to 10m
- Weathered Material Batter Angle: 45 Degrees
- Competent Material Batter Angle: 80 Degrees
- Haul Ramp Gradient: 1 in 8 (12.5%)
- Haul Ramp Width: 15m
- Property Boundary Buffer: 10m
- Overburden Material Swell Factor:15%
- Rock Density 2.6 t/m^3

3.5.2.2 Extraction Sequence

The sequence for development of the Extraction Area is presented in **Figure 3.7** and is summarised as follows.

- Stage E1 – initial development within a footprint of 6.4ha and to an elevation of approximately 852.5m AHD.
- Stage E2 – lateral extension to the north of approximately 5.6ha and same floor elevation as Stage E1 (852.5m AHD).
- Stage E3 – lateral extension to the south of approximately 6.0ha and to the same floor elevation (852.5m AHD).
- Stage E4 – widening of the Extraction Area to the north east (an additional 3.1ha to the full extent of 21.1ha) and development to a final floor elevation of 795m AHD.

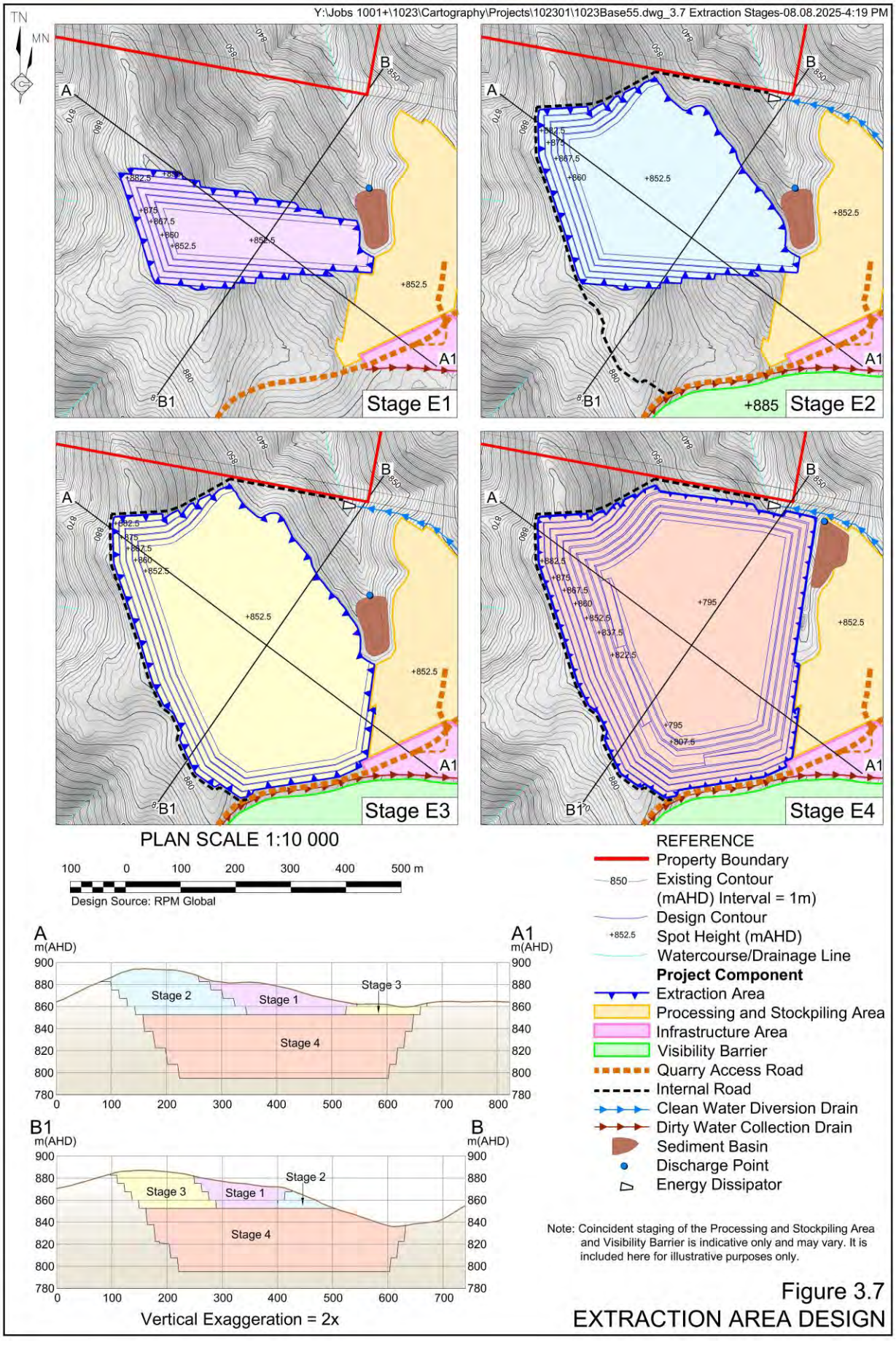


Figure 3.7
EXTRACTION AREA DESIGN

3.5.3 Processing and Stockpiling Area Staging

The Applicant would utilise the Processing and Stockpiling Area for raw material crushing, shaping and screening for various product sizes as well as product stockpiling and loading Quarry products for despatch. The development of the Processing and Stockpiling Area would be staged to allow for the progressive expansion of the area which would reflect operational requirements identified during the development of the Project. **Figure 3.8** presents the three stages for development of the Processing and Stockpiling Area, namely: P1, P2 and P3.

- Stage P1 Processing Area – Initial development of the Processing and Stockpiling Area over approximately 4.9ha during site establishment. This area would be sufficient to support production levels up to approximately 250,000tpa.
- Stage P2 Processing Area – Further extension of the Processing and Stockpiling Area to the east to a total area of 13.0ha. The Processing and Stockpiling Area would be developed in three tiers and would feature increased stockpiling areas and the Eastern Dam. The mobile plant presented in Stage P2 (**Figure 3.8**) represents the indicative configuration of ongoing processing activities while the fixed plant is being constructed to the east. Construction of the fixed plant would be expected to last approximately six months.
- Stage P3 Processing Area – The stage represents the final development of the Processing and Stockpiling Area. The Processing and Stockpiling Area would feature a fixed processing plant to support production at the proposed limit of 1Mtpa.

3.5.4 Visibility Barrier Staging

The Applicant would utilise the area to the south of the Extraction Area and Processing and Stockpiling Area to construct a Visibility Barrier. The barrier would have a dual purpose of providing a stable and vegetated barrier to shield operational components of the Project from residences and public vantage points to the south and southeast and as a storage location for overburden material that may not be suitable for sale. The Visibility Barrier would principally be constructed from highly and moderately weathered material removed during the development of the Extraction Area and Processing and Product Stockpiling Area. In addition to being proximal to the Extraction Area, thus resulting in shorter haul distances for material, the principal selection criterion for the location of the Visibility Barrier was to make use of the natural landform as much as possible in establishing an effective topographic barrier.

The development of the Visibility Barrier would be staged as follows to ensure that impacts are mitigated to the greatest extent practicable during the progressive development of the Quarry. **Figure 3.9** presents the staged development of the Visibility Barrier.

- Stage V1 Visibility Barrier – construction of the initial barrier would commence during site establishment using weathered material removed from operational areas. The barrier has been designed to reach an elevation of 865m AHD with a footprint of 6.9ha. The total volume of material required to construct the barrier would be approximately 556,000m^3 (lcm).

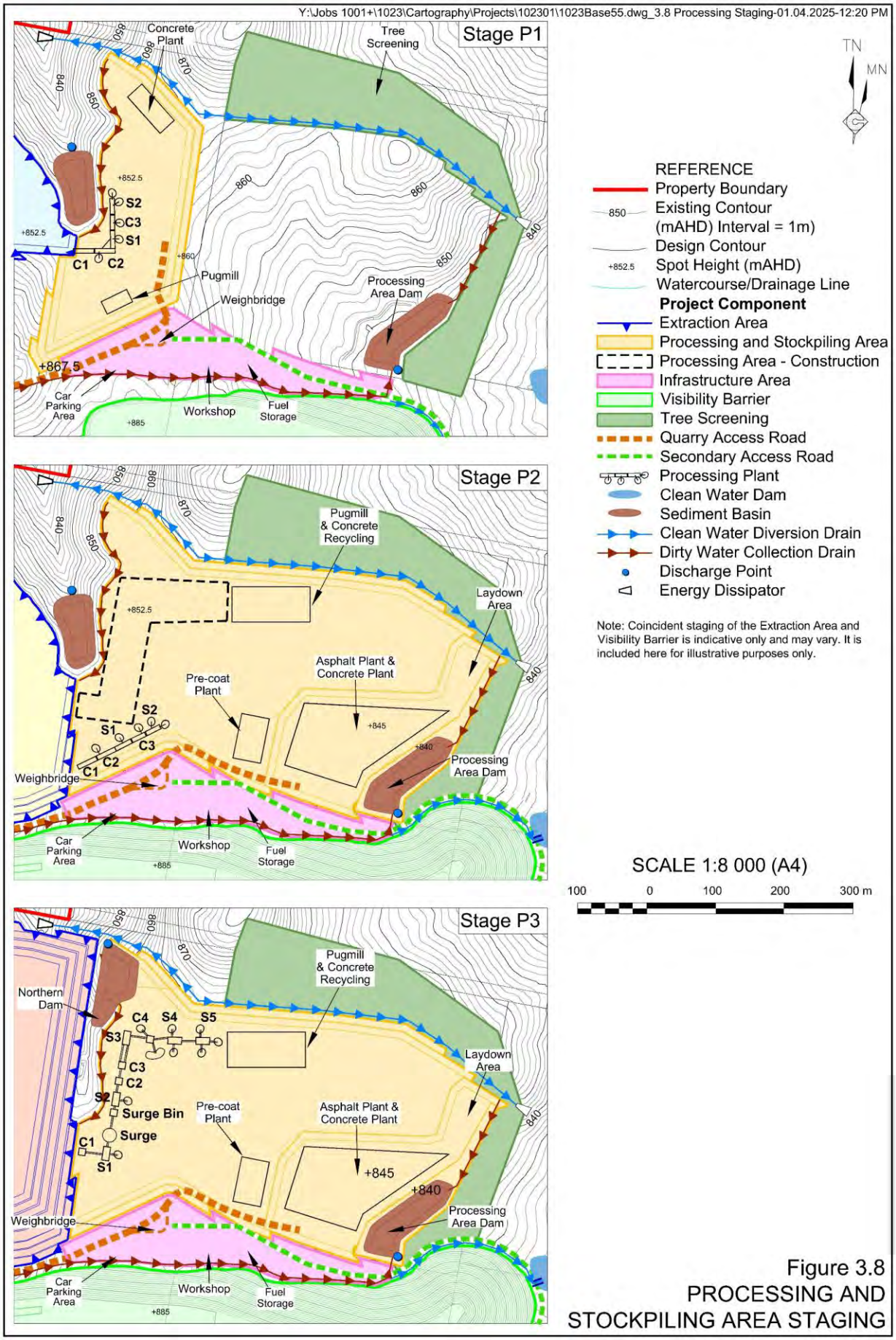


Figure 3.8
PROCESSING AND STOCKPILING AREA STAGING

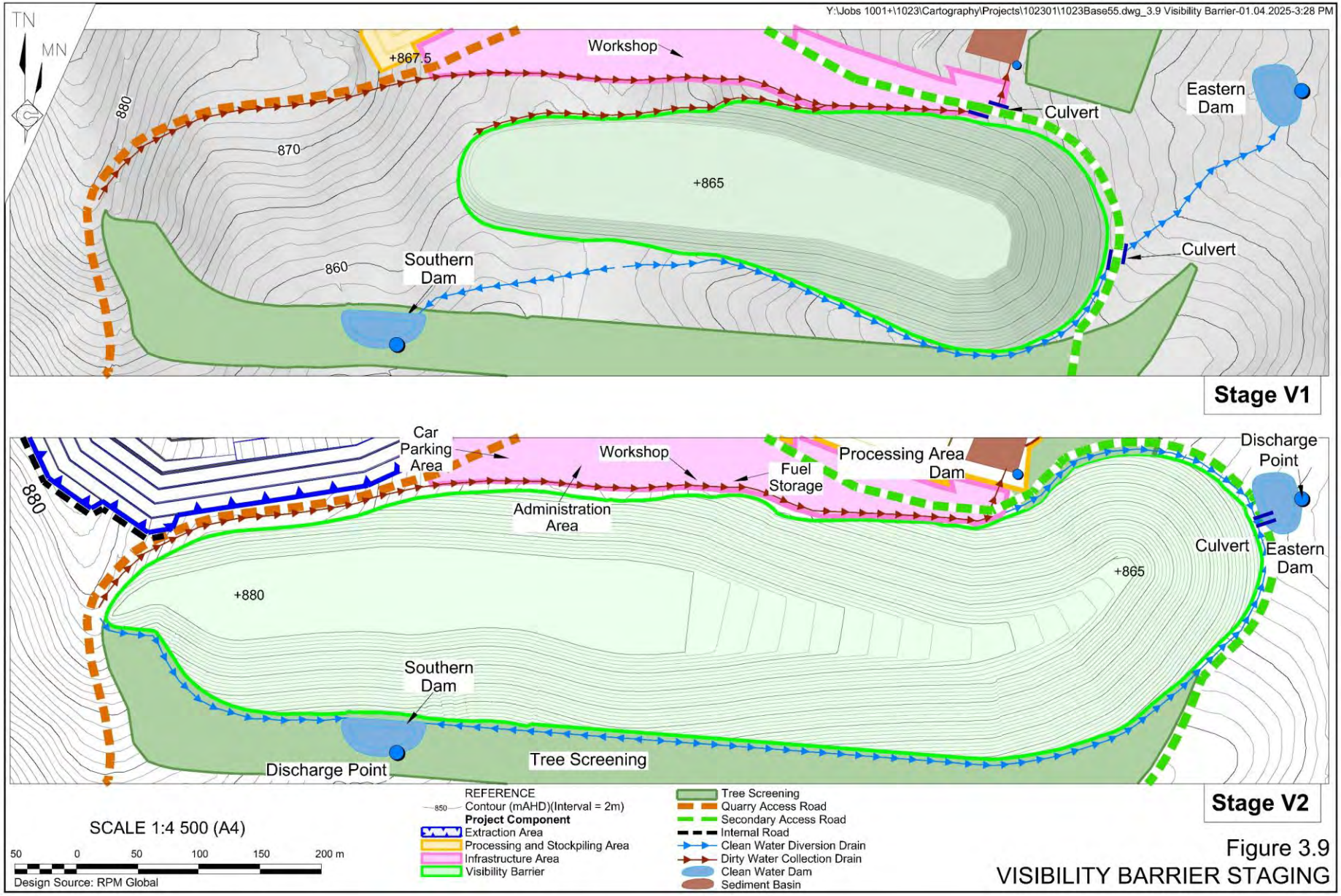


Figure 3.9
VISIBILITY BARRIER STAGING

- Stage V2 Visibility Barrier – Extension of the Visibility Barrier to the northeast to obscure the development of the processing area and to the west to obscure further development of the Extraction Area. The barrier would extend the existing structure to an elevation of 880m AHD and cumulative area of 16.1ha. Development of the Stage V2 Visibility Barrier would require 1.2Mm^3 (lcm) of material and is likely to commence with the extension of the Processing and Stockpiling Area (Stage P2 Processing Area)

During both stages of Visibility Barrier construction, the southern faces of the barrier would be constructed first, with infill occurring progressively to the north. The barrier would be constructed in lifts of between three to five metres. This would permit the southern faces to be stabilised and revegetated as soon as practical and would provide the benefit of mitigating possible views of the Project Site while obscured areas of the barrier continue to be developed. **Figure 3.10** presents a schematic of progressive barrier development to illustrate this approach.

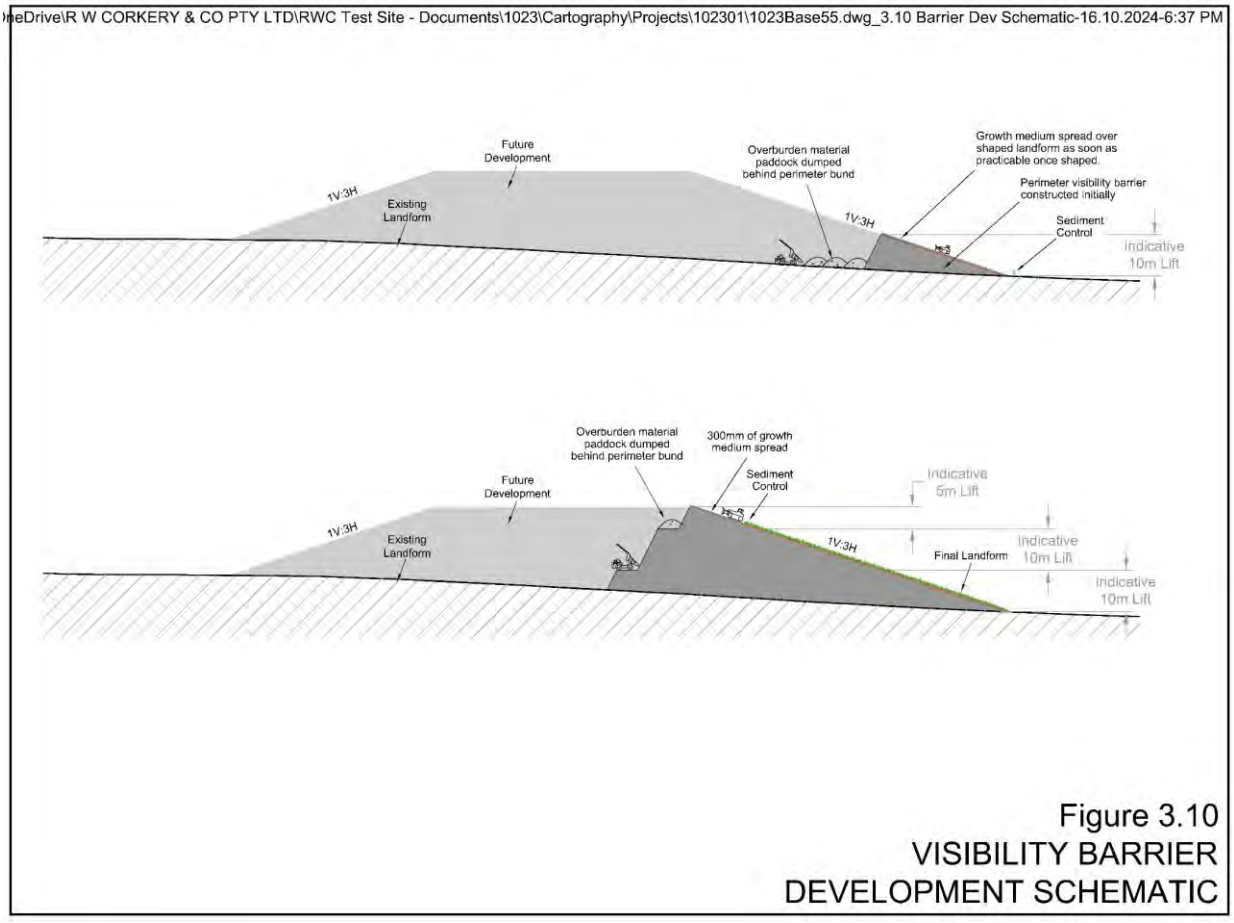


Figure 3.10
VISIBILITY BARRIER
DEVELOPMENT SCHEMATIC

The Visibility Barrier has been deliberately sized to permit space for the management of overburden material as well as to obscure operations. This would enable material to be placed within the barrier as required. Where customer demand for road base or other materials requires blending with moderately or highly weathered material, it would be taken from the barrier. The design of the barrier allows for the storage of approximately 2.1Mm^3 of material over the life of the Project. Assuming a material density of 2.6t/m^3, this is equivalent to approximately 5.5 million tonnes. It is anticipated that approximately 1.25Mm^3 of highly weathered suitable for barrier construction may be generated over the life of the Project within the Extraction Area or

for development of the Processing and Stockpiling Area. This volume would be sufficient to construct southern faces that function as mitigation for potential views of the Project Site. This notwithstanding, the structure has been over-designed to accommodate short-term storage of moderately weathered material for future blending in the pugmill to produce road base. As a result, construction of the barrier as designed may not be completed at closure although mitigation would be in place in a staged manner.

The Applicant is proposing the importation of up 150,000tpa of VENM for site construction and rehabilitation activities. Construction of the visibility barriers may be supplemented by material imported to the Project Site for application to land (consistent with resource recovery). Only material classified as VENM or ENM would be imported to the Project Site for construction activities. The Applicant would comply with all requirements of the NSW EPA with regards to the management of material importation (consistent with resource recovery[1]) including material sampling, record keeping and reporting.

Where possible, material would be transported to the Project Site via trucks returning from the delivery of quarry products to customers. The transportation of VENM/ENM materials would be included in daily and hourly limits for the Quarry and measured at the weighbridge.

3.5.5 Flexible Elements

This subsection outlines the components of the Project that would be refined throughout the Project life without causing any substantial changes in environmental impacts. Changes in the components described below would be considered refinements[2] and therefore would not require further approval.

- Project Staging

  The staging identified in Section 3.5 reflects the current projected development of the Quarry. The staging of the Project may be refined to reflect on-the-ground conditions and operational requirements.

- Internal Haul Roads

  Throughout the Project life, the internal haul roads within the Project Site would be periodically relocated in order to satisfy safety requirements, preferred lower road gradients and the staged development of the Project. These roads would not require vegetation clearing outside of the proposed limit of disturbance.

- Extraction Area Sump

  All runoff within the Extraction Area would report to a sump within the active Extraction Area. The locations and footprint of the active sumps would vary throughout the Project life.

[1] The proposed importation of ENM to the Project Site would be undertaken in accordance with *The excavated natural material exemption 2014* (or subsequent policies) as specified in Part 9, Clauses 91 and 92 of the *Protection of the Environmental Operations (Waste) Regulation*. The legislative context for this aspect of the development is discussed in more detail in Section 4.

[2] These refinements would be described in the relevant environmental management plan(s) for the operation.

- Equipment Fleet

  The equipment fleet nominated in Section 3.6 reflects the equipment currently anticipated to suit extraction operations within the Project Site. Throughout the Project life, the Applicant may progressively upgrade and/or refurbish the equipment fleet to more modern equipment or equipment able to undertake the same tasks with similar or reduced levels of noise or dust generation.

- Processing Equipment

  Throughout the Project life, the Applicant would rely upon both mobile and fixed processing plants to process the fragmented rock resource. This equipment may be replaced or supplemented, as required.

3.6 Extraction and Processing Operations

3.6.1 Production Rates

The proposed rate of production would be progressively increased to meet demand. The triggers for production rates would coincide with the staging of development of the Processing and Stockpiling Area as the space available in this area would need to grow to provide stockpiling space and the management of various product types. Timing for each stage would be dependent on customer demand but it is anticipated that Stage 2 would be commenced within five years of approval.

- Project Site Establishment – Processing and despatch of up to 100,000tpa during site establishment using mobile processing plant which would initially be located within the Extraction Area.
- Stage 1 – Processing of up to 250,000tpa using a mobile processing plant which would be located within the Stage P1 Processing Area. A Pugmill would also be used during this stage.
- Stage 2 – Once a production rate of 250,000tpa is reached, the Stage P2 Processing Plant area would be constructed. The production rate would then be targeting up to 500,000tpa.
- Stage 3 – Production using mobile processing equipment would continue up to a level of 750,000tpa. At this level, or earlier if needed, a fixed processing plant would be commissioned and built. The fixed processing equipment would then be used for production up to the limit of 1Mtpa.

3.6.2 Extraction Operations

Extraction would occur using standard drill and blast, load and haul methods. Blasting would generate between 25 000t and 100 000t of raw material for each blast event. Blasted rock would be loaded to haul trucks by excavator or front-end loader and hauled from the Extraction Area to the mobile or fixed processing plant.

Blasting would be limited to at most weekly blast events. Blasting may need to be repeated in the event of a misfire, however this would be rare. The transport and handling of dangerous goods is described in Section 3.11.4.

3.6.3 Processing Operations

Mobile Processing Plant

Both mobile and fixed processing plants would be utilised throughout the Project life.

Figure 3.11 presents the indicative plant flow path for the proposed mobile processing plant. The mobile crushing and screening equipment would include the following indicative components.

- A Primary Jaw Crusher e.g. Terex Finlay J-1480 or similar.
- Secondary and Tertiary Cone Crushers, e.g. Terex Finlay C-1550P or similar.
- A Quaternary Vertical Shaft Impactor, e.g. TwisterTrac VS350E or similar
- Two screening decks e.g. Terex Finlay 984 or 893 screeners or similar.
- Conveyor belts, stackers, bins and hoppers.
- Pugmill

The mobile processing plant would have an indicative production capacity of 300tph when producing hard rock aggregates and up to 400tph when producing road base products. It is anticipated that on average production would be split 60%/40% between aggregates and road base.

Fixed Processing Plant

For all production at levels greater than 750,000tpa the Applicant would use fixed processing plant (Stage P3 Processing Plant). **Figure 3.12** presents an indicative plant flow sheet for the fixed processing equipment, noting that the sequence of crushing and screening may be refined in the final plant design. The fixed processing plant would include the following components.

- A Primary Jaw Crusher.
- Secondary and Tertiary Cone Crushers.
- A Quaternary Vertical Shaft Impactor
- Five screening decks.
- Conveyor belts, stackers, bins and hoppers.
- Pugmill.

All new processing plant would be constructed in accordance with standard practice for the quarrying industry and incorporate suitable enclosures and other mitigation for potential noise and dust impacts.

The fixed processing plant would have an indicative production capacity of 350tph when producing hard rock aggregates and up to 600tph when producing road base products.

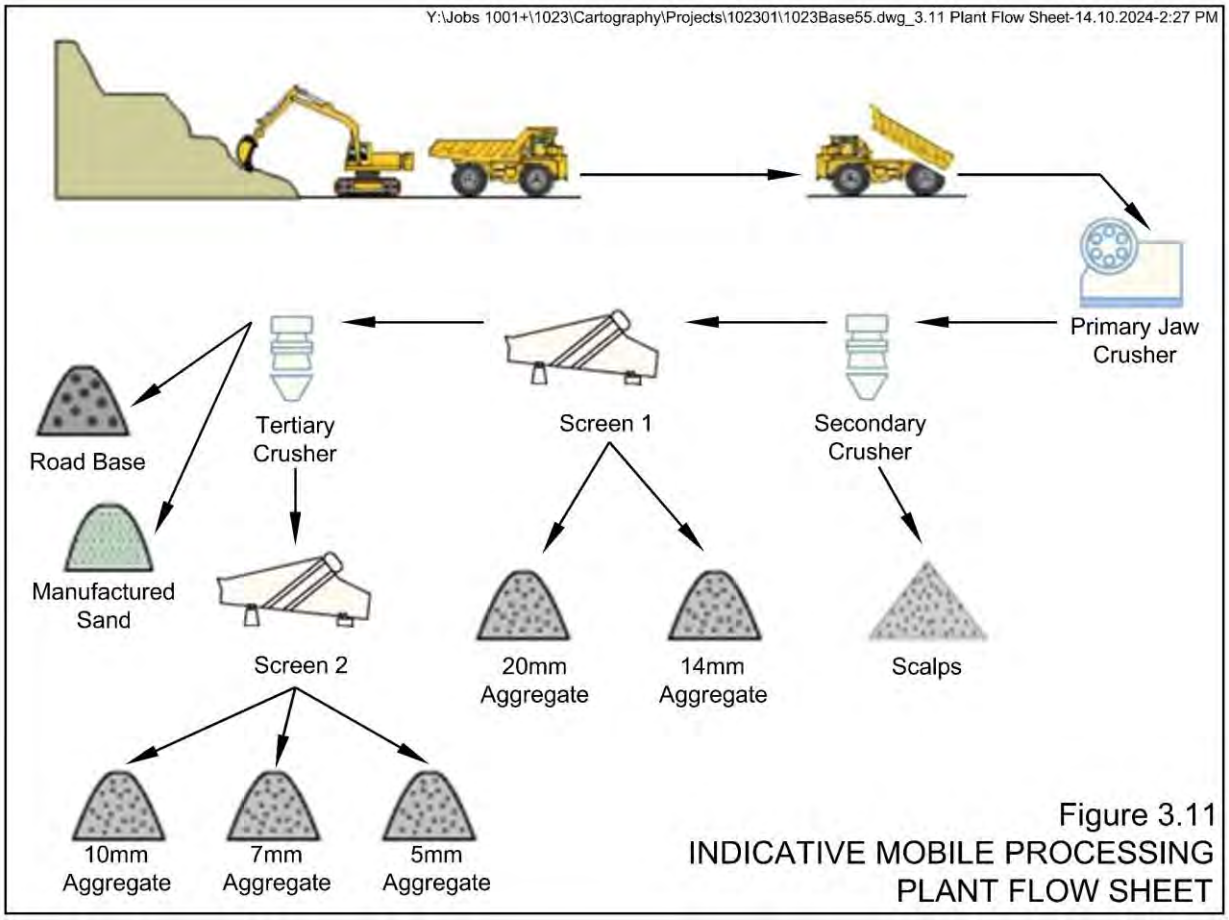


Figure 3.11
INDICATIVE MOBILE PROCESSING PLANT FLOW SHEET

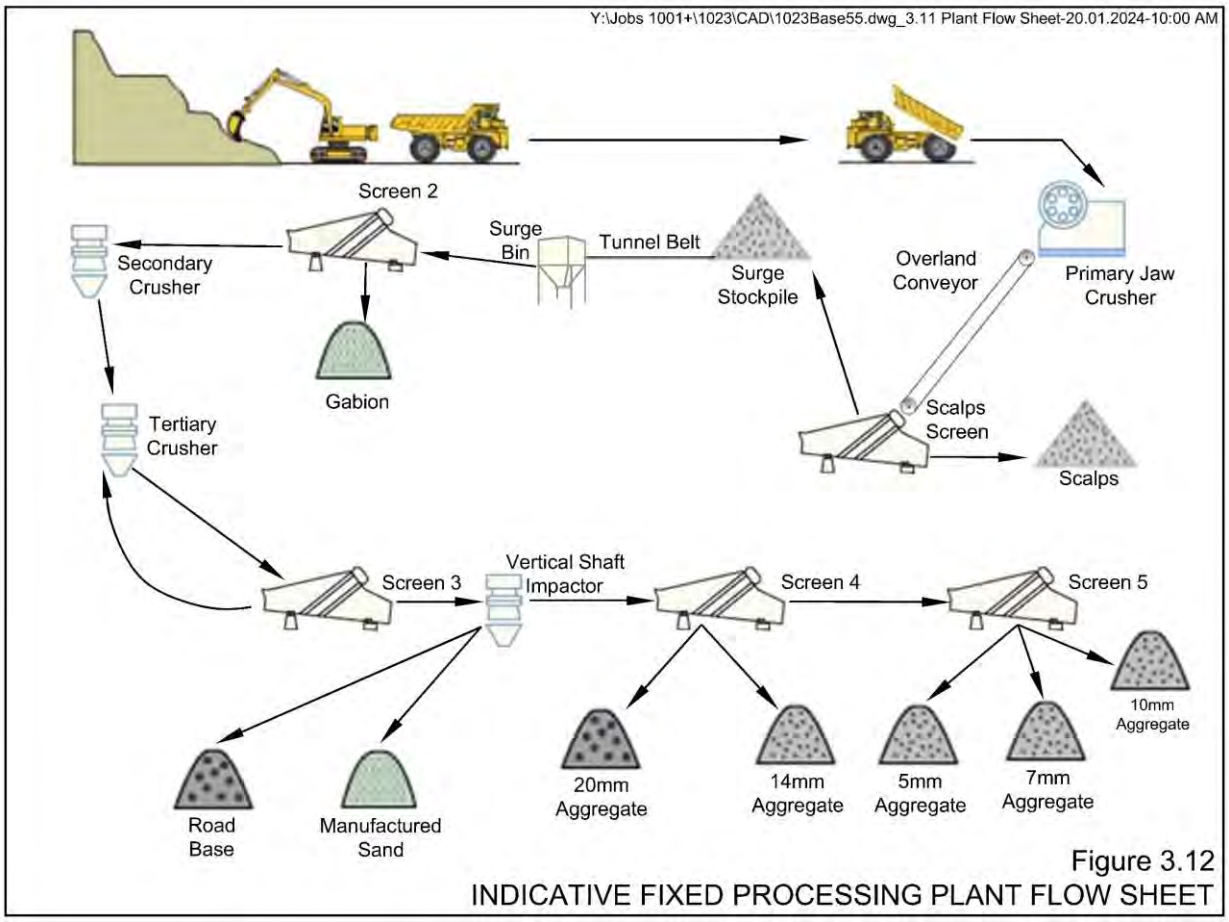


Figure 3.12
INDICATIVE FIXED PROCESSING PLANT FLOW SHEET

Pugmill

It is also proposed that a Pugmill would be located within the Processing and Stockpiling Area to produce road base products. The Pugmill would comprise a loading hopper in which quarry material would be placed. The material would then move along a conveyor to the mixing chamber where water and cementitious binder would be added (if needed). The mixed material would then be temporarily stockpiled before being loaded onto trucks for delivery. It is envisaged that the Pugmill would complete the required processing at a rate of up to 300tph. However, the use and size of the Pugmill would be dependent on demand and may be higher. The internal location of Pugmill is presented in **Figure 3.8**, however, this infrastructure may be relocated to the material storage area of the Visibility Barrier to enable blending of materials stored in the barrier.

3.6.4 Equipment Fleet

Table 3.4 lists the mobile equipment fleet which would be used for extraction, load and haul, processing and road maintenance operations. Details are provided on the number of each item of equipment, their main function and frequency of use. This presents a general equipment list only, and other similar equipment may be used at times, or the existing equipment may be used for other purposes, as required to meet operational requirements.

Table 3.4
Mobile Earthmoving Equipment Fleet

Equipment*	Number	Use/Activity
Percussion Drill Rig (Atlas Copco T40 or similar)	2	Drilling blast holes (typically used five days every month)
Hydraulic Excavator 50t (Komatsu PC850 or similar)	1	Resource extraction and haul truck loading (daily use)
Hydraulic Excavator 26t (Komatsu PC490 or similar)	1	Resource extraction and haul truck loading (daily use).
Bulldozer (Caterpillar D9 Dozer or similar)	1	Resource extraction (ripping/pushing), site works (daily use)
Front-end Loader (Caterpillar 982M or similar)	3	Haul truck and product truck loading, blending road pavement materials (daily use)
Grader (Caterpillar 140 or similar)	1	Road maintenance (typically used two days every month)
Articulated Haul Truck (Caterpillar 730 Articulated haul trucks or similar)	3	Raw material haulage to processing area (daily use)
Bobcat (Caterpillar 289 Bobcat or similar)	1	Maintenance within product stockpile area, site works (daily use)
Water Truck (Minimum 12,000 L) (Caterpillar 740 Water Truck or similar)	1	Dust suppression activities (daily use)
Utility Vehicle (Toyota Hilux Dual Cab or similar)	3	General operational use (daily use)
* Note: All equipment would be periodically replaced/refurbished with better equipment of a similar capacity and noise rating.		

3.7 Ancillary Infrastructure

Additional infrastructure would be developed for activities that are ancillary to the production of hard rock aggregates. These activities would occur alongside extraction and processing operations to produce additional products for use in the construction industry. The following subsections describe the location, components and expected rate of production for these activities.

3.7.1 Concrete Recycling

The Applicant would import and process approximately 20,000tpa of concrete and use the material as a component of blended products for sale. The proposed location of the concrete recycling plant within the Quarry expansion is shown in **Figure 3.4**.

Recycling of concrete material would involve the following key activities.

- Import and stockpiling of concrete waste (meeting the classification of building and demolition waste and not containing asbestos waste or liquid waste).
- Loading of material for processing using a Front-end Loader or Hydraulic Excavator.
- Campaign crushing using a mobile crushing unit.
- Temporary storage of processed materials prior to relocation for further processing.
- Further processing may consist of simple blending, crushing and screening, stabilisation or a combination of all processes, depending on raw feed characteristics and the desired product specification.

Concrete crushing may occur in the mobile processing plant within the Infrastructure Area or a dedicated mobile crushing unit may be used. Incoming concrete material volumes would vary over the short and long term but would not exceed 20,000tpa. The principal source of concrete for recycling would be concrete washout material that is likely to be transported to the Quarry by trucks returning from concrete plants (i.e. backloading). However, this would be dependent on the material source and may not always be the case.

Only solid concrete material would be transported to the Quarry. Solid concrete is classified as General Solid Waste (non-putrescible) under the EPA's Waste Classification Guidelines. Solid concrete does not require a licensed transporter and does not need to be tracked. However, solid concrete material can only be transported and stored at a licensed facility. The imported material would not be liquid waste and would not contain asbestos (asbestos waste). Material would be verified at delivery and rejected if it is not consistent with solid concrete waste.

Recovered aggregates are the final product of concrete recycling and are subject to a general exemption from waste licencing by the NSW EPA. Under these exemptions, recovered aggregates and fines can be applied to land for road making activities, building, landscaping and construction works, without the need for a licence.

The recycled concrete product would be used primarily in road base products to reduce the volume of raw materials used making this product. Using recycled concrete in this manner would reduce the volume of washout waste going to landfill. It is therefore considered beneficial to recycle washout material at the Quarry from where it can be directly incorporated into products.

The Applicant would comply with all requirements of the NSW EPA with regard to the management of concrete importation and recycling including record keeping and reporting.

3.7.2 Concrete Batching Plant

A conventional concrete batching plant would be developed within the Processing and Stockpiling Area. The plant would have the capacity to produce and despatch up to 50,000m^3 of concrete per annum and up to 300m^3 of concrete per day. It is not expected that the concrete batching plant would be constructed during site establishment but would commence later in the Quarry life.

The location of the concrete batching plant is provided in **Figure 3.8** and an indicative layout provided in **Figure 3.13**. The exact configuration of the required infrastructure would be determined upon commissioning of construction. Concrete batching would involve the following key activities.

- Receipt and storage of concrete raw materials (in designated material bins, cementitious storage silos and tanks).
- Loading of aggregates and sand into a hopper using a Front-end Loader.
- Conveying of aggregates and sand to batching bins.
- Blending of concrete raw materials.
- Despatch of concrete to customers in concrete agitators.
- Washout of returning concrete agitators.

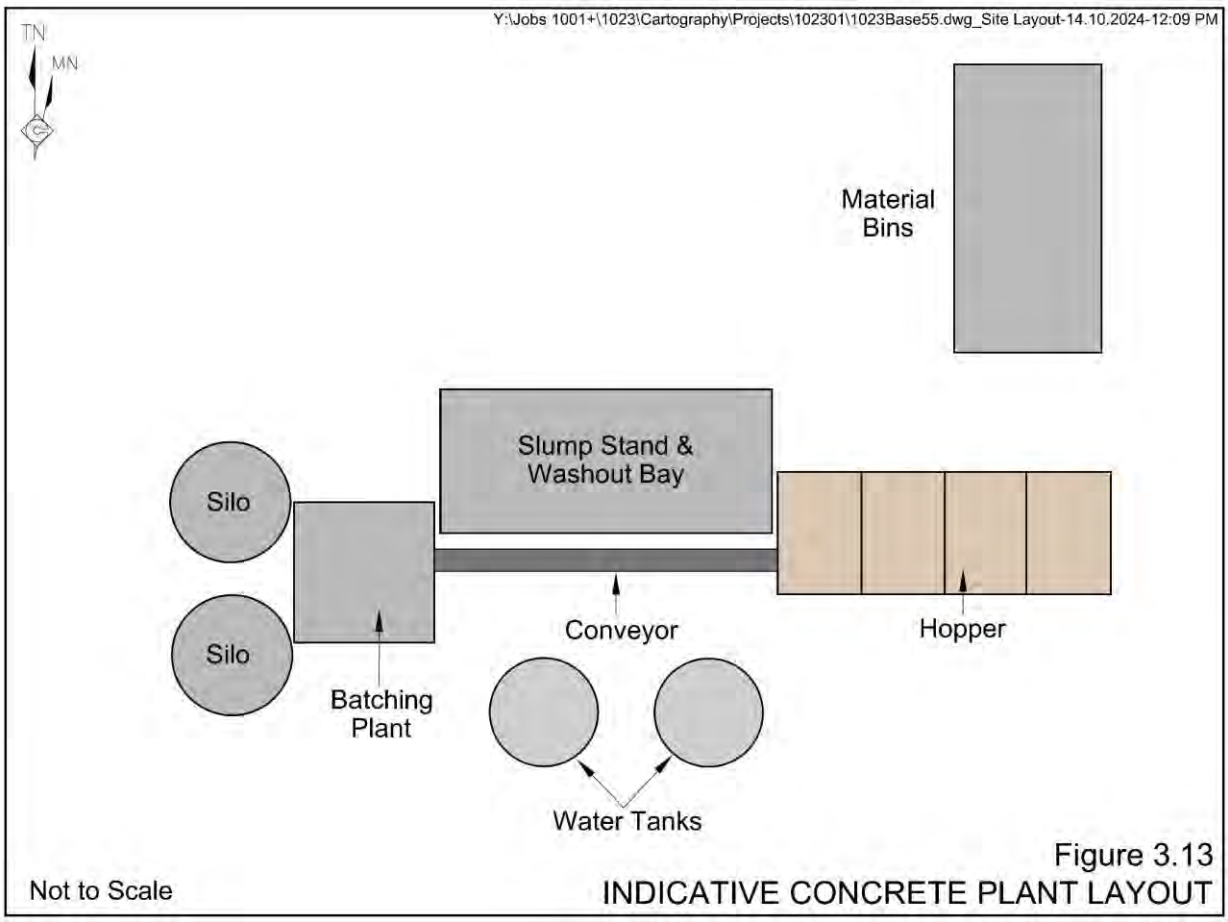


Figure 3.13
INDICATIVE CONCRETE PLANT LAYOUT

In its current configuration, the layout of the facility incorporates the following.

- Raw material bins
- A concrete batching plant comprising:
  - two silos for cement or fly ash (approximately 19m vertical above ground level);
  - weigh hoppers and mixer; and
  - agitator truck loading station.
- A conveyor system to transfer raw materials to the concrete batching plant.
- A slump stand and wash-out bay for agitator trucks.
- Two 25,000L water tanks that would be filled from dams within the Project Site.

Production of concrete would require the importation of the following materials on a regular basis.

- Sand would be delivered by road-registered trucks. This material would be stored in designated material bins.
- Cement and flyash would be delivered in pneumatic tankers and stored in storage silos.
- Additives, such as admixtures, would be transported in road registered trucks and be stored in a designated and appropriately bunded storage area.

Coarse aggregates and manufactured sand would be sourced on-site and limit the need for delivery of this material.

Approximately 180L of water would be required for each cubic metre of concrete produced. Based on the assumption that producing $1m^3$ of concrete requires 2.2t of coarse aggregate, sand and cementitious material, at maximum production the concrete batching plant requires 220,000t of raw materials. This process involves the following steps.

- Retrieval of required aggregates from storage bins and transfer to the batching plant via front end loader, feed hopper and the conveyor system.
- Automatic weighing of the required amount of cement and additives in the mobile batching plant's weigh hoppers.
- Direct transfer of weighed dry concrete material into the agitator truck positioned below the loading hood and any dust generated at this point being collected by the batching plant's vacuum dust collection system.
- Direct addition of water and admixtures at the mobile batching plant loading point into the agitator truck prior to slumping and transportation to the customer.

Concrete would be despatched from the Project Site using concrete agitator trucks with a nominal load capacity of up to $8.7m^3$, although the average load is (usually) approximately $6.0m^3$. Concrete despatch is discussed in Section 3.8.3.

3.7.3 Asphalt Plant

An asphalt plant would also be constructed within the Processing and Stockpiling Area to produce asphalt for road construction and maintenance. The plant would have the capacity to produce and despatch up to 50,000t of asphalt per annum and up to 1,000t of asphalt per day. The location of the asphalt plant is provided in **Figure 3.8** and an indicative layout provided in **Figure 3.14**. Construction of the asphalt plant would also not occur during site establishment but occur later in the Quarry life.

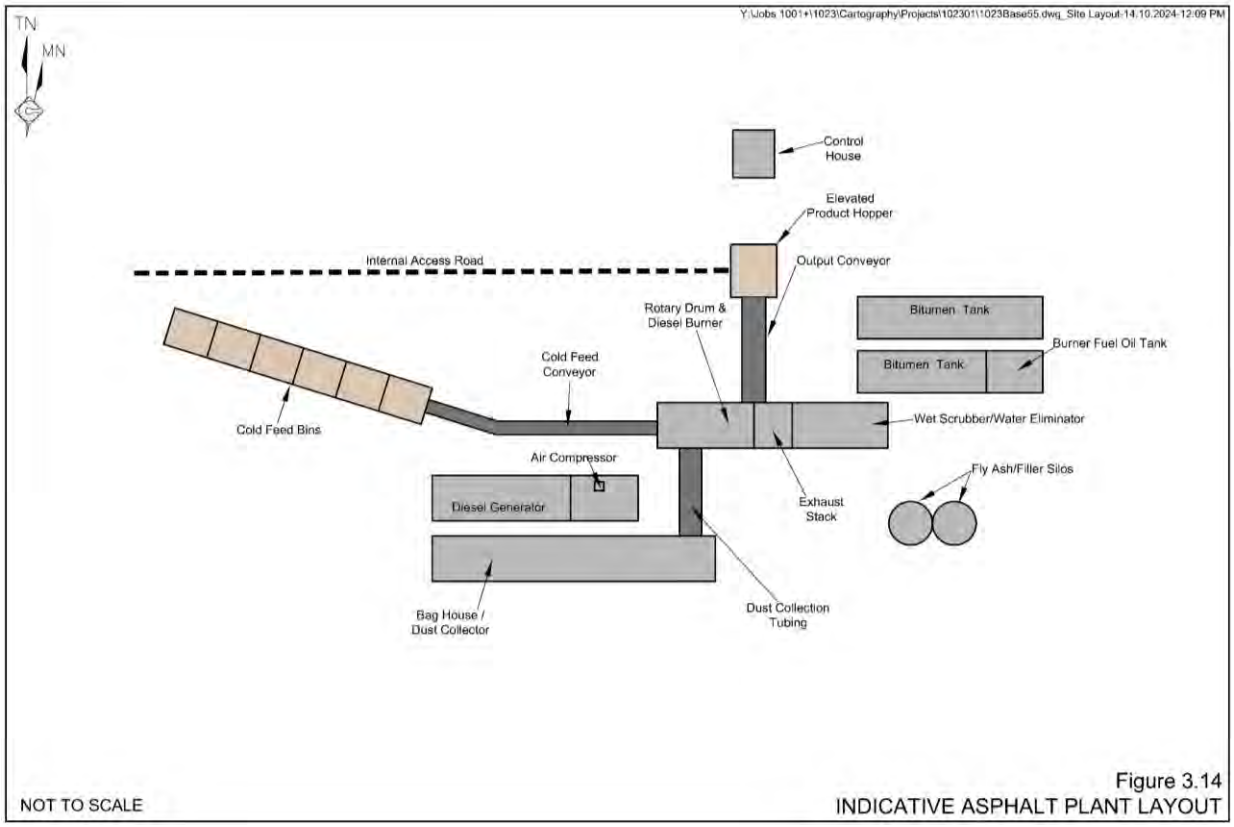


Figure 3.14
INDICATIVE ASPHALT PLANT LAYOUT

Asphalt production principally consists of mixing aggregate materials with bitumen in a heated environment to create a heated mix that is then applied in road construction. Aggregates of varying type and size are used in the process as well as additional materials that are called 'fillers' that fill voids in the paving mix and improve the cohesion of the asphalt binder.

The model of asphalt plant and its components may change over time. Improvements in manufacturing are constantly being introduced and the Applicant may utilise alternate models of asphalt plant to meet the specific needs of road surfacing and resurfacing projects. The asphalt plant would be fixed or mobile and include the following components.

- cold aggregate feed bins;
- a cold feed conveyor;
- a diesel burner;
- a rotary drum drier/mixer;
- a wet scrubber and water eliminator;

- an exhaust stack;
- a wet scrubber / dust collector;
- an output conveyor;
- an elevated hot asphalt storage hopper; and
- a control house.

Aggregates and fillers are loaded into the cold feed aggregate bins using a front-end loader before being drawn down from individual feeder bins using weigh feeders and conveyed into the drum drier/mixer and heated to approximately 165ºC by a burner. Bitumen is added to the hot aggregates at the end of the mixing process to produce hot-mix asphalt. The hot-mix asphalt would then be conveyed into the overhead storage hopper and discharged into trucks. Materials would be transferred between components by conveyor before being transferred directly to heavy vehicles for transport.

Most aggregates for asphalt production would be sourced within the Project Site with all other materials imported as needed and stored within dedicated storage bays. Hard rock aggregates of varying size would be used, but reclaimed asphalt pavement (RAP) and steel slag also have a similar role in asphalt mixes. The use of fillers is a standard practice in asphalt production with the predominant filler being lime, however, other materials such as fly-ash, dust, glass, plastics and crumbed rubber may be used. The use of additional materials in asphalt production provides a variety of benefits to asphalt performance as well as the economic and environmental benefits associated with the beneficial reuse of waste materials. For example, steel furnace slag is a waste product of steel making and can be used to improve the anti-skid properties of asphalt.

As an example, for the production of 6,000t of asphalt the raw materials used would include:

- 4,980t of course aggregates (various sizes);
- 600t fine aggregates (typically <5mm);
- 120t filler; and
- 300t bitumen.

Filler materials such as lime would be stored within silos adjacent to the asphalt plant. Aggregates imported to the Project Site would be stored in dedicated storage bins. Bitumen would be stored in a bunded bitumen storage tank with a 36,000L capacity. Diesel required to power the burner in the asphalt plant would be supplied from a dedicated asphalt plant fuel storage area that includes a bunded above-ground take with a 20,000L capacity.

Some materials required for asphalt production would be imported to the Project Site. A variety of heavy vehicles may be required for this purpose including pneumatic tankers, semi-trailers or truck-and-dog configuration vehicles. Walking floor semi-trailers and truck and dog configuration heavy vehicles would be used to transport asphalt from the Project Site.

3.8 Project Site Access and Transportation Activities

3.8.1 Quarry Access Road

A dedicated Quarry Access Road would be constructed between the operational areas of the Quarry and the Monaro Highway. The road would be approximately 4.0km in length and include a crossing of the Goulburn Bombala Railway Line (not currently operating). After the crossing, the road would pass into the ACT with a short road constructed to a dedicated intersection with the Monaro Highway. **Figure 3.15** presents the proposed Quarry Access Road in relation to the railway crossing and the ACT border and Monaro Highway. Design information that presents the location and configuration of the railway line crossing is provided in **Appendix I**.

As presented in **Figure 3.15**, the Quarry Access Road would be sealed for a length of 2.7km from the intersection with the Monaro Highway and a 3m high colorbond or wooden fence constructed on one side of the sealed section of road. The sealing and fencing would be in place to mitigate noise propagation (acoustic barrier) and dust dispersion. The remainder of the road from the Quarry operating area to the south towards Enchanted Hill would be unsealed and graded. The Applicant would monitor and maintain the condition of the entire road to limit noise and dust generation as much as practically possible.

As noted in Section 3.1.2, development approval under the ACT *Planning Act 2023* would be required for the construction and use of a short road and an intersection with the Monaro Highway. The NSW State Significant Development application relates only the section of the Quarry Access Road within NSW up to and including the railway crossing. Assessment of the use of the entire road is presented in Section 6.10 in order that the cumulative impacts of transport operations may be considered.

3.8.2 Transport Routes

All heavy vehicles transporting material or products to and from the Project Site would access and depart the Project Site using the Quarry Access Road. Vehicles may turn left or right at the Monaro Highway depending on the location of customers. It is anticipated that 90% of vehicle movements leaving the Project Site would require a right turn onto the Monaro Highway in the direction of Tuggeranong. However, this proportion may vary from day to day with all vehicles turning right on some days.

3.8.3 Traffic Levels

The bulk of quarry products would be despatched from the Project Site using truck and dog trailers of various configurations, i.e. with a capacity of between 32.5t and 37.5t, smaller quantities of products would be despatched by semi-trailers (27.5t to 30t capacity) or rigid trucks (12.5t to 18t capacity). Larger capacity vehicles may be used depending on customer requirements.

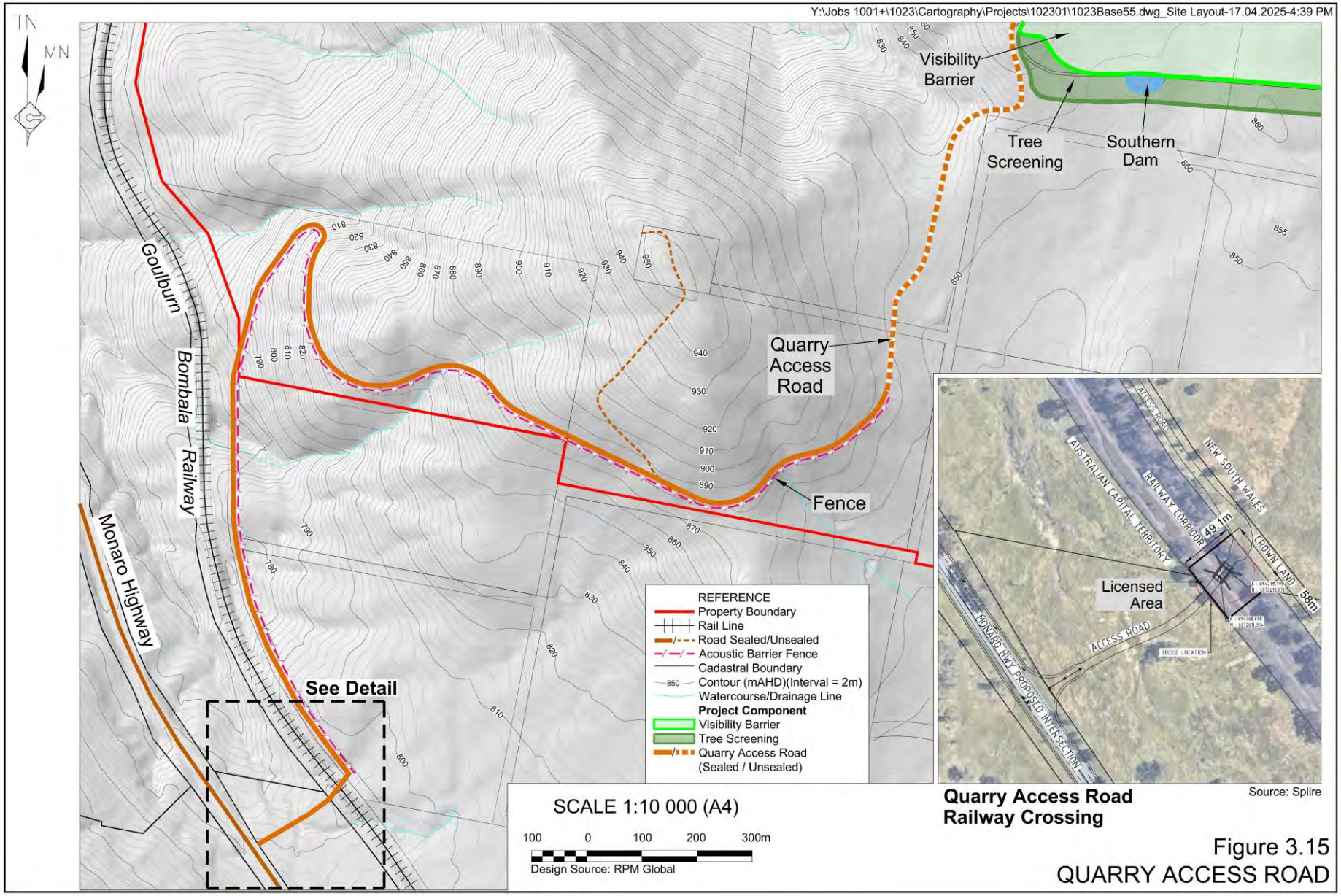


Figure 3.15
QUARRY ACCESS ROAD

Daily traffic would vary over the life of the Project, dependent on demand. It is the nature of the construction business for there to be peaks and troughs in demand. In order to meet peaks in demand a peak daily traffic level of 200 heavy vehicle laden loads is proposed and a limit of no more than 25 laden loads in any given hour. Up to 50 laden loads of concrete may be despatched on a peak day by concrete agitator (in addition to heavy vehicle traffic). For the purpose of assessment and for setting limits, traffic levels are considered in terms of movements to take into account the movement to the Project Site and the movement departing the Project Site (that is, laden loads are a one-way measure and movements account for both directions)

Ancillary activities would also generate traffic with the following traffic levels expected.

- VENM / ENM import - The Applicant is proposing the importation of up 150,000tpa of VENM or ENM for site construction and rehabilitation activities. Where possible, material would be transported to the Project Site using trucks returning from the delivery of quarry products to customers. The transportation of VENM / ENM materials would be included in daily and hourly limits for the Quarry and measured at the weighbridge.
- Concrete Recycling - The Applicant is proposing to import 20,000tpa of hardened concrete for recycling. It is likely that concrete would be transported to the Quarry by trucks returning from concrete plants (i.e. backloading). However, this would be dependent on the material source and may not always be the case. The transportation of concrete materials would not be expected to exceed 10 loads on any day and would be included in the heavy vehicle daily and hourly limits for the Project and measured at the weighbridge.
- Concrete Production – The Applicant would produce up to up to 50,000m^3 of concrete per annum and up to 300m^3 of concrete per day. Raw materials for concrete production may be delivered in a variety of vehicles including pneumatic tankers, semi-trailers and truck-and-dog configuration heavy vehicles. Raw material delivery would be included in the daily and hourly limits for the Project. Concrete would be despatched in various sized concrete agitators with up to 50 loads despatched in a day (assuming an average payload of 6m^3).
- Asphalt Production – The Applicant would produce and despatch up to 50,000t of asphalt per annum and up to 1,000t of asphalt per day. As asphalt would be produced in campaigns it is not expected to be despatched on each day. Raw materials for asphalt production may be delivered in a variety of vehicles including pneumatic tankers, semi-trailers and truck-and-dog configuration heavy vehicles. Asphalt would be despatched in various sized heavy vehicles depending on customer requirements. Up to 40 loads of asphalt may be despatched in a day (assuming an average payload of 25t) and would be included in the heavy vehicle daily and hourly limits for the Project and measured at the weighbridge.

A summary of total traffic generation at the Project Site is presented in **Table 3.5**. Although vehicle types would vary over any day, the maximum for heavy vehicle truck and trailer configuration vehicles would remain at 200 loads per day and the maximum for concrete agitators involved in the despatch of concrete would be 50 loads per day. Concrete despatch would be managed separately given the small volume despatched in each concrete agitator. Various types of service vehicles and light vehicles would enter and leave the Project Site on any given day depending on the activities occurring at the time and for the transport of employees.

Table 3.5
Predicted Transport Types and Levels

Transport Type	Most Common Vehicle Type	Transport Levels (loads / movements)[1]		
		Average Daily[2]	Peak Daily	Cumulative Daily Limit[3]
Aggregate Despatch	Truck-and-Dog	95 / 190	200 / 400	200 / 400
VENM / Concrete Import		15 / 30	60 / 120	
Concrete/Asphalt Raw Material Delivery		3 / 6	5 / 10	
Asphalt Despatch		14 / 28	40 / 80	
Concrete Despatch	Concrete Agitator	28 / 56	50 / 100	50 / 100

Note 1: Loads and movements are considered separately as a load represents transport in both directions (despatch and return) while a movement represents one-way travel.

Note 2: Assumes 302 operating days in a 12-month period and average load of 35t

Note 3: Represents the maximum number of traffic loads/movements in any day across all transport types. That is, peaks in one type of traffic would require a decrease in other traffic types on a given day to a level no greater than the cumulative daily limit.

3.9 Waste Management

3.9.1 Production By-products

Highly weathered rock, and scalps or fines generated during processing may be considered overburden and a by-product of aggregate production. It is intended that all materials (including highly weathered material and scalps/fines) would either be blended with better quality materials and sold as product or used to construct Project components such as the Quarry Access Road and Visibility Barrier.

The resource assessment presented in Section 3.3.3 describes the anticipated balance of materials generated, sold and that would be used on site.

3.9.2 Non-Production Wastes

All non-production wastes would be removed from the Project Site by a licenced contractor to a facility licensed to receive these materials. No domestic wastes would be disposed of on site.

General domestic waste would be segregated into recyclable and non-recyclable materials.

It is estimated that approximately 200m^3 of domestic mixed solid waste and recyclables would be produced annually. General waste would be placed in skip bins for collection on an expected fortnightly rotation. Recyclables would be collected on an as needs basis. It is anticipated that the Quarry would also produce waste steel that would also be stored in skip bins and collected on an as needs basis.

Waste oil would be stored in a bunded container stored within the Workshop area from which it would be collected and removed from site for disposal/reuse by a licenced contractor. It is expected that the waste oil tank would be collected once or twice a year. All routine maintenance consumables would be treated as general mixed solid waste.

3.10 Water Supply

3.10.1 Introduction

The following subsections present a summary of the expected water demand and water sources that would be used to meet that demand. A summary of water licence requirements is also provided. More information on the assessment of water supply and demand is presented in Section 6.12 and the *Surface Water Management Report* prepared by Strategic Environmental & Engineering Consulting (SEECb) and presented as **Appendix K**.

3.10.2 Water Demand

Water demand or use for the Project would include the following.

- Dust suppression on roads used for the operation and product stockpile area.
- Concrete production.
- Infiltration or evaporative losses from water infrastructure.

An average of 12ML/yr of water would be required for dust suppression on the Quarry Access Road and between 5ML/yr and 13ML/yr would be required for dust suppression on operational areas (varying by stage of development). These volumes have been adopted to achieve an average water control efficiency of 90%. This approach sets a target of supressing 90% of predicted dust emissions. Water for dust suppression would be prioritised above all other uses so that this use is not compromised by other demand.

As described in Section 3.7.2, an estimated 180L of water is required to produce 1m^3 of concrete. Assuming a maximum of 50,000m^3 of concrete produced per year, up to 9ML a year of water would be required for this process. Very little water would be used for asphalt production given this is a dry process. However small volumes of water would be used for washing down operating areas and is included in the total assumed allowance for concrete production.

All water storages would lose water through infiltration and evaporation. Infiltration is assumed to be 0.08mm/hr. Evaporation from each dam is a function of the dam surface area and based on publicly available data on expected evaporation rates.

3.10.3 Water Sources

Water for the Project would principally be sourced from the following locations.

1. Surface water collected under harvestable rights entitlements within the Applicant's landholdings.
2. Surface water and groundwater accumulating within the extraction area for recycling and reuse.
3. Surface water collected within the sediment dams.
4. Groundwater abstracted from a production bore.
5. External supply via tanker.

The Maximum Harvestable Right Dam Capacity (MHRDC) of the property on which the Project would be located is 38.71 ML. The MHRDC has been calculated using the maximum harvestable right calculator maintained by the WaterNSW[3] and was based on a total property size of 553ha. The construction of farm dams within the MHRDC does not require a water access licence or water supply work as long as it remains within the MHRDC of the land. **Figure 3.16** presents the location of existing dams within the property and proposed dams that would be constructed. Note that several existing dams would be removed / filled to ensure that adequate water remains available to the Project. Two clean water dams would be constructed to collect surface water runoff that would be used for the Project. The Southern Dam and Eastern Dam would also be managed within the MHRDC of the land with water captured in these dams transferred to water tanks within the Processing and Stockpiling area for use.

During ordinary operations, water may accumulate in the extraction area or in sediment dams within the Processing and Stockpiling Area in response to rainfall and runoff or through groundwater inflows. The Groundwater Assessment for the Project has identified that in Stage E4 of extraction area development, groundwater is likely to be intercepted. This would require water access licensing. Water accumulated in these locations would be temporarily stored to ensure sediment levels are reduced. This water may be used for the Project or discharged from the Project Site in a controlled manner (once water quality objectives are satisfied).

The Applicant would also construct a production bore in the vicinity of the Northern Dam. The water balance assessment for the project has identified that during prolonged dry periods, water captured in dams within the property may not be sufficient to meet demand. This is particularly the case for the early stages of development before the groundwater table is intercepted and groundwater inflow is occurring. As a contingency a production bore would be used to top-up water storage dams in dry periods. Groundwater investigations have established that a bore with a production level of 1L/s would be possible in this location. Any water take from the groundwater setting would need to be licenced and meet the impact assessment requirements of the NSW Government.

Supplementary water may also be supplied via water tanker which may be imported to the Project Site to top up water tanks or water storage infrastructure.

3.10.4 Water Management Infrastructure

Water management at the Project Site would follow three main strategies.

- The separation of clean and dirty water through the use of diversion drains and bunding.
- Disturbed areas of the Quarry Site would internally draining to sediment basins with sediment laden runoff within the Project Site directed to sediment dams.
- Recycling of water where possible through the use of wedge pit or other infrastructure within concrete or asphalt production areas.

[3] See https://www.waternsw.com.au/customer-services/water-licensing/maximum-harvestable-rights-calculator

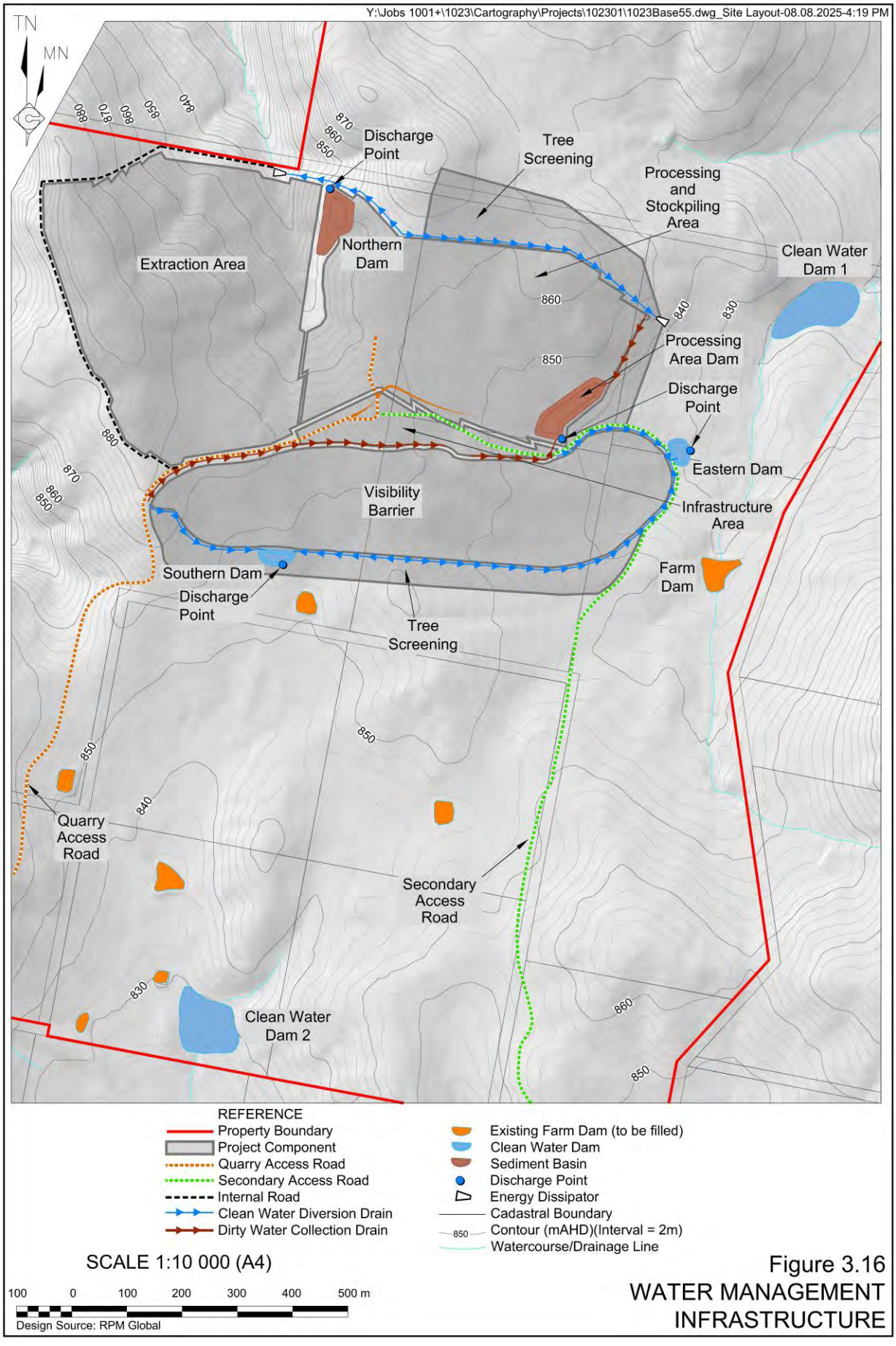


Figure 3.16
WATER MANAGEMENT INFRASTRUCTURE

Figure 3.16 presents the location of sediment laden (dirty) water drainage to sediment dams and clean water diversions to the north and south of the Project Site. **Table 3.6** provides a summary of the dams that would be constructed for the Project as well as their intended capacity and use. It is noted that an existing farm dam and the two clean water dams would be constructed and used progressively as development of the Project proceeds. This allows for management of water infrastructure in accordance with the MHRDC. Table 11 of SEEC (2025b) presents the proposed staging of the MHRDC over the life of the Project.

Table 3.6
Water Management Storages

Storage	Proposed Dam Capacity (ML)	Water Type	Period of Use	Priority Water Use	Transfer / Discharge Required
Extraction Pit Sump	5.0	Dirty	All years	Directed to Northern Dam for settlement. Dust suppression use.	Transfer to Northern Dam
Processing Area Dam	10.7	Dirty	All years	Dust suppression use	Controlled discharge of water that meets water quality objectives
Northern Dam	11.1	Dirty	All years	Dust suppression use	Controlled discharge of water that meets water quality objectives
Southern Dam	1.6	Clean	All years	Dust suppression, concrete production and processing uses	Transfer to water tanks as needed. Natural uncontrolled discharge via spillway
Eastern Dam	2.8	Clean	All years		
Farm Dam	4.9	Clean	Years 1-3		
Clean Water Dam 1	16.0	Clean	Years 4-35		
Clean Water Dam 2	3.1	Clean	All years		

3.10.5 Water Licensing

No water access licences (WALs) are requires for the use of surface water for the Project. All water would be captured and used within the MHRDC of the land or within sediment dams within the Project Site.

A WAL would be required for the take of groundwater associated with the proposed production bore and the dewatering of the extraction area once the groundwater table is intercepted. A WAL within the Lachlan Fold Belt MDB Groundwater Source specified under the *Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2020* will be secured with a share equivalent to 45ML.

3.11 Infrastructure, Utilities and Services

3.11.1 Introduction

Quarrying operations would require a site office, staff amenities (i.e. lunch and bathroom facilities), car park, weighbridge and workshop area. The proposed services that would be used on site are outlined in this sub-section. Plans of buildings would be prepared and submitted to Council with accompanying applications for Construction Certificates.

3.11.2 Power and Lighting

Private powerlines would be constructed to supply power to the Project Site and specifically the Site Office, Weighbridge, Workshop and staff amenities during site establishment (see Section 3.4). It is proposed that this service would be provided to the Project Site from a connection to the existing 11kV power supply located adjacent to Old Cooma Road and via Mates Drive. A connection application enquiry has been submitted to Essential Energy and the capacity for power supply confirm (subject to improvements not related the Project).

It is anticipated that some artificial lighting (other than mobile vehicle mounted lighting) would be required in work areas for security and efficiency of operations. Lighting would be appropriately shielded to prevent nuisance to occupants of surrounding properties. Flood lighting of operational areas would not be needed as operations in the Extraction Area and Processing and Stockpiling Area would generally be limited to daylight hours (that is, until 6:00pm).

3.11.3 Telephone

The Project Site would be serviced by telephone lines to the office. On-site communication would be undertaken by two-way radio and mobile phones.

3.11.4 Dangerous Goods

The only dangerous goods that would be used within the Project Site would be explosives and related materials brought to the Project Site only on the days when blasts are initiated. The explosives would be transported in specialised mobile manufacturing units by licenced contractors in accordance with well recognised safety protocols.

Once on site, the explosives and related materials would be loaded into the previously drilled blast holes and initiated on the day of delivery. The practices adopted on site would be consistent with standard quarrying practices.

The blasting contractors may decide it is necessary to ‘sleep the shot’ or delay blasting due to safety, environmental concerns or inclement weather. In these cases the blast firing may be delayed by one day. This occurs only rarely and would be avoided where possible.

3.11.5 Fuels and Lubricants

Diesel fuel would be stored on site in self-bunded above-ground tanks (nominally 20,000L in capacity with total storage of approximately 70,000L) located adjacent to the workshop (see **Figure 3.2**). All refuelling of mobile equipment would either be conducted within a bunded, concrete hardstand area or defined areas within the extraction or processing areas.

All lubricants and other small quantities of chemicals used on site would be stored in the on-site Workshop is a bunded storage area.

All hydrocarbons and other chemicals would be stored in accordance with *Australian Standards AS 1940:2004 – The Storage and Handling of Flammable and Combustible Liquids* with bunded areas sized to store 110% of the capacity of tanks located in that area.

3.11.6 Sewage and Effluent Disposal

Sewage and effluent disposal would be managed on site using a septic system. The system would either be established as a biocycle system or would regularly be pumped clean by a licenced contractor.

3.11.7 Safety, Security and Signage

The Project Site would be secured by locked gates outside of operating hours. The property on which the Project would be located is also fenced to restrict access by humans and cattle. Any ongoing agricultural activities within the Property would occur within areas fenced to restrict access to the Project Site by livestock.

A series of safety bunds would be established along internal access roads in the vicinity of the extraction areas to limit potential risks associated with proximity to the road.

Signage at access gates would identify the Project and any necessary emergency contacts.

3.12 Hours of Operation

Table 3.7 lists the proposed hours of operation for the range of activities that would be undertaken throughout the life of the Project.

The hours nominated in **Table 3.7** are those that the Applicant would operate within, not that they would be operating throughout the entire nominated periods. That is, the nominated hours would provide the flexibility needed to undertake all Project-related activities, when required. The flexibility achieved by the proposed operating hours would be important in order that the Applicant can respond to large volume or urgent orders from its customers.

Table 3.7
Proposed Hours of Operation

Activity	Monday to Friday	Saturdays	Sundays or Public Holidays
Construction Activities	7:00am to 6:00pm	8:00am to 1:00pm	Nil
Extraction and Processing Operations including use of Pugmill and concrete recycling	7:00am to 6:00pm	7:00am to 6:00pm	Nil
Blasting Operations	9:00am to 5:00pm	Nil	Nil
Product Despatch and Material Importation	5:00am to 6:00pm	5:00am to 6:00pm	Nil
Concrete / Asphalt Production	7:00am to 6:00pm	8:00am to 1:00pm	Nil
Maintenance	24 hours / day	24 hours / day	Nil

3.13 Project Life

At the proposed rate of extraction and processing, the overall operational life of the Project would be between 30 and 35 years. The range in years is due to the expected ramping up of production (see Section 3.6). Should demand exceed expectations the resource may be extracted within 30 years. Alternatively, an additional period of up to five years may be required. For the purposes of development approval, a Project life of 35 years is being sought.

It should be noted that feasibility planning and assessment for the Project has assumed a 35-year timeframe. However, assessment of potential impacts (such as groundwater) has assumed the impacts occur in a shorter timeframe (a higher intensity and therefore more conservative approach).

Final rehabilitation activities would require a further three to five years to complete beyond the cessation of extraction and processing activities.

3.14 Employment

The Applicant would employ between 14 and 20 persons fulltime during operations.

A further 10 positions would be generated for transportation activities.

3.15 Estimated Development Cost

The Estimated Development Cost (EDC) of the Project has been calculated in accordance with Planning Circular PS 24-002 and the document titled *Standard Form of Estimated Development Cost Report (State significant projects) - October 2024*. The EDC would be $90.2 million and has been assessed by Ms Fiona Doherty, Director at Rider Levett Bucknall[4]. The EDC includes costs associated with the following key activities.

- Construction of the Quarry Access Road, railway bridge crossing and its intersection with the Monaro Highway.
- Civil works including the construction of the Stage V1 Visibility Barrier and Stage P1 Processing Area.
- The purchase and commissioning of mobile processing plant and mobile equipment.
- The purchase and commissioning of fixed processing plant and mobile equipment.
- The costs associated with purchasing and replacement of mobile equipment over the life of the Project.
- Environmental mitigation works such as the planting of tree screens and erosion and sediment control infrastructure.
- The establishment of ancillary infrastructure and services including power supply to the Project Site.

[4] Ms Doherty Fiona is a Chartered Quantity Surveyor and a Fellow of both the Royal Institution of Chartered Surveyors and Australian Institute of Quantity Surveyors.

3.16 Rehabilitation

3.16.1 Introduction

A progressive approach would be adopted for rehabilitation of all areas to be disturbed within the Project Site. Progressive rehabilitation procedures would be adopted from the Site Establishment and Construction Stage and throughout the life of the Quarry, where practicable, as described in the following subsections. The post-approval Rehabilitation Management Plan for the Quarry would reflect the contents of this section where appropriate.

The consideration of rehabilitation of the Project Site has been undertaken with reference to the relevant sections of the following documents.

- Mine Rehabilitation – Leading Practice Sustainable Development Program for the Mining Industry (Commonwealth Government, 2016a).
- Mine Closure – Leading Practice Sustainable Development Program for the Mining Industry (Commonwealth Government, 2016b).
- Strategic Framework for Mine Closure (AMZMEC and MCA, 2000).

3.16.2 Rehabilitation Objectives

The objectives for rehabilitation of the disturbed areas within the Project Site are centred upon:

- the initial stabilisation of the areas to be disturbed during the site establishment and construction stage;
- progressive stabilisation and revegetation of the Visibility Barrier; and
- the progressive shaping and revegetation of the final or terminal extraction benches and floor as they are completed.

Monaro Rock would implement a program of interim rehabilitation of disturbed / constructed areas in order to:

- conserve all topsoil and as much subsoil as possible for use in long-term rehabilitation of the final landform within the Project Site;
- minimise the areas of exposed surfaces that would otherwise be potential sources of sediment-laden runoff into the surrounding watercourses; and
- ensure all interim slopes are stable.

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

- provide a low maintenance, geotechnically stable and safe landform with minimal erosion that would be suited for the proposed subsequent land uses; and
- ensure that the upper benches within the extraction area are well vegetated to minimise visual contrasts and the visibility of the benches from surrounding residences, particularly from vantage points to the north and north-east.

3.16.3 Final Land Use

The *Queanbeyan-Palerang Local Environmental Plan 2022* provides for a range of permissible land uses that may be sought following closure of the Project. Any further development would require development consent. At this time, it is proposed that land use following development of the Project would include ongoing agricultural land use (grazing) on flat areas in the landform, with other areas returned to a native ecosystem. Land with native ecosystems may be suitable for a future Biodiversity Stewardship Site. The extraction area void would remain a clean water storage in the landform and would progressively fill with water. It is predicted that water would fill the void up to approximately 803m AHD and fluctuate between that level and 799m AHD. .

3.16.4 Final Landform Design

Figure 3.17 displays the proposed indicative final landform and indicative sections across the Project Site displaying the proposed rehabilitation domains.

- Native Vegetation Domain – steep terminal faces of the extraction area with bench heights of 5m or 10-15m, terminal bench widths of 10m to 15m and face angles of 80°. Overburden and other suitable materials would be placed on the upper benches to provide a growth medium with water holding capacity for trees and shrubs. This domain would also include the Visibility Barrier, which would be revegetated with would be revegetated with trees and shrubs.
- Agricultural Domain –subsoil and topsoil would be placed over the Infrastructure and Processing and Stockpiling Areas to support the establishment of pasture species.
- Open Water Domain – the final landform would include the final void, which would fill with water to a level in equilibrium with groundwater.

3.16.5 Progressive Rehabilitation

The southern face of the visibility barrier would be revegetated as it is constructed to stabilise the surface and provide a vegetation groundcover and shrub layer. Opportunities for progressive rehabilitation within the extraction area would be limited to areas that are progressively completed. **Figure 3.18** presents an indicative schedule of progressive rehabilitation.

3.16.6 Rehabilitation Methods

An overview of the rehabilitation methods are provided in this subsection. Further details would be incorporated in the Rehabilitation Management Plan proposed for the Project Site should the Project be approved.

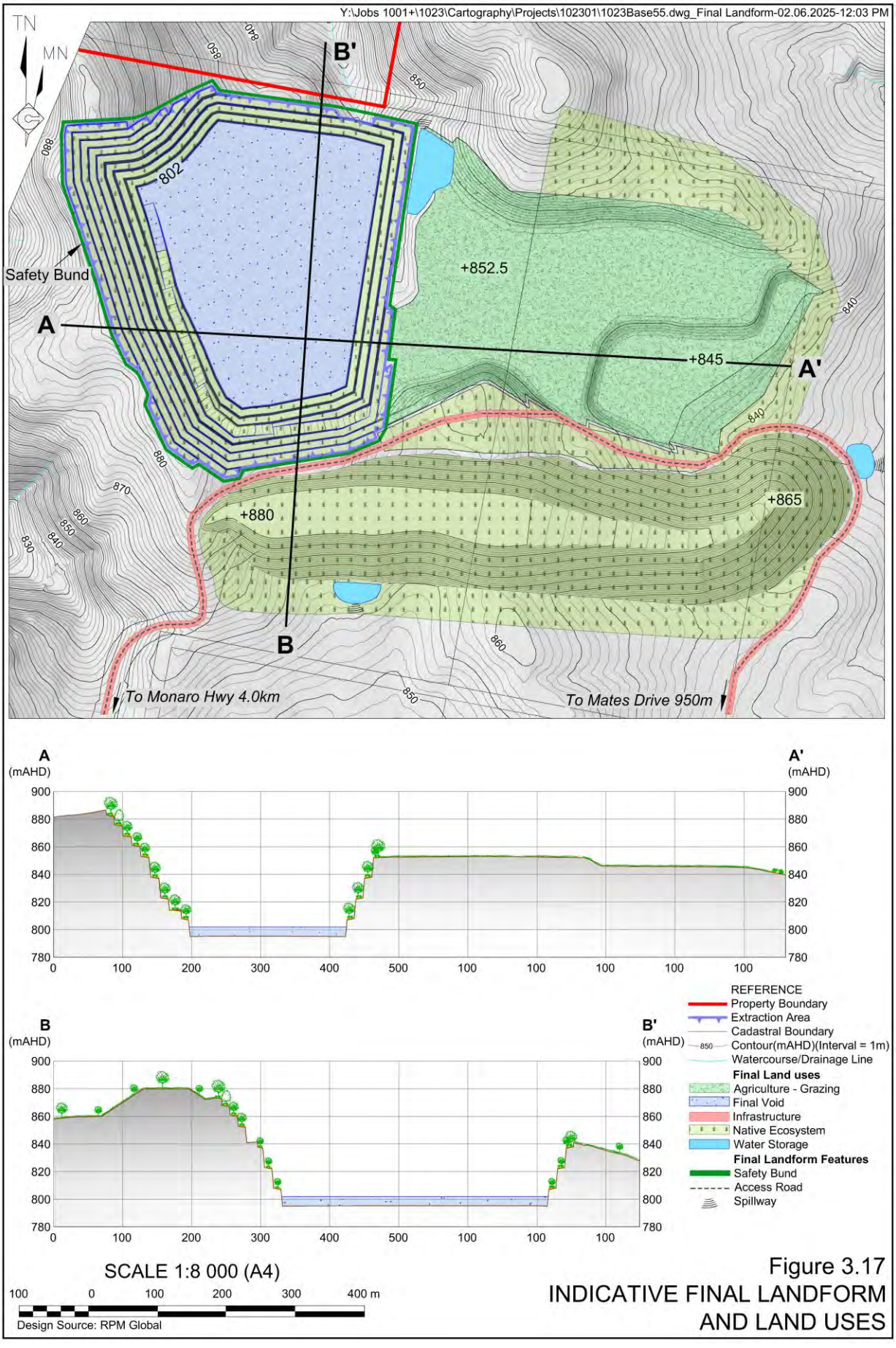


Figure 3.17
INDICATIVE FINAL LANDFORM AND LAND USES

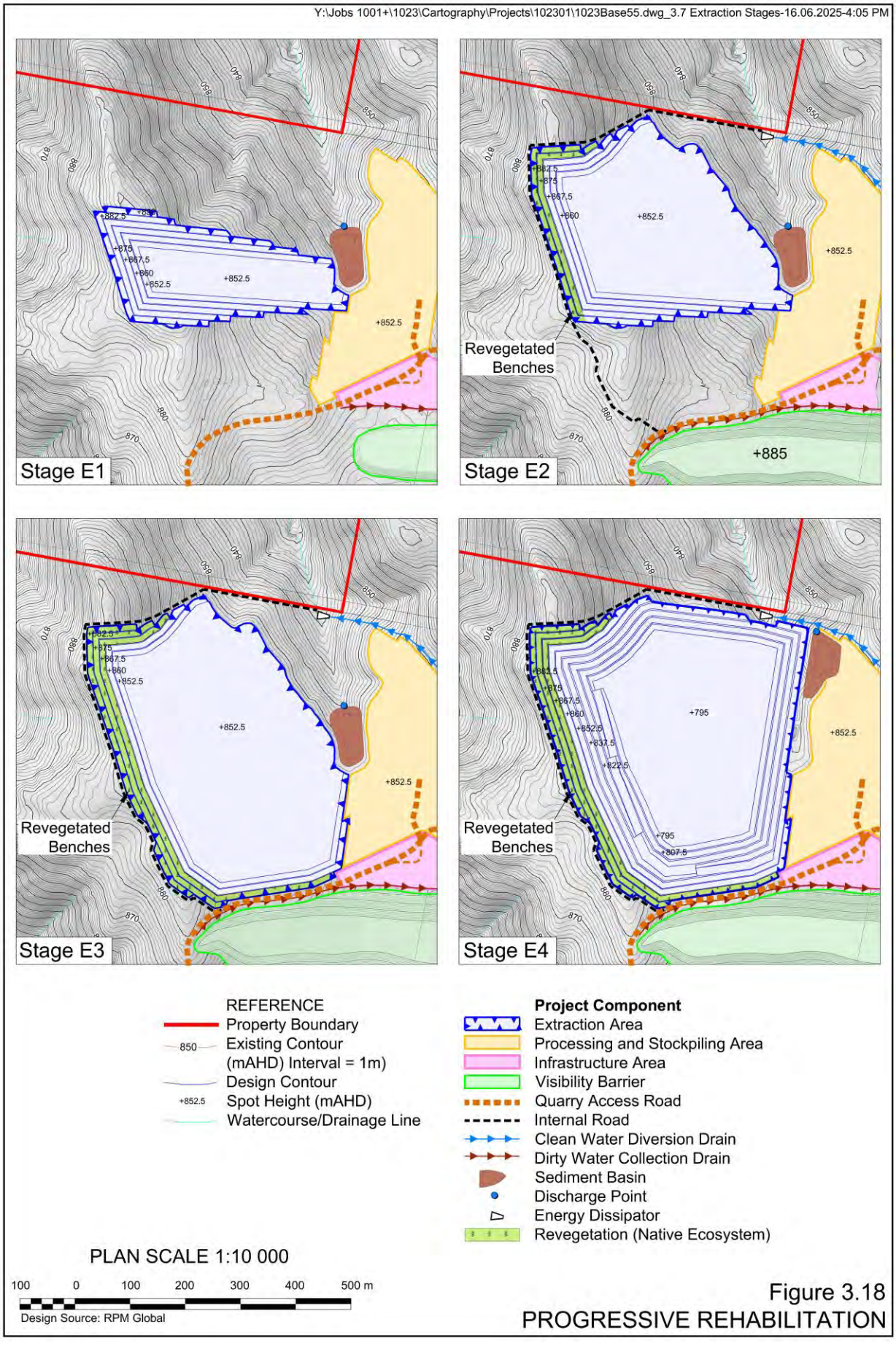


Figure 3.18
PROGRESSIVE REHABILITATION

3.16.6.1 Short and Medium Term Rehabilitation

The Applicant would progressively stabilise and revegetate the southern side of the Visibility Barrer as it is constructed. This would involve the placement of approximately 0.5m of topsoil or other growth medium on the outer face of the barrier and the immediate stabilisation of these areas by hydroseeding with the proposed seed mix, fertiliser and binders. Tubestock may also be used to supplement the hydroseed application.

All topsoil stockpiles would be stabilised and revegetated within one month of their construction to maintain their viability. The subsoil stockpiles to be retained long term would be ameliorated or covered with 0.3m of topsoil and revegetated in the same manner as the topsoil stockpiles.

An important component of the short and medium term rehabilitation would be the establishment of vegetation on the upper 5m benches on the western side of the Extraction Area. The rehabilitation of the upper benches on the western side of the Extraction Area during Stages 1-3 would involve the placement of overburden in conjunction with some of the residual fragmented rock on the initial 5m bench prior to the removal of the remainder of the fragmented rock below the bench level. **Figure 3.18** displays the staged rehabilitation of the upper final benches. The overburden and fragmented rock would be roughened and profiled so that rainfall is retained on the bench and/or directed to the back of the bench to assist with vegetation growth. The upper benches of the northern, southern and western sides of the final Extraction Area would be progressively revegetated during Stages 2-4 of extraction as they become available.

Once profiled, the upper benches would be vegetated through a combination of direct seeding and planting of tubestock for the proposed shrub and tree species. A mulch would be applied to assist in moisture retention, particularly during the early years of growth. Supplementary watering would be undertaken using a water truck, if necessary.

All vegetated areas would be regularly weeded and monitored for consistent coverage. Supplementary soil placement and/or replanting would be undertaken, if required.

3.17 Biodiversity Offsets

3.17.1 Introduction

A Biodiversity Development Assessment Report (BDAR) for the Project has been prepared by Capital Ecology Pty Ltd (Capital Ecology, 2025). The BDAR presents an assessment of residual biodiversity-related impacts of the Project after steps taken to avoid or minimise impacts to biodiversity.

The outcomes of the assessment presented in the BDAR are presented in Section 6.7. Steps to avoid impacts to biodiversity are included in the consideration of alternatives presented in Section 2.7. The BDAR is provided as **Appendix G** to the EIS.

3.17.2 Residual Biodiversity Impacts of the Project

Following the implementation of all practical measures to avoid or minimise impacts to native vegetation, it is estimated that the Project would result in the removal of approximately 77.83ha of vegetation which is considered a residual impact[5]. 0.8ha of this is non-native and 77.03ha is native vegetation as defined under the BC Act. Capital Ecology has assessed vegetation clearing in two stages.

1. Stage 1 of offsetting would incorporate vegetation clearing for site establishment and construction (see Section 3.4) which includes construction of the Quarry access road, preliminary operating areas and commenced extraction in Stage E1.
2. Stage 2 of offsetting would incorporate all remaining vegetation clearing as the Project is developed and includes principally the expansion of the extraction area, processing and stockpiling area and the visibility barrier.

Figure 3.19 presents the area of progressive vegetation clearing by stage with the vegetation community and area to be cleared in each stage presented in **Table 3.8**. The cumulative impacts of vegetation clearing in NSW and the ACT are considered in Section 6.7.

Table 3.8
Vegetation Clearing by Stage

Plant Community Type (PCT)	Description	Stage 1 Area (ha)	Stage 2 Area (ha)	Total
PCT3375	Monaro-Queanbeyan Rolling Hills Grassy Forest	27.85	27.54	55.39
PCT3376	Southern Tableland Grassy Box Woodland	10.84	11.60	22.44
Source: Capital Ecology (2025) – Modified after Table 34				

3.17.3 Credit Calculations

The biodiversity offsetting obligations of the Project are also staged, noting that operations in an area would not commence until the offsetting obligation of vegetation clearing in that area is satisfied.

Ecosystem Credits

The calculated ecosystem credit offsetting obligations for Offset Stage 1 are presented in **Table 3.9** and for Offset Stage 2 in **Table 3.10**. Due to the nature of the assessed indirect impacts, all ecosystem credits associated with indirect impacts would be satisfied in Offset Stage 1.

[5] The total physical disturbance area of 78.69ha includes dams, roads and other areas.

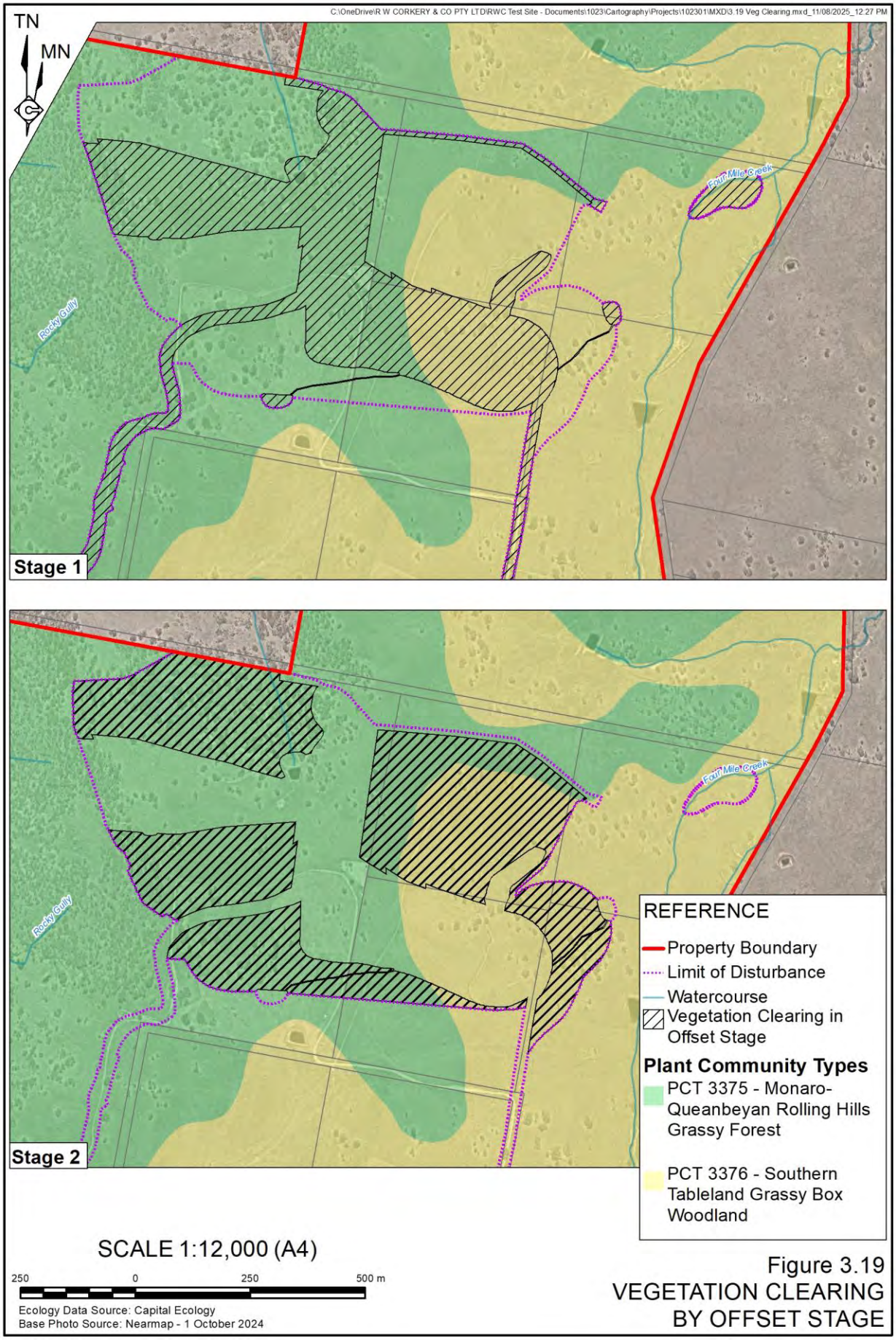


Figure 3.19
VEGETATION CLEARING BY OFFSET STAGE

Table 3.9
Ecosystem Credit Requirements – Offset Stage 1

Plant Community Type (PCT)	Description	Impact Type	Area (ha)	Credits Required
PCT3375	Monaro-Queanbeyan Rolling Hills Grassy Forest	Direct	27.85	674
		Indirect	37.80	70
PCT3376	Southern Tableland Grassy Box Woodland	Direct	10.84	208
		Indirect	5.39	10
Source: Capital Ecology (2025) – Modified after Table 34				

Table 3.10
Ecosystem Credit Requirements – Offset Stage 2

Plant Community Type (PCT)	Description	Impact Type	Area (ha)	Credits Required
PCT3375	Monaro-Queanbeyan Rolling Hills Grassy Forest	Direct	27.54	657
PCT3376	Southern Tableland Grassy Box Woodland	Direct	11.60	247
Source: Capital Ecology (2025) – Modified after Table 34				

Species Credits

The calculated species credit offsetting obligations for Offset Stage 1 are presented in **Table 3.11** and for Offset Stage 2 in **Table 3.12**.

Table 3.11
Species Credit Requirements – Offset Stage 1

Species	Area (ha)	Credits Required
Pink-tailed Legless Lizard (*Aprasia parapulchella*)	16.38	456
Key's Matchstick Grasshopper (*Keyacris scurra*)	2.35	93
Pale Pomaderris (*Pomaderris pallida*)	0.28	17
Small Purple-pea (*Swainsona recta*)	0.13	4
Silky Swainson-pea (*Swainsona sericea*)	2.32	63
Source: Capital Ecology (2025) – Modified after Table 34		

Table 3.12
Species Credit Requirements – Offset Stage 2

Species	Area (ha)	Credits Required
Pink-tailed Legless Lizard (*Aprasia parapulchella*)	23.57	671
Pale Pomaderris (*Pomaderris pallida*)	0.28	17
Silky Swainson-pea (*Swainsona sericea*)	0.34	13
Source: Capital Ecology (2025) – Modified after Table 34		

3.17.4 Preliminary Biodiversity Offsetting Strategy

A Biodiversity Offset Strategy for the Project would be developed following approval and presented in a Biodiversity Management Plan. Capital Ecology has undertaken initial investigations to identify:

- credits that may be generated by establishing a Biodiversity Stewardship Site on land owned by the Applicant adjacent to the Project Site.
- credits available for purchase from landowners that have established Biodiversity Stewardship Sites in the Monaro / Murrumbateman IBRA Subregions; and
- the costs of satisfying credit requirements through payment into the Biodiversity Conservation Fund (BCF).

Initial ecological investigations have commenced regarding the establishment of a Biodiversity Stewardship Site on land to the west of the Project Site (between the Project and the Monaro Highway) and to the north of the Project Site. Capital Ecology has estimated that a stewardship site to the west of the Project site would generate sufficient credits to cover approximately 50% of the biodiversity offsetting obligations of the Project. It is also noted that land to the east of the Project Site (Beatty Hill) is owned by a Company associated with the Applicant and a Biodiversity Stewardship Site has been established on that land. Capital Ecology has identified that almost 100% of the biodiversity offsetting obligation could be met by the purchase of credits from other landowners in the region.

It is currently anticipated that that the final biodiversity offsetting strategy would include a mixture of the above options.

Section 4

Statutory Context

PREAMBLE

This section identifies the relevant legislation and planning instruments that have guided the approach to the design of the Project and the environmental assessments and identifies the relevant statutory requirements that must be considered by the consent authority before the development application may be determined.

4.1 Introduction

This section identifies the relevant statutory requirements that must be considered by the consent authority before the development application may be determined. The relevant statutory requirements are described in terms of power to grant approval, permissibility, and other required approvals. The section concludes with the statutory compliance matters that must be considered by the consent authority.

4.2 Statutory Requirements for The Project

4.2.1 Power to Grant Approval

Under Clause 7 of Schedule 1 of the *State Environmental Planning Policy* (SEPP) *(Planning Systems)*, a development for the purpose of extractive industry is classified as State Significant if the Project either:

- extracts more than 500,000 tonnes of material per year;
- extracts from a total resource (the subject of the development application) of more than 5 million tonnes; or
- extracts from an environmentally sensitive area of State Significance.

As the Project would extract a total resource of more than 5 million tonnes and would exceed the maximum annual extraction threshold of 500,000 tonnes per annum (tpa), it is considered State Significant Development. The Development Application (DA) will therefore require assessment under Division 4.7 of Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

In accordance with Section 4.5(a) of the *Environmental Planning and Assessment Act 1979*, the consent authority for the Project will be the NSW Minister for Planning and Public Spaces. Alternatively, under Clause 2.7 of the Planning Systems SEPP, the Independent Planning Commission would be the consent authority if the following criteria are met.

- Queanbeyan-Palerang Regional Council provides a submission objecting to the Project.
- There are more than 50 submissions objecting to the Project.
- The Applicant has made a reportable political donation.

4.2.2 Permissibility

The Project Area includes land zoned under the *Queanbeyan-Palerang Regional Environmental Plan 2022* (Queanbeyan-Palerang LEP) as (see **Figure 2.1**):

- RU2 (Rural Landscape);
- C2 (Environmental Conservation); and
- SP2 (Infrastructure).

The proposed extractive industry is a permissible land use in accordance with the provisions of Clause 2.9(3) of State Environmental Planning Policy (Resources and Energy) 2021 which states that:

> *"(3) **Extractive Industry** Development for any of the following purposes may be carried out with development consent:*
>
> *(a) extractive industry on land on which development for the purposes of agriculture or industry may be carried out (with or without development consent)"*

Extractive industries are permissible as follows in each of these zones.

- Zone RU2 – Extractive industries are prohibited on land zoned as RU2 under the Queanbeyan-Palerang LEP. However, extensive agriculture (a form of agriculture under the definitions of the Queanbeyan-Palerang LEP) is permissible without consent on land zoned RU2 under the Queanbeyan-Palerang LEP; therefore, extractive industries are permissible within Zone RU2 under the Resources and Energy SEPP.
- Zone C2 – Extractive industries are prohibited on land zoned as C2 under the Queanbeyan-Palerang LEP. However, oyster aquaculture (a form of aquaculture, which is in turn a form of agriculture under the definitions of the Queanbeyan-Palerang LEP) is permissible with consent on land zoned RU2 under the Queanbeyan-Palerang LEP; therefore, extractive industries are permissible within Zone RU2 under the Resources and Energy SEPP.
- Zone SP2 – Roads are permissible with consent on land zoned SP2.

The objectives of zone RU2 are:

- *"to encourage sustainable primary industry production by maintaining and enhancing the natural resource base;*
- *to maintain the rural landscape character of the land; and*
- *to provide for a range of compatible land uses, including extensive agriculture."*

The objectives of zone C2 are:

- *"to protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values;*
- *to prevent development that could destroy, damage or otherwise have an adverse effect on those values;*
- *to encourage rehabilitation and regeneration of ecosystems;*
- *to provide for a limited range of development and land use activities that support environmental conservation outcomes;*
- *to identify and protect escarpment areas that enhance the visual amenity of Queanbeyan-Palerang Regional local government area and possess special aesthetic or conservational value; and*
- *to protect water quality by preventing inappropriate development within catchment areas."*

The objectives of zone SP2 are:

- *"to provide for infrastructure and related uses; and*
- *to prevent development that is not compatible with or that may detract from the provision of infrastructure."*

These objectives have been considered during the design and planning process of the Project and are addressed throughout the EIS. A summary of how the Project is considered to be consistent with these objectives is presented in Section 7.2.3.

4.2.3 Other Approvals

4.2.3.1 Approvals that Cannot be Refused if Consent is Granted

In accordance with Section 4.42 of the EP&A Act, the following authorisation cannot be refused if it is necessary for carrying out an approved SSD and is to be substantially consistent with the development consent.

- An Environmental Protection License (EPL) under Chapter 3 of the *Protection of the Environment Operations Act 1997* (POEO Act) (for any of the purposes referred to in Section 43 of that Act);
- A permit under Section 138 of the *Roads Act 1993* (Roads Act); and
- An activity approval under Section 91 the *Water Management Act 2000*.

4.2.3.2 Approvals Not Required for State Significant Development

In accordance with Section 4.41 of the EP&A Act, the following relevant authorisations are not required for SSD for which consent has been granted under Division 4.7 of the EP&A Act.

- An approval under Part 4, or an excavation permit under Section 139 of the *Heritage Act 1977*.
- An Aboriginal Heritage Impact Permit (AHIP) under Section 90 of the *National Parks and Wildlife Act 1974*.
- A bush fire safety authority under Section 100B of the *Rural Fires Act 1997*.
- A water use approval under Section 89, a water management work approval under Section 90, or an activity approval (other than an aquifer interference approval) under Section 91 of the *Water Management Act 2000*.

4.2.3.3 Other Approvals

Environment Protection and Biodiversity Conservation Act 1999

The Project was referred to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) due to potential impacts on Matters of National

Environmental Significance (MNES). It is considered likely that the Project would be a "controlled action" under Section 75 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) due to potential significant impacts on listed threatened species and communities including:

- PCT1443 Yellow Box grassy woodland of the northern Monaro and Upper Shoalhaven area, South Eastern Highlands Bioregion (Critically Endangered);
- Pale Pomaderris (*Pomaderris pallida)* (Vulnerable); and
- Pink-tailed Legless Lizard (*Aprasia parapulchella*) (Vulnerable).

The EIS provides an assessment of potential impacts of the Project on the above MNES. Additional requirements to be covered in the EIS with regard to the relevant matters under the EPBC Act were provided by the Commonwealth DCCEEW. Those requirements have been addressed in the EIS and are listed in **Appendix 2** together with a record of where each requirement is addressed in the EIS.

Water Management Act 2000

As outlined in Section 4.2.3.2, water use approvals under Section 89, water management work approvals under Section 90 and activity approvals (excluding aquifer interference approvals) under Section 91 of the *Water Management Act 2000* (WM Act) would not be required for the Project.

The Project Site is located within a harvestable rights order area and water collected under harvestable rights would be used for the Project.

SafeWork NSW Approvals and Licenses

Appropriate approvals and licenses from SafeWork NSW for the on-site use of explosives would be required for the Project.

4.3 Pre-conditions to Exercising the Power to Grant Approvals

Table 4.1 presents an overview of the relevant pre-conditions to the consent authority exercising its power to grant approval.

4.4 Mandatory Matters for Consideration

Table 4.2 presents an overview of the relevant mandatory matters for consideration by the consent authority in determining the application for development consent.

Table 4.1
Pre-conditions to Granting Approval

Statutory Reference	Pre-condition	Relevance	EIS Section
EP&A Regulation			
Section 23	Persons who may make development applications 1) A development application may be made by— a) the owner of the land to which the development application relates, or b) another person, with the written consent of the owner of the land. 2) The consent of the owner of the land is not required for a development application made by a public authority or for public notification development if the applicant complies with subsections (3) and (4). 3) The applicant must give notice of the application— a) to the owner of the land before the application is made, or b) by publishing, no later than 14 days after the application is made, a notice in a newspaper circulating in the area in which the development will be carried out. 4) If the applicant gives notice under subsection (3)(b), the applicant must also, no later than 14 days after the application is made— a) if the applicant is a public authority—publish the notice on the public authority's website, or b) for public notification development—arrange for the consent authority to publish the notice on the NSW planning portal.is not likely to have any significant impact on biodiversity values.	Written consent for the submission of the development application has been provided by Crown lands (for construction and use of Crown roads within the Project Site) and the Transport Asset Holding Entity of NSW (for the construction and use of a private rail overbridge). All other land is owned by the Applicant.	Section 1.3
Biodiversity Conservation Act 2016 (BC Act)			
Section 7.9	An SSD application is to be accompanied by a biodiversity development assessment report (BDAR) unless the Planning Agency Head and the Environment Agency Head determine that the proposed development is not likely to have any significant impact on biodiversity values.	**Appendix G** presents a BDAR prepared in accordance with the requirements of the *Biodiversity Conservation Act 2016* and the *Biodiversity Assessment Method* (DPIE, 2020)	Section 6.7

Table 4.1 (Cont'd)
Pre-conditions to Granting Approval

Statutory Reference	Pre-condition	Relevance	EIS Section
Biodiversity Conservation Act 2016 (BC Act) (Cont'd)			
Section 7.16(3)	If the Minister for Planning is of the opinion that proposed SSD is likely to have serious or irreversible impacts on biodiversity values, the Minister: a) is required to take those impacts into consideration, and b) is required to determine whether there are any additional and appropriate measures that will minimise those impacts if consent or approval is granted.	The Project would result in the removal of 77.03ha native vegetation. The Project Site supports the following ecological community and threatened flora species which are listed as SAII entities. • PCT3376 - Southern Tablelands Grassy Box Woodland (BC Act Box-Gum Woodland). • Pale Pomaderris (*Pomaderris pallida*). The Project would result in the clearance of 22.44ha of BC Act Box-Gum Woodland, indirect impact to 5.39ha of BC Act Box-Gum Woodland, and clearance of 0.56ha of Pale Pomaderris habitat. The consent authority may form the opinion that the Project is likely to have serious or irreversible impacts on biodiversity values. Measures that have been taken to avoid impacts to native vegetation are presented in Section 2.8.	Section 2.8 (avoidance and alternatives) Section 6.7 (BDAR) **Appendix G**
Queanbeyan-Palerang Local Environmental Plan 2022 (Queanbeyan-Palerang LEP			
Clause 2.3(2)	**Zone objectives and Land Use Table** The consent authority must have regard to the objectives for development in a zone when determining a development application in respect of land within the zone.	An assessment of the Project against the objectives of each zone is presented.	Section 2.4.2, Section 4.2.2
Clause 5.10	The consent authority must, before granting consent under this clause in respect of a heritage item or heritage conservation area, consider the effect of the proposed development on the heritage significance of the item or area concerned.	19 sites of Aboriginal heritage significance have been identified with the Project Site. A significance assessment of the impact of destroying these sites is provided. The design of the Project Site was amended to avoid impacts to two culturally modified trees on the property.	Section 6.8, **Appendix H**

Table 4.1 (Cont'd)
Pre-conditions to Granting Approval

Statutory Reference	Pre-condition	Relevance	EIS Section
Queanbeyan-Palerang Local Environmental Plan 2022 (Queanbeyan-Palerang LEP) (Cont'd)			
Clause 7.1(3)	**Earthworks** Before granting development consent for earthworks (or for development involving ancillary earthworks), the consent authority must consider the following matters: a) the likely disruption of, or any detrimental effect on, drainage patterns and soil stability in the locality of the development, b) the effect of the proposed development on the likely future use or redevelopment of the land, c) the quality of the fill or the soil to be excavated, or both, d) the effect of the proposed development on the existing and likely amenity of adjoining properties, e) the source of any fill material and the destination of any excavated material, f) the likelihood of disturbing relics, g) the proximity to, and potential for adverse impacts on, any waterway, drinking water catchment or environmentally sensitive area, h) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development, i) the proximity to and potential for adverse impacts on any heritage item, archaeological site, or heritage conservation area.	The Project would result in ground disturbing activities, including earthworks. Each of the matters identified have been addressed in this document.	Section 6
Clause 7.2	**Terrestrial Biodiversity** 3) Before determining a development application for development on land to which this clause applies, the consent authority must consider – a) whether the development is likely to have— i) any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and ii) any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and iii) any potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land, and iv) any adverse impact on the habitat elements providing connectivity on the land, and d) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.	The Project would result in the removal of 77.03ha of native vegetation, including within areas shown as land identified as containing Biodiversity on the Queanbeyan LEP Terrestrial Biodiversity Map. A BDAR has been prepared for the Project and is presented as **Appendix G**.	Section 6.7, **Appendix G**

Table 4.1 (Cont'd)
Pre-conditions to Granting Approval

Statutory Reference	Pre-condition	Relevance	EIS Section
Queanbeyan Local Environmental Plan 2012 (Queanbeyan LEP) (Cont'd)			
	4) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that— a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or b) if that impact cannot be reasonably avoided by adopting feasible alternatives—the development is designed, sited and will be managed to minimise that impact, or c) if that impact cannot be minimised—the development will be managed to mitigate that impact.	The Project has been designed with consideration of opportunities for the avoidance or minimisation of environmental impacts, particularly impacts to biodiversity.	Section 2.8
Clause 7.4(3)	**Riparian land and watercourses** Before determining a development application to carry out development on land to which this clause applies, the consent authority must consider whether or not the development— a) is likely to have any adverse impact on the following— i) the water quality and flows within the watercourse, ii) aquatic and riparian species, habitats and ecosystems of the watercourse, iii) the stability of the bed and banks of the watercourse, iv) the free passage of fish and other aquatic organisms within or along the watercourse, v) any future rehabilitation of the watercourse and its riparian areas, and b) is likely to increase water extraction from the watercourse.	The Project Site contains land identified as "Watercourse" on the Queanbeyan LEP Riparian Lands and Watercourses Map, however, these areas are not proposed to be disturbed and would not experience any adverse impacts. Therefore, this clause is not considered further in this document.	Not applicable
Clause 7.9	**Essential services** Development consent must not be granted to development unless the consent authority is satisfied that any of the following services that are essential for the development are available or that adequate arrangements have been made to make them available when required— a) the supply of water, b) the supply of electricity, c) the disposal and management of sewage, d) stormwater drainage or on-site conservation, e) suitable vehicular access.	A reticulated water supply would not be required for the development. A connection enquiry has been made to Essential Energy and the possible supply of energy confirmed. The proposed supply of electricity to the Project Site is discussed in Section 3.11.2. On-site sewage would be managed by a dedicated septic system (see Section 3.11.6). Stormwater drainage would be managed in accordance with a proposed Erosion and Sediment Control Plan (see Section 3.10 and **Appendix K**)	Sections 3.10, 3.11.2, 3.11.6, **Appendix K**

Table 4.1 (Cont'd)
Pre-conditions to Granting Approval

Statutory Reference	Pre-condition	Relevance	EIS Section
State Environmental Planning Policy (Resources and Energy) 2021			
Clause 2.17	Before determining an application for consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must – a) consider: i) the existing uses and approved uses of land in the vicinity of the development, and ii) whether or not the development is likely to have a significant impact on the uses that, in the opinion of the consent authority having regard to land use trends, are likely to be the preferred land uses in the vicinity of the development, and iii) any ways in which the development may be incompatible with any of those existing, approved or likely land uses, and b) evaluate and compare the respective public benefits of the development and the land uses referred to in paragraph (a)(i) and (ii), and c) evaluate any measures proposed by the applicant to avoid or minimise any incompatibility, as referred to in paragraph (a)(iii).	The Project would not be incompatible with surrounding land uses and would result in substantial additional public benefit when compared with the existing and potential future public benefit that may be obtained from the existing uses.	Section 2.4
Clause 2.18	Before determining an application for consent for State significant development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider any applicable provisions of the voluntary land acquisition and mitigation policy and, in particular: a) any applicable provisions of the policy for the mitigation or avoidance of noise or particulate matter impacts outside the land on which the development is to be carried out, and b) any applicable provisions of the policy relating to the developer making an offer to acquire land affected by those impacts.	The Voluntary Land Acquisition and Mitigation Policy has been addressed in relation to noise and air quality. The Project would comply with the requirements of the VLAMP at all residential receptors	Section 6.2, Section 6.5
Clause 2.19	Consideration is given to: a) the existing uses and approved uses of land in the vicinity of the development; b) whether or not the development is likely to have a significant impact on current or future extraction or recovery of minerals, petroleum or extractive materials (including by limiting access to, or impeding assessment of, those resources) c) any ways in which the development may be incompatible with any of those existing or approved uses or that current or future extraction or recovery	The Project is not in the vicinity of existing mining, petroleum production or extractive industry development and would be compatible with existing operations. The Project would ensure that the maximum benefit is obtained from the target resource within the proposed life of the Project.	Section 2.4, Section 7.7

Table 4.1 (Cont'd)
Pre-conditions to Granting Approval

Statutory Reference	Pre-condition	Relevance	EIS Section
State Environmental Planning Policy (Resources and Energy) 2021 (Cont'd)			
Clause 2.20	Consideration is given to ensuring that the development is undertaken in an environmentally responsible manner, including conditions to ensure: a) impacts on significant water resources, including surface and groundwater resources, are avoided or minimised to the greatest extent practicable;	Potential risks to groundwater and surface water resources have been assessed for the Project.	Section 6.12, Section 6.13
	b) impacts on threatened species and biodiversity are avoided or are minimised to the greatest extent practicable; and	The Project has been designed with consideration of opportunities for the avoidance or minimisation of environmental impacts, particularly impacts to biodiversity.	Section 2.8
	c) greenhouse gas emissions are minimised to the greatest extent practicable.	A Greenhouse Gas Assessment has been prepared for the application and included as **Appendix B**. The Applicant would implement a climate change mitigation plan in accordance with the requirements of the NSW EPA.	Section 6.2, **Appendix B**
Clause 2.21	The efficiency of resource recovery, including the reuse or recycling of material and minimisation of the creation of waste, is considered.	The Project would ensure that the maximum benefit is obtained from the target resource within the approved life of the Project.	Section 3.3
Clause 2.22	The following transport-related issues are considered. • The transport of some or all of the materials from the site by means other than public road. • Limitation of the number of truck movements that occur on roads within residential areas or roads near to schools. The preparation of a code of conduct for the transportation of materials on public roads.	There are no opportunities for rail transportation at the locality. As the development would directly enter the Monaro Highway, there would be limited risk of conflict with residential areas or roads near to schools.	Section 6.10

Table 4.1 (Cont'd)
Pre-conditions to Granting Approval

Statutory Reference	Pre-condition	Relevance	EIS Section
State Environmental Planning Policy (Resources and Energy) 2021 (Cont'd)			
Clause 2.23	1) Before granting consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider whether or not the consent should be issued subject to conditions aimed at ensuring the rehabilitation of land that will be affected by the development. 2) In particular, the consent authority must consider whether conditions of the consent should – a) require the preparation of plan that identifies the proposed end use and landform of the land once rehabilitated, or b) require waste generated by the development or the rehabilitation to be dealt with appropriately, or c) require any soil contaminated as a result of the development to be remediated in accordance with relevant guidelines (including guidelines under clause 3 of Schedule 6 to the [EP&A] Act and the *Contaminated Land Management Act 1997*), or d) require steps to be taken to ensure that the state of the land, while being rehabilitated and at the completion of the rehabilitation, does not jeopardise public safety.	Waste management, rehabilitation objectives, strategies and methods are presented in the EIS.	Section 3.9, Section 3.16
State Environmental Planning Policy (Resilience and Hazards) 2021			
Clause 3.12	In determining an application to carry out development to which this Part applies, the consent authority must consider: a) current circulars or guidelines published by the Department of Planning relating to hazardous or offensive development b) whether any public authority should be consulted concerning any environmental and land use safety requirements with which the development should comply c) in the case of development for the purpose of a potentially hazardous industry—a preliminary hazard analysis prepared by or on behalf of the applicant d) any feasible alternatives to the carrying out of the development and the reasons for choosing the development the subject of the application e) any likely future use of the land surrounding the development.	An assessment of additional hazardous substances is included in the EIS.	Section 6.14

Table 4.1 (Cont'd)
Pre-conditions to Granting Approval

Statutory Reference	Pre-condition	Relevance	EIS Section
State Environmental Planning Policy (Resilience and Hazards) 2021 (Cont'd)			
Clause 4.6	A consent authority must not consent to the carrying out of any development on land unless: a) it has considered whether the land is contaminated, and b) if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and c) if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.	The Project would not be situated on contaminated land and possible contamination would be rehabilitated upon completion of operations.	Section 3.16
State Environmental Planning Policy (Biodiversity and Conservation) 2021			
Part 3.2	2. Before a council may grant consent to a development application for consent to carry out development on the land, the council must assess whether the development is likely to have any impact on koalas or koala habitat. 3. If the council is satisfied that the development is likely to have low or no impact on koalas or koala habitat, the council may grant consent to the development application. 4. If the council is satisfied that the development is likely to have a higher level of impact on koalas or koala habitat, the council must, in deciding whether to grant consent to the development application, take into account a koala assessment report for the development.	Koala have not been identified within the Project Site.	Section 6.7

Table 4.2
Mandatory Considerations

Statutory Reference	Mandatory Consideration	EIS Section
Considerations under the *Environmental Planning & Assessment Act 1979* (EP&A Act)		
Section 1.3	Relevant objects of the Act: • to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources, • to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment, • to promote the orderly and economic use and development of land, • to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats, • to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage), • to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State, • to provide increased opportunity for community participation in environmental planning and assessment.	Section 7.2.2
Section 4.15	Relevant environmental planning instruments. • Queanbeyan Local Environmental Plan 2012 • State Environmental Planning Policy (Resources and Energy) 2021 • State Environmental Planning Policy (Resilience and Hazards) 2021 • State Environmental Planning Policy (Biodiversity and Conservation) 2021 • State Environmental Planning Policy (Transport and Infrastructure) 2021	See Table 4.1
	• Relevant proposed planning instrument - none	Not Applicable
	• Development Control Plan – not applicable to SSD in accordance with Clause 2.10 of the Planning Systems SEPP.	Not Applicable
	• Any planning agreement	Section 2.7
	• The EP&A Regulation – to the extent that it prescribes matters for the purposes of Section 4.15(1)(a)(iv) of the EP&A Act.	See below
	• The likely impacts of the development, including environmental impacts on both the natural and built environment, and social and economic impacts in the locality.	Section 6 (generally)
	• The suitability of the site for the development.	Section 7.7
	• Any submissions made in accordance with the EP&A Act or the regulations.	To be addressed once provided
	• The public interest.	Section 7.9

Table 4.2 (Cont'd)
Mandatory Considerations

Statutory Reference	Mandatory Consideration	EIS Section
Considerations under the *Environmental Planning and Assessment Regulation 2021* (EP&A Reg.)		
Clause 192	An environmental impact statement must include each of the following- a) a summary of the environmental impact statement,	Executive Summary
	b) a statement of the objectives of the development, activity or infrastructure,	Section 1.5
	c) an analysis of any feasible alternatives to the carrying out of the development, activity or infrastructure, having regard to its objectives, including the consequences of not carrying out the development, activity or infrastructure,	Section 2.8
	d) an analysis of the development, activity or infrastructure, including— i) a full description of the development, activity or infrastructure, and	Section 3
	ii) a general description of the environment likely to be affected by the development, activity or infrastructure, together with a detailed description of those aspects of the environment that are likely to be significantly affected, and	Section 6
	iii) the likely impact on the environment of the development, activity or infrastructure, and	Section 6
	iv) a full description of the measures proposed to mitigate any adverse effects of the development, activity or infrastructure on the environment, and	Section 6, Appendix 7
	v) a list of any approvals that must be obtained under any other Act or law before the development, activity or infrastructure may lawfully be carried out,	Section 3.1.2
	e) a compilation (in a single section of the environmental impact statement) of the measures referred to in item (d)(iv),	Appendix 7
	f) the reasons justifying the carrying out of the development, activity or infrastructure in the manner proposed, having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development set out in subclause (4).	Section 7
Biodiversity Conservation Act 2016		
Section 7.14 (2)	The relevant authority, when determining in accordance with the Environmental Planning and Assessment Act 1979 any such application, is to take into consideration under that Act the likely impact of the proposed development on biodiversity values as assessed in the biodiversity development assessment report. The relevant authority may (but is not required to) further consider under that Act the likely impact of the proposed development on biodiversity values.	Section 6.7
Section 7.14 (3)	If the relevant authority decides to grant development consent or approval and the biodiversity offsets scheme applies to the proposed development or infrastructure, the conditions of the consent or approval must, subject to subsection (3A), require the applicant to retire biodiversity credits to offset the residual impact on biodiversity values of the number and class specified in the biodiversity development assessment report.	Section 6.7
Section 7.14 (4)	A condition to retire biodiversity credits is required to be complied with before any development is carried out that would impact on biodiversity values. If the retirement of particular biodiversity credits applies to a stage of the development, compliance with the condition for their retirement is postponed until it is proposed to carry out that stage of the development	Section 6.7

Table 4.2 (Cont'd)
Mandatory Considerations

Statutory Reference	Mandatory Consideration	EIS Section
State Environmental Planning Policies (SEPPs)		
Planning Systems SEPP 2021	Classification of SSD - Clauses 7(1)(a & b) of Schedule 1	Section 4
Resources and Energy SEPP 2021	Development applications – matters for consideration Clause 2.16, 2.17, 2.18, 2.19, 2.20, 2.21, 2.22, and 2.23.	Table 4.1 above
Resilience and Hazards SEPP 2021	Not likely to be relevant as the Project would not be classified as a potentially hazardous industry	Table 4.1 above
Transport and Infrastructure SEPP 2021	Clause 2.119 - development on land that has a frontage to a classified road	Table 4.1 above

Section 5

Engagement

PREAMBLE

This section provides an overview of the engagement undertaken by Monaro Rock and its consultant team during the preparation of the EIS to identify the environmental, social and economic issues of interest to the surrounding community and relevant government agencies to be addressed in the EIS. The section concludes with an outline of Monaro Rock's intentions for future community engagement should the Project be approved.

5.1 Local Community

5.1.1 Introduction

In order to identify issues likely to be of greatest significance to the environment, surrounding landowners, the local community and the wider community, a program of community and government engagement has been undertaken. Various methods have been applied to provide the greatest opportunity for interested community members to seek information, register for updates and ask questions concerning the Project. Equally, the information shared during these processes has informed Project planning and design.

Consultation with the community commenced in April 2021 and the extended period between initial conversations with neighbours and the presentation of the EIS to the community is acknowledged. Throughout the phase of Project design and planning, information provided by the community has been used to consider alternatives and plan for the most appropriate outcomes. Delays in planning for the Project have partly occurred due to the detailed consideration of alternatives and subsequent changes to the Project to address environmental risks. Section 1.7 describes in detail the process used by the Applicant to consider alternatives for the Project. The following subsections describe the engagement that has occurred with stakeholders and some of the issues raised in response. Engagement for the Social Impact Assessment was undertaken by Landscape Research and is summarised in Section 6 and presented in the Social Impact Assessment that is presented as **Appendix N**. This engagement has also informed Project planning.

5.1.2 Stakeholder Identification

Stakeholder identification has occurred throughout the planning process for the Project as different groups or stakeholders sought information. The following key groups have been identified for engagement on the Project.

- Direct neighbours and nearby landowners and residents in the area closest to the Project Site. The approval of a subdivision to the south of the Project Site has meant that several landowners not involved in initial consultation have moved into the locality.
- Residents within the districts of Royalla and Fernleigh Park that are within proximity to the Project Site and considered to be within the Local Study Area for the Social Impact Assessment. These residents are most likely to experience amenity impacts (noise, air quality or visual) associated with the Project.
- Broader residential areas including Googong, Tuggeranong, Jerrabomberra and Queanbeyan.
- Representatives of key community groups such as the Royalla Community Association, Googong Community Association, Jerrabomberra Community Association, Royalla Landcare and the Rural Fire Service.
- The Queanbeyan-Palerang Regional Council.
- Political representatives at local, State and Federal levels.

- Government agencies within NSW and the ACT.
- Various other groups or organisations including representatives of Canberra Airport, UGL Linx (managers of rail infrastructure in NSW)

Different methods were applied for these stakeholder groups, depending on their level of interest and preferences for engagement. The Applicant was also approach by several media representatives in NSW and the ACT during planning for the Project.

5.1.3 Engagement Carried Out

Since commencing engagement for the Project in 2021, multiple methods of communication have been used to keep the community informed about the Project, provide opportunities for questions to be asked and for stakeholders to speak directly with community members about the local setting, their concerns and to address questions about potential impacts.

Engagement has occurred throughout the design stages of the Project and during the preparation of environmental and social assessments for the EIS. A range of forums and formats were used for engagement including the following.

- A dedicated Project website has been created to provide information about the Project which includes a dedicated 'Contact Us' page for people to register for updates on the Project and to ask questions.
- Initial Community Information Sessions were held in at the gate of the property (located at the end of Mates Drive) on 16 and 17 April 2021 to discuss the initial plans for the development with the community members. These sessions were attended by 80-120 people and provided a forum robust feedback on initial plans for the development.
- At the initial information sessions, community surveys were provided to attendees to enable interested parties to provide detailed feedback on their concerns or questions. A copy of a blank survey form is provided in **Appendix 5**.
- Newsletters were sent out to the stakeholders at various times to provide updated information about the Project including key components and to provide information on the approvals pathway. The newsletters also included advice on upcoming events and opportunities for engagement. An example of one newsletter sent to the community is provided in **Appendix 5**. Initial newsletters were posted to each resident in the local area, however after this time were then sent via email to people who had registered their email with the Applicant. The newsletters were also provided on the Company website.
- Following identification of key matters of concern for the local community, fact sheets were prepared and emailed to registered email addresses concerning the following.
  - Air quality, human health and silica exposure risks
  - Local biodiversity risks including field survey outcomes.

  - Groundwater-related risks and the outcomes of monitoring and assessment.
  - The need for the Project including the outcomes of supply-demand market analysis.

  A copy of the fact sheet presented to the community regarding air quality is provided in **Appendix 5**.

- Several briefing meetings were held with Government agencies to provide updates on the Project including with Council, the ACT City and Environment Directorate (formerly the Environment, Planning and Sustainable Development Directorate and Transport and Canberra City Services) and the Federal Department of Climate Change, Energy, the Environment and Water).
- Presentations were given to Councillors of Queanbeyan-Palerang Regional Council at councillor meetings in November 2022 and May 2024.
- Information on the Project was provided to Federal and State members of parliament in NSW and the ACT to inform them of the Project and provide an avenue for further consultation.
- Aboriginal stakeholders (registered Aboriginal parties or RAPs) from NSW and the ACT were consulted during the preparation of the Aboriginal heritage impact assessments and the Social Impact Assessment. Registered parties participated in field surveys and commented on the outcomes of assessment.
- A Virtual Community Meeting was held on 11 June 2024 to provide an update to the community on the Project. This included a detailed presentation on the outcomes of Project design and the proposed Project layout. The meeting was attended by 60 people and opportunities were provided to address questions from attendees.
- Project Site Tours were conducted on 4 and 5 July 2024 to provide registered community members an opportunity to see the proposed Project Site and ask questions about the Quarry design and environmental impact assessment process. Site tours were offered in hourly timeslots over two days with people transported to the Project Site from the Royalla Community Hall. 22 people registered for the Project Site tours including a staff member representing State member for Monaro.
- A Virtual Community Meeting was held on 4 June 2025 to present the outcomes of the environmental assessments that were conducted and address any questions that the community have regarding those results or the Project design in general. 24 people attended the community meeting and opportunities were provided to address questions from attendees.

5.1.4 Identified Issues

The issues raised during the engagement with the community are considered in three categories, namely environmental, economic and social. Each of the issues discussed below are listed in **Appendix 5** together with the relevant section(s) of the EIS and technical reports where each issue is addressed.

Environmental Issues

Since consultation began with the community in 2021, several environmental issues have been identified as primary concerns, as follows.

- Increased traffic, particularly the increase in trucks on the Monaro Highway is a concern to surrounding residents. Strong objection to Quarry traffic exiting onto Mates Drive or Old Cooma Rd.
- Air quality, particularly dust with its potential health impacts, is a concern to surrounding residents. Uncertainty exists whether the dust from the extraction operations may affect the quality of water in their rainwater tanks resulting from rainfall washing dust from their roofs into their tanks. Concerns were expressed that Monaro Rock may not have enough water to manage dust at the Project Site.
- Noise from machinery operating within the processing area and movement of trucks is a concern to surrounding residents.
- Physical health concerns related to the chemical content of the blast fumes and the risk from crystalline silica in the rock that is blasted, extracted and processed.
- Noise and vibration from blasting has been a concern to some surrounding residents principally with respect to the perceived risk of structural damage to their homes.
- The destruction of native flora and fauna and habitat for local wildlife caused by removal of vegetation within the Project Site.
- Availability of water for operation of the Project during drier years and the need to use large volumes of groundwater.
- Reduction of surface water flow to surrounding catchments and creeks due to construction of dams and diversion drains.

Economic Issues

Two primary economic concerns were identified by the community throughout consultation processes, as follows.

- The potential for the long-term operation of the proposed Quarry to impact upon property prices and saleability of properties was raised by some surrounding rural land holders. Some expressed a concern that close neighbours to the extraction area are bearing the cost for the benefits of the wider community that need/use the Quarry's products.
- The need for the project was questioned given the presence of other quarries in the region.

Social Issues

Several social impact concerns were raised by the community throughout consultation, as follows.

- The frustrations and stresses caused by living with cumulative quarrying impacts.
- The associated decline in rural and social amenity and the devaluation of properties.

- The stress and uncertainty about the Project and changes to adjacent land use.
- A lack of trust in systems used to influence project design and operational management.

Some surrounding residents in the community also identified the issue of reduced visual amenity and changes to surroundings arising from views of the extraction area and extraction activities.

5.2 Government Agencies

5.2.1 Engagement Carried Out

Monaro Rock initially consulted with the then Department of Planning, Industry and Environment (DPIE) (now DPHI), as required under Schedule 2, Part 2(3)(1) of the *Environmental Planning and Assessment Regulation 2000* to obtain the Planning Secretary's Environmental Assessment Requirements (SEARs) for the Project. This consultation involved providing the Department with a Scoping Report introducing the Project and providing an overview of the Project, its environmental setting, strategic and statutory context and proposed community engagement.

The DPHI circulated the Scoping Report to a range of State Government agencies and Council seeking their respective requirements for issues to be addressed in the EIS for the Project. The DPHI's requirements and those provided by the State Government agencies were collectively assembled and forwarded to Monaro Rock as the Project SEARs on 29 September 2021. Additional SEARs were provided by Council on 25 October 2021.

A request to extend the expiry date of the SEARs was sent to the then Department of Planning and Environment (DPE) on 26 July 2023 and an extension was granted by DPE on 18 August 2023.

The following government agencies provided assessment requirements for the Project.

- Queanbeyan-Palerang Regional Council
- Conservation Programs and Heritage Regulation
- Environment Protection Authority
- Transport for NSW
- DPIE Water and Natural Resources Access Regulator
- Heritage NSW
- NSW Mining, Exploration Geoscience and the Resources Regulator
- NSW Crown Lands
- NSW Department of Primary Industries
- NSW Rural Fire Service
- NSW Resources Regulator

Canberra Airport has also provided a request for consideration of the flight path for planes arriving at the airport.

Monaro Rock also consulted with ACT Environment, Planning and Sustainable Development Directorate (EPSDD) and the Trasport Canberra and City Services Directorate (TCCS) (now combined as the City and Environment Directorate) on the Project. Noise and air quality amenity within the ACT was raised, however most discussions focused in the construction and use of an intersection within the ACT and transport and road safety risks associated with heavy vehicle use of the Monaro Highway.

The issues that the NSW Government agencies, Council and Commonwealth DCCEEW have requested to be addressed in the EIS were provided in correspondence from the respective agencies.

The SEARs are reproduced in **Appendix 1** and a list of detailed assessment requirements and where each issue is addressed in the EIS is provided in **Appendix 2**. In some cases, the requirements are also addressed in the technical studies that accompany the EIS.

5.3 Engagement to be Carried Out

5.3.1 Future Government Engagement

Monaro Rock would continue to liaise closely with relevant government agencies during assessment of the application for and following receipt of development consent. Consultation would likely be focused on the following matters.

- Negotiation of a Planning Agreement with Queanbeyan-Palerang Regional Council.
- Resolution of queries or uncertainties in relation to the information required to determine the application for development consent.
- Licencing and obtaining approvals other than the development consent.

Following receipt of development consent, government agency consultation would likely be on the following matters.

- Preparation of Environmental Management Plans.
- Obtaining all required approvals and licences to commence operations.
- Ongoing environmental management of the Project.

In addition, the Applicant would continue to liaise with elected representatives at Commonwealth, State and Local government levels.

5.3.2 Future Community Engagement

Monaro Rock proposes to maintain a proactive approach to ongoing community engagement through the implementation of the following prior to and following determination of the application for development consent.

- Direct contact with its near neighbours at a frequency agreed upon with each neighbour.
- Direct contact with other surrounding rural property owners when approached or at a frequency that is otherwise reasonably requested by the property owner.
- Establishment of a blast notification register to provide at least 24hrs notice of expected blast events.
- Creation and participation within a Community Consultative Committee.
- Community meetings as and when needed.
- Posting the following information on Monaro Rock's website.
  - Monaro Rock Scoping Report
  - Secretary's Environmental Assessment Requirements (SEARs)
  - Monaro Rock Fact and Information Sheets
    - Silica Fact Sheet
    - Groundwater Fact Sheet
    - Biodiversity Fact Sheet
    - Need for the Project
  - EIS and supporting documents
  - Development Consent and Environment Protection Licence
  - All approved environmental management plans
  - Recent Annual Reviews
  - Recent Environment Protection Licence monitoring data
  - Recent minutes from Community Consultative Committee meetings
  - Recent Independent Environmental Audit reports
  - Complaints register
- Continued engagement with the wider community on Monaro Rock's activities via community newsletters and Monaro Rock website.

Section 6

Assessment and Management of Key Environmental Issues

PREAMBLE

This section presents background information on the topography within and surrounding the Project Site and relevant climate data relied upon for a number of the environmental assessments of the Project. The subsequent subsections relate to the range of environmental components that would be influenced, to varying degrees, by the Project. For each component, information is provided on the existing environment together with the proposed safeguards and mitigation measures and the likely impacts the Project would have following the implementation of these measures. These sections directly reflect the outcomes of technical assessment presented with the EIS.

The various environmental components are presented generally in an order prioritised based on the statutory context (Section 4), strategic context including the risk analysis (Section 2) and outcomes of community engagement (Section 5) although the economic and social impacts are intentionally placed at the end of Section 6 as both assessments rely upon information presented in the earlier subsections.

Appendix 6 provides a summary of all proposed environmental, economic and social management and mitigation measures for the Project.

6.1 Environmental Setting

6.1.1 Introduction

The assessment of the environmental impacts of the Project in this section is reliant upon background information common to many environmental issues. Key features of the Project Site and surrounding region, including community, surrounding land uses, land ownership, natural and built features, risks and hazards are described in Section 2. In this subsection, background information is provided on the topography, drainage and climate.

6.1.2 Topography and Drainage

The topography of the local area surrounding the Project Site is characterised by rolling hills at elevations above 850mAHD, with northwest trending ridgelines that are incised by steep gullies. The Project Site lies between two prominent local topographic features; Enchanted Hill (elevation of approximately 955mAHD) is located within the Property Boundary to the west of the Site, and Beatty Hill (elevation approximately 920mAHD) is located outside of the Property Boundary to the east of the Site. The terrain also rises towards the northern boundary of the Property, the highest element of which is an unnamed localised hill with an elevation of approximately 880mAHD.

The topography over the Project Site slopes away from a ridgeline at the western edge of the proposed Extraction Area (elevation approximately 892mAHD) towards the east. Drainage from the Project Site generally flows east into Four Mile Creek, which drains into Jerrabomberra Creek, which in turn drains into Lake Burley Griffin via Molongolo River. The Project Site also contains an unnamed ephemeral watercourse which runs north from the Extraction Area into Monks Gully, which in turn drains into Dunns Creek. Dunns Creek continues westward and drains into Tuggeranong Creek and ultimately into the Murrumbidgee River.

Figure 6.1 displays the local topography, watercourses and catchments within the local area.

6.1.3 Climate

6.1.3.1 Introduction

Temperature and rainfall data is sourced from the Bureau of Meteorology (BoM) operated Tuggeranong (Isabella Plains) automated weather station (Station Number 070339) located approximately 6km to the northwest of the Project Site at an elevation of 587mAHD. This station provides continuous meteorological data for the period January 1996 to April 2025. Evaporation data was sourced from the BoM operated Braidwood (Wallace Street) automated weather station (Station Number 069010) located approximately 60km east of the Project Site at an elevation of 643mAHD. This station provides daily evaporation data for the period January 1996 to December 2022.

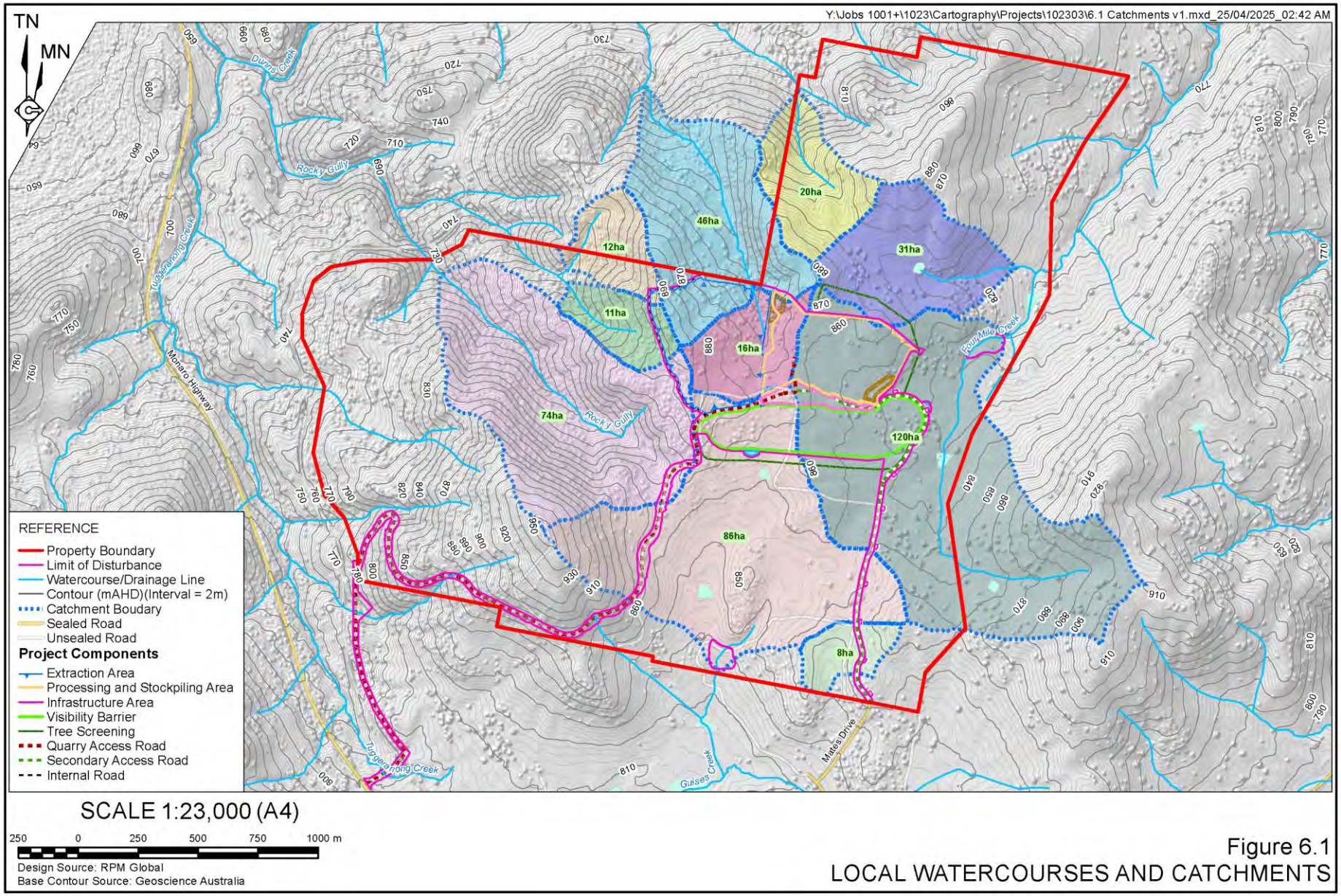


Figure 6.1
LOCAL WATERCOURSES AND CATCHMENTS

6.1.3.2 Temperature

January is typically the hottest month, with a mean maximum temperature of 29.4ºC and a mean minimum temperature of 14.5°C. July is typically the coldest month with an average maximum temperature of 12.4ºC and an average minimum temperature of 0.1ºC (**Table 6.1**).

Table 6.1
Monthly Meteorological Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Temperature (Bureau of Meteorology Station No 070339 – Tuggeranong (Issabella Plains))[1]													
Mean Maximum (°C)	29.4	28.0	25.3	20.9	16.5	13.1	12.4	14.2	17.7	21.0	24.2	27.2	20.8
Mean Minimum (°C)	14.5	14.1	11.5	6.9	2.6	1.2	0.1	1.0	3.7	6.6	10.0	12.4	7.1
Rainfall (Bureau of Meteorology Station No 070339 – Tuggeranong (Issabella Plains))1													
Mean Monthly Rainfall (mm)	60.9	72.4	57.4	38.5	29.8	51.7	36.6	48.9	57.0	57.7	77.9	69.6	657.5
Mean days of rain ≥1mm	5.8	5.6	5.3	4.0	3.9	5.7	5.4	6.0	5.9	6.6	7.2	6.0	67.4
Evaporation (Bureau of Meteorology Station No 069010 – Braidwood (Wallace Street))2													
Mean Daily Evaporation (mm)	4.6	3.8	2.9	2.2	1.4	0.9	1.1	1.7	2.6	3.4	4.0	4.5	2.8

Note 1: Covering the period January 1996 to April 2025

Note 2: Covering the period January 1996 to December 2022

6.1.3.3 Rainfall

Monthly average rainfall varies between 29.8mm and 77.9mm, with rainfall generally spread relatively evenly through the year. Late spring through to early autumn are generally the wettest months, while mid-autumn through to late winter are the driest months. The total average annual rainfall is 657.5mm (**Table 6.1**).

6.1.3.4 Evaporation

Average daily evaporation measured at the BoM Braidwood (Wallace Street) weather station varies from 0.9mm to 4.6mm per day. The average annual daily evaporation rate is 2.8mm.

6.1.3.5 Wind

Project-specific meteorological conditions were modelled by Northstar (2025), as described in Section 6.2. The modelling defined 2021 as the most representative year for assessing air quality impacts. **Figure 6.2** presents the annual and seasonal wind roses for the Project for January (Summer), April (Autumn), July (Winter), October (Spring) and Annual, which demonstrate strong north-westerly and northerly winds across all seasons, with westerly and north-easterly winds picking up in summer and pulling right back in winter.

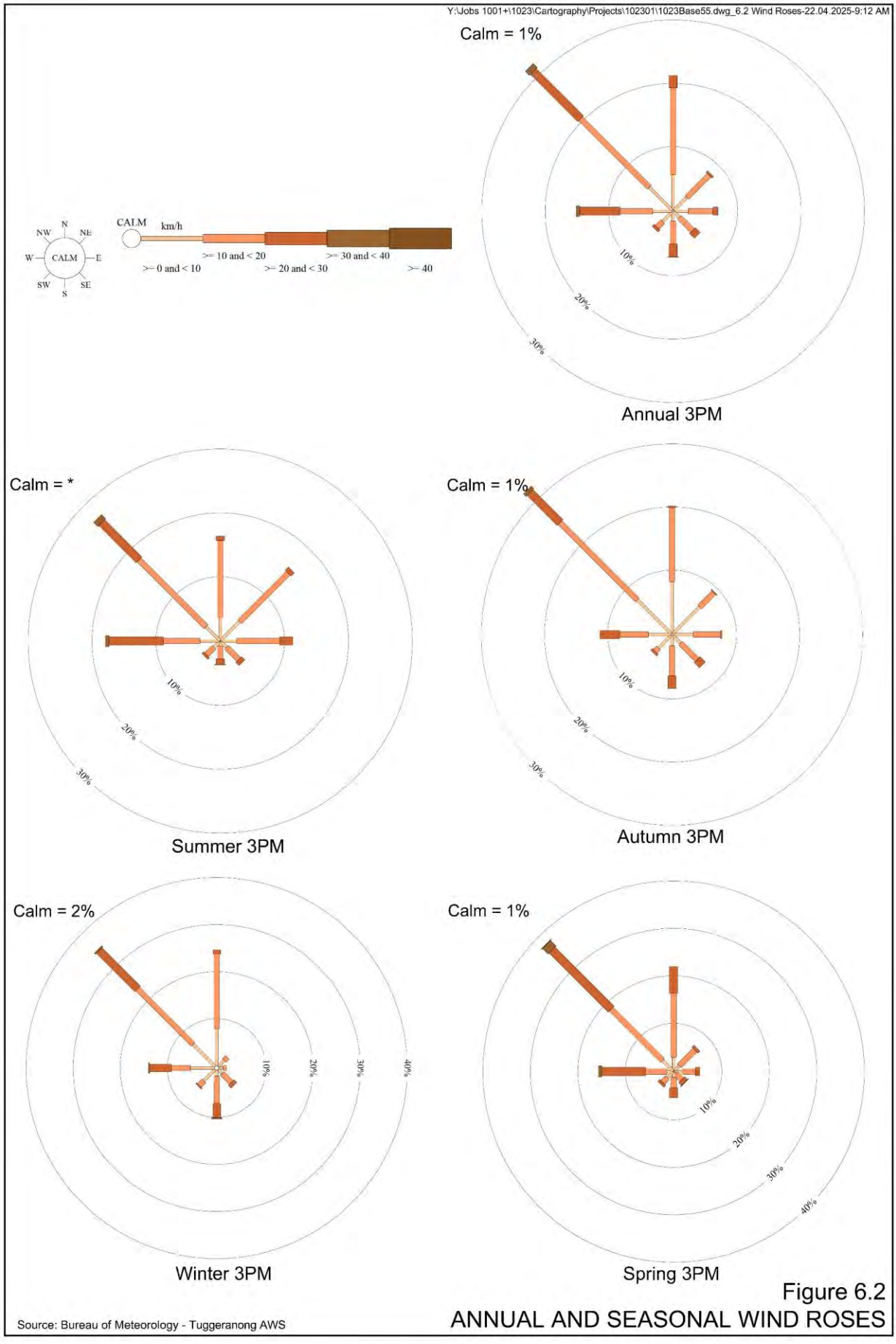


Figure 6.2
ANNUAL AND SEASONAL WIND ROSES

6.2 Air Quality

6.2.1 Introduction

The SEARs for the Project require the EIS to include an assessment of the following potential impacts of the Project on air quality.

- A detailed assessment of potential construction and operational air quality impacts, in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*, with a focus on dust emissions including $PM_{2.5}$ and PM_{10}, and having regard to the *Voluntary Land Acquisition and Mitigation Policy*; and
- Details of proposed mitigation, management and monitoring measures.

The assessment requirements of the NSW Environment Protection Authority (EPA) and Council were also considered during the preparation of the air quality assessment. A summary of the SEARs and requirements of the EPA and Council are listed within **Appendix 2** with a record of where each requirement is addressed in the EIS.

An Air Quality Impact Assessment (AQIA) for the Project was undertaken by Northstar Air Quality Pty Ltd (Northstar) and is presented as **Appendix B** and hereafter referred to as Northstar (2025). The following subsections provide a summary of Northstar (2025) and describe the proposed ongoing operational control measures that would be implemented by the Applicant.

6.2.2 The Existing Environment

6.2.2.1 Background Air Quality

Site-specific background air quality data was not available for the AQIA. Therefore, existing air quality in the area surrounding the Project Site was determined by reviewing measurements collected by the NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) and Australian Capital Territory Health (ACT Health). Data available from the DCCEEW operated air quality monitoring stations (AQMS) located in Monash, Civic and Florey were examined, as per **Table 6.2**.

Table 6.2
Proximate AQMS Relative to the Project Site

AQMS Location	Approximate Distance to Project Site (km)	Screening Parameters			
			Measurements		
		2021 Data	PM_{10}	$PM_{2.5}$	TSP[1]
Monash	6.4	✓	✓	✓	×
Civic	18.6	✓	✓	✓	×
Florey	27.5	✓	✓	✓	×
Note 1. Northstar (2025) note that no AQMS identified in Table 6.1 measure concentrations of TSP. This pollutant is of relevance to the expected emissions from the Project. Other sources of data have been adopted to allow representation of the TSP environment in the area surrounding the Project Site, and a full discussion is provided in Appendix C of Northstar (2025).					
Source: Northstar (2025) – Table 12					

The Monash AQMS was considered to be the closest representative location with data available for the year 2021 (the selected representative year consistent with the meteorological modelling performed – refer Appendix B of Northstar (2025)), as the most reflective of conditions surrounding the Project Site.

Appendix C of Northstar (2025) provides a detailed assessment of the background air quality monitoring data used in the AQIA. A summary of the air quality monitoring data and assumptions used to produce this AQIA are presented in **Table 6.3**. Five exceedances of the maximum 24-hour average $PM_{2.5}$ criterion were measured in the background data at the Monash AQMS in 2021 and are discussed further in Section 6.2.5 and Appendix C of Northstar (2025).

Table 6.3
Summary of Background Air Quality Data used in the AQIA

Pollutant	Averaging Period	Units	Measured Value	Notes
Particles (as TSP)	Annual	µg/m^3	24.1	Estimated on a TSP:PM_{10} ration of 2.3404:1
Particles (as PM_{10})	24-hour	µg/m^3	Daily Varying	The 24-hour maximum PM_{10} in 2021 at Monash was measured to be 37.6µg/m^3 (exceeding the criterion)
	Annual	µg/m^3	10.3	
Particles (as $PM_{2.5}$)	24-hour	µg/m^3	Daily Varying	The 24-hour maximum $PM_{2.5}$ in 2021 at Monash was measured to be 27.9µg/m^3 (exceeding the criterion)
	Annual	µg/m^3	6.9	
Particles (as dust deposition)	Annual	g/m^2/month	2.0	Difference in NSW EPA maximum allowable an incremental impact criterion
Source: Northstar (2025) – Table 13 and Appendix C				

6.2.2.2 Sensitive Receivers

The air quality impact assessment (Northstar, 2025) considers potential impacts to air quality at 47 privately-owned residential properties surrounding the Project Site. **Figure 6.3** presents details of the residences considered in the AQIA. It is noted that, in addition to privately-owned residences, one Project-related residence (PR1) that lies within the Project Site is considered in the AQIA, however compliance is not assessed for this location.

6.2.2.3 Meteorology

The meteorology experienced within a given area can govern the generation, dispersion, and eventual fate of pollutants in the atmosphere. The meteorological conditions surrounding the Project Site have been characterised using data collected by three surrounding Automatic Weather Stations (AWS) operated by the Australian Government Bureau of Meteorology (BoM) as per **Table 6.4**.

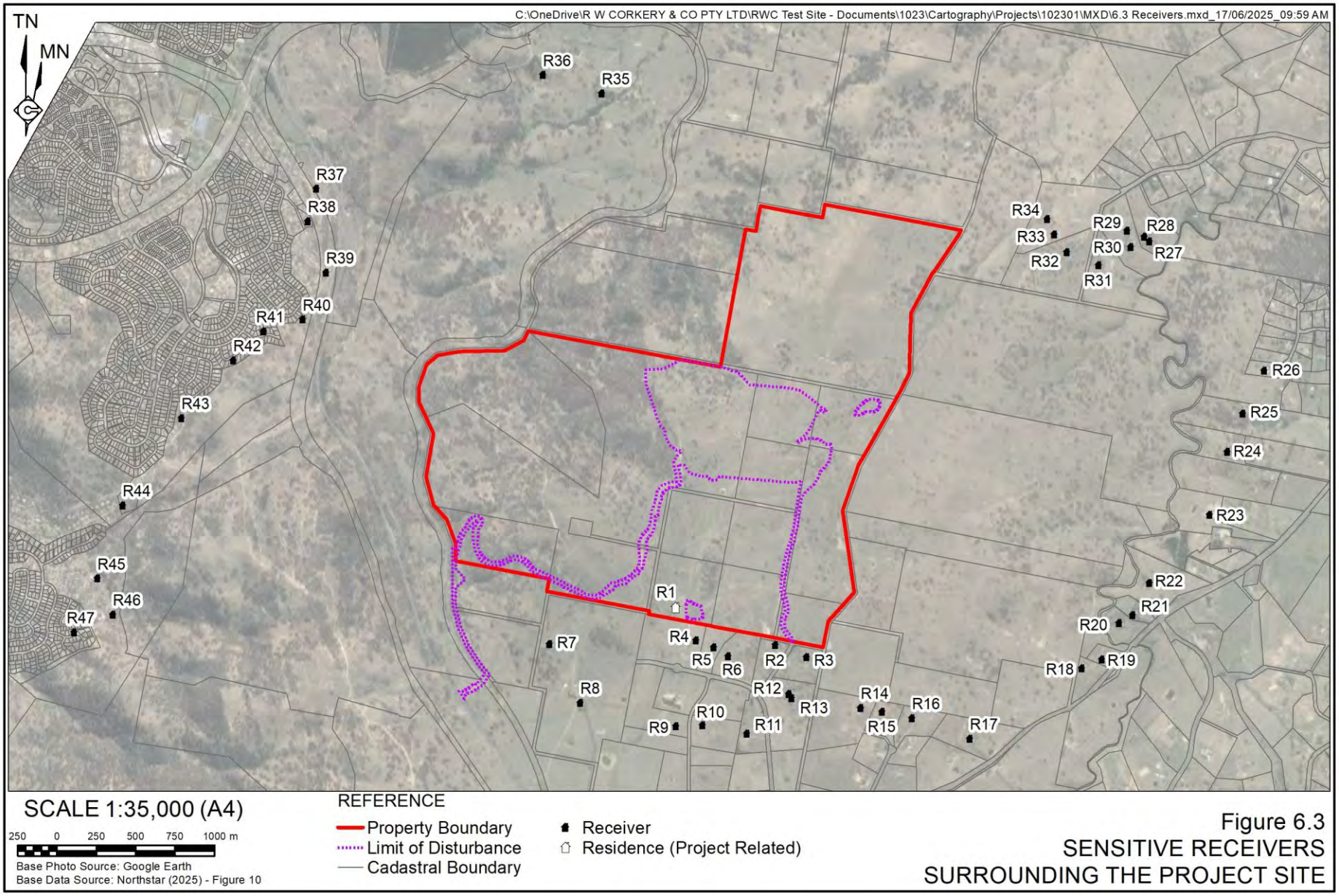

C:\OneDrive\R W CORKERY & CO PTY LTD\RWC Test Site - Documents\1023\Cartography\Projects\102301\MXD\6.3 Receivers.mxd_17/06/2025_09:59 AM
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R47
SCALE 1:35,000 (A4)
250 0 250 500 750 1000 m
Base Photo Source: Google Earth
Base Data Source: Northstar (2025) - Figure 10
REFERENCE
Property Boundary
Limit of Disturbance
Cadastral Boundary
Receiver
Residence (Project Related)
Figure 6.3
SENSITIVE RECEIVERS
SURROUNDING THE PROJECT SITE

Table 6.4
Details of Meteorological Monitoring Surrounding the Project Site

Site Name	Station #	Source	Approximate Location (UTM)		Approximate Distance (km)
			mE	mS	
Tuggeranong (Isabella Plains) AWS	070339	BoM	690 089	6 078 543	6.4
Canberra Airport	070351	BoM	700 049	6 090 490	16.6
Mount Ginni AWS	070349	BoM	660 667	6 006 812	34.9
Source: Northstar (2025) – Table 11					

Tuggeranong (Isabella Plains) AWS was considered to be the most representative of the conditions at the Project Site, based on its proximity. Northstar (2025) presents the meteorological conditions measured at Tuggeranong (Isabella Plains) AWS for the 2019 to 2023 period (most recent five years of completed data) in Appendix B of their report.

A detailed description of the meteorological data relied upon for this assessment is provided in Appendix B of Northstar (2025).

6.2.2.4 Potential for Cumulative Impacts

The Project Site is surrounded by predominantly rural land uses with high density residential land use further to the west. Two existing quarries were identified as proximate to the Project Site, (see **Table 6.5**). Given the distance of these quarry operations from the Project Site, it is not anticipated that any cumulative air quality impacts would occur, and these operations were not considered further within the AQIA.

Table 6.5
Summary of Surrounding Quarry Operations

Name	Distance from the Project Site	Description	Scale of Production
Cooma Road Quarry	6.2 km NE	Hard rock quarry	Estimated up to 1.5 Mtpa (NSW DPIE, 2013)
Williamsdale Quarry	8.2 km S	Hard rock quarry	Estimated up to 2 Mtpa (NSW EPA, 2020)
Source: Northstar (2025) – Table 14			

6.2.3 Potential Sources of Air Contaminants

Table 6.6 presents potential sources of operational emissions were considered by Northstar (2025).

Table 6.6
Identified Potential for Air Contaminants

Operation	Quarrying (extraction, processing and transport)	Concrete Batching	Concrete Recycling	Asphalt Batching
Contaminant Source	• Drilling and blasting • Loading of haul truck in the Extraction Area and transport to Processing Plant and Stockpiling Area, or Visibility Barrier; • Unloading of material, loading of processing equipment, processing of rock, and storage in stockpiles • Receipt and unloading of materials for concrete and asphalt production; • Operation of pugmill, concrete batching plant and asphalt plant; • Loading of product trucks, and transport offsite; • Wind erosion of disturbed areas; and • Emissions from vehicle and equipment exhaust.	• Movement of vehicles around the Project Site on paved and unpaved road surfaces; • Loading and unloading of materials to storage areas and hoppers; • Handling of materials; • Operation of the concrete batching plant; and • Loading of concrete to trucks.	• Movement of vehicles around the Project Site on paved and unpaved road surfaces; • Loading and unloading of materials to storage areas; • Handling of materials; • Processing (crushing and screening) of concrete; and • Loading of product to trucks.	• Movement of vehicles around the Project Site on paved and unpaved road surfaces; • Loading and unloading of materials to storage areas and hoppers; • Handling of materials; • Operation of the asphalt batching plant; and • Loading of asphalt to trucks.
Specific Associated Pollutants	• Total Suspended particulate (TSP); • Particulate matter with an aerodynamic diameter of 10 microns (PM_{10}); and • Particulate matter with an aerodynamic diameter of 2.5 microns ($PM_{2.5}$).			
	• Respirable Crystalline Silica (RCS)			• Odour
Source: Northstar (2025) – adapted from Section 2.11				

6.2.4 Assessment Criteria

6.2.4.1 Criteria Air Pollutants

Table 6.7 presents the air quality criteria listed in the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (EPA, 2022) which were adopted for the Project. It is noted that the criteria are intended to minimise any potential impacts to human health and amenity.

Table 6.7
NSW EPA Air Quality Impact Assessment Criteria

Pollutant	Averaging Period	Units	Criterion	Notes
Particulates (PM_{10})	24-hours	µg/m^3	50	Numerically equivalent to the AAQ NEPM[(a)] standards and goals.
	1 year	µg/m^3	25	
Particulates ($PM_{2.5}$)	24-hours	µg/m^3	25	
	1 year	µg/m^3	8	
Particulates (TSP)	1 year	µg/m^3	90	
Particulates (as dust deposition)	1 year[(b)]	g/m^2/month	2	Assessed as insoluble solids as defined by AS 3580.10.1
	1 year[(c)]	g/m^2/month	4	
Notes: (a): National Environment Protection (Ambient Air Quality) Measure (b): maximum increase in deposited dust level (c): maximum total deposited dust level				
Source: Northstar (2025) - Table 6				

6.2.4.2 Respirable Crystalline Silica

Northstar (2025) also assessed the likelihood of respirable crystalline silica (RCS) generation associated with the proposed material to be extracted and processed at the Project Site. Given that NSW EPA do not provide air quality criteria for RCS, a conservative interim criterion implemented by the South Australia Environment Protection Authority (SA EPA) was adopted for the AQIA. The SA EPA criterion used for RCS is 3 µg/m^3 (annual average) for the PM_{10} size fraction of dust in ambient air due to the greater PM_{10} concentrations compared to $PM_{2.5}$ (see Section 6.2.7).

It should be noted that RCS is generally an occupational health and safety issue (i.e. on-site) rather than an environmental issue (i.e. off-site) when considering quarrying activities. Potential health risks associated with particulate matter and RCS is discussed in Section 6.4 and a Human Health Risk Assessment prepared by EnRiskS presented as **Appendix C**.

6.2.4.3 Odour

One odour unit (OU) is the threshold concentration required to produce an olfactory response or sensation and is referred to as the odour threshold. It is based on the 'nose response time average' with the reaction time averaged to one second. Theoretically, an odour that is predicted to be less than 1OU represents no impact. An odour assessment criteria of 7OU is considered to represent the level below which 'offensive' odours should not occur (DECC, 2006).

The level at which an odour is perceived to be of nuisance is dependent on a range of factors. The principal factor influencing nuisance is relative population density as this allows for the presence of individuals sensitive to odour, but can also be influenced by other factors. For the purpose of assessment odour performance goals are specified for various population densities in the *Technical Framework: Assessment and Management of Odour from Stationary Sources in NSW (DECC, 2006)*. These are summarised in **Table 6.8**.

Table 6.8
NSW EPA Odour Impact Criterion

Population of Affected Community	Complex Mixture of Odours (OU)
Urban area (≥2000)	2.0
500 – 2000	3.0
125 – 500	4.0
30 – 125	5.0
10 – 30	6.0
Single residence (≤2)	7.0
Source: The Odour Technical Notes, DECC 2006	

Given the population density in the environment immediately surrounding the Project Site is <500 persons/km an odour impact criterion of 4OU would be most applicable. However, Northstar (2025) applied a more stringent odour criterion of 2OU for the odour assessment for the Project.

6.2.4.4 NSW Voluntary Land Acquisition and Mitigation Policy

The NSW Government published the *Voluntary Land Acquisition and Mitigation Policy for State Significant Mining, Petroleum and Extractive Industry Developments* (VLAMP) in September 2018 (NSW Government, 2018). The Applicant is required to assess the impacts of the development in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (EPA, 2022). Should exceedances of the relevant particulate matter criteria be predicted, then comparison with the mitigation and acquisition criteria within the VLAMP must be performed.

6.2.5 Assessment Methodology

6.2.5.1 Air Dispersion Modelling

Air dispersion modelling was used to simulate the dispersion of particulate matter associated with the sources outlined in Section 6.2.3. A range of emissions controls (for example, the use of fabric filters on drill rigs) were included in the modelling assessment (refer **Table 6.12**) with emission reduction factors applied based on accepted guidance. Modelling was performed using the NSW EPA approved CALPUFF atmospheric dispersion model in 3-dimensional (3-D) mode, adopting a 'No-Obs' meteorological modelling simulation, in accordance with NSW DPHI guidance (Barclay & Scire, 2011). This approach allowed the inclusion of topographical features which are present in the area surrounding the Project Site. Meteorological data

generated for the Project Site was also used (see Section 6.2.2.3). The modelling applied background air quality and meteorological data from the year 2021 which was determined to be most representative for the area. A discussion of the representative meteorological data and background air quality data is included in Appendix B and Appendix C of Northstar (2025).

6.2.5.2 Operational Scenarios

The assessment modelled dust generation from operational activities and likely dispersion pathways that account for topography and meteorological conditions, with dust levels for various particulate fractions predicted at private residences or sensitive locations. The assessment relied upon average and likely maximum operational characteristics to assess the Project against longer term (annual average) and shorter term (24-hour) criteria for particulate matter. Two operational scenarios were selected for dispersion modelling as presented in **Figure 6.4** and **Figure 6.5**.

- Operational Scenario 1
  - Stage E3 Extraction Area, Stage P2 Processing Area and Stage V2 Visibility Barrier.
  - Quarry production rate of 750,000tpa.
  - Material processing through a mobile processing plant.
  - Maximum production rate for concrete, asphalt and concrete recycling.
- Operational Scenario 2
  - Stage E3 Extraction Area, Stage P2 Processing Area and Stage V2 Visibility Barrier.
  - Quarry production rate of 1,000,000tpa.
  - Material processing through a fixed processing plant.
  - Maximum production rate for concrete, asphalt and concrete recycling.

As the background data for 24-hour $PM_{2.5}$ used for the assessment (based on the Monash AQMS) includes periods when the standard assessment criteria is breached (i.e. the criteria is exceeded within any assumed background level, regardless of the operation of the Project), Northstar (2025) assessed 24-hour average $PM_{2.5}$ and PM_{10} using a Level 2 Assessment as described in the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (EPA, 2022). In this approach the measured background levels for each day over a representative year are added to the corresponding predicted incremental dust level from the Project to establish the number of additional days (if any) in a representative year when the criteria would be exceeded as a result of the proposed changes.

It is noted that Stages E3 and E4 were selected as these stages were considered to be representative of the progressive development when the peak rates of extraction and processing area occurring.

A specific scenario for construction activities was not modelled as although construction activities would occur at the commencement of the Project, the activity rates and emissions are anticipated to be much lower and occur for only short periods of time.

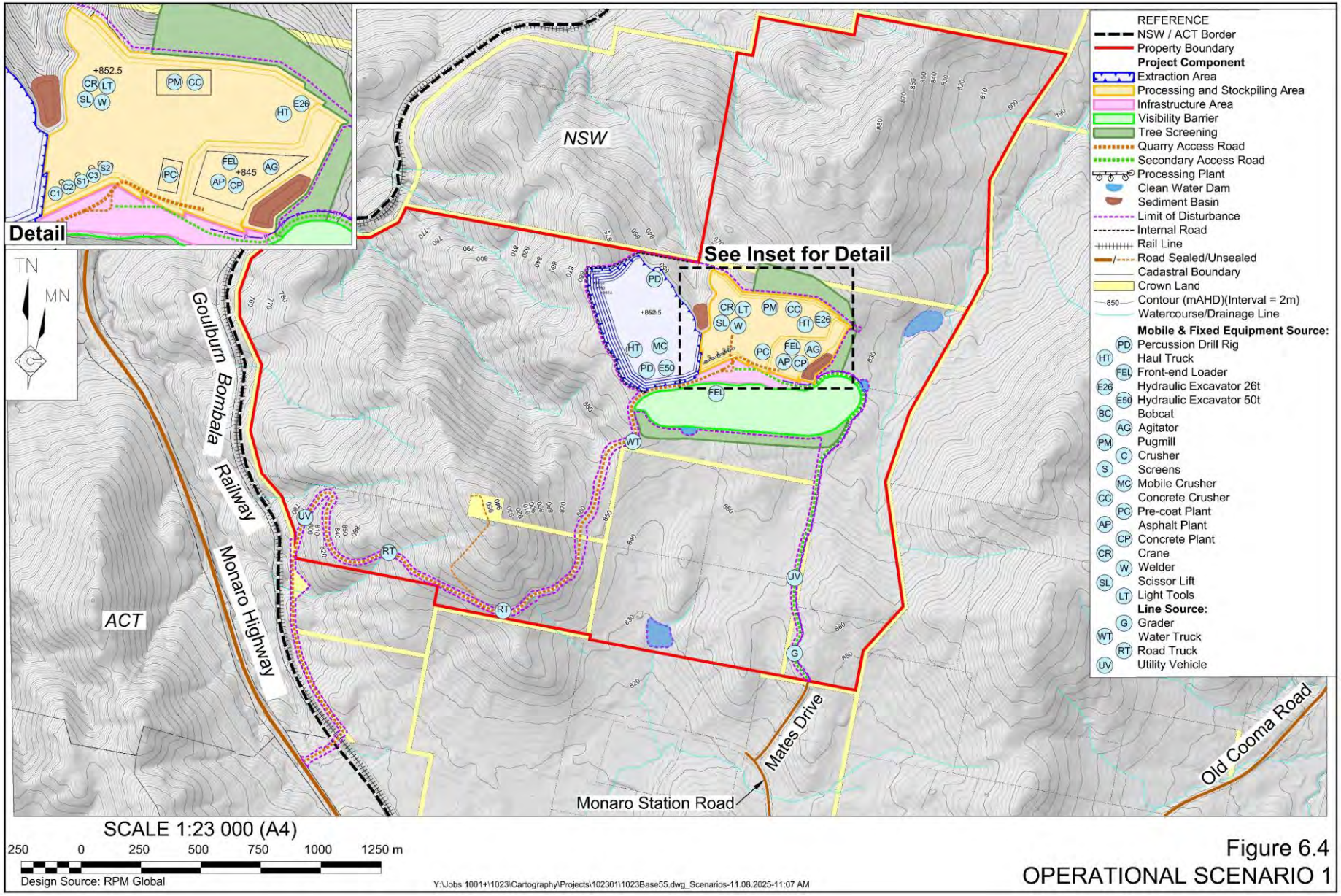


Figure 6.4
OPERATIONAL SCENARIO 1

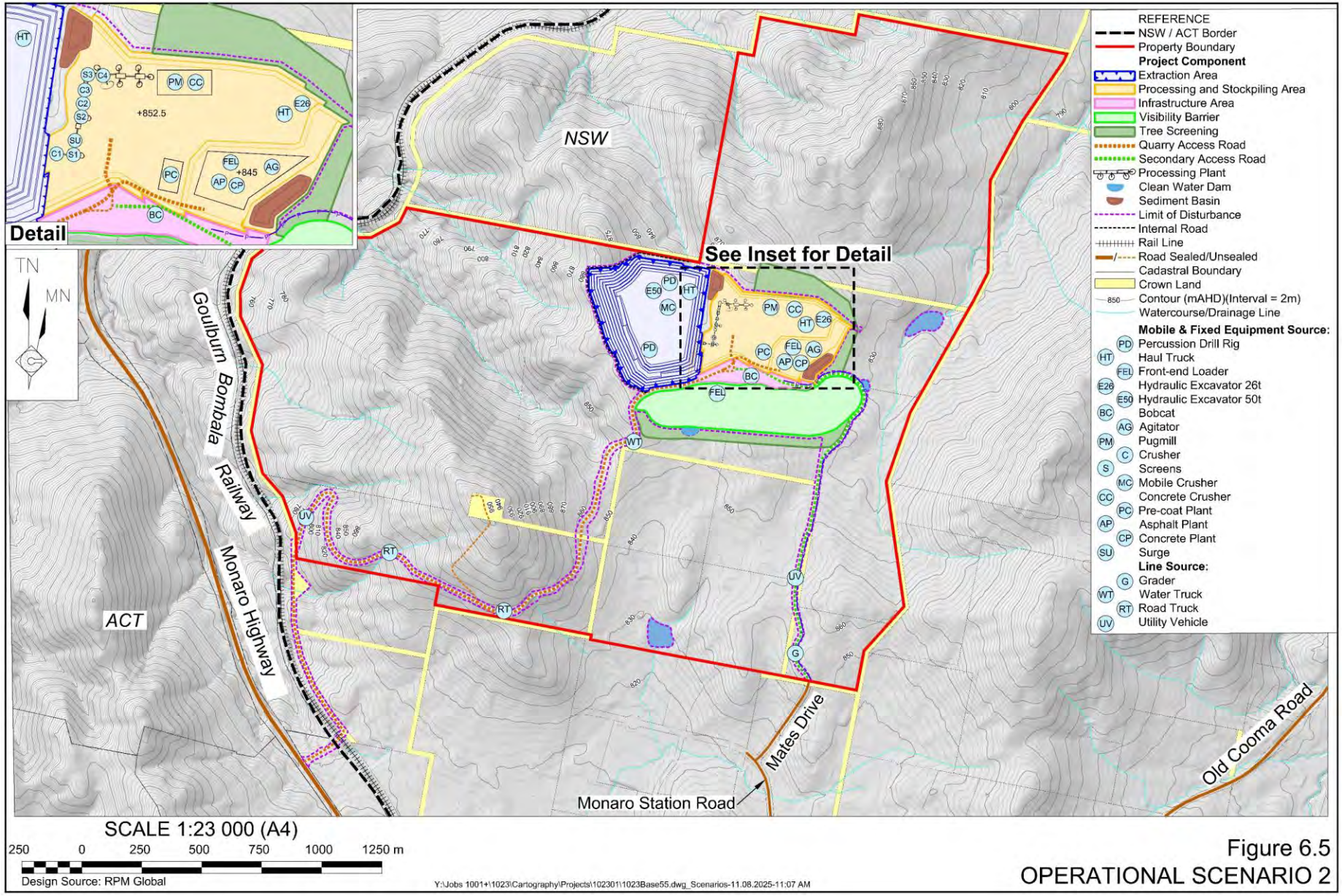


Figure 6.5
OPERATIONAL SCENARIO 2

6.2.5.3 Emissions Estimation

Emissions estimation of the Project Site was performed using the application of factors which appropriately represent the processes under assessment. Emission factors adopted for this assessment are summarised in **Table 6.12**. These factors are appropriate for adoption in Australia and are routinely adopted in the assessment of operations of this nature.

Emissions associated with the Concrete Batching Plant have been calculated using emission factors outlined in the Australian Government National Pollutant Inventory Emission Estimation Technique Manual (EETM) for Concrete Batching Plants (NPI, 1999a).

Emissions of odour from the Asphalt Batching Plant have been estimated based on emissions testing data associated with an operational asphalt batching plant in Tomago, NSW. The data was associated with the production of asphalt using rubber crumb, which is considered to represent a potential worst-case scenario. Potential emissions of particulate matter from the operation of the Asphalt Batching Plant have been estimated using the NPI EETM for hot mix asphalt plants (NPI, 1999b).

An assumption of steady rate Project operations across the year has been applied to annual emission estimation. Additionally, a conservative assumption of maximum activity occurring on every day of the year has been adopted for the maximum potential 24-hour impact assessment.

6.2.6 Management and Mitigation Measures

A range of emission controls have been assumed in the dispersion modelling and would be implemented to control the generation and dispersion of particulate matter at the Project Site. Most of the following measures are standard procedures for quarrying operations and considered best practice in the industry.

- The use of fabric filters on drill rigs.
- Minimise drop height during material unloading/loading.
- Application of water and/or chemical suppressants on materials crushing and screening operations and for transfer of materials and loading of stockpiles from plant.
- Use of dust shroud during concrete blending.
- Enclosure around loading point of concrete agitator trucks.
- Reverse pulse dust filters of materials storage silos.
- Application of water and/or chemical suppressants on all access roads.
- Limit all vehicles travelling on internal unsealed roads within the Project Site to a speed no greater than 30km/h.
- Use of vegetation screen and colorbond fence along the paved section of the Quarry Access Road.
- Fully extend each truck cover on laden product transport trucks before each truck leaves the Project Site
- Limit load sizes to ensure material is not above the level of truck sidewalls.

The Applicant would employ the following best practice procedures to ensure that dust impacts are minimised.

- Regularly service the dust collection system on the drill rig to ensure it remains effective.
- Maintain mobile equipment in accordance with the manufacturer's specifications to ensure equipment is operating efficiently.
- All unsealed internal roads would be surfaced with appropriate materials to limit dust lift-off, as required.
- Take appropriate care to avoid spillage during loading.
- Establish and maintain a complaints management system to ensure that all complaints are dealt with through investigation and implementation of corrective treatments.

6.2.7 Air Quality Management System

The Applicant would implement an air quality management system informed by real-time air quality monitoring at a minimum of two locations. The monitoring system would include notification triggers for Project personnel that would initiate an investigation response or action response (depending on the level triggered).

Section 8.1 of Northstar (2025) provides a detailed summary of how this system would be implemented including proactive measures for air quality management and reactive management such as the use of a trigger alarm on monitoring equipment to prompt prior warning of dust impacts and the necessary response in the event of an exceedance. These procedures would form the Air Quality Management System for the Project that that would be developed in more detail following an approval of the Project.

The general matters to be covered in the Air Quality Management System would include (but not be limited to) the following.

- A description of the controls that would be applied at the Project Site to limit air quality related impacts.
  - Operating within approved operating hours.
  - Staff training and inductions.
  - Specific mitigation measures such as sprays and enclosures.
  - Operational mitigation measures to guide behaviour at the site.
  - Guidance for the operation of a water cart for dust suppression including water application rates.
- Reactive management guidance including protocols for response to
  - Triggers established within monitoring equipment.
  - Incidents or non-compliant monitoring outcomes.

  - Complaints.
  - Predicted adverse weather.
  - Extraordinary events or Conditions
  - Pre-emptive measures for dust control, including:
- Area and activity specific controls for the Extraction Area, Processing and Stockpile Area, Asphalt Batching Plant, Concrete Batching Plant, Concrete Crushing activities, and haulage routes.

6.2.8 Assessment of Impacts

The following subsections summarise the air quality modelling results for both Scenario 1 and Scenario 2 that are presented in **Table 6.9** and **6.10**, respectively.

6.2.8.1 Annual Average Particulate Matter and Deposited Dust

The modelling results for annual average particulate matter dispersion are summarised as follows.

- Predicted concentrations of annual average TSP, PM_{10} and $PM_{2.5}$ at surrounding residences would be below the relevant criteria under both Scenario 1 and Scenario 2.
- Predicted annual average dust deposition at surrounding residences would be below the relevant criteria under both Scenario 1 and Scenario 2.

6.2.8.2 Incremental 24-hour Average Particulate Matter

Figure 6.6 and **Figure 6.7** present the maximum 24-hour average incremental PM_{10} and $PM_{2.5}$ assessment outcomes as isopleth/contour plots in relation to the residences under the assumptions of Scenario 1. The maximum 24-hour average PM_{10} and $PM_{2.5}$ concentrations under Scenario 1 are predicted to occur residence R2 (see **Table 6.11**). The predicted maximum 24-hour average concentrations at R2 under Scenario 1 are 10.2µg/m^3 for PM_{10} and 0.9µg/m^3 for $PM_{2.5}$, both significantly below the adopted criterion of 50µg/m^3 and 25µg/m^3 for PM_{10} and $PM_{2.5}$, respectively. All other assessment outcomes were below these results.

Figure 6.8 and **Figure 6.9** present the maximum 24-hour incremental PM_{10} and $PM_{2.5}$ assessment outcomes as isopleth/contour plots in relation to the residences under the assumptions of Scenario 2. The maximum incremental 24-hour average PM_{10} concentration under Scenario 2 is predicted to occur residence R16 (11.3 µg/m^3 see **Table 6.11**) and the maximum incremental 24-hour average $PM_{2.5}$ concentration under Scenario 2 is predicted to occur residence R2 (1.8µg/m^3 see **Table 6.11**). Both results are significantly below the adopted criterion of 50µg/m^3 and 25µg/m^3 for PM_{10} and $PM_{2.5}$, respectively. All other assessment outcomes were below these results.

Table 6.9
Air Quality Modelling Assessment Results – Scenario 1

Receptor	Annual Average Particulate Matter Concentration (µg/m³)									Annual Average Dust Deposition (g/m²/month)			Maximum Incremental 24-hour Average Concentration (µg/m³)		99th percentile 1-hour Odour Concentration (OU)
	TSP			PM_{10}			$PM_{2.5}$						PM_{10}	$PM_{2.5}$	
	Incr.	Bkg.	Cmul.	Incr.	Bkg.	Cmul.	Incr.	Bkg.	Cmul.	Incr.	Bkg.	Cmul.	-	-	Incr.
Criterion	**90**			**25**			**8**			**2**	**-**	**4**	**50**	**25**	**2.0**
Max % of criterion	**1.1**	**26.8**	**27.9**	**2.3**	**41.2**	**43.5**	**<0.1**	**86.3**	**87.5**	**<0.1**	**-**	**51.3**	**20.5**	**6.5**	**33.3**
PR1	1.1	24.1	25.2	0.5	10.3	10.8	<0.1	6.9	7.0	<0.1	2.0	2.1	6.3	0.9	0.7
R2	1.0	24.1	25.1	0.6	10.3	10.9	<0.1	6.9	7.0	<0.1	2.0	2.1	10.2	1.6	0.6
R3	1.0	24.1	25.1	0.5	10.3	10.8	<0.1	6.9	7.0	<0.1	2.0	2.1	7.9	1.3	0.6
R4	0.7	24.1	24.8	0.3	10.3	10.6	<0.1	6.9	7.0	<0.1	2.0	2.1	4.1	0.5	0.5
R5	0.7	24.1	24.8	0.3	10.3	10.6	<0.1	6.9	7.0	<0.1	2.0	2.1	5.0	0.8	0.5
R6	0.7	24.1	24.8	0.3	10.3	10.6	<0.1	6.9	7.0	<0.1	2.0	2.1	5.4	0.8	0.5
R7	0.7	24.1	24.8	0.2	10.3	10.5	<0.1	6.9	7.0	<0.1	2.0	2.1	3.5	0.6	0.3
R8	0.4	24.1	24.5	0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	2.3	0.3	0.2
R9	0.3	24.1	24.4	0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	2.2	0.3	0.3
R10	0.4	24.1	24.5	0.2	10.3	10.5	<0.1	6.9	7.0	<0.1	2.0	2.1	3.0	0.4	0.3
R11	0.4	24.1	24.5	0.2	10.3	10.5	<0.1	6.9	7.0	<0.1	2.0	2.1	4.0	0.6	0.3
R12	0.7	24.1	24.8	0.3	10.3	10.6	<0.1	6.9	7.0	<0.1	2.0	2.1	5.8	0.9	0.5
R13	0.6	24.1	24.7	0.3	10.3	10.6	<0.1	6.9	7.0	<0.1	2.0	2.1	5.4	0.8	0.5
R14	0.7	24.1	24.8	0.4	10.3	10.7	<0.1	6.9	7.0	<0.1	2.0	2.1	6.1	0.9	0.7
R15	0.7	24.1	24.8	0.4	10.3	10.7	<0.1	6.9	7.0	<0.1	2.0	2.1	7.9	1.2	0.7
R16	0.7	24.1	24.8	0.4	10.3	10.7	<0.1	6.9	7.0	<0.1	2.0	2.1	9.8	1.5	0.6
R17	0.4	24.1	24.5	0.3	10.3	10.6	<0.1	6.9	7.0	<0.1	2.0	2.1	4.9	0.7	0.7
R18	0.3	24.1	24.4	0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	2.5	0.4	0.5
R19	0.2	24.1	24.3	0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	2.3	0.4	0.5
R20	0.2	24.1	24.3	0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	2.3	0.4	0.4
R21	0.2	24.1	24.3	0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	2.4	0.4	0.4
R22	0.2	24.1	24.3	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	2.3	0.4	0.4
R23	0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	1.7	0.3	0.4
R24	0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	2.3	0.3	0.4

Table 6.9 (Cont'd)
Air Quality Modelling Assessment Results – Scenario 1

Receptor	Annual Average Particulate Matter Concentration (µg/m³)									Annual Average Dust Deposition (g/m²/month)			Maximum 24-hour Average Concentration (µg/m³)		99th percentile 1-hour Odour Concentration (OU)
	TSP			PM_{10}			$PM_{2.5}$						PM_{10}	$PM_{2.5}$	
	Incr.	Bkg.	Cmul.	Incr.	Bkg.	Cmul.	Incr.	Bkg.	Cmul.	Incr.	Bkg.	Cmul.	-	-	Incr.
Criterion	**90**			**25**			**8**			**2**	**-**	**4**	**50**	**25**	**2.0**
Max % of criterion	**1.1**	**26.8**	**27.9**	**2.3**	**41.2**	**43.5**	**<0.1**	**86.3**	**87.5**	**<0.1**	**-**	**51.3**	**20.5**	**6.5**	**33.3**
R25	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	2.7	0.4	0.4
R26	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	2.0	0.3	0.3
R27	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	1.3	0.2	0.2
R28	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	1.3	0.2	0.2
R29	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	1.3	0.2	0.2
R30	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	1.4	0.2	0.2
R31	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	1.7	0.2	0.3
R32	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	2.0	0.3	0.3
R33	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	1.5	0.2	0.3
R34	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	1.2	0.2	0.3
R35	0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	1.9	0.3	0.3
R36	0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	1.6	0.2	0.3
R37	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	1.3	0.2	0.1
R38	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	1.6	0.2	0.1
R39	0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	1.7	0.2	0.2
R40	0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	1.1	0.1	0.2
R11	0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	0.9	0.1	0.2
R42	0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	0.9	0.1	0.2
R43	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	0.7	<0.1	0.2
R44	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	0.6	<0.1	0.1
R45	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	0.6	<0.1	0.1
R46	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	0.7	<0.1	0.1
R47	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	0.6	<0.1	0.1

Incr.= Incremental Impact Bkg.= Background Cmul.= Cumulative Impact

Source: Northstar (2025) – Table 21, Table 22, Table 23 and Table 31

Table 6.10
Air Quality Modelling Assessment Results – Scenario 2

Receptor	Annual Average Particulate Matter Concentration (µg/m³)									Annual Average Dust Deposition (g/m²/month)			Maximum 24-hour Average Concentration (µg/m³)		99th percentile 1-hour Odour Concentration (OU)
	TSP			PM10			PM10						PM10	PM2.5	
	Incr.	Bkg.	Cmul.	Incr.	Bkg.	Cmul.	Incr.	Bkg.	Cmul.	Incr.	Bkg.	Cmul.	-	-	Incr.
Criterion	**90**			**2**			**8**			**2**	**-**	**4**	**50**	**25**	**2.0**
Max % of criterion	**1.5**	**26.8**	**28.3**	**2.6**	**41.2**	**43.8**	**<0.1**	**86.3**	**86.9**	**<0.1**	**-**	**51.3**	**22.6**	**7.3**	**33.3**
PR1	1.3	24.1	25.4	0.5	10.3	10.8	<0.1	6.9	7.0	<0.1	2.0	2.1	6.6	0.9	0.7
R2	1.3	24.1	25.4	0.7	10.3	11.0	<0.1	6.9	7.0	<0.1	2.0	2.1	11.2	1.8	0.6
R3	1.2	24.1	25.3	0.6	10.3	10.9	<0.1	6.9	7.0	<0.1	2.0	2.1	9.8	1.6	0.6
R4	0.8	24.1	24.9	0.3	10.3	10.6	<0.1	6.9	7.0	<0.1	2.0	2.1	4.4	0.6	0.5
R5	0.9	24.1	25.0	0.4	10.3	10.7	<0.1	6.9	7.0	<0.1	2.0	2.1	5.4	0.8	0.5
R6	0.8	24.1	24.9	0.4	10.3	10.7	<0.1	6.9	7.0	<0.1	2.0	2.1	5.8	0.9	0.5
R7	0.8	24.1	24.9	0.3	10.3	10.6	<0.1	6.9	7.0	<0.1	2.0	2.1	3.7	0.6	0.3
R8	0.5	24.1	24.6	0.2	10.3	10.5	<0.1	6.9	7.0	<0.1	2.0	2.1	2.6	0.4	0.2
R9	0.4	24.1	24.5	0.2	10.3	10.5	<0.1	6.9	7.0	<0.1	2.0	2.1	2.3	0.3	0.3
R10	0.4	24.1	24.5	0.2	10.3	10.5	<0.1	6.9	7.0	<0.1	2.0	2.1	3.2	0.4	0.3
R11	0.5	24.1	24.6	0.2	10.3	10.5	<0.1	6.9	7.0	<0.1	2.0	2.1	4.4	0.6	0.3
R12	0.8	24.1	24.9	0.4	10.3	10.7	<0.1	6.9	7.0	<0.1	2.0	2.1	6.5	1.0	0.5
R13	0.8	24.1	24.9	0.4	10.3	10.7	<0.1	6.9	7.0	<0.1	2.0	2.1	6.0	1.0	0.5
R14	0.9	24.1	25.0	0.5	10.3	10.8	<0.1	6.9	7.0	<0.1	2.0	2.1	7.0	1.2	0.7
R15	0.9	24.1	25.0	0.5	10.3	10.8	<0.1	6.9	7.0	<0.1	2.0	2.1	8.8	1.3	0.7
R16	0.9	24.1	25.0	0.5	10.3	10.8	<0.1	6.9	7.0	<0.1	2.0	2.1	11.3	1.7	0.6
R17	0.6	24.1	24.7	0.3	10.3	10.6	<0.1	6.9	7.0	<0.1	2.0	2.1	5.8	0.9	0.7
R18	0.4	24.1	24.5	0.2	10.3	10.5	<0.1	6.9	7.0	<0.1	2.0	2.1	2.8	0.5	0.5
R19	0.3	24.1	24.4	0.2	10.3	10.5	<0.1	6.9	7.0	<0.1	2.0	2.1	2.6	0.4	0.5
R20	0.3	24.1	24.4	0.2	10.3	10.5	<0.1	6.9	7.0	<0.1	2.0	2.1	2.6	0.4	0.4
R21	0.3	24.1	24.4	0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	2.7	0.4	0.4
R22	0.2	24.1	24.3	0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	2.7	0.4	0.4
R23	0.2	24.1	24.3	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	1.9	0.3	0.4
R24	0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	2.4	0.4	0.4

Table 6.10 (Cont'd)
Air Quality Modelling Assessment Results – Scenario 2

Receptor	Annual Average Particulate Matter Concentration (µg/m³)									Annual Average Dust Deposition (g/m²/month)			Maximum 24-hour Average Concentration (µg/m³)		99th percentile 1-hour Odour Concentration (OU)
	TSP			PM_{10}			PM_{10}						PM_{10}	$PM_{2.5}$	
	Incr.	Bkg.	Cmul.	Incr.	Bkg.	Cmul.	Incr.	Bkg.	Cmul.	Incr.	Bkg.	Cmul.	-	-	Incr.
Criterion	**90**			**2**			**8**			**2**	**-**	**4**	**50**	**25**	**2.0**
Max % of criterion	**1.5**	**26.8**	**28.3**	**2.6**	**41.2**	**43.8**	**<0.1**	**86.3**	**86.9**	**<0.1**	**-**	**51.3**	**22.6**	**7.3**	**33.3**
R25	0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	2.8	0.4	0.4
R26	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	2.5	0.4	0.3
R27	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	1.5	0.2	0.2
R28	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	1.5	0.2	0.2
R29	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	1.6	0.2	0.2
R30	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	1.6	0.2	0.2
R31	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	2.0	0.3	0.3
R32	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	2.5	0.4	0.3
R33	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	1.8	0.3	0.3
R34	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	1.4	0.2	0.3
R35	0.2	24.1	24.3	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	2.3	0.3	0.3
R36	0.2	24.1	24.3	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	1.8	0.3	0.3
R37	0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	1.7	0.2	0.1
R38	0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	2.0	0.3	0.1
R39	0.2	24.1	24.3	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	1.9	0.3	0.2
R40	0.2	24.1	24.3	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	1.2	0.2	0.2
R11	0.2	24.1	24.3	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	1.2	0.2	0.2
R42	0.2	24.1	24.3	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	1.0	0.1	0.2
R43	0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	0.8	0.1	0.2
R44	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	0.7	0.1	0.1
R45	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	0.6	<0.1	0.1
R46	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	0.8	0.1	0.1
R47	<0.1	24.1	24.2	<0.1	10.3	10.4	<0.1	6.9	7.0	<0.1	2.0	2.1	0.7	0.1	0.1

Incr.= Incremental Impact Bkg.=Background Cmul.=Cumulative Impact

Source: Northstar (2025) – Table 26, Table 27, Table 28 and Table 31

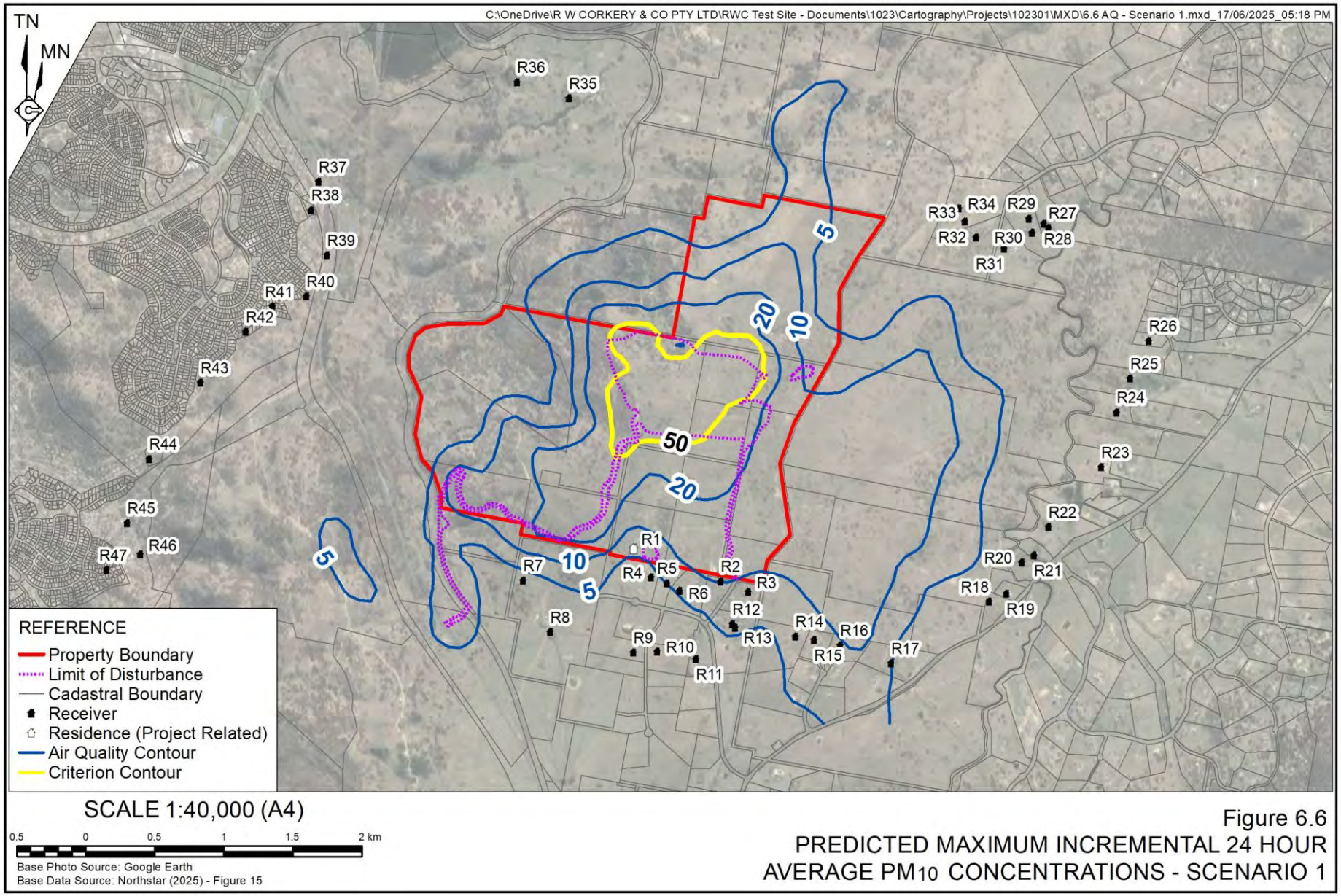


Figure 6.6
PREDICTED MAXIMUM INCREMENTAL 24 HOUR AVERAGE PM_{10} CONCENTRATIONS - SCENARIO 1

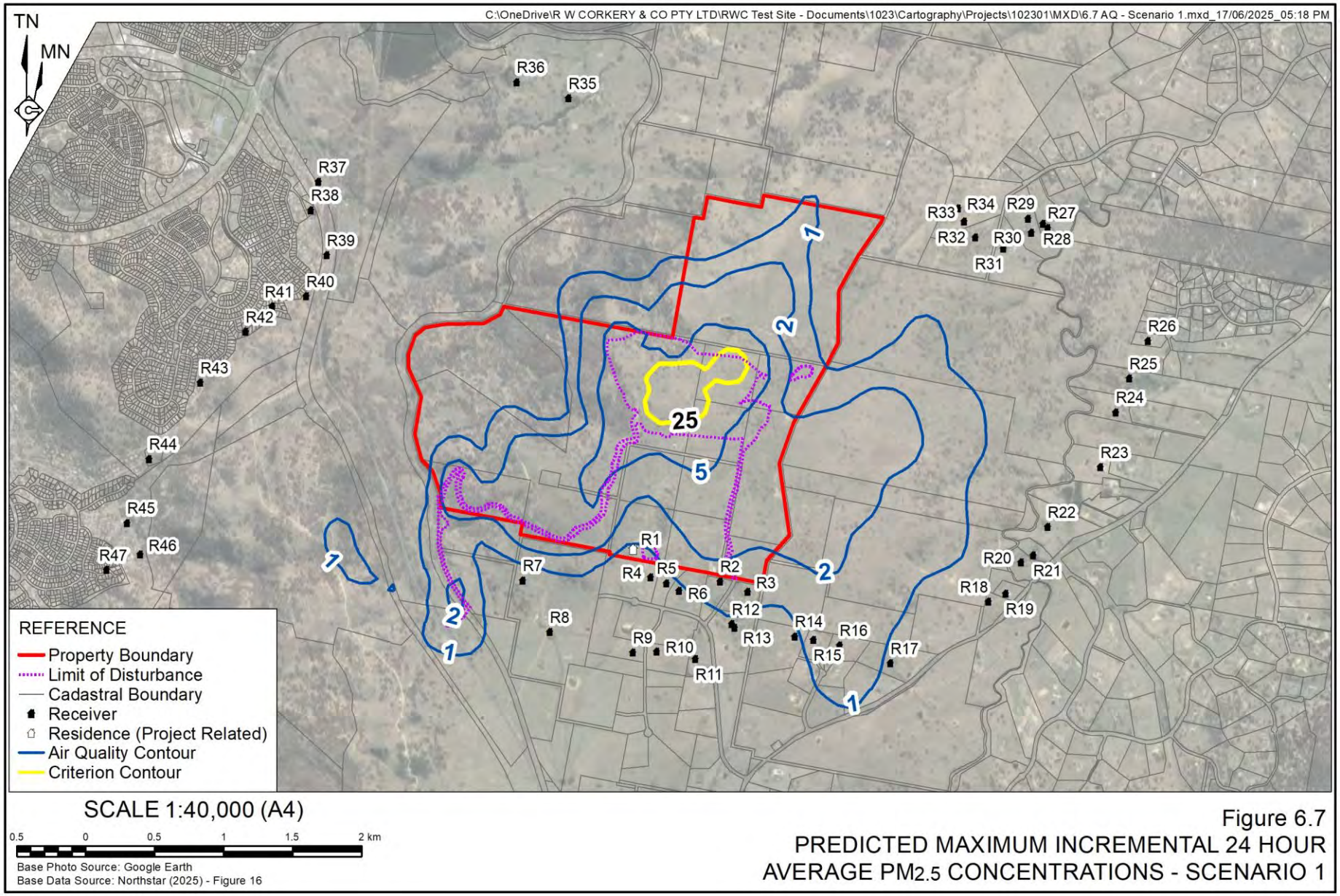


Figure 6.7
PREDICTED MAXIMUM INCREMENTAL 24 HOUR AVERAGE $PM_{2.5}$ CONCENTRATIONS - SCENARIO 1

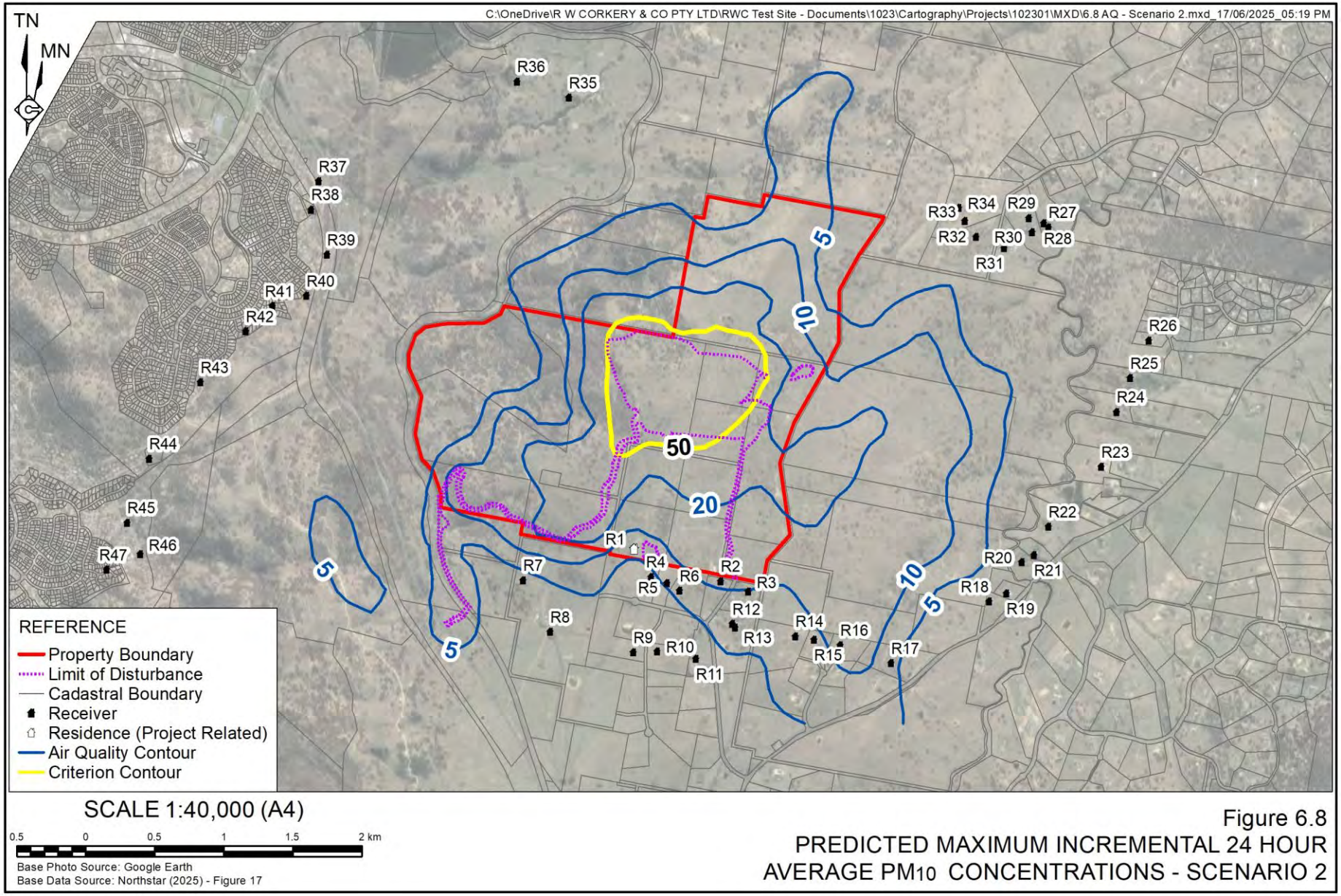


Figure 6.8
PREDICTED MAXIMUM INCREMENTAL 24 HOUR AVERAGE PM_{10} CONCENTRATIONS - SCENARIO 2

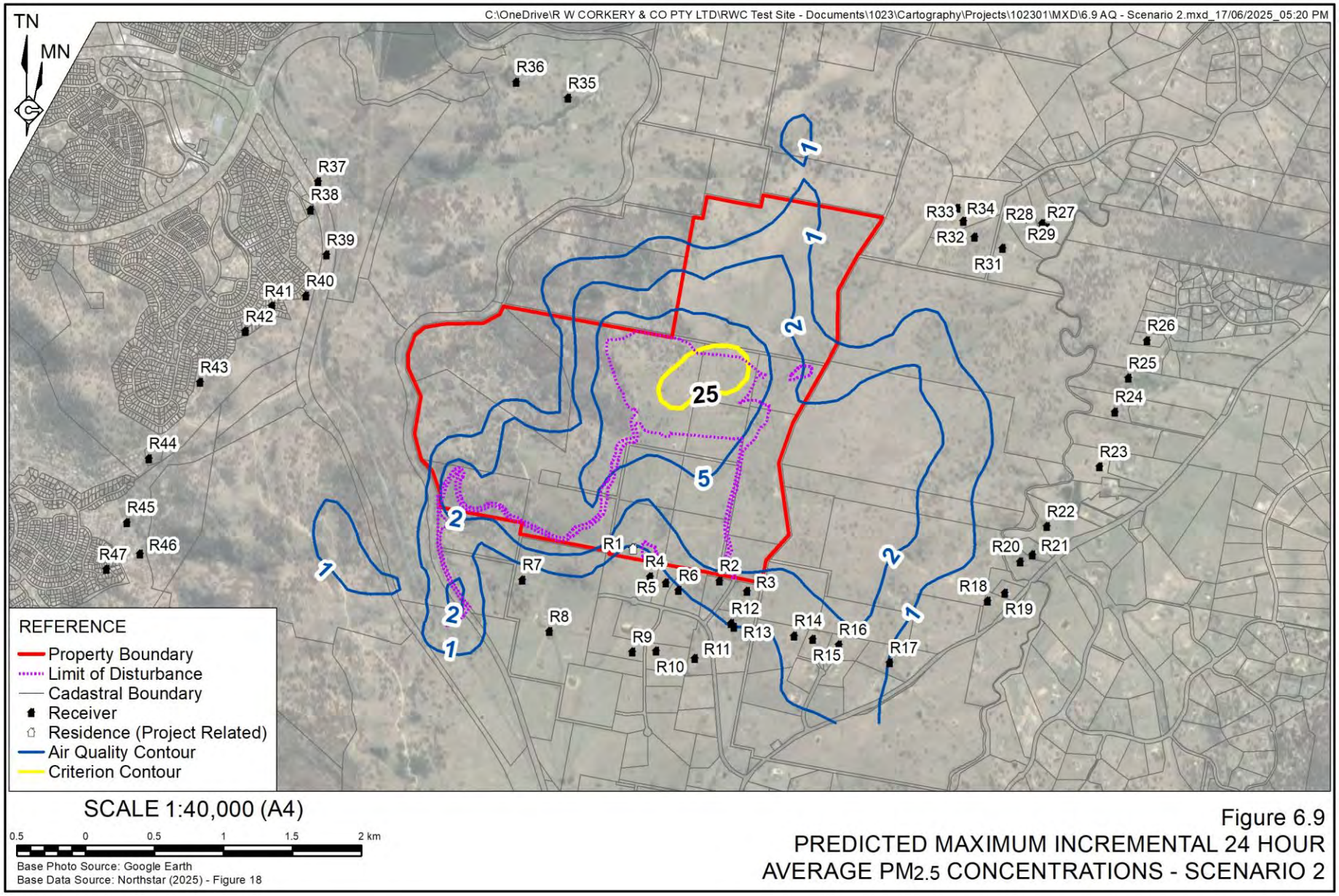


Figure 6.9
PREDICTED MAXIMUM INCREMENTAL 24 HOUR AVERAGE $PM_{2.5}$ CONCENTRATIONS - SCENARIO 2

6.2.8.3 Contemporaneous 24-hour Average Particulate Matter

Contemporaneous impact considers the cumulative outcome, assuming the predicted incremental change from the Project is added to background or existing dust or particulate matter levels. The Level 2 assessment approach considers if the addition of the Project would cause any days in the assessed representative year to have resulted in an exceedance with the presence if proposed activities. Northstar (2025) presented the contemporaneous impact assessment outcomes for Residence R2 as the most impacted location, noted that outcomes at all other residences would be similar or lower than this location.

There were no exceedances of the 24-hour average PM_{10} criterion in the analysed background data (see Section 6.2.2.1). The outcomes of the contemporaneous impact and background results for 24-hour average PM_{10} are presented in **Table 6.11** and demonstrate that no additional exceedances of the 24-hour average PM_{10} criterion are predicted at any modelled residence under Scenario 1 or Scenario 2 (Northstar, 2025). More detailed analysis of modelling outcomes is presented in Section 6 of (Northstar, 2025).

Table 6.11
Summary of Level 2 Assessment 24-hour Average PM_{10} Concentrations at Residence R2

Date	Scenario 1 (µg-m^{-3})			Date	Scenario 2 (µg-m^{-3})		
	Incr.	Bkg.	Cmul.		Incr.	Bkg.	Cmul.
29/04/2021	5.2	37.3	42.5	29/04/2021	6.1	37.3	43.4
30/04/2021	0.9	37.1	38.0	30/04/2021	1.1	37.1	38.1
19/05/2021	4.8	27.9	32.7	02/05/2021	6.1	26.8	32.9
22/07/2021	7.0	25.3	32.3	22/07/2021	7.6	25.3	32.9
02/05/2021	5.5	26.8	32.2	22/05/2021	9.2	23.3	32.6
01/05/2021	1.5	30.7	32.2	19/05/2021	4.5	27.9	32.5
20/05/2021	2.3	29.0	31.3	01/05/2021	1.7	30.7	32.4
22/05/2021	7.7	23.3	31.0	20/05/2021	2.3	29.0	31.3
31/05/2021	4.7	25.8	30.4	31/05/2021	5.2	25.8	31.0
22/08/2021	7.4	23.0	30.3	22/08/2021	7.7	23.0	30.7
Note: Incr. = Incremental impact, Bkg. = Background, Cmul. = Cumulative impact							
Source: Northstar (2025) – Table 24							

There were five exceedances of the 24-hour average $PM_{2.5}$ criterion in the analysed background data (see Section 6.2.2.1). The contemporaneous impact and background results for $PM_{2.5}$ is presented in **Table 6.12** and demonstrates that one additional exceedance is predicted to occur at Receptor R2 on 22 July 2021 as a result of the Project. Northstar (2025) notes that this exceedance would also occur at Residence R3 but at no other residence. The additional exceedance at Residence R2 occurs when the background conditions were 96.4% of the criterion (that is dust present without the Project) under both Scenario 1 and Scenario 2 (Northstar, 2025).

Table 6.12
Summary of Level 2 Assessment 24-hour Average $PM_{2.5}$ Concentrations at Residence R2

Date	Scenario 1 (µg-m^{-3})			Date	Scenario 2 (µg-m^{-3})		
	Incr.	Bkg.	Cmul.		Incr.	Bkg.	Cmul.
29/04/2021	0.8	27.9	28.7	29/04/2021	1.0	27.9	28.8
30/04/2021	0.1	25.8	25.9	30/04/2021	0.2	25.8	26.0
08/07/2021	<0.1	25.6	25.7	08/07/2021	<0.1	25.6	25.7
01/05/2021	0.2	25.4	25.6	01/05/2021	0.2	25.4	25.7
21/05/2021	<0.1	25.2	25.3	22/07/2021	1.2	24.1	25.3
22/07/2021	1.1	24.1	25.2	21/05/2021	<0.1	25.2	25.3
19/05/2021	0.7	24.0	24.7	19/05/2021	0.7	24.0	24.6
02/05/2021	0.8	22.8	23.7	22/05/2021	1.4	22.5	23.9
22/05/2021	1.2	22.5	23.7	02/05/2021	1.0	22.8	23.8
19/08/2021	0.6	23.0	23.6	19/08/2021	0.6	23.0	23.7

Note: Shaded green cell = Pollutant concentration / deposition rate less than the relevant criterion.
Shaded yellow cell = Pollutant concentration / deposition rate equal to, or greater than the relevant criterion.
Incr. = Incremental impact, Bkg. = Background, Cmul. = Cumulative impact

Source: Northstar (2025) – Table 29 and Table 30

The predicted additional exceedance of the 24-hour $PM_{2.5}$ criterion on 22 July 2021 under both Scenario 1 and Scenario 2 indicates a minimal reduction in total incremental impact would be required to achieve the criterion. Review of the existing exceedances of the 24-hour $PM_{2.5}$ criterion (see Appendix C of Northstar (2025)) indicates they occurred during hazard reduction burns or during winter and resulting from increased use of wood fired heaters. That notwithstanding, reductions in incremental dust generation on these days may achieve improved outcomes, noting that operations at the Project Site would be informed by continuous air quality monitoring.

Northstar (2025) also noted that the situation of the Project operating at maximum capacity on each and every day of the year is unlikely to eventuate, therefore, the modelling results should be viewed as conservative. That is, it is unlikely that peaks in operation would correspond with hazard reduction burns or the increased use of wood-fired heaters but it remains possible. Therefore, while the predicted minor exceedance of the 24-hour $PM_{2.5}$ criterion would not be anticipated to occur, the Applicant would monitor and respond to conditions in accordance with its Air Quality Management System.

6.2.8.4 Odour

The 99th percentile 1-hour average odour concentrations at surrounding receptor locations resulting from the operation of the Asphalt Batching Plant were predicted under both Scenario 1 and Scenario 2 (**Table 6.9** and **Table 6.10**).

In summary, the modelling demonstrated that all results under both Scenario 1 and Scenario 2 are predicted to be significantly below the adopted criterion of 2OU (Northstar, 2025). All results would be below the odour threshold (1OU) indicating that odour from the Project Site is unlikely to be detected.

6.2.8.5 Annual Average Respirable Crystalline Silica

Petrographic analysis of the resource that it the target of the Project indicates that it is comprised of between 30% and 40% quartz. To assess risks associated with exposure to Respirable Crystalline Silica (RCS), an annual average RCS concentration of 40% of the annual average PM_{10} concentration was considered by Northstar (2025). The highest incremental annual average PM_{10} prediction was 0.6µg/m^3, resulting in an RCS concentration under Scenario 1 of 0.24µg/m^3, and under Scenario 2 of 0.28µg/m^3, both significantly below the adopted annual average RCE criterion of 3µg/m^3. In summary, the modelling results indicate that all predicted incremental concentrations under both Scenario 1 and Scenario 2 would be significantly below the relevant criteria for RCS at surrounding receptor locations (Northstar, 2025).

6.2.8.6 Voluntary Land Acquisition and Mitigation Policy

The relevant air quality criteria related to the NSW VLAMP are not exceeded on any parts of private landholdings under the assumptions of Scenario 1 or Scenario 2. The modelling demonstrates that all results meet air quality requirements related to the VLAMP at surrounding residences or on any parts of privately-owned residences or landholdings (Northstar, 2025).

6.2.9 Conclusion

The results of the AQIA undertaken by Northstar (2025) indicate that the Project is predicted to comply with all impact assessment criteria for annual average concentrations of TSP, $PM_{2.5}$, PM_{10}, Odour, RCS and deposited dust with the implementation of the standard mitigation measures. The assessment of 24-hour average $PM_{2.5}$ and 24-hour average PM_{10} applying a Level 2 Assessment has indicated that there would be one additional exceedances of the assessment criteria for 24-hour average $PM_{2.5}$ as a result of the Project but that this occurs when background conditions are close to exceeding the criteria and the incremental impact of the Project remains a minor contribution.

The outcomes of the AQIA reflect the siting of the Project at a distance of approximately 1.5km from the closest private residence and with topographic features including hills and ridgelines influencing likely dust dispersion.

The implementation of an Air Quality Management System for the Project would ensure that air quality risks are managed and monitored, and a system is in place to direct proactive management measures and to guide reactive management of unexpected outcomes. This would include the real-time monitoring of air quality that would provide immediate indicators of impact and trigger changes to operations or an investigation into dust sources. Management of air quality risks on an ongoing basis would ensure that dust levels are kept to an acceptable level and that health risks associated with particulate matter and respirable crystalline silica remain low and acceptable.

6.3 Greenhouse Gas

6.3.1 Introduction

The SEARs for the Project require the EIS to address greenhouse gas emissions from Project and include the following.

- A greenhouse gas assessment of the operation of the development having regard to any applicable State or national policies, programs or guidelines.
- Details of proposed mitigation, management and monitoring measures.

A Greenhouse Gas Assessment (GHGA) for the Project was undertaken by Northstar Air Quality Pty Ltd (Northstar) as part of the Air Quality Impact Assessment (AQIA) and is presented as **Appendix B** and hereafter referred to as Northstar (2025).

The assessment requirements identified by the Environment Protection Authority (EPA) were also considered during the preparation of the greenhouse gas assessment. A summary of the SEARs and requirements of the EPA are listed within **Appendix 2** with a record of where each requirement is addressed in the EIS. The following subsections provide a summary of Northstar (2025) and describe the proposed ongoing operational control measures that would be implemented by the Applicant.

6.3.2 Existing Environment

The Commonwealth of Australia tracks the emissions of greenhouse gases (GHG) via the Australian National Greenhouse Accounts (ANGA) program. The ANGA program, along with its reports and data submitted as part of the program, fulfils Australia's international and domestic reporting requirements. Data from the 2022 reporting (the most recent reports at the time of drafting) for Australia was considered by Northstar (2025) including the following.

- *National Inventory by Economic Sector 2022* (DCCEEW, 2024b)
- *State and Territory Greenhouse Gas Inventories 2022* (DCCEEW, 2024c).

The *State and Territory Greenhouse Gas Inventories 2022* report documents the total carbon emissions by State, Territory, and sector, annually.

In 2022, the Scope 1 GHG emissions from Australia across all economic sectors were 432.6Mt carbon dioxide equivalent (CO_2-e). In comparison, Scope 1 emissions from the mining / quarrying industry sector (including metal ore and non-metallic mineral mining and quarrying) accounted for 17.9Mt CO_2-e, or 4.1% of total emissions (DCCEEW, 2024b). In NSW, GHG emissions associated with the mining sector accounted for 14.5Mt CO_2-e in 2022, 13% of the States total GHG emissions for that year.

6.3.3 Statutory Context

Northstar (2025) considered several financial and reporting standards throughout the GHGA in addition to various Australian Government and NSW Government Schemes.

- Schemes legislated by the Australian Government for measuring, managing, reducing and offsetting Australia's carbon emissions including the following.
  - National Greenhouse and Energy Reporting (NGER) Scheme, under the *National Greenhouse and Energy Reporting Act* (2007).
  - Emissions Reduction Fund, under the *Carbon Credits (Carbon Farming Initiative) Act* (2011).
  - Renewable Energy Target, under the *Renewable Energy (Electricity) Act* (2000).
  - Australian National Registry of Emission Units under the *Australian National Registry of Emission Units Act 2011*.
- Legislation and policies applied in NSW including the *Climate Change (Net Zero Future) Act 2023*, the NSW EPA *Climate Change Policy 2023* and *NSW Guide for Large Emitters 2024*.
- GHG Accounting and reporting principles as described in the following guidance.
  - Commonwealth Department of Climate Change, Energy, the Environment and Water, *Australian National Greenhouse Accounts Factors 2024* (DCCEEW, 2024d).
  - The World Resources Institute (WRI) and the World Business Council for Sustainable Development (WSCSD) *GHG Protocol: A Corporate Accounting and Report Standard* (WRI, 2004).
  - ISO 14064-1:2018 *Greenhouse Gases – Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals*.
  - ISO 14064-1:2018 *Greenhouse Gases – Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements*.
  - ISO 14064-3:2019 *Greenhouse Gases – Part 3: Specification with guidance for the verification and validation of greenhouse gas statements.*

6.3.4 Assessment Methodology

Northstar (2025) performed a quantitative assessment of likely GHG emissions arising from the various activities associated with the proposed operation of the Project. The source of the emissions from proposed operational activities were determined and subsequently considered under two classifications, whether they are direct or indirect, and whether they are Scope 1, Scope 2, or Scope 3. Several assumptions were made regarding each emission generating activity calculate an emissions estimation, which was then compared with the total national and NSW GHG emissions from 2022 for context.

The GHGA does not provide a definitive quantification of GHG emissions arising from the Project but provides estimates and the general context of the likely quantum of emissions, similar to other modelling performed for the Project.

6.3.4.1 Emission Types

Two types of GHG emissions are defined in the *Australian National Greenhouse Accounts Factors 2024* (DCCEEW, 2024d) as follows.

- Direct – Produced from sources within the boundary of an organisation and as a result of that organisation's activities (e.g. consumption of fuel in on-site vehicles).
- Indirect – Generated in the wider economy as a consequence of an organisation's activities (particularly from its demand for goods and services), but which are physically produced by the activities of another organisation (e.g. consumption of purchased electricity.

The GHGA considered both emission types resulting from the operation of the Project.

6.3.4.2 Emission Scopes

Three 'scopes' of emissions for GHG accounting and reporting purposes are identified by the *Australian National Greenhouse Accounts Factors 2024* (DCCEEW, 2024c) and the Greenhouse Gas Protocol (GHG Protocol) (WRI, 2004).

- Scope 1 – Direct (or point-source) emission factors give the kilograms of carbon dioxide equivalent (CO2-e) emitted per unit of activity at the point of emission release (i.e. fuel use, energy use, manufacturing process activity, mining activity, on-site waste disposal, etc.). These factors are used to calculate Scope 1 emissions (DCCEEW, 2024d).
- Scope 2 – Indirect emission factors are used to calculate Scope 2 emissions from the generation of the electricity purchased and consumed by an organisation as kilograms of CO2-e per unit of electricity consumed. Scope 2 emissions are physically produced by the burning of fuels (coal, natural gas, etc.) at the power station (DCCEEW, 2024d).
- Scope 3 – An optional reporting category that allows for the treatment of all other indirect emissions. Scope 3 emissions are a consequence of the activities of the company but occur from sources not owned or controlled by the company (e.g. extraction and production of purchased materials; transportation of purchased fuels; and use of sold products and services) (WRI, 2004).

As Scope 3 emissions are generally outside the control of the Applicant they are not always considered an impact of a specific project. Northstar (2025) considered emissions associated with the transport of materials from the Project as Scope 1 emissions as they are under the operational control of the Applicant, however the use of fuels in employee transport to the Project Site have also been considered as Scope 3 emissions.

6.3.4.3 Emission Source Identification

The geographical boundary of the GHGA is defined as activities within the Project Site and the transport of materials from the Project Site to customers. **Table 6.13** presents GHG emission sources assessed by Northstar (2025) as they have the potential to generate GHG emissions within the boundary of the assessment. Each emission is categorised as Scope 1, Scope 2 or/and Scope 3 emission sources.

Table 6.13
Greenhouse Gas Emission Sources for the Project

Project Component	Scope	Emission Source Description
Consumption of diesel fuel in mobile plant and equipment at the Project Site	1, 3	Emissions from combustion of fuel (Scope 1) Emissions associated with the extraction and processing of fuel (Scope 3)
Consumption of electricity at the Project Site	2, 3	Emissions associated with the generation of electricity (Scope 2) Upstream and downstream emissions associated with electricity generation (Scope 3)
Consumption of diesel fuel / unleaded fuel for material transport purposes	1, 3	Emissions from combustion of fuel (Scope 1) Emissions associated with the extraction and processing of fuel (Scope 3)
Consumption of diesel fuel / unleaded fuel for employee transport purposes	3	Emissions associated with the extraction and processing of fuel (Scope 3)
Source: Northstar (2025) – Table 18		

6.3.4.4 Emissions Estimation

Northstar (2025) calculated the emissions of GHG from the source using activity data for the source per annum (i.e. per kilowatt (kW) of electricity, per kilolitre (kL) of diesel) and the relevant emission factor for each source. The assumptions used in the calculation of activity data for the emission source and emission factors are presented in **Table 6.14**.

6.3.4.5 Emission Factors

Northstar (2025) utilised emissions factors for the GHGA associated with the operation of the Project as per **Table 6.15**, sourced from the NGA Factors (CDDEEW, 2024d).

Table 6.14
Calculated Activity Data

Component	Assumptions	Activity	Units
Consumption of diesel fuel in mobile plant and equipment at the Quarry	In the absence of specific information, a diesel fuel consumption rate of 1L per t of rock processed has been applied, based on review of other quarrying operations. Disel fuel use estimated to be 1,200,000L per annum in mobile equipment and to provide power to the processing plant. Light vehicles and product transport trucks may also be refuelled on site, although the fuel use associated with trucks is considered separately below.	1,200	kL-annum^{-1}
Consumption of diesel fuel in asphalt batching plant	To produce 1t of hot mix asphalt requires between 7.6L to 11.4L of diesel (Thives & Ghisi, 2017). To produce the required 50,000t of asphalt per year would require 570kL of diesel.	570	kL-annum^{-1}
Consumption of diesel fuel / unleaded fuel for employee transport purposes	20 to 30 full-time equivalent positions to be generated by the Project (including 10 truck drivers). Assume employees reside in Canberra (45km as a two-way journey). 300 days per year 10.6L per 100km fuel efficiency (ABS, 2017)	42.9	kL-annum^{-1}
Consumption of diesel fuel / unleaded fuel for material transport purposes	Market for products would vary, although for the purposes of this assessment, laden trucks are assumed to travel to Goulburn (or equivalent distance, on average). 220km return trip, to travel 26.2km to Rankin Springs (20% of loads) and 49.2km to Goolgowi (80% of loads) Up to 46,500 return trips each year (all materials and products – no backloading assumed) 56.3L per 100km fuel efficiency (ABS, 2017)	5,438	kL-annum^{-1}
Electricity	Electricity consumption across the Project Site is not known, although electricity is likely to be used in administration buildings and in the concrete batching plant (Lend Lease, Unknown) provides an electricity consumption rate of 4.375kWh of electricity per 1m^3 of concrete produced. Assuming 50,000m^3 of concrete produced per year results in 218,750kWh electricity consumption per year.	218,750	kWh-annum^{-1}

Source: Northstar (2025) – Table 19

Table 6.15
Greenhouse Gas Emission Factors

Emission Scope	Emission Source	Emission Factor	Energy Content Factor
Scope 1	Diesel fuel for mobile plant and equipment and material transport	70.2 kg CO_2-e GJ^{-1}	38.6 Gj-kL^{-1}
	Diesel fuel for material transport	70.2 kg CO_2-e GJ^{-1}	38.6 Gj-kL^{-1}
Scope 2	Consumption of purchased electricity (NSW and ACT)	0.66 kg CO_2-e kWh^{-1}	NA
Scope 3	Diesel fuel for mobile plant and equipment	17.3 kg CO_2-e GJ^{-1}	38.6 Gj-kL^{-1}
	Unleaded fuel for employee transport	17.2 kg CO_2-e GJ^{-1}	34.2 Gj-kL^{-1}
	Diesel fuel for material transport	17.3 kg CO_2-e GJ^{-1}	38.6 Gj-kL^{-1}
	Consumption of purchased electricity (NSW and ACT)	0.04 kg CO_2-e kWh^{-1}	NA
Source: Northstar (2025) – Table 20			

6.3.5 Management and Mitigation Measures

GHG mitigation would be regulated by the NSW EPA and the Applicant agrees to consider measures to avoid emission generation where feasible and where this is not possible to mitigate emission generation. This may include the use of solar power at the Project, the shift from diesel power generation to grid supply or the purchase of 'green' electricity through grid supply.

Although GHG emissions are anticipated to be small, Northstar (2025) recommends reducing emissions further through the application of the following measures.

- All vehicles/plant and machinery should be turned off when not in use and regularly serviced to ensure efficient operation, including the optimisation of tyre pressures.
- Truck routes and loading capacity should be designed to reduce the distance and effort required by the vehicles.
- Maintenance of roads in good condition to avoid meandering of vehicles.
- Reducing gradients around site where feasible.
- Where possible, B5 fuel should be used in plant and equipment.

6.3.6 Assessment of Impacts

A quantitative assessment of greenhouse gas (GHG) emissions generated by the Project was undertaken by Northstar (2025) with emissions compared to national and State totals. Emissions associated with the Project would represent less than 0.005 % of Australian and less than 0.002 % of NSW emissions totals for the year 2022. Emissions are proposed to be reduced further through the implementation of a maintenance program for all plant and equipment.

6.3.6.1 Calculation of Greenhouse Gas Emissions

Northstar (2025) calculated the GHG emissions based on the activity data for the operation of the Project and the emissions factors outlined in Section 6.3.4.5, detailed in **Table 6.16**.

Table 6.16
Project GHG Emissions in Context

Project Phase	Emissions (t CO_2-e per annum)		
	Project	NSW (2022) Total – 111 Mt	Australia (2022) Total 432.6 Mt
Maximum operation	19,531.7	0.018%	0.005%
Source: Northstar (2025) – Table 34			

The Project is calculated to result in direct (Scope 1) GHG emissions of 19,532t CO_2-e per annum.

6.3.6.2 Greenhouse Gas Emissions in Context

Northstar (2025) compared the results of the GHGA to the Australian (DCCEEW, 2024b) and NSW (DCCEEW, 2024d) total emissions, as per **Table 6.17**.

The Project is calculated to contribute less than 0.002% of NSW total GHG emissions and less than 0.005% of Australian total GHG emissions in 2022.

6.3.7 Conclusion

The Northstar (2025) GHG assessment concluded that average Scope 1 emissions from the Project would represent less than 0.005% of Australian and less than 0.002% of NSW GHG emissions which represents a very minor proportion of global GHG emissions. GHG emission impacts are acceptable and do not require targeted mitigation. The Applicant would be guided by the requirements of the NSW EPA on future GHG emission avoidance, mitigation or offset as determined under the NSW EPA *Climate Change Policy 2023.* Any requirements would be regulated under an Environment Protection Licence (EPL) for the Project.

Table 6.17
Calculated Project GHG Emissions

Scope		Activity Rate	Units	Energy Content	Units	Emission Factor		Emissions CO_2-e (t-yr^{-1})
1	Diesel fuel in plant and machinery on site	1,200	kL yr^{-1}	38.6	GJ-kL^{-1}	70.2	kg CO_2-e-GJ^{-1}	3,251.7
	Material transport	5,438						14,735.5
	Diesel fuel in plant and machinery at asphalt batching plant	570						1,544.5
							Scope 1 (subtotal)	**19,531.7**
2	Electricity consumption	218,750	kWh yr^{-1}	-	-	0.66	Kg CO_2-e-kWh^{-1}	144.4
							Scope 2 (subtotal)	**144.4**
3	Diesel fuel in plant and machinery on site	1,200	kL-yr^{-1}	38.6	GJ-kL^{-1}	17.3	kg CO_2-e-GJ^{-1}	801.3
	Material transport	5,438						3,631.4
	Diesel fuel in plant and machinery at asphalt batching plant	570						380.6
	Employee travel	42.9		34.2		17.2		25.2
	Electricity consumption	218,750	kWh-yr^{-1}	-	-	0.04	Kg CO_2-e-kWh^{-1}	8.8
							Scope 3 (Subtotal)	**4,847.3**

Source: Northstar (2025) – Table 33

6.4 Human Health

6.4.1 Introduction

The EPA assessment requirements for the Project require the EIS to include a Human Health Risk Assessment (HHRA), undertaken in conjunction with the air quality and odour impact assessment (Section 6.2 of this EIS). The human health risk assessment must be undertaken following the *Environmental Health Risk Assessment: Guidelines for Assessing Human Health Risks from Environmental Hazards* (enHealth) and must include the inhalation of criteria pollutants and exposure from all pathways (i.e. inhalation, ingestion and dermal to specific air toxics)[1]. Health risks associated with the Project have also been raised by the community throughout consultation. It is noted that a significant community concern is silica dust and silicosis risk.

A summary of the SEARs and requirements of the EPA are listed within **Appendix 2** with a record of where each requirement is addressed in the EIS.

This section presents the outcomes of assessment of potential human health risks associated with air emissions from the proposed operation of the Quarry within the Project Site. The HHRA undertaken by EnRisks (2025) is provided as **Appendix C**.

6.4.2 Assessment Methodology

The HHRA follows a structured approach, generally consistent with the enHealth, *Environmental Health Risk Assessment: Guidelines for Assessing Human Health Risks from Environmental Hazards* (enHealth, 2012) and includes the following.

- Identifying key issues relevant to the assessment of health risks and summarising relevant Project background information and available data
- Defining the surrounding community and outlining their demographic and social characteristics.
- A comprehensive review of the known risks associated with Particulate Matter (PM) and Respirable Crystaline Silica (RCS) exposure, including how, where, and when it affects humans. This included a review of physical and chemical properties of RCS and an assessment of the toxicity of RCS.
- Review of case studies that monitored background levels of RCS and reported on environmental (non-occupational) exposure to RCS. This allowed an estimate of likely background levels of RCS to be developed.
- An assessment of health impacts based on exposure predicted by the AQIA prepared by Northstar (2025) and presented in Section 6.2 of this EIS.

[1] Reference in the EPA assessment requirements to the use of a waste to energy facility is considered to be an error and is not considered further.

- Evaluating human health risks based on the gathered information. This risk assessment includes conclusions regarding potential health risks, acknowledges uncertainties, and outlines any necessary risk management actions.
- An assessment of uncertainties in the assessment and potential outcomes.

Air Quality Impact Assessment (AQIA)

The HHRA assessed and characterised health risks associated with the likely impacts of day-to-day operation of the Project through reference to the AQIA modelling and predicted exposure outcomes for particulate matter.

The AQIA identified multiple sources of dust and air emissions during operations, including the following.

- Quarrying activities: drilling, blasting, material handling, processing, vehicle movements, wind erosion, and equipment exhaust.
- Concrete and asphalt facilities: material handling, vehicle movements on paved/unpaved roads, plant operations, and loading of products to trucks.
- Concrete recycling: material processing, handling, and vehicle activity.

The two operational scenarios modelled in the AQIA (Stages E3 and E4 of extraction operations) were considered in the HHRA as` presented in **Figure 6.4** and **Figure 6.5** of Section 6.2. Air quality modelling focused on key pollutants: Total Suspended Particulates (TSP), PM_{10}, $PM_{2.5}$, and Respirable Crystalline Silica (RCS), as these are the primary emissions of concern from project activities (Northstar, 2025). The air quality modelling methodology is presented in Section 6.2.5 and the assessment outcomes are presented in Section 6.2.8.

6.4.3 Community Health Profile

The HHRA considers potential health impacts within the whole population that comprises a community. This includes sensitive or vulnerable groups within the population. The Project Site is wholly located within the Queanbeyan-Palerang Local Government Area (LGA).

Based on the population data presented in **Table 6.18**, the communities within the Queanbeyan-Palerang LGA and their surrounds and Googong SA2 (Statistical Area 2) include the following statistical observations.

- Older Population: Lower proportion over 65 than NSW average
- Younger Population: Slightly higher proportion of people under 19 (including 0-4 years)
- Indigenous Population: Similar or lower than NSW average
- Unemployment: Lower than NSW
- Born Overseas: Lower proportion than NSW

Table 6.18
Summary of Populations Surrounding the Proposed Project Site (ABS Census 2021)

Indicator	Local Government Area	SA2 Statistical Areas		NSW	Australia
	Queanbeyan-Palerang LGA	Queanbeyan Surrounds	Googong		
Total Population	63,302	16,536	6,224	8,072,161	25,422,789
Population 0-4 years	6.7% (4,225)	5.5% (915)	13.4% (838)	5.8% (468,056)	5.8% (1,463,817)
Population 5-19 years	18.2% (11,559)	20.2% (3,330)	21.0% (1,307)	18.1% (1,459,841)	18.1% (4,632,001)
Population 20-64 years	61.4% (38,978)	59.1% (9,772)	62.0% (3,868)	58.5% (4,720,103)	59.0% (14,948,880)
Population 65 years and over	13.5% (8,540)	15.3% (2,520)	3.5% (221)	17.7% (1,424,141)	17% (4,378,088)
Median age	38	42	31	39	38
Household size	3	3.5	3.1	3.1	3.1
Unemployment (Dec, 2024)	1.5%	0.7%	0.3%	3.9%	3.9%
Tertiary education	23.3%	20%	35.5%	27.8%	26.3%
SEIFA IRSAD	1,062	1,105	1,154	--	--
SEIFA IRSAD decile	9	10	10	--	--
Indigenous	3.5%	2.8%	2.3%	3.4%	3.2%
Born Overseas	23.3%	18.3%	22.8%	34.6%	33.1%

Notes:

SEIFA IRSAD = index of relative socioeconomic advantage and disadvantage, Rank is for within NSW and ranges from 1 = most disadvantaged to 10 = most advantaged

Shading relates to comparison against NSW (noting not all data is indicative of potential vulnerability)

Statistic / data suggestive of a potential higher vulnerability within the population to health stressors

Statistic / data suggestive of a potential lower vulnerability within the population to health stressors

Source: EnRisks (2025) – Adapted from Table 3.1

The Southern NSW Area Local Health District (LHD) was determined to be consistent with and encapsulating of the health reported for the local community surrounding the Project Site. EnRisks (2025) review of available data in relation to mortality, the prevalence of disease and hospitalisation rates for the Southern NSW Area LHD compared to NSW, indicates the following.

- Obesity: Higher than NSW as a whole
- Overweight: Similar to NSW as a whole
- Hospitalisations (Cardiovascular/Respiratory): Lower than NSW as a whole
- All-Cause Mortality: Higher than NSW as a whole
- Respiratory Mortality: Higher than NSW as a whole
- Elevated Blood Pressure: Higher than NSW as a whole

The local population near the Project Site has health characteristics broadly similar to NSW overall, indicating neither increased nor reduced sensitivity, and this was accounted for in the HHRA.

6.4.4 Particulate Matter

Dust or particulate matter (PM) is a widespread air pollutant that has and always will be present in air. The physical and chemical characteristics of PM vary by location and source. Particles in the air can be made up of a wide variety of materials including soil, ash, rock wood, moulds, hair or minerals). Therefore, particles that are inhaled can have varying effects. PM has the ability to affect health and cause nuisance effects, often categorised by size in the following ways (as presented in **Figure 6.10**).

- Total suspended particulates (TSP) – refers to all suspended particles in the air (often 30 – 50 micrometres (µg) in diameter).
- PM_{10} – particulate matter below 10 microns in diameter, µm
- $PM_{2.5}$ – particulate matter below 2.5µm in diameter.
- Ultrafines - particulate matter below 0.1µm in diameter.

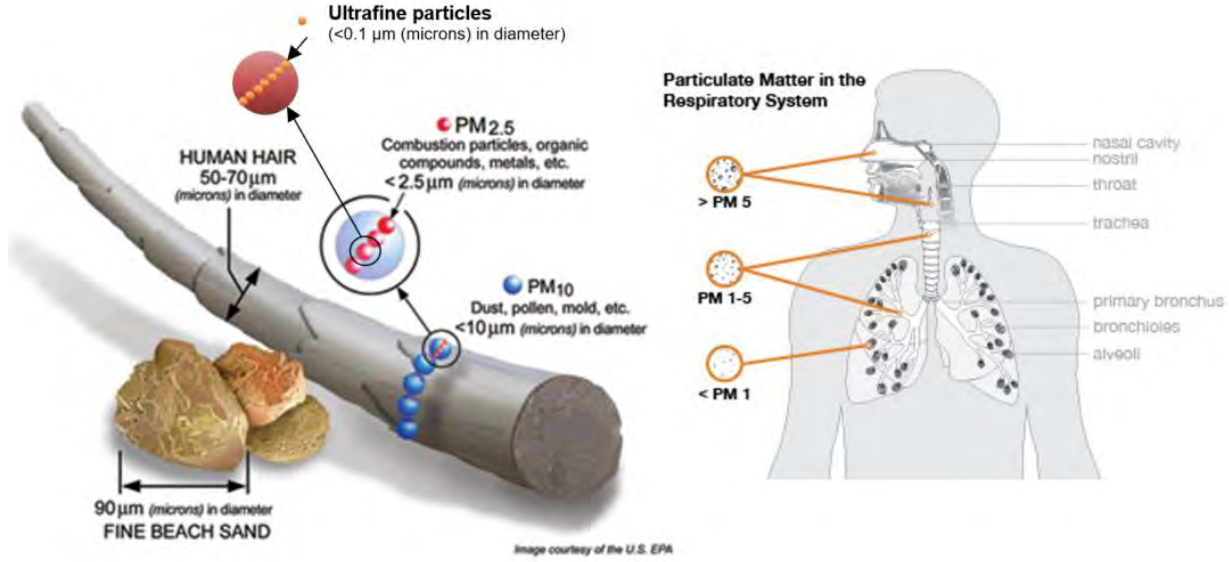


Figure 6.10
PARTICLE SIZES AND PENETRATION INTO THE LUNGS

The size of particles in air is important as it determines how far the dust would travel from the emissions source and also the potential for adverse health impacts as only fine particles can infiltrate the human respiratory system. Larger particles drop out of the air quickly due to their mass and smaller particles may disperse in wind and travel further from the source. The human respiratory system is generally capable of trapping particles that enter through the nose and throat and then eliminating them by coughing, sneezing or swallowing. Smaller particles may pass through to the lungs where they become encased in mucous and may be ejected. Particles

that enter the alveoli of the lungs can cause a range of lung and heart health problems and therefore the fine particles that are considered to be in the respirable fraction (PM_4 or less) present the greatest risk of health impact.

Northstar (2025) assumed that 40% of particulate matter would be respirable crystalline silica (RCS) based on petrographic analysis of the resource material (between 30% to 40% quartz content). To ensure a comprehensive assessment in the HHRA, EnRisks (2025) considered the situation where RCS forms 40% of $PM_{2.5}$ and PM_{10} concentrations in addition to RCS comprising 100% of $PM_{2.5}$ and PM_{10} concentrations.

6.4.5 Respirable Crystalline Silica

Silica (SiO_2) is a naturally occurring mineral that exists in crystalline or amorphous forms. In the form of quartz, silica is one of the most abundant minerals in the earth's crust and is found in stone, rock, sand, gravel, and clay, and is used to produce materials such as bricks, tiles, artificial stone benchtops and some plastics. When these materials are extracted or worked on, silica is released in dust and is known as respirable crystalline silica (RCS) or silica dust. Crystalline silica, especially quartz, is common in sand and rock and is the harmful form linked to lung scarring. Only respirable crystalline silica (RCS)—smaller particles that reach deep into the lungs—pose health risks.

EnRisks (2025) references an average ambient RCS level of 1.9µg/m³ based on review of international guidance and as presented in the Texas Commission on Environmental Quality (TCEQ) guidance on crystalline silica (TCEQ, 2009), as a reasonable annual average exposure for most Australians (see Table 4.2 of EnRisks 2025).

6.4.6 Potential Health Risks

Respirable dust of any kind may be hazardous to human health, and repeated high levels of exposure can cause a variety of respiratory diseases. Exposure to RCS in dust can cause silicosis. Whether or not silicosis develops depends on factors such as how much RCS is in the dust, how much dust is inhaled and for how long.

Silicosis occurs when RCS is deposited in the lungs causing inflammation, resulting in a build-up of scar tissue and reduced lung capacity. Silicosis can be classed into three types.

- Chronic silicosis – caused by long-term exposure (10+ years) to low levels of RCS.
- Accelerated silicosis – caused by short-term exposure (1-10 years) to large amounts of RCS.
- Acute silicosis – a rare form of silicosis caused by exposure to very high concentrations of RCS over a very short period (less than 1 year).

Links have also been made between exposure to RCS and other respiratory diseases such as chronic obstructive pulmonary disease (COPD) and lung cancer. Environmental or community exposures to respirable crystalline silica are much lower than those encountered in the workplace and are, in most cases, not sufficiently high to cause occupational diseases such as silicosis (CCAA, 2018).

6.4.7 Assessment Criteria

The HHRA was prepared in accordance with several relevant National protocols and guidelines, including the following.

- enHealth, Environmental Health Risk Assessment, Guidelines for Assessing Human Health Risks from Environmental Hazards (enHealth 2012)
- enHealth, Health Impact Assessment Guidelines, Commonwealth Department of Health and Aged Care (enHealth 2017)
- National Environment Protection (Ambient Air Quality) Measure (NEPC 2021)
- National Environmental Protection (Assessment of Site Contamination) Measure (NEPC 2013)
- NSW Approved Methods for the Modelling and Assessment of Air Pollutants (NSW EPA, 2022)
- NHMRC Australian Drinking Water Guidelines (NHMRC, 2022)

Additional international protocols and guidelines developed by agencies such as the United States Environmental Protection Agency (USEPA) and the World Health Organisation (WHO) were also used to offer supplementary guidance, where required.

Particulate Matter

Table 6.19 presents the national Australian guidelines for particulate matter air particles adopted for this HHRA, derived from the National Environment Protection (Ambient Air Quality) Measure (Ambient Air Quality NEPM) (NEPC 2021) and NSW EPA Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (NSW EPA 2022). These guidelines are applied to the cumulative concentration – i.e. the increment from a particular project plus the background concentrations already present.

Table 6.19
National Australian Guidelines for Particles in Air

Parameter	Concentration (µg/m^{-3})	
	24-hour Average	Annual Average
$PM_{2.5}$ guidelines	20	7
PM_{10} guidelines	50	25
Source: EnRisks (2025) – Table 4.1		

Respirable Crystalline Silica – Ambient Average

EnRisks (2025) evaluated the average measured ambient RCS concentrations in urban environments. The average ambient RCS value of 1.9µg/m³ value from TCEQ (2009) was adopted as a reasonable estimate of typical yearly exposure for most Australians. This level is considered higher or similar to background levels found in some Australian studies, making it a suitable and conservative choice for the assessment. This means it likely overestimates actual levels near the Project Site but helps ensure the project's contribution to overall exposure remains limited.

Quantitative Toxicity Reference Values

Toxicity Reference Values (TRVs) are quantitative benchmarks established by health authorities to protect against the adverse health effects of chemical exposure. TRVs are derived by identifying the most sensitive health effect of a chemical and determining the lowest exposure level at which this effect may occur, ensuring protection across all possible health outcomes.

For RCS, two key types of TRVs are used.

- Occupational air guidelines: Designed for workplace settings, these values protect healthy workers during working hours. They may allow for higher exposure levels that could cause mild irritation but are not expected to pose significant health risks in occupational scenarios.
- Community air guidelines: Intended for the general public, including sensitive populations (e.g. the elderly, children, or those with pre-existing conditions). These values are more conservative and account for greater uncertainty, using data from both human and animal studies to ensure broad protection.

The community air guidelines are lower than occupational guidelines by around 10 to 30 times, thus more conservative.

EPA Victoria (2007) adopted the community air Office of Environmental Health Hazard Assessment (OEHHA) (2005) guideline for respirable crystalline silica (RCS), applying it to $PM_{2.5}$, which is appropriate since smaller particles are more likely to reach deep into the lungs. California OEHHA (OEHHA 2005) is informed by occupational study data with a guideline value of 3µg/m^3. In contrast, the AQIA used the SA EPA (2022) guideline, applying it to the PM_{10} size fraction—this is more conservative but not consistent with international science or definitions of respirable dust.

This HHRA uses EPA Victoria's approach and applies the 3µg/m^{-3} OEHHA guideline to the cumulative value for RCS (background concentration plus project-related increment).

6.4.8 Management and Mitigation Measures

Air quality control measures considered and supported by EnRisks are presented in Section 6.2.8 and Section 8 of Northstar (2025). These measures were considered in the HHRA. In addition to the air quality control measures, EnRisks (2025) also recommended that the initial air quality samples collected for the air quality monitoring program proposed by Northstar (2025) should be subject to laboratory analysis for RCS concentration.

SafeWork NSW and the NSW Resources Regulator regulate workplace health and safety legislation in NSW and the EPA regulates environmental pollution including air quality. Each of these Government agencies regulate the appropriate management of air quality for quarrying and other developments to ensure that relevant workplace standards are met and that surrounding residents are not placed at risk.

6.4.9 Assessment of Impacts

Predicted concentrations of $PM_{2.5}$, PM_{10}, and RCS were assessed for Operational Scenario 1 and Operation Scenario 2. Concentrations from quarry activities are separated from background levels, and cumulative concentrations represent the combined total.

Representative residence locations for assessment were selected based on modelling by Northstar (**Figure 6.3**), with a focus on worst-case exposure sites.

- Southern boundary: R1–R4.
- Eastern: R18 (representing R18–R26).
- Northern: R35 and R36 (representing R27–R36).
- Western: R40 (representing R37–R47).

Other residences assessed by Northstar (2025) have lower predicted exposure.

Predicted concentrations are assessed against health-based guideline values for particulates and RCS (Section 6.4.7) to determine potential health risks.

6.4.9.1 Particulate Matter

Table 6.20 presents the predicted concentrations of $PM_{2.5}$ for Operational Scenario 1 and Operational Scenario 2. The results demonstrate that the Project would not substantially change existing air quality in relation to particles in air and that air quality in the area complies with the national health based guidelines (EnRisks, 2025).

Table 6.20
Concentrations of $PM_{2.5}$ and PM_{10} – Scenario 1 and 2

Receptor (Worst-case or Closest to Quarry)	Annual Average $PM_{2.5}$ (µg/m^{-3})			Annual Average PM_{10} (µg/m^{-3})		
	From the Quarry	Background	Cumulative	From the Quarry	Background	Cumulative
Guideline (NEPM 2021)	**7**			**25**		
Scenario 1						
R1	0.07	6.9	7.0	0.5	10.3	10.8
R2	0.08	6.9	7.0	0.6	10.3	10.9
R3	0.08	6.9	7.0	0.5	10.3	10.8
R4	0.04	6.9	6.9	0.3	10.3	10.6
R18	0.02	6.9	6.9	0.1	10.3	10.4
R35	0.01	6.9	6.9	0.07	10.3	10.4
R36	0.01	6.9	6.9	0.07	10.3	10.4
R40	0.009	6.9	6.9	0.06	10.3	10.4

Table 6.20 (Cont'd)
Concentrations of $PM_{2.5}$ and PM_{10} – Scenario 1 and 2

Receptor (Worst-case or Closest to Quarry)	Annual Average $PM_{2.5}$ ($\mu g/m^{-3}$)			Annual Average PM_{10} ($\mu g/m^{-3}$)		
	From the Quarry	Background	Cumulative	From the Quarry	Background	Cumulative
Guideline (NEPM 2021)	**7**			**25**		
Scenario 2						
R1	0.07	6.9	7.0	0.5	10.3	10.8
R2	0.10	6.9	7.0	0.7	10.3	11.0
R3	0.09	6.9	7.0	0.6	10.3	10.9
R4	0.05	6.9	7.0	0.3	10.3	10.6
R18	0.03	6.9	7.0	0.2	10.3	10.5
R35	0.01	6.9	6.9	0.09	10.3	10.4
R36	0.01	6.9	6.9	0.09	10.3	10.4
R40	0.01	6.9	6.9	0.08	10.3	10.4
Source: EnRisks (2025) – adapted from Table 5.1 and Table 5.2						

6.4.9.2 Respirable Crystalline Silica

Table 6.21 presents the predicted concentrations of RCS results for Operational Scenario 1 and Operational Scenario 2. The results demonstrate that the proposed rock quarry would contribute only a very minor amount of respirable crystalline silica to the atmosphere (EnRisks, 2025). The small amount will not substantially change the existing levels of RCS in the atmosphere assuming it is 40% of the total predicted $PM_{2.5}$ concentrations and makes a very small change that would not be measurable in the concentrations if 100% of the predicted $PM_{2.5}$ concentrations were RCS. This is considered highly conservative as not all the dust released from the Project Site would be crystalline silica (EnRisks, 2025).

Table 6.21
Concentrations of RCS – Scenario 1 and 2

Receptor (Worst-case or Closest to Quarry)	Annual Average RCS ($\mu g/m^{-3}$) Based on 40% $PM_{2.5}$			Annual Average RCS ($\mu g/m^{-3}$) Based on 100% $PM_{2.5}$		
	From the Quarry	Background	Cumulative	From the Quarry	Background	Cumulative
Guideline (EPA Victoria 2007)	**3**			**3**		
Scenario 1						
R1	0.03	1.9	1.9	0.07	1.9	2.0
R2	0.03	1.9	1.9	0.08	1.9	2.0
R3	0.03	1.9	1.9	0.08	1.9	2.0
R4	0.02	1.9	1.9	0.04	1.9	1.9
R18	0.008	1.9	1.9	0.02	1.9	1.9
R35	0.004	1.9	1.9	0.01	1.9	1.9
R36	0.004	1.9	1.9	0.01	1.9	1.9
R40	0.004	1.9	1.9	0.009	1.9	1.9

Table 6.21 (Cont'd)
Concentrations of RCS – Scenario 1 and 2

Receptor (Worst-case or Closest to Quarry)	Annual Average RCS (µg/m^{-3}) Based on 40% $PM_{2.5}$			Annual Average RCS (µg/m^{-3}) Based on 100% $PM_{2.5}$		
	From the Quarry	Background	Cumulative	From the Quarry	Background	Cumulative
Guideline (EPA Victoria 2007)	**3**			**3**		
Scenario 2						
R1	0.03	1.9	1.9	0.07	1.9	2.0
R2	0.04	1.9	1.9	0.10	1.9	2.0
R3	0.04	1.9	1.9	0.09	1.9	2.0
R4	0.02	1.9	1.9	0.05	1.9	2.0
R18	0.01	1.9	1.9	0.03	1.9	1.9
R35	0.004	1.9	1.9	0.01	1.9	1.9
R36	0.004	1.9	1.9	0.01	1.9	1.9
R40	0.004	1.9	1.9	0.01	1.9	1.9

Source: EnRisks (2025) – adapted from Table 5.3 and Table 5.4

All of the existing levels of RCS and the cumulative concentrations with the proposed project comply with the health-based guidelines from EPA Victoria (EnRisks, 2025).

6.4.10 Uncertainty Analysis

EnRisks (2025) conducted an uncertainty analysis on the outcomes of the assessment including consideration of the following.

- The slightly lower screening guideline derived by TCEQ (2009) for the protection of silicosis.
- The TCEQ (2009) screening level guideline for the protection of lung cancer.
- The predicted maximum 24-hour average $PM_{2.5}$ concentrations for the Project.
- The predicted PM_{10} concentrations for the Project.
- The assumed silica content in dust.

EnRisks (2025) performed a screening-level evaluation that conservatively assumes $PM_{2.5}$ concentrations at residences adjacent to the Quarry contain both 40% and 100% silica. The $PM_{2.5}$ data is based on air quality modelling from the AQIA (Northstar, 2025), with results showing annual average concentrations are at least 70 times lower than the screening guideline. Corresponding RCS concentrations are at least 30 times below health-based guidelines, even under worst-case assumptions.

6.4.10.1 Conservative Assumptions

EnRisks (2025) noted that the predicted maximum incremental RCS exposure from the quarry (0.1µg/m³) is 20 times below the silicosis guideline (assuming 100% RCS) and 75 times below when assuming 40% RCS. For lung cancer, the predicted RCS exposure remains below the TCEQ guideline of 0.29µg/m³. International Agency for Research on Cancer (IARC) indicates that RCS carcinogenicity is linked to occupational exposure, and that cancer is unlikely to occur unless silicosis has first been found.

Worst-case RCS exposure RCS concentration of 0.1µg/m^3 (based on $PM_{2.5}$ concentrations) was predicted at only a few locations immediately to the south of the project site with all other locations having annual average concentrations that are lower. EnRisks (2025) also noted that this worst-case value is 20 times below the guideline for silicosis and 2 to 3 times below the guideline for lung cancer.

6.4.10.2 PM_{10} Considerations

While not typically compared to RCS guidelines in Australia, PM_{10} concentrations were also assessed by EnRisks (2025) for conservatism. The maximum modelled incremental increase in annual average PM_{10} cumulative concentration presented in the AQIA (0.66µg/m³) remains well below the 3µg/m³ RCS guideline, even assuming full silica content. Only $PM_{2.5}$-sized particles are capable of reaching deep into the lungs, so using PM_{10} data in this way is an overestimate (EnRisks, 2025).

Despite conservative assumptions and uncertainties, no health risks of concern are identified for the surrounding community from exposure to RCS due to proposed quarry operations (EnRisks, 2025). The assessment remains valid even when applying stricter international guidelines.

6.4.11 Conclusion

EnRisks (2025) determined that the management and mitigation measures proposed for the Air Quality Management System, alongside the consideration of uncertainties in the HHRA, that the health risks to residents in existing properties adjacent to the Quarry are low and acceptable. No discernible changes to existing air quality would be expected during operations when the relevant dust control measures are incorporated (EnRisks, 2025).

EnRisks (2025) concluded that the outcomes of the assessment would not change, despite the uncertainties listed in Section 6.4.10. The incremental impact (that is the Quarry alone) is still at least 70 times below the adopted screening level guideline (EnRisks, 2025).

6.5 Noise and Blasting

6.5.1 Introduction

The SEARs for the Project require the EIS to include an assessment of the following potential impacts of the Project on noise and blasting.

- A detailed assessment of the likely construction, operational and off-site transport noise impacts of the development in accordance with the *Interim Construction Noise Guideline*, *NSW Noise Policy for Industry* and the *NSW Road Noise Policy* respectively, and having regard to the *Voluntary Land Acquisition and Mitigation Policy*;
- Proposed blasting hours, frequency and methods.[2]
- A detailed assessment of the likely blasting impacts of the development (including ground vibrations, overpressure, flyrock, visual and fumes / odour) on people, animals, buildings/structures, infrastructure and significant natural features, having regard to the relevant guidelines.
- An assessment of the vertical flyrock blast clearance zone and its impacts on the Canberra Airport protected airspace.

The assessment requirements of the EPA and Transport for New South Wales (TfNSW) were also considered during the preparation of the Noise and Vibration Impact Assessment (NVIA). A summary of the SEARs and requirements of the EPA and TfNSW are listed within **Appendix 2** with a record of where each requirement is addressed in the EIS.

An NVIA for the Project was undertaken by Octave Acoustics Pty Ltd (Octave). The resulting report is presented as **Appendix D** and hereafter referred to as Octave (2025).

A Flyrock Assessment was prepared by Fromble Corp Pty Ltd (Fromble). The resulting report is presented as **Appendix E** and hereafter referred to as Fromble (2025).

The following subsections provide a summary of Octave (2025) and Fromble (2025) and describe the operational safeguards and management measures to be implemented by the Applicant.

6.5.2 Existing Environment

6.5.2.1 Sensitive Receivers

Octave (2025) considered potential impacts to the existing noise environment at 47 privately owned residences spread across both NSW and the ACT. The location of residences consider sensitive receivers for the Project are presented in **Figure 6.3**. For the purposes of the NVIA, similarly affected sensitive receivers have been grouped into Noise Catchment Areas (NCAs) as shown in **Figure 6.11**. NCA 1 is wholly within the ACT and there were no sensitive receivers within NCA 3.

[2] Details of the proposed blasting hours and frequency are presented in Section 3.6.2.

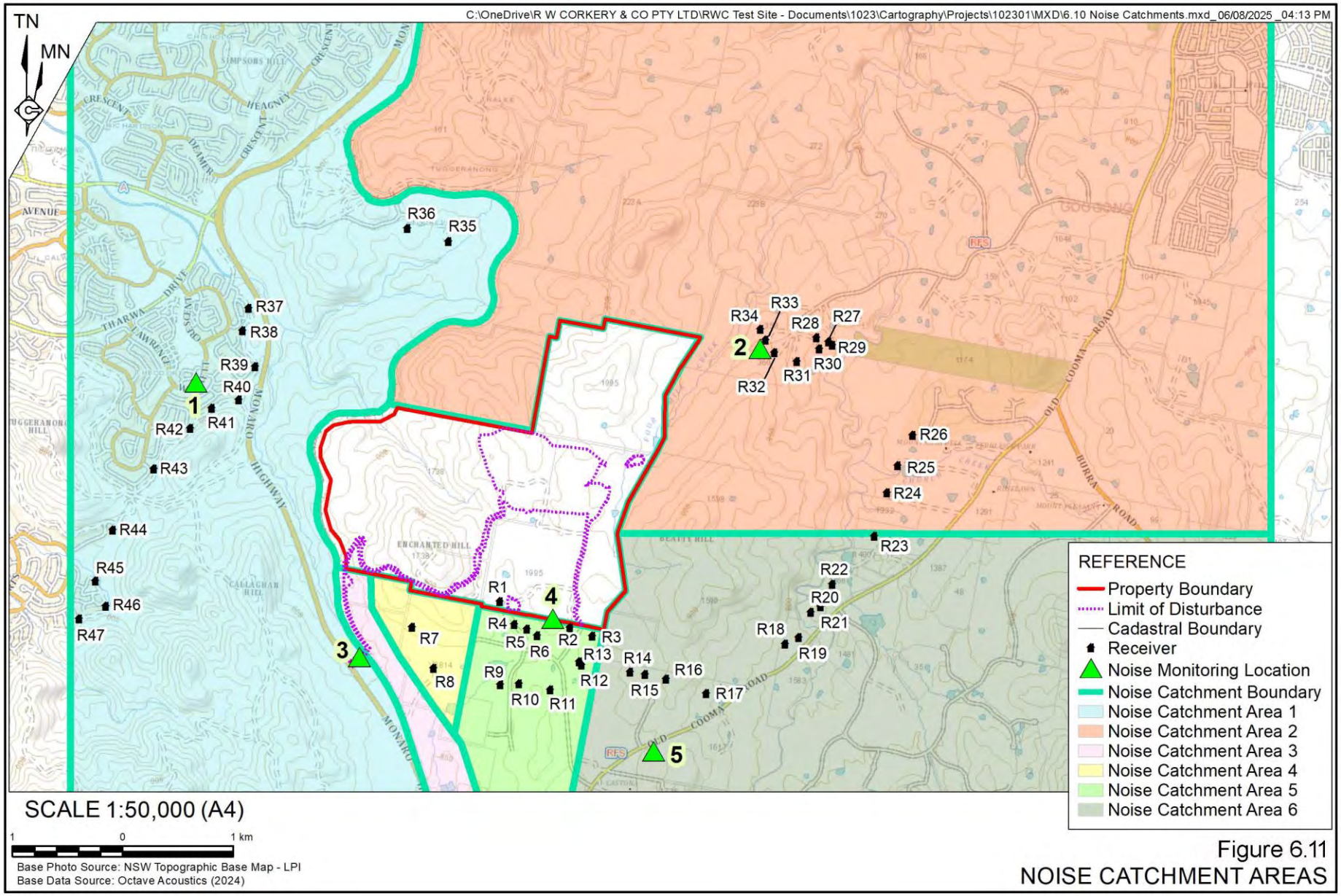


Figure 6.11
NOISE CATCHMENT AREAS

Additionally, Lot 151 DP754912 is an undeveloped lot northwest to the boundary of the Project Site. While there are not currently any sensitive receivers located on the lot, it is identified for consideration under the NSW Government Voluntary Land Acquisition and *Mitigation Policy for State Significant Mining, Petroleum and Extractive Industry Developments* (VLAMP).

6.5.2.2 Meteorological Environment

The atmospheric conditions most relevant to the NVIA are temperature inversions and source to receiver winds. The *NSW Noise Policy for Industry* (NPI) (EPA, 2017) states that noise-enhancing conditions need to be assessed when source to receiver winds (at 10m height) of 3m/s or below occur for 30% or more of the time in any season in any assessment period with a stability category of A-D (daytime) or F (night-time).

The meteorological data analysis conducted for the Air Quality Impact Assessment for the Project (see **Appendix B** (Northstar, 2025)) utilised data from the Tuggeranong (Isabella Plains) AWS meteorological station. This meteorological data was analysed to establish the relevant meteorological conditions for the NVIA for the Project.

The meteorological analysis found that noise enhancing conditions did not occur for 30% or more of the time in any season during daytime periods. However, noise enhancing conditions at night-time exceeded the 30% threshold during Autumn and Winter. To account for the different conditions, noise modelling was undertaken under standard conditions for the day period assessment, and both standard and noise enhancing conditions for the night period assessment.

6.5.2.3 Existing Acoustic Environment

There is minimal existing industrial noise in the area surrounding the Project Site, and the areas potentially affected by noise emissions from the Project are best described acoustically as either suburban (consistent with ACT land zoning) or rural (some ACT and all NSW residences).

Unattended noise monitoring was undertaken by Octave in 2021 at five locations to inform the Rating Background Levels (RBL) and noise criteria for the assessment.

NCA 1 was assessed against the ACT *Environment Protection Regulation 2005* noise standards. The RBL at NCA 1 was measured at 38dB(A)L_{90} in the daytime and evening, and 29 dB(A)L_{90} in the night-time.

At all NSW monitoring locations (apart from NCA 3), the Rating Background Level (RBL) are below the assumed policy minimums. In accordance with section A1.2 of the NPI, the default minimum daytime background noise level of 35dB(A),L_{90}, and the default minimum evening and night background noise levels of 30dB(A),L_{90} have been adopted as the basis for determining assessment criteria.

Details of the outcomes of all background noise monitoring are presented in Section 2 and Appendix E of Octave (2025).

6.5.3 Assessment Criteria

6.5.3.1 Australian Capital Territory

As NCA 1 is located in the ACT, project-specific noise goals have been determined in accordance with the *ACT Environmental Protection Regulation 2005* and *ACT EPA Noise Environmental Protection Policy 2010*.

Under the *ACT Environmental Protection Regulation 2005*, the ACT is divided into "Noise Zones" in accordance with the *Territory Plan 2008*, and each Noise Zone has applicable "Noise Standards". The relevant Noise Zone and Standards as defined by ACT policy (applicable to NCA 1 only) are shown in **Table 6.22**.

Table 6.22
ACT Receiver Operational Noise Limits

Noise Catchment Area	Land Use Zone	Noise Zone	Land Use Description	Noise Standard dB(A)[1,2]	
				Day	Night
NCA 1 (R35 – R47)	RZ1	Zone G	Suburban Residential	45	35
Note 1: Day is defined as Monday – Saturday (7:00am – 10:00pm) Sunday and public holidays (8:00am – 10:00pm)					
Note 2: Night is defined as Monday – Saturday (10:00pm – 7:00am) Sunday and public holidays (10:00pm – 8:00am)					
Source: Octave (2025) – After Table 11					

6.5.3.2 New South Wales

6.5.3.2.1 Operational Noise Criteria

Intrusiveness Criteria

The intrusiveness criteria limit Equivalent Continuous Noise Level (L_{eq}) from the industrial source to a value of 'background plus 5dB' averaged over a 15-minute period. That is, the RBL for the time period, plus 5dB(A). The RBL (L_{A90}) is defined as the overall single figure background level representing each assessment period.

The intrusiveness criteria for all NCAs within NSW are shown in **Table 6.23**.

Table 6.23
NPI Intrusiveness Criteria

Page 1 of 2

Noise Catchment Area	Time Period	RBL dB(A)	Intrusiveness Levels ($L_{Aeq,15min}$dB(A))
NCA 2	Day[a]	35[d]	40
	Evening[b]	30[d]	35
	Night[c]	30[d]	35
NCA 3	Day[a]	41	46
	Evening[b]	34	39
	Night[c]	30[d]	35
NCA 4	Day[a]	35[d]	40
	Evening[b]	30[d]	35
	Night[c]	30[d]	35

Table 6.23 (Cont'd)
NPI Intrusiveness Criteria

Noise Catchment Area	Time Period	RBL dB(A)	Intrusiveness Levels ($L_{Aeq,15min}$dB(A))
NCA 5	Day[a]	35[d]	40
	Evening[b]	30[d]	35
	Night[c]	30[d]	35
NCA 6	Day[a]	35[d]	40
	Evening[b]	30[d]	35
	Night[c]	30[d]	35
Note a: Day is defined as Monday – Saturday (7:00am – 6:00pm) and Sunday and Public Holidays (8:00am – 9:00pm). Note b: Evening is defined as 6:00pm – 10:00pm. Note c: Night is defined as 10:00pm – 7:00am. Note d: Actual RBLs are below assumed policy minimums, therefore, adopt assumed minimums.			
Source: Octave (2025) – After Table 12			

Amenity Criteria

The amenity criteria aim to protect against excessive noise in situations where an area is becoming increasingly developed. The criteria are based on the nature of the receiver area and existing levels of industrial noise. Note that a -5dB(A) adjustment has not been applied to formulate the project-specific amenity criteria as no other industries are present in the area or are expected to be introduced. The amenity criteria for all NCAs within NSW are shown in **Table 6.24**.

Table 6.24
NPI Project Amenity Criteria

Noise Catchment Area	Noise Amenity Area	Time Period[a]	L_{Aeq}, dB(A)[b]
NCA 2 – NCA 5	C4 – Environmental Living	Day	50
		Evening	45
		Night	40
Note a: See **Table 6.23** for definition of time periods. Note b: Under the NPI short term, 15 minute assessments should be assessed with respect to the established amenity criteria +3dB(A).			
Source: Octave (2025) – After Table 13			

Project Noise Trigger Levels

The Project Noise Trigger Levels (PNTLs) are the lower of the intrusiveness or amenity criteria and are the project-specific criteria against which the Project must be assessed. Therefore, the PNTLs adopted for the Project are the intrusiveness criteria as shown in **Table 6.23**.

Maximum Noise Level Criteria

The maximum noise trigger levels apply to transient noise events that have the potential to cause sleep disturbance and would, therefore, apply to any activities undertaken between 10:00pm and 7:00am between Monday to Saturday and 10:00pm and 8:00am on Sundays and public holidays. The maximum noise level trigger levels for the Project are as follows.

- 40dB(A) $L_{eq(15\ min)}$
- 52dB L_{Amax}

6.5.3.2.2 Construction Noise Criteria

The *Interim Construction Noise Guideline 2009* (ICNG) sets out construction noise management levels and criteria for various sensitive uses. The ICNG management levels are presented in **Table 6.25**.

Table 6.25
ICNG Management Levels

Time of Day	Management Level, $L_{Aeq,15min}$	How to Apply
Recommended Standard Hours: Monday to Friday 7:00am-6:00pm Saturday 8:00am-1:00pm No work on Sundays or Public Holidays	Noise affected RBL + 10dB	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured LAeq (15 min) is greater than the affected noise level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. The proponent should also inform all potentially impacted residences of the nature of the works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75dB(A)	The highly noise affected level represented the point above which there may be strong community reaction to noise. Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences. If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	Noise affected RBL + 5dB	A strong justification would typically be required for works outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5dB(A) above the noise affected level, the proponent should negotiate with the community.
Source: Octave (2025) – After Table 19		

The Project Noise Management Levels (NML) for construction activities are presented in **Table 6.26**.

Table 6.26
Project Construction Noise Management Levels

Receiver	Time	RBL, dB L_{A90}	Noise Affected Level, dB $L_{Aeq,15\ min}$	Highly Noise Affected Level, dB $L_{Aeq,15\ min}$
NCA 1	Monday to Friday 7am to 6pm Saturday 8am to 1pm	38	48	75
	Out of hours 'evening'	38	43	-
	Out of hours 'night'	30	35	-
NCA 2, NCA 4, NCA 5, NCA 6	Monday to Friday 7:00am to 6:00pm Saturday 8:00am to 1:00pm	35	45	75
	Out of hours 'evening'	30	35	-
	Out of hours 'night'	30	35	-
Source: Octave (2025) – After Table 20				

6.5.3.2.3 Road Traffic Noise Criteria

In accordance with the NSW *Road Noise Policy* (RNP), the Octave (2025) adopted the "Freeway/arterial/sub-arterial Roads" and "Local Roads" category for the designated transport routes, consistent with their classification as "principal haulage routes". The criteria adopted for the Project are shown in **Table 6.27**.

Table 6.27
Project Road Traffic Noise Criteria

Road Category	Assessment Criteria (dB(A))	
	Day (7:00am – 10:00pm)	Night (10:00pm – 7:00am)
Freeway/arterial/sub arterial Roads	$L_{Aeq, (15\ hour)}$ 60 (external)	$L_{Aeq, (9\ hour)}$ 55 (external)
Local Roads	$L_{Aeq, (1\ hour)}$ 55 (external)	$L_{Aeq,(1\ hour)}$ 50 (external)
Source: Octave (2025) – After Table 17		

6.5.3.2.4 Vibration Criteria

Octave (2025) assessed the impacts of continuous and impulsive vibration at residences in accordance with the *Assessing Vibration: a technical guideline 2006* published by the Department of Environment and Conservation (now DCCEEW). Criteria applied to the assessment were adopted from Australian Standard AS 2187.2 – 2006 *Explosives – Storage and use, Part 2: Use of explosives* (AS2187).

Human Comfort

Table 6.28 presents the human comfort criteria for exposure to continuous and impulsive vibration.

Table 6.28
Vibration Assessment Criteria for Human Comfort

Type of Vibration	Time	Assessment Criteria					
		[1]rms Acceleration (m/s^2)		[2]rms Velocity (mm/s)		[2]Peak Velocity (mm/s)	
		Preferred	Max	Preferred	Max	Preferred	Max
Continuous	Daytime[3]	0.010	0.020	0.20	0.40	0.28	0.56
	Night-Time	0.0070	0.014	0.14	0.28	0.20	0.40
Impulsive	Daytime[3]	0.30	0.60	6.0	12.0	8.6	17.0
	Night-Time	0.10	0.20	2.0	4.0	2.8	5.6
Note 1: Values derived from z-axis critical frequency range 4–8 Hz. Where required, a more detailed analysis can be conducted as per BS 6472–1992.							
Note 2: Values given for the most critical frequency range >8 Hz assuming sinusoidal motion. Where required, a more detailed analysis can be conducted as per AS 2670.2–1990. Sufficient justification should accompany the use of a peak velocity approach if used in an assessment.							
Note 3: Specific values depend on social and cultural factors, psychological attitudes and expected degree of intrusion.							
Source: Octave (2025) – After Table 22							

Table 6.29 sets out the acceptable Vibration Dose Values (VDV) for occupants inside buildings for intermittent vibration.

Table 6.29
Acceptable VDV for Intermittent Vibration (m/s$^{1.75}$)

Location	Daytime (7am to 10pm)		Night time (10pm to 7am)	
	Preferred Value	Maximum Value	Preferred Value	Maximum Value
Residences	0.2	0.4	0.13	0.26
Source: Octave (2025) – After Table 23				

Table 6.30 sets out the vibration trigger levels associated with structural damage.

Table 6.30
Structural Damage Criteria

Group	Type of Structure	Peak Component Particle Velocity, mm/s		
		4Hz to 15Hz	15Hz to 40Hz	40Hz and above
1	Reinforced or framed structures Industrial and heavy commercial buildings	50	50	50
2	Un-reinforced or light framed structures Residential or light commercial type buildings	15-20	20-50	50
Source: Octave (2025) – After Table 24				

6.5.3.2.5 Blasting Criteria

Appendix J of the *Australian Standard AS 2187.2 – 2006 Explosives – Storage and use, Part 2: Use of explosives* provides human comfort and building damage criteria for blast induced ground vibration and overpressure.

Ground Vibration

Table 6.31 sets out the applied assessment criteria for blast-induced ground vibration impacts on human comfort.

Table 6.31
Ground Vibration Criteria for Human Comfort

Category	Type of Blasting Operation	Peak Component Particle Velocity (mm/s)
Sensitive Site*	Operations lasting for more than 12 months or more than 20 blasts	5mm/s for 95% blasts per year, 10mm/s maximum unless agreement is reached with the occupier that a higher limit may apply.
Sensitive Site*	Operations lasting for less than 12 months or less than 20 blasts	10mm/s maximum unless agreement is reached with occupier that a higher limit may apply.
Occupied non-sensitive sites, such as factories and commercial premises	All Blasting	25mm/s maximum unless agreement is reached with occupier that a higher limit may apply. For sites containing equipment sensitive to vibration, the vibration should be kept below manufacturer's specification or levels that can be shown to adversely affect the equipment operation.
Note: A sensitive site includes houses and low-rise residential buildings, hospitals, theatres, schools, etc. occupied by people.		
Source: Octave (2025) – After Table 25		

Table 6.32 sets out the applied assessment criteria for ground vibration impacts on buildings.

Table 6.32
Ground Vibration Criteria for Building Damage

Category	Type of Blasting Operation	Peak Component Particle Velocity (mm/s)
Other structures or architectural elements that include masonry, plaster, and plasterboard in their construction.	All Blasting	Frequency dependent damage limits criteria as per Table 24.
Unoccupied structures of reinforced concrete or steel construction.	All Blasting	100mm/s maximum unless agreement is reached with the owner that a higher limit may apply.
Service structures pipelines, powerlines and cables located above ground.	All Blasting	Limit is to be determined by structural design methodology.
Source: Octave (2025) – After Table 26		

Air Blast

Table 6.33 sets out the applied assessment criteria for airblast overpressure impacts on human comfort.

Table 6.33
Air Blast Overpressure Criteria for Human Comfort

Category	Type of Blasting Operation	Peak Sound Pressure Level (dBL)
Sensitive Site*	Operations lasting for more than 12 months or more than 20 blasts	115 dBL for 95% blasts per year. 120 dBL maximum unless agreement is reached with occupier that a higher limit may apply
Sensitive Site*	Operations lasting for less than 12 months or less than 20 blasts	120 dBL for 95% blasts per year. 125 dBL maximum unless agreement is reached with occupier that a higher limit may apply.
Occupied non-sensitive sites, such as factories and commercial premises	All Blasting	125 dBL maximum unless agreement is reached with the occupier that a higher limit may apply. For sites containing equipment sensitive to vibration, the vibration should be kept below manufacturer's specifications or levels that can be shown to adversely affect the equipment operation.
Note: A sensitive site includes houses and low-rise residential buildings, hospitals, theatres, schools, etc. occupied by people.		
Source: Octave (2025) – After Table 27		

Table 6.34 sets out the applied assessment criteria for airblast overpressure impacts on buildings.

Table 6.34
Air Blast Overpressure Criteria for Building Damage

Category	Type of Blasting Operation	Peak Sound Pressure Level (dBL)
Structures that include masonry, plaster and plasterboard in their construction and unoccupied structures of reinforced concrete or steel construction.	All Blasting	133dBL maximum unless agreement is reached with the owner that a higher limit may apply.
Service structures, such as pipelines, powerlines and cables located above the ground.	All Blasting	Limit to be determined by structural design and methodology.
Source: Octave (2025) – After Table 28		

6.5.3.2.6 ANZEC Blast Guidelines

Overpressure and vibration levels from blasting are assessable against criteria proposed by the Australian and New Zealand Environment and Conservation Council (ANZECC) in their publication *"Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration – September 1990"*. These criteria are summarised as follows.

- Blasting should generally only be permitted during the hours of 9:00am to 5:00pm Monday to Saturday and should not take place on Sundays and Public Holidays.
- Blasting should generally take place no more than once per day, except in the event of a misfire.
- The restrictions on times and frequency of blasting referred to above do not apply to:
  - those premises where the effects of the blasting are not perceived at noise sensitive sites; and
  - major underground metalliferous mining operations.

6.5.3.2.7 Fly Rock

Fromble (2025) considered two major criteria when assessing the potential fly rock impact associated with the Project. These criteria are summarised as follows.

- Fromble (2025) drew upon a variety of publications to determine the required Factor of Safety (FoS) for the Project. F*lyrock Range & Fragment Size Prediction* by Cameron McKenzie (2009), *Safe Distances When Using Explosives* by WorkSafe Victoria (2022) and *Flyrock Range & Flyrock Control – By Chance or* Design by Alan Richards and Adrian Moore (2004) all informed Fromble (2025) in nominating a FoS of 4 for the blast clearance zone.
- Fromble (2025) applied a maximum altitude criterion of 305m (1,000 feet) for vertical throw to ensure that impacts to the Canberra Airport flight path can be avoided. This criterion was assumed based on publicly available information on the Civil Aviation Safety Authority website.

6.5.4 Assessment Methodology

6.5.4.1 Operational Noise Model

Octave (2025) predicted the potential operational noise levels from source to receiver generated by the Project using the ISO 9613 and CONCAWE noise algorithms in CadnaA software.

The ISO 9613 algorithms apply to meteorological conditions favourable to noise propagation, namely receivers downwind from the source with a wind speed between 1m/s and 5m/s measured at a height of 3m to 11m above ground. The ISO 9613 equations also hold for a well-developed moderate ground-based temperature inversion.

The CONCAWE algorithms calculate the meteorological effect based on the wind speed vector and atmospheric stability, and therefore can be applied to a range of meteorological conditions. CONCAWE defines 6 meteorological categories, with wind speeds ranging from >3 m/s upwind to >3 m/s downwind, and Pasquill Stability Category ranging from A-G.

The ISO 9613 and CONCAWE equations also consider propagation effects associated with the following.

- Source sound power.
- Geometrical spreading.
- Air absorption.
- Ground absorption (G = 0.0 in the Quarry, G = 0.7 elsewhere)
- Reflection.
- Barrier effects associated with topography and built form, including buildings and fences.

Under noise-enhancing conditions, the ISO 9613 algorithm more appropriately models the attenuation of a windblown barrier. The ISO 9613 algorithms were therefore used for calculation under noise-enhancing conditions, and the CONCAWE algorithms were used to model standard conditions (which ISO 9613 does not provide a calculation method for), with wind speed at 0.5 m/s in the worst-case direction and stability category D.

6.5.4.2 Operational Noise Sources

The staged development of the Project was modelled under two operational scenarios.

- Operational Scenario 1 (**Figure 6.4**)
  - Stage E3 Extraction Area, Stage P2 Processing Area and Stage V2 Visibility Barrier.
  - Quarry production rate of 750,000tpa.
  - Material processing through a mobile processing plant.
  - Maximum production rate for concrete, asphalt and concrete recycling.
- Operational Scenario 2 (**Figure 6.5**)
  - Stage E3 Extraction Area, Stage P2 Processing Area and Stage V2 Visibility Barrier.
  - Quarry production rate of 1,000,000tpa.
  - Material processing through a fixed processing plant.
  - Maximum production rate for concrete, asphalt and concrete recycling.

More detail on the selected operational scenarios is presented in Section 6.2.5.2.

6.5.4.3 Construction Noise Assessment

Assessment of construction noise generated by the Project focuses on noise from widening of the Secondary Access Road and construction of the Quarry Access Road. The typical sound power levels of nominated construction equipment were obtained from Table A1 in Appendix A of Australian Standard AS 2436 *Guide to Noise and Vibration Control on Construction, Demolition, and Maintenance Sites*, and compared against the ICNG criteria presented in Section 6.5.3.2.2.

6.5.4.4 Fly Rock Assessment

Fromble (2025) completed an assessment of the maximum fly-rock range utilising the published Terrock Flyrock Model from *Flyrock Control – By Chance or Design*[3] by Richards and Moore 2004 and the alternative McKenzie Flyrock Model from *Flyrock Range & Fragment Size Prediction* by McKenzie 2009.

The Terrock and McKenzie methods were applied using the blast parameter ranges presented in Table 1 of Fromble (2025). The key parameters are summarised below in **Table 6.35**. up to 1.2g/cc, and target powder factors of ~0.65kg/m^3 in weathered material and ~0.85kg/m^3 in hard rock.

Table 6.35
Range of Blast Parameters Used to Estimate Maximum Flyrock Range

Blast Scenario	5m Bench in Weathered Material	10m Bench in Hard Rock	15m Bench in Hard Rock
Blasthole diameter (mm)	76	89	102
Stem height (m)	2.4	2.8	3.2
Bulk explosive density (g/cc)	1.2	1.2	1.2
2 Charge density (kg/m)	5.4	7.5	9.8
Face burden (m)	2.4	2.8	3.3
Notes: 76mm patterns for shallow surface benches in weathered material with target PF ~0.65kg/m^3. 89mm and 102mm patterns for 10 to 15m deep benches in 'hard' material with target PF ~0.85kg/m^3.			
Source: Fromble (2025) – modified after Table 1			

Further detail on the methods used to calculate horizontal and vertical flyrock ranges and blast clearance zones is presented in Fromble (2025).

6.5.5 Management Measures

6.5.5.1 Operational Noise Management Measures

The Applicant is committed to minimising the noise generated by extraction, processing and transport activities through the implementation of the following operational noise controls and management measures proposed by Octave (2025).

- Construct a 3.0m high acoustic barrier along the sealed section of the Access Road on the side closest to R3.

- Ensure that equipment selected for use in the Project would not exceed the nominated sound power levels presented in Appendix D of Octave (2025).
- Ensure all operations occur within the approved hours of operation (Section 3.12).
- The internal unsealed road network would be surfaced with well graded materials to reduce noise generation.
- The design of the fixed plant would incorporate suitable enclosures
- Incorporate noise management measures in the Drivers Code of Conduct to direct driver behaviour with regards to noise generation (use of exhaust brakes, speed limits and other noisy behaviour).
- All equipment on site is maintained to adhere to existing noise standards and ensure that noise generated by equipment is not exacerbated.
- Operations at exposed locations and under unfavourable weather conditions are modified, where necessary, to reduce potential noise-related impacts.
- Limit all vehicles travelling on sealed roads within the Project Site to a speed no greater than 60km/h.
- Limit all vehicles travelling on internal unsealed roads within the Project Site to a speed no greater than 30km/h.

6.5.5.2 Construction Noise Management Measures

Table 6.36 presents noise management measures would be implemented by the Applicant during construction activities at the Project, specifically focusing on construction of access roads which would occur in proximity to residences.

Table 6.36
Construction Noise Management Measures

Management Measure	Responsibility
Stage construction of the acoustic barrier so that it can act as a barrier to noise generated by construction of the main access road as early as possible.	Road construction contractor and Quarry Manager
Regularly inspect and maintain equipment to ensure it is in good working order.	Quarry Manager
Minimise use of engine brakes where safe to do so and ensure there are no extended periods of unnecessary engine idling.	All construction personnel
Conduct community consultation with potentially affected residences and provide a dedicated contact phone number for enquiries or complaints.	Quarry Manager
Consider quieter construction equipment and methods where the works have the potential to exceed the “noise affected” level.	Road construction contractor and Quarry Manager

Australian Standards AS2436 sets out a variety of noise attenuation treatments for construction equipment. A summary of these measures that may be applied at the Project are presented in Appendix I of Octave (2025).

6.5.5.3 Blast Design and Operational Safeguards

The following operational controls would be implemented to ensure that any potential impacts from blasting are limited and that blasting processes are undertaken efficiently and safely.

- A Blast Management Plan would be prepared and contain operating protocols for all blasting activities.
- Complete a risk assessment regarding blast clearances prior to the commencement of blasting operations.
- Organise blasting notifications to be sent out to registered community members prior to and on the day of the blast through email or text messages (depending on preference).
- Organise short-duration clearance protocol with adjacent land holders if any risk is identified to the property.
- Place sentries at accessible entry points to the blast clearance area.
- Should it be needed, utilise drone surveillance and audible sirens prior to blasting.

6.5.6 Assessment of Impacts

The potentially most affected receivers within each NCA have been selected as the representative receiver for their NCA and presented in the following summary of assessment outcomes. Where noise and vibration impacts are determined to comply with the relevant criteria at the most affected receivers, compliance is expected at all other receivers within the associated NCA.

6.5.6.1 Operational Noise Assessment Results

Operational Noise Levels

Table 6.37 displays the predicted noise levels during Scenario 1 for daytime and night-time operations, alongside the criteria for each NCA.

Table 6.37
Scenario 1 Noise Levels at the Most Affected Receivers, dB $L_{Aeq,15min}$

NCA	Most Affected Residence	Day (7:00am-6:00pm)		Night (5:00am-7:00am)			Compliance
		Standard Conditions	Criteria	Standard Conditions	Noise Enhancing Conditions	Criteria	
1	R35	26	45	13	28	35	Yes
2	R33	28	40	19	30	35	Yes
4	R7	33	40	32	33	35	Yes
5	R4	37	40	32	35	35	Yes
6	R16	34	40	24	31	35	Yes
Source: Octave (2025) – After Table 32							

Figure 6.12 illustrates the predicted noise contours under Scenario 1 during standard daytime conditions. It shows the spatial distribution of operational noise across the Project Site and surrounding receivers, including the 40dB(A) criterion contour and project-related residences. **Figure 6.13** presents the predicted noise contours under Scenario 1 during noise-enhancing night-time conditions. The map highlights the influence of meteorological factors on noise propagation and identifies receivers potentially affected by elevated night-time noise levels.

Table 6.38 displays the predicted noise levels during Scenario 2 for daytime and night-time operations, alongside the criteria for each NCA.

Table 6.38
Scenario 2 Noise Levels at the Most Affected Receivers, dB $L_{Aeq,15min}$

NCA	Most Affected Residence	Day (7:00am-6:00pm)		Night (5:00am-7:00am)			Compliance
		Standard Conditions	Criteria	Standard Conditions	Noise Enhancing Conditions	Criteria	
1	R35	28	45	12	27	35	Yes
2	R33	25	40	20	29	35	Yes
4	R7	33	40	32	33	35	Yes
5	R4	33	40	31	33	35	Yes
6	R16	27	40	22	31	35	Yes
Source: Octave (2025) – After Table 33							

Figure 6.14 illustrates the predicted noise contours under Scenario 2 during standard daytime conditions. It shows the spatial distribution of operational noise across the Project Site and surrounding receivers, including the 40dB(A) criterion contour and project-related residences. **Figure 6.15** presents the predicted noise contours under Scenario 2 during noise-enhancing night-time conditions. The map highlights the influence of meteorological factors on noise propagation and identifies receivers potentially affected by elevated night-time noise levels.

The predicted noise levels for Scenario 1 and 2 of the Project are below the operational criteria at all assessed receivers (Octave, 2025). This includes operational noise criteria applicable in the ACT at NCA 1 and within NSW at all other NCAs.

Scenario 1 and Grader Results

Grading of roads is considered a maintenance activity and likely to only be required over two days each month. As a result, Octave (2025) modelled its use separately and allowed a +5db(A) correction to the criteria in accordance with Appendix C of the EPA *Noise Policy for Industry* (2017) modifying factors applied to non-routine events to correct for duration. **Table 6.39** presents the noise levels predicted to occur at the most affected sensitive receiver when the grader is operating concurrently with Scenario 1.

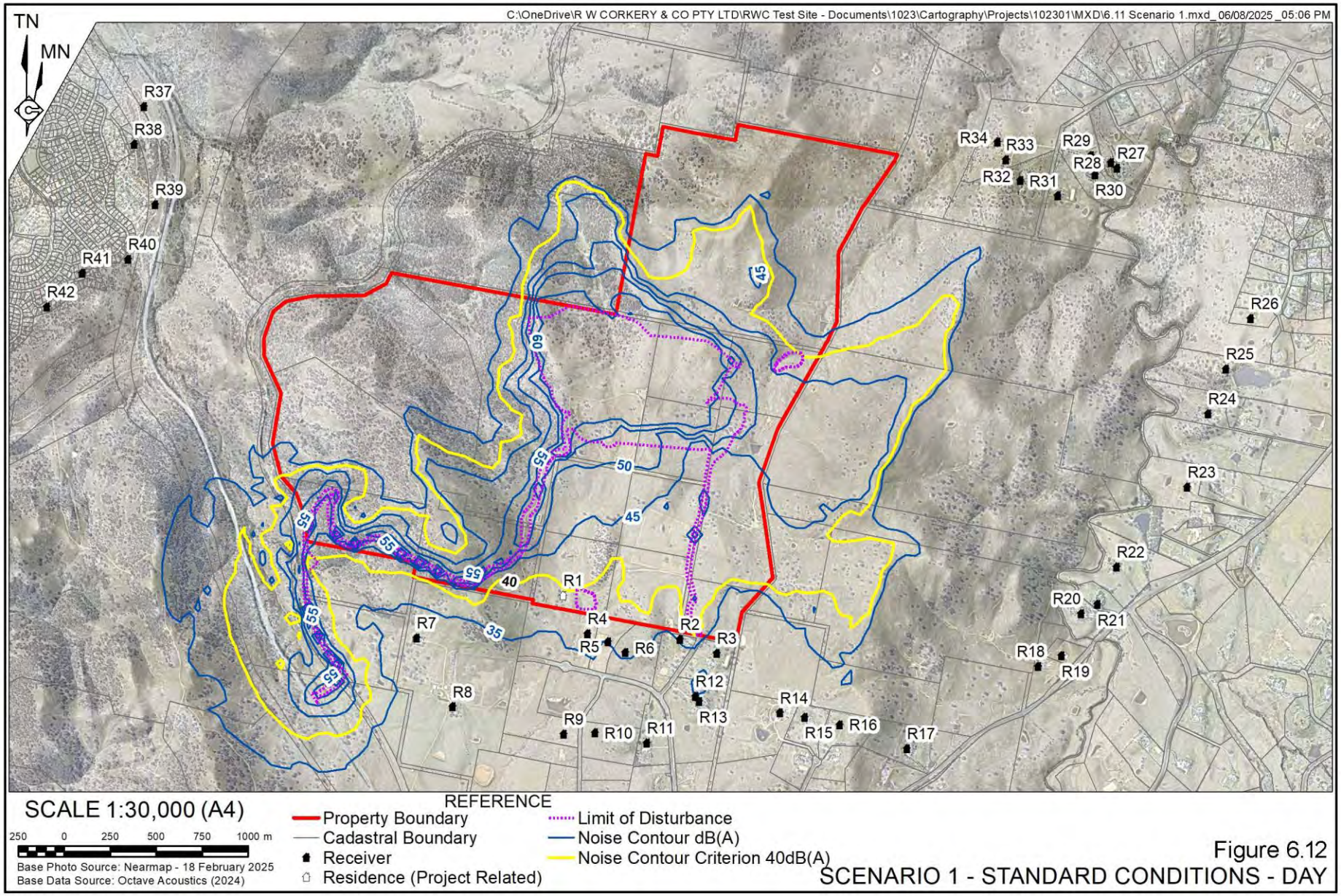
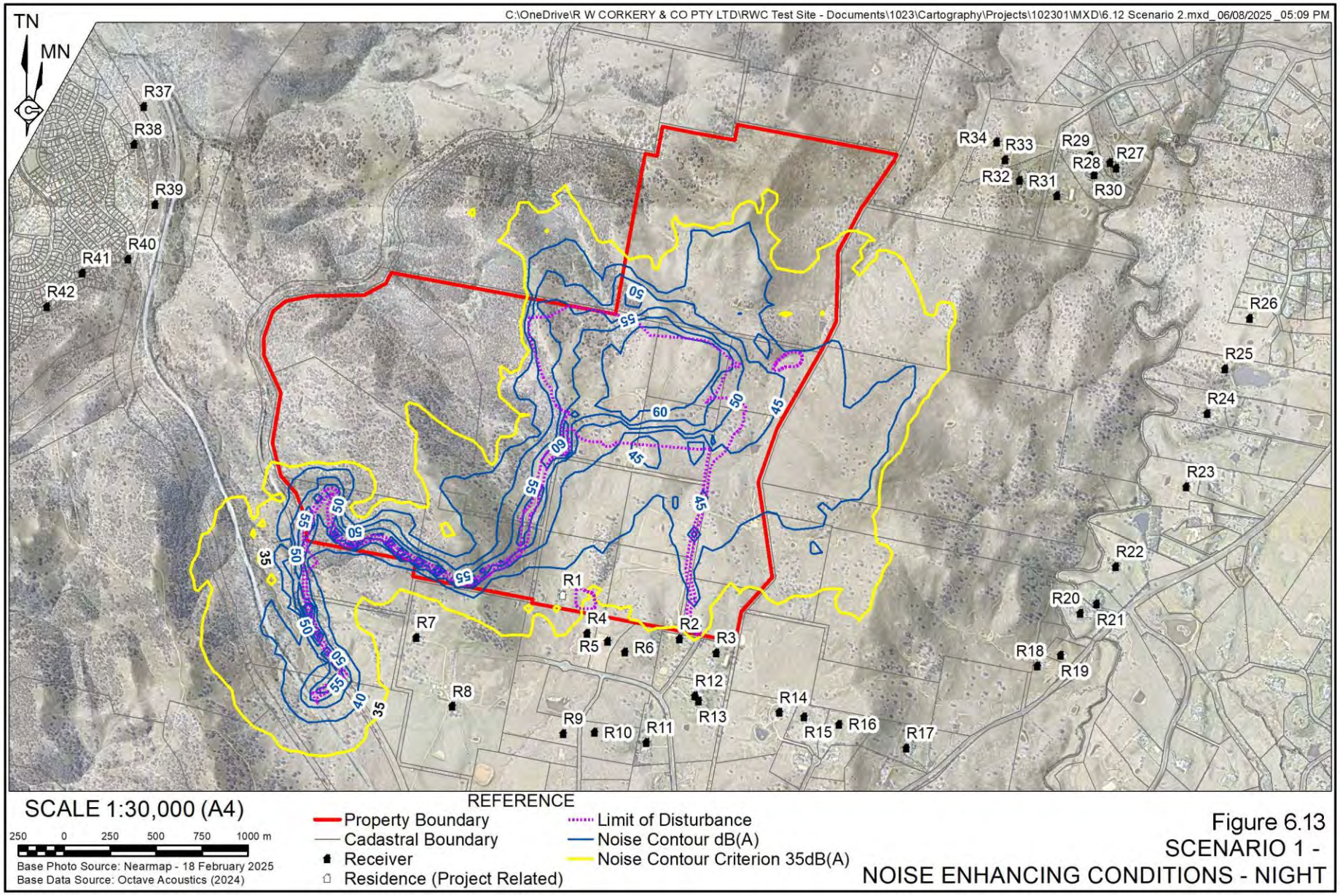


Figure 6.12
SCENARIO 1 - STANDARD CONDITIONS - DAY


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Base Photo Source: Nearmap - 18 February 2025
Base Data Source: Octave Acoustics (2024)
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Cadastral Boundary
Receiver
Residence (Project Related)
Limit of Disturbance
Noise Contour dB(A)
Noise Contour Criterion 35dB(A)
Figure 6.13
SCENARIO 1 -
NOISE ENHANCING CONDITIONS - NIGHT

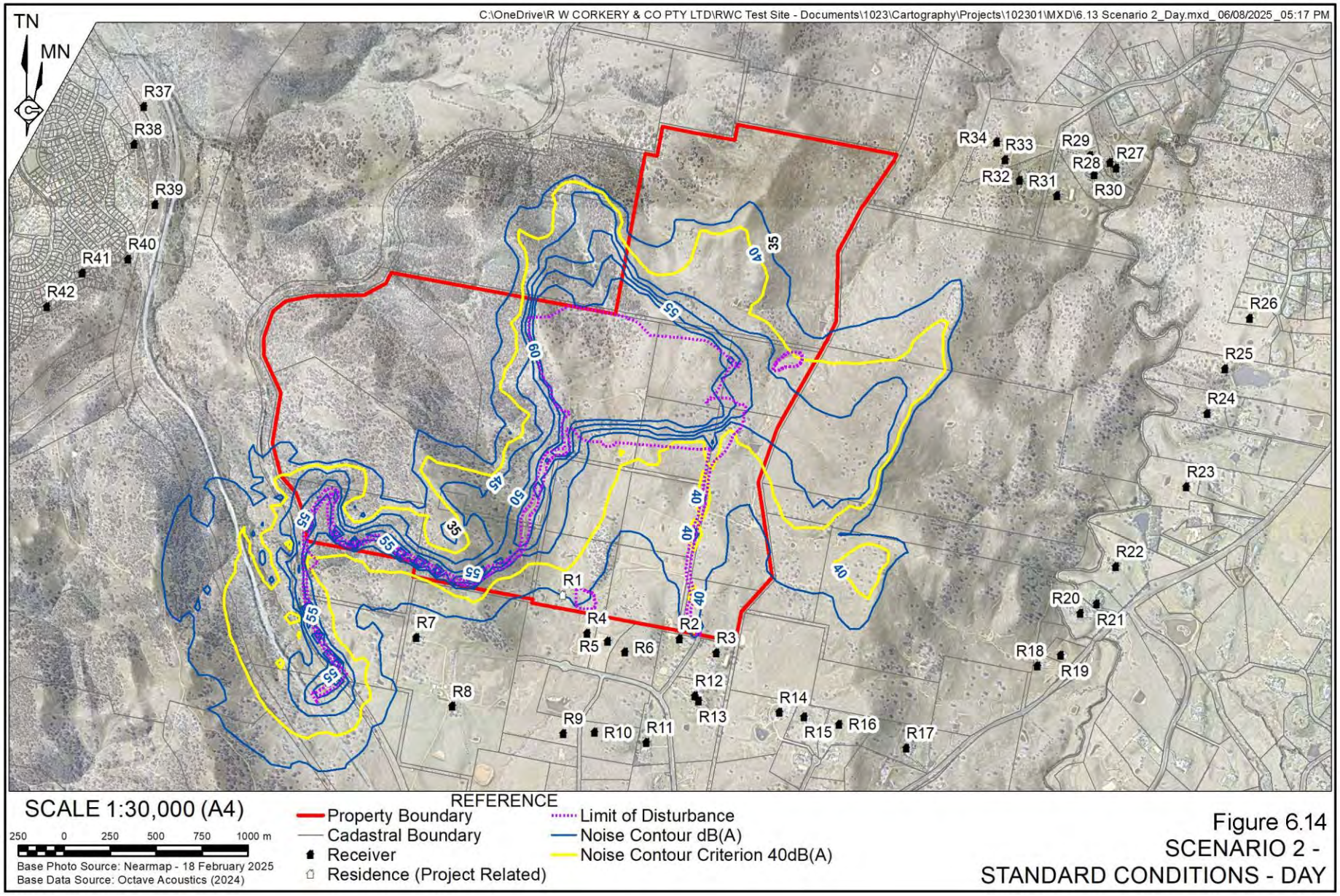


Figure 6.14
SCENARIO 2 -
STANDARD CONDITIONS - DAY

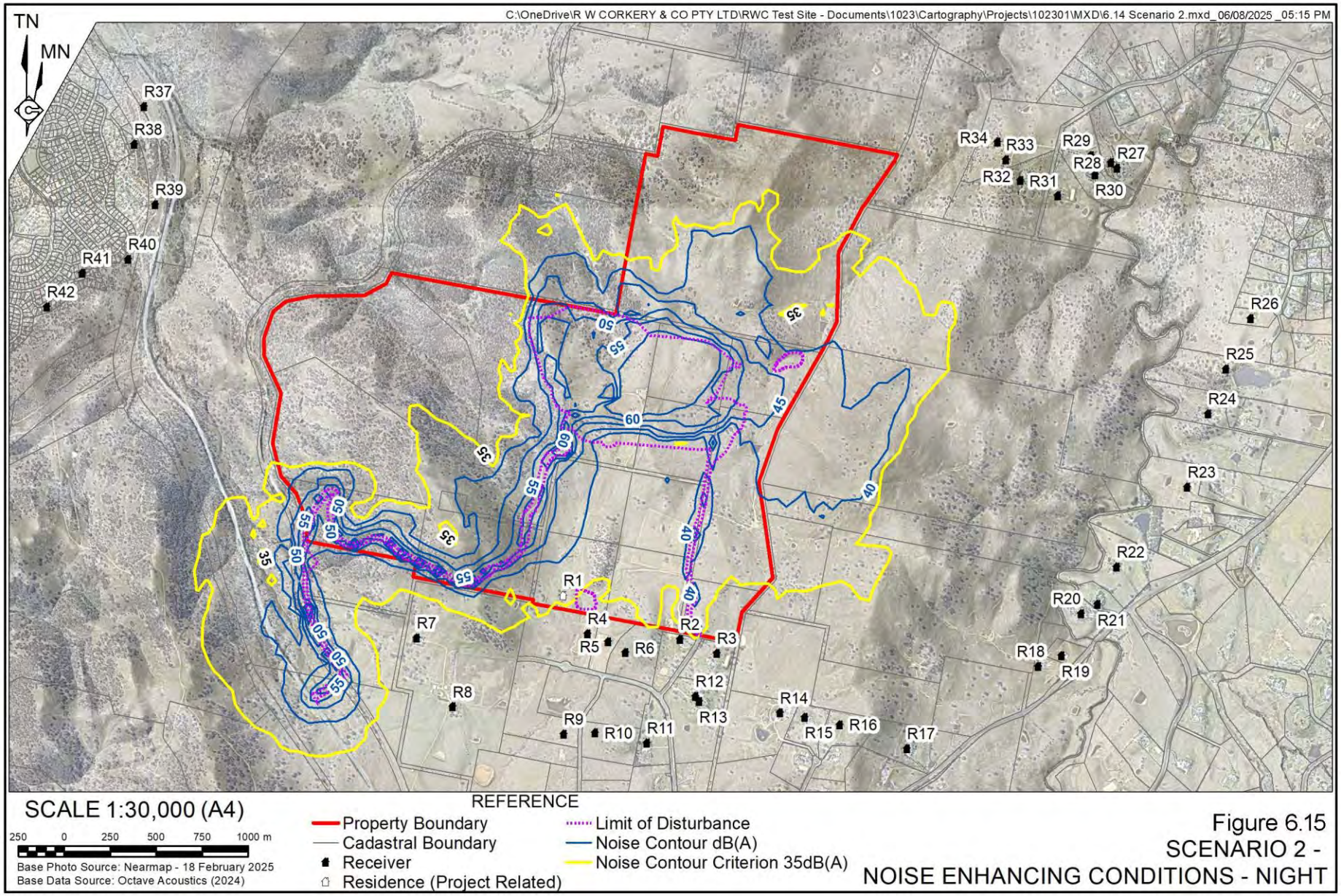

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SCALE 1:30,000 (A4)
250 0 250 500 750 1000 m
Base Photo Source: Nearmap - 18 February 2025
Base Data Source: Octave Acoustics (2024)
REFERENCE
Property Boundary
Cadastral Boundary
Receiver
Residence (Project Related)
Limit of Disturbance
Noise Contour dB(A)
Noise Contour Criterion 35dB(A)
Figure 6.15
SCENARIO 2 -
NOISE ENHANCING CONDITIONS - NIGHT

Table 6.39
Cumulative Scenario 1 and Grader Noise Levels at Most Affected Receivers, dB $L_{Aeq,15min)}$

NCA	Most Affected Residence	Noise Level	Criteria	Compliance
1	R35	26	45	Yes
2	R33	28	45	Yes
4	R7	34	45	Yes
5	R2	45	45	Yes
6	R16	34	45	Yes
Source: Octave (2025) – After Table 34				

Maximum Noise Levels

The maximum noise sources with the greatest potential to cause sleep disturbance to nearby sensitive receivers are trucks using the Quarry Access Road between 5:00am and 7:00am. **Table 6.40** presents the maximum noise levels predicted to be generated by the Project at each sensitive receiver.

Table 6.40
Maximum Noise Levels at Most Affected Receivers, dBL_{AFmax}

NCA	Receiver	Noise Level	Criteria	Further Consideration Required?
1	R40	27	52	No
2	R33	25	52	No
4	R7	40	52	No
5	R4	50	52	No
6	R16	29	52	No
Source: Octave (2025) – After Table 36				

Road Traffic Noise

The Project would generate a maximum of 400 truck movements and 100 concrete despatch vehicle movements per day. Octave (2025) utilised the United kingdom Department of Transport Welsh Office *Calculation of Road Traffic Noise*, 1988 prediction algorithm (CoRTN) to determine the predicted change in road traffic noise as a result of the Project. **Table 6.41** presents the results of the road traffic noise assessment.

Table 6.41
Road Traffic Noise Assessment Results

Road	Existing Traffic Volumes	Existing Heavy Vehicle %	Additional Heavy Vehicles	Additional Light Vehicles	Predicted Noise Level Increase, dB	Relative Increase Criterion, dB	Further Consideration Required?
Monaro Highway	7,323 per day	8%	+ 500 per day	+ 40 per day	+ 1.1	2.0	No
Source: Octave (2025) – After Table 37							

6.5.6.2 Construction Noise Assessment Results

The noise impacts produced by construction within the Extraction, Processing and Visibility Barrier areas of the Quarry are expected to produce noise levels similar to that presented for operational noise outcomes (Section 6.5.6.1). Therefore, assessment of construction noise focuses on the construction of the Quarry Access Road and the Secondary Access Road.

Table 6.42 presents the predicted noise levels during construction of the Secondary Access Road at each NCA and **Table 6.43** presents predicted noise levels produced from construction of the Quarry Access Road. Sound transmission to each NCA was calculated conservatively, based on distance attenuation. The Typical Sound Power limits adopted by Octave (2025) for the assessment were obtained from Table A1 in Appendix A of Australian Standard AS 2436 *Guide to Noise and Vibration Control on Construction, Demolition, and Maintenance Sites*, and are listed in Section 11 of Octave (2025).

As shown in **Table 6.43**, total construction noise levels will remain below the Highly Noise Affected Level at all nearby sensitive receivers for construction of the access roads. However, total noise levels from construction on the Secondary Access Road were calculated to exceed the noise affected level at residences within:

- NCA 5 at average distances; and
- NCA 6 at the minimum distance.

Total noise levels from construction of the Quarry Access Road were found to exceed the noise affected level at residences within:

- NCA 4 and NCA 5 at average distances; and
- NCA 6 at the minimum distance.

6.5.6.3 Vibration Assessment Results

The Transport for NSW *Construction Noise and Vibration Strategy* (V4.1 2019) sets out recommended minimum working distances for vibration intensive plant from sensitive receivers. The largest source of vibration provided is a large vibratory roller, for which the minimum working distance is 100m for compliance with human comfort criteria. Octave (2025) assessed the impacts of vibration at sensitive receiver R2, as it is approximately 92m from the Limit of Disturbance. **Table 6.44** presents the results of the assessment of vibration at R2.

Table 6.42
Construction Noise Results – Secondary Access Road

	NCA 1			NCA 2			NCA 4			NCA 5			NCA 6		
	Min (2500m)	Avg (3600m)	Max (4600m)	Min (2000m)	Avg (2700m)	Max (3400m)	Min (1350m)	Avg (1700m)	Max (2100m)	Min (70m)	Avg (1000m)	Max (1900m)	Min (600m)	Avg (1500m)	Max (2300m)
Total (all equipment)	38	35	33	40	38	36	44	42	40	69	46	41	51	43	39
Noise affected level (Day)	48			45			45			45			45		
Highly noise affected level	75			75			75			75			75		

Table 6.43
Construction Noise Results– Quarry Access Road

	NCA 1			NCA 2			NCA 4			NCA 5			NCA 6		
	Min (1700m)	Avg (2900m)	Max (4000m)	Min (2700m)	Avg (4100m)	Max (5500m)	Min (350m)	Avg (1000m)	Max (1700m)	Min (550m)	Avg (1400m)	Max (2200m)	Min (1600m)	Avg (3000m)	Max (4400m)
Total (all equipment)	47	42	39	43	39	37	61	51	47	57	48	45	47	42	39
Noise affected level (Day)	48			45			45			45			45		
Highly noise affected level	75			75			75			75			75		

Table 6.44
Vibration Assessment at R2 Results

Plant Description	Operating Condition	Typical Peak Particle Velocity at 7.6m (mm/s)[1]	Peak Particle Velocity at Receiver (mm/s)[2]	Human Comfort Criteria (Day), mm/s PPV	Cosmetic Building Damage Criteria, mm/s PPV	Compliance
Vibratory Roller	Steady state	5.3	0.13	0.28	15	Yes
	Start-up and run-down	5.3	0.21	0.28	15	Yes
Note 1: Via US FTA Transit Noise and Vibration Impact Assessment Manual, 2018.						
Note 2: Vibration attenuation during steady state operation of the vibratory roller was calculated according to Transport Research Laboratory Report 429 Groundborne vibration caused by mechanised construction works, 2000 as $v = v_{7.6m}(7.6/d)^{1.5}$ for steady state operation and $v = v_{7.6m}(7.6/d)^{1.3}$ for start-up and run-down						
Source: Octave (2025) – modified after Table 43						

Octave (2025) determined that that vibration impacts due to construction and operation of the quarry are anticipated to comply with human comfort and cosmetic building damage criteria at all nearby sensitive receivers.

6.5.6.4 Blast Assessment Results

Octave (2025) assessed the potential ground vibration and airblast impacts associated with the Project in accordance with Australian Standard AS 2187.2:2006 *Explosives – Storage and use, Part 2: Use of explosives* Appendix J.

Predicted ground vibration impacts were calculated at the most affected sensitive receiver within each NCA according to standard, using the largest planned Maximum Instantaneous Charge mass (MIC) of 126 kg. **Table 6.45** presents the predicted ground vibration impacts.

Table 6.45
Blast Vibration Impacts at Closest Receivers – Human Comfort Assessment

NCA	Receiver	Distance (m)	Typical Vibration[1] (PPV mm/s)	Vibration Range (PPV mm/s)	Criteria (PPV mm/s)	Compliance
1	35	1750	0.35	0.14-1.41	5	Yes
2	34	2250	0.24	0.09-0.95	5	Yes
4	7	1500	0.45	0.18-1.81	5	Yes
5	4	1200	0.65	0.26-2.59	5	Yes
6	14	1900	0.31	0.12-1.24	5	Yes
Note 1. Site constant Kg = 1140 and site exponent B = 1.6 were used, which are provided by AS 2187 as typical for free face average conditions.						
Source: Octave (2025) – Modified after Table 44						

Octave (2025) used the Terrock model to conduct a detailed assessment of airblast overpressure. **Table 6.46** presents the results of the airblast overpressure calculations at the closest receivers.

Table 6.46
Airblast Impacts at Closest Receivers – Human Comfort Assessment

NCA	Receiver	Distance (m)	Peak Pressure Level		Criteria (dBL)	Compliance
			Front of Face	Behind Face		
1	35	1750	111	101	115	Yes
2	34	2250	107	98	115	Yes
4	7	1500	113	103	115	Yes
5	4	1200	115	106	115	Yes
6	14	1900	110	100	115	Yes
Source: Octave (2025) – Modified after Table 46						

While R1 is not classified as a sensitive receiver, airblast levels were calculated at this location for informative purposes. At 950m from the blast, peak pressure levels at R1 were calculated to be 118dBL in front of the face, and 109dBL behind the face. The predicted peak pressure level in front of the quarry face marginally exceeds the human comfort criteria but comfortably complies with the building damage criteria.

The results of the airblast overpressure assessment indicate that Project would comply with human comfort criteria for both the front of face and behind face conditions at all sensitive receivers. Therefore, it is concluded that airblast levels will comfortably comply with the applicable building damage criteria.

6.5.6.5 Fly Rock

Fromble (2025) demonstrated the following outcomes based on the conservative blast parameters.

- Estimated maximum horizontal fly rock ranges up to 70m and maximum vertical throw up to 62m.
- A minimum horizontal blast clearance zone of 140m for a FoS of 2.
- A minimum horizontal blast clearance zone of 280m for a FoS of 4.
- A maximum vertical throw up to 76m for a FoS>4.

In summary, Fromble (2025) determined that available clearances surrounding the extraction area are sufficient that both flyrock control (50m to 70m) and blast clearance requirements (up to 300m) could generally be maintained within the Project Site boundary.

Fromble (2025) also notes that blast settings should be reviewed after the first blast and can be progressively adjusted to meet blast performance requirements. Modifications to blast parameters may be made as actual flyrock outcomes are confirmed but the flyrock range would remain within the maximum range of 70m in order to achieve the nominated Factor of Safety.

6.5.7 Voluntary Land Acquisition and Mitigation Policy Assessment

The NSW Government *Voluntary Land Acquisition and Mitigation Policy for State Significant Mining, Petroleum and Extractive Industry Developments* (VLAMP) describes policy for voluntary mitigation and land acquisition actions undertaken to address noise and dust impacts from State significant extractive industry developments.

Relevant to the proposed development, a consent authority may apply voluntary land acquisition rights where, even with the implementation of best practice management:

- the noise generated by the development would be characterised as significant at any residence on privately owned land; or
- the noise generated by the development would contribute to exceedances of the Noise Policy for Industry amenity noise levels plus 5dB(A) on more than 25% of any privately-owned land where there is an existing dwelling or where a dwelling could be built under existing planning controls.

Octave (2025) considered the predicted impacts against the VLAMP criteria, and found that the policy was not triggered at any properties.

6.5.8 Monitoring

Ongoing monitoring of noise, airblast and ground vibration would be managed in accordance with the procedures described in the Noise Management System for the Project.

In summary, the following noise monitoring procedures would be undertaken.

- Annual attended and unattended noise monitoring would be undertaken during the autumn or winter months to confirm noise levels are consistent with predicted impacts.
- The noise monitor would be configured to capture L_{eq} noise levels in third-octave bands with a frequency range of at least 10 Hz to 10 kHz, as required for assessment of low-frequency noise and tonality.
- Noise monitoring would initially be carried out at a location within each NCA to validate the outcomes of noise modelling. Some locations may be removed if noise impacts are negligible and agreement is provided by the EPA.

Blast monitoring would be described in the Blast Management Plan for the Project and include the monitoring for airblast overpressure and ground vibration at three locations to the north, south and southeast of the Project Site. Records would be maintained for all blasts to assist in the design and optimisation of future blasts and to provide a traceable system of documentation in case of an incident or complaint.

An on-site Automatic Weather Station would be established at a suitable location within the property and installed generally in accordance with the EPA's *Approved Methods of the Modelling and Assessment of Air Pollutants in NSW*.

6.5.9 Conclusion

Noise levels and vibration impacts generated as a result of the operation of the Quarry are predicted to comply with the relevant assessment criteria at all private residences (within NSW and the ACT). Noise impacts from construction activities have the potential to exceed noise affected levels at some locations and would be managed by employing appropriate construction noise management practices. Construction noise would only be generated during the site establishment and construction stage that is estimated to occur over a period of six months. Further to this, construction noise in operational areas (the Processing and Stockpiling Area and the Infrastructure Area) is expected to comply with noise levels expected to be higher during construction of access road to the Project Site. These activities are expected to occur over a period of two months.

Impacts associated with blasting events are also predicted to comply with the relevant assessment criteria at all privately-owned residences. Fromble (2025) determined suitable measures would be established to manage flyrock risk and that blast clearance (up to 300m) would be satisfied. Therefore no changes to the flight path of airplanes approaching Canberra Airport are needed.

The outcomes do not mean that the community would not hear or experience the effects of noise and blasting from time to time. However, the operation would satisfy the requirements of the NSW Government with regards to the environmentally responsible operation of the Project. The management of noise and blasting risks would occur over the life of the Project with regular monitoring published on the Company website and in annual reporting for the Project.

6.6 Visibility

6.6.1 Introduction

The Secretary's Environmental Assessment Requirements (SEARs) for the Project require the Environmental Impact Statement (EIS) to include an assessment of potential impacts to visual amenity. This includes an assessment of the likely visual impacts of the development (before, during and post-quarrying) on private landowners in the vicinity of the development and key vantage points in the public domain, with particular attention to any new landforms.

The assessment requirements of Council were also considered during the preparation of the Visual Impact Assessment. A summary of the SEARs and requirements of Council is provided in **Appendix 2** with a record of where each requirement is addressed in the EIS.

A Visual Impact Assessment (VIA) for the Project was undertaken by R.W. Corkery & Co. Pty Limited (RWC) and is presented as **Appendix F** and hereafter referred to as RWC (2025). The following subsections provide a summary of the VIA, with emphasis on the mitigation measures that Monaro Rock would implement to minimise visual impacts.

6.6.2 The Existing Environment

The Project Site is located in a rural landscape characterised by rolling hills, remnant vegetation, and scattered residential development. Key topographic features include the following.

- Enchanted Hill (955m AHD) to the southwest, with a communications tower visible from the Monaro Highway.
- Beatty Hill (920m AHD) to the east, which screens the Project Site from Old Cooma Road and Royalla.
- Unnamed ridgelines to the north and west, which provide partial shielding from Fernleigh Park and the ACT border.

The existing visual landscape is determined by features of the views or outlook from specific vantage points and the characters that the landscape imparts. The visual landscape is comprised of elements of the following.

- Local geology and geological features such as outcropping or ridgelines (described in Section 3.3).
- Topography and drainage features (described in Section 6.1).
- Vegetation present in the landscape (described in Section 6.7 and comprising PCT3375 (Monaro-Queanbeyan Rolling Hills Grassy Forest) and PCT3376 (Southern Tableland Grassy Box Woodland – Box-Gum Woodland). Vegetation is present at higher density on ridgelines and lower density in cleared paddocks.
- Land use and ownership (described in Section 2.4).

- Infrastructure, consisting of local highways and arterial roads and features such as the communications tower on Enchanted Hill and the presence of airplanes above the land. The Project Site is not visible from most public roads due to intervening topography and vegetation.

Plates 6.1 and **6.2** illustrate views from the site towards Fernleigh Park and Royalla which are key areas that may have views towards the Project Site.



Plate 6.1 View from the Extraction Area to the Northeast Towards Fernleigh Park (Ref: E1023A_020)



Plate 6.2 View from the Extraction Area to the southeast towards Royalla (Ref: E1023A_023)

6.6.3 Potential Visual Impacts

Potential visual impacts generated by the Project include the following.

1. The intersection and rail overbridge would be visible from the Monaro Highway.
2. Glimpses of the Quarry Access Road may be possible from the Monaro Highway.
3. Views of operational areas would be limited from the Monaro Highway and are not assessed further.
4. Views of operational areas may be possible from residences in Fernleigh Park to the northeast of the Project Site.
5. Views of operational areas may be possible from residences in Royalla to the south and southeast of the Project Site. There residences would be more likely to view the Visibility Barrier than operational areas of the Project.
6. Views of operational areas may be possible from private land to the north within NSW and the ACT, however these views would predominantly consist of glimpses through existing vegetation and are not assessed further.
7. Views of the Quarry Access Road would be possible from properties in Royalla to the south and southeast of the Project Site.
8. Views of the Quarry Access Road would result from a residence to the south of Enchanted Hill and adjacent to the ACT/NSW border. There would not be views of the operational areas of the Project Site from this location.
9. Views of operational areas at a distance greater than 4kms may be possible from public land on Mount Campbell to the southeast of the Project Site. These views are considered negligible and are not assessed further
10. Blasts initiated within the Project Area may generate a plume of dust immediately following the blast. The extent to which the plume is visible would depend on the quantity of rock blasted, direction and strength of the prevailing winds, the depth of the blast within the extraction area.
11. Blast fumes are also possible where blast preparation has been inadequate. Blast fumes are generally visible as an orange-coloured plume but are rare.
12. As the Project may operate in the early morning (from 5:00am) and after dusk at some times of the year (to 6:00pm), lighting for the Project may cause nuisance to local residences.

6.6.4 Management and Mitigation Measures

The Project has been designed to manage and mitigate the impact of visibility to the surrounding region. The following design and operational mitigation measures would be implemented.

6.6.4.1 Design Mitigation Measures

Based on the Project Site layout and possible visibility from the surrounding region, the following design measures would be implemented to reduce visual impacts.

- Vegetation clearing would be delayed until shortly before extraction begins in stages, retaining screening vegetation for as long as possible.
- The Visibility Barrier would be constructed in two stages to an elevation of 880m AHD, with progressive revegetation of the southern face to shield views from Royalla and Fernleigh Park.
- A 3m acoustic fence would be installed along sealed sections of the Quarry Access Road to obscure vehicle movements and reduce noise and dust.
- Upper benches would be reduced to 5m height and widened to 5m to 10m to support vegetation growth and improve screening.
- All fixed lighting would be directed downward and shielded to prevent nuisance to nearby residences.

6.6.4.2 Operational Mitigation Measures

The following operational measures would complement the design features to mitigate any potential impacts from Project visibility in the surrounding regions.

- Tree screening areas would be established during site establishment and maintained throughout the Project life.
- Southern batters of the Visibility Barrier would be revegetated immediately following construction (as described in Section 3.5.4).
- Terminal benches would be progressively rehabilitated as soon as practical following completion.
- Vegetation near Location F would be planted between the Quarry Access Road and nearby residences to reduce visibility.
- Vegetation along the ACT section of Quarry Access Road would be planted to mitigate views from the Monaro Highway and address erosion.
- Biodiversity and Rehabilitation Management Plan: Includes protocols for seed collection, species selection, planting, and maintenance of revegetated areas.
- Blast Management Plan: Includes dust and fume mitigation protocols and community notification procedures.
- The Project Site would be maintained in a clean and tidy condition to reduce visual clutter.
- Visual changes would be tracked and reported in the Annual Review.

6.6.5 Assessment of Impacts

RWC (2025) assessed the visual impact of the proposed Project on surrounding residential areas, incorporating the mitigation and management measures outlined in Section 6.6.4. The assessment adopted a multi-layered methodology combining spatial modelling, site inspections, and representative receptor-based analysis to determine the extent, nature, and significance of visual change across the landscape.

6.6.5.1 Visual Catchment Modelling

Visibility was modelled under the following three scenarios to understand how the Project would appear from surrounding areas.

- Unmitigated views: Assumes no Visibility Barrier or tree screening (**Figure 6.16**).
- Mitigated views: Assumes construction of the Visibility Barrier and tree screening to an effective height of 5m (**Figure 6.17**).
- Quarry Access Road views only: Assumes visibility of vehicles mitigated by a 3m high acoustic fence (**Figure 6.18**).

To quantify visibility, a 20m point grid was placed across the operational areas, and the proportion of visible points from each location was calculated. Visibility was categorised into six bands, ranging from non-visible to locations that may view more than 50% of the operational area visible. Visibility distance zones were also applied, based on DPE's Wind Energy Visual Assessment Bulletin (2016), to account for the diminishing influence of visual elements with distance.

The visual catchment analysis revealed the following general patterns across the three receptor zones.

- Southern Catchment (Royalla and Moringol Place): Residences may have partial views of the Extraction Area and Quarry Access Road. Views are generally filtered by ridgelines and remnant vegetation. Sensitivity is considered moderate due to the residential nature of the area and potential for future development.
- Northern Catchment (Fernleigh Park): Elevated lots may have distant views of the Infrastructure Area and southern face of the Visibility Barrier. The Extraction Area is not visible due to intervening topography. Sensitivity is moderate, with views partially obstructed and the landscape already modified by rural development.
- Western Catchment (Enchanted Hill vicinity): A residence located approximately 350m west of the Quarry Access Road may experience direct views of vehicle movements and fencing. No views of the operational areas would be visible. Sensitivity is moderate to high due to proximity and limited screening.

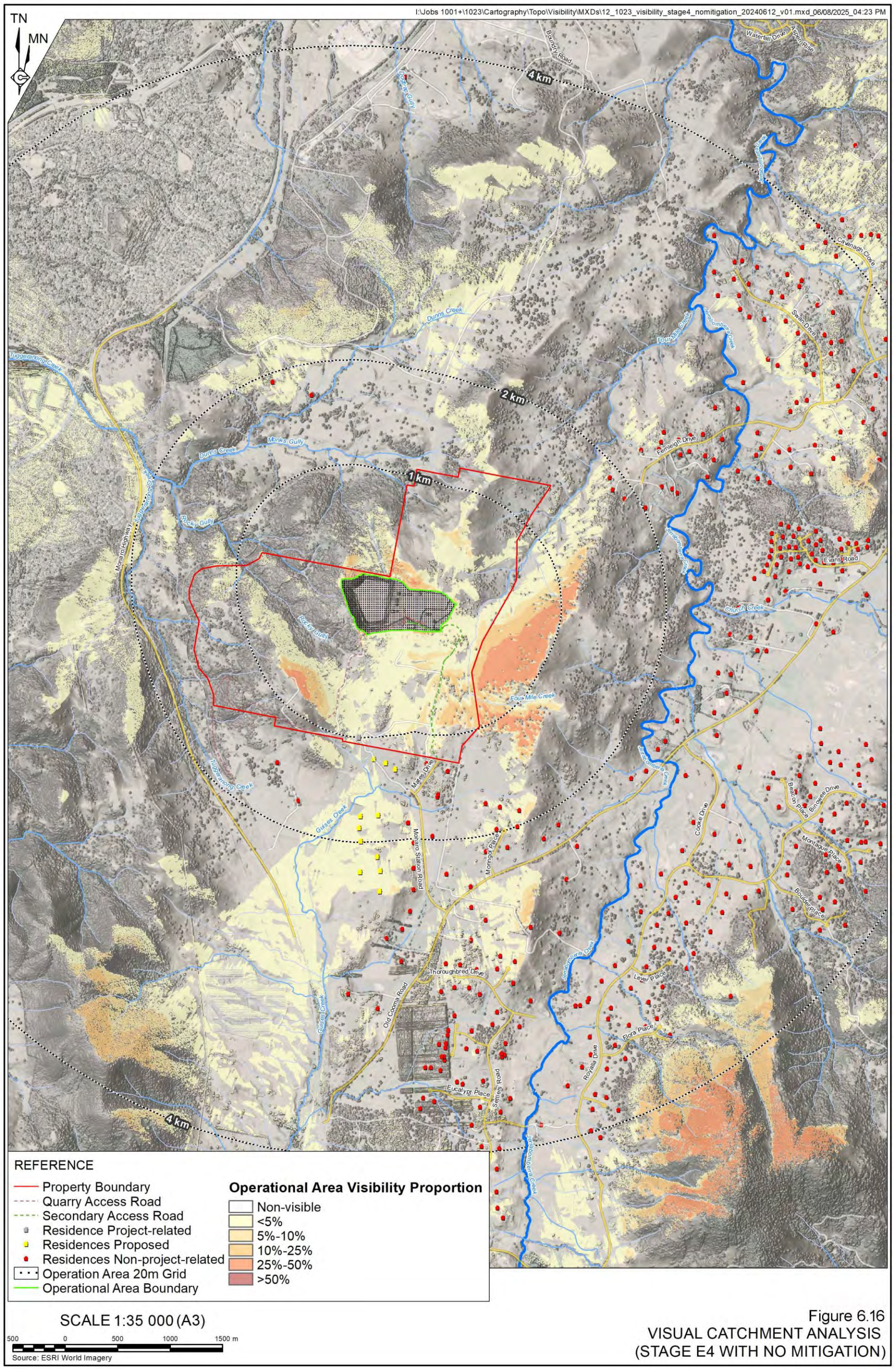


Figure 6.16
VISUAL CATCHMENT ANALYSIS
(STAGE E4 WITH NO MITIGATION)

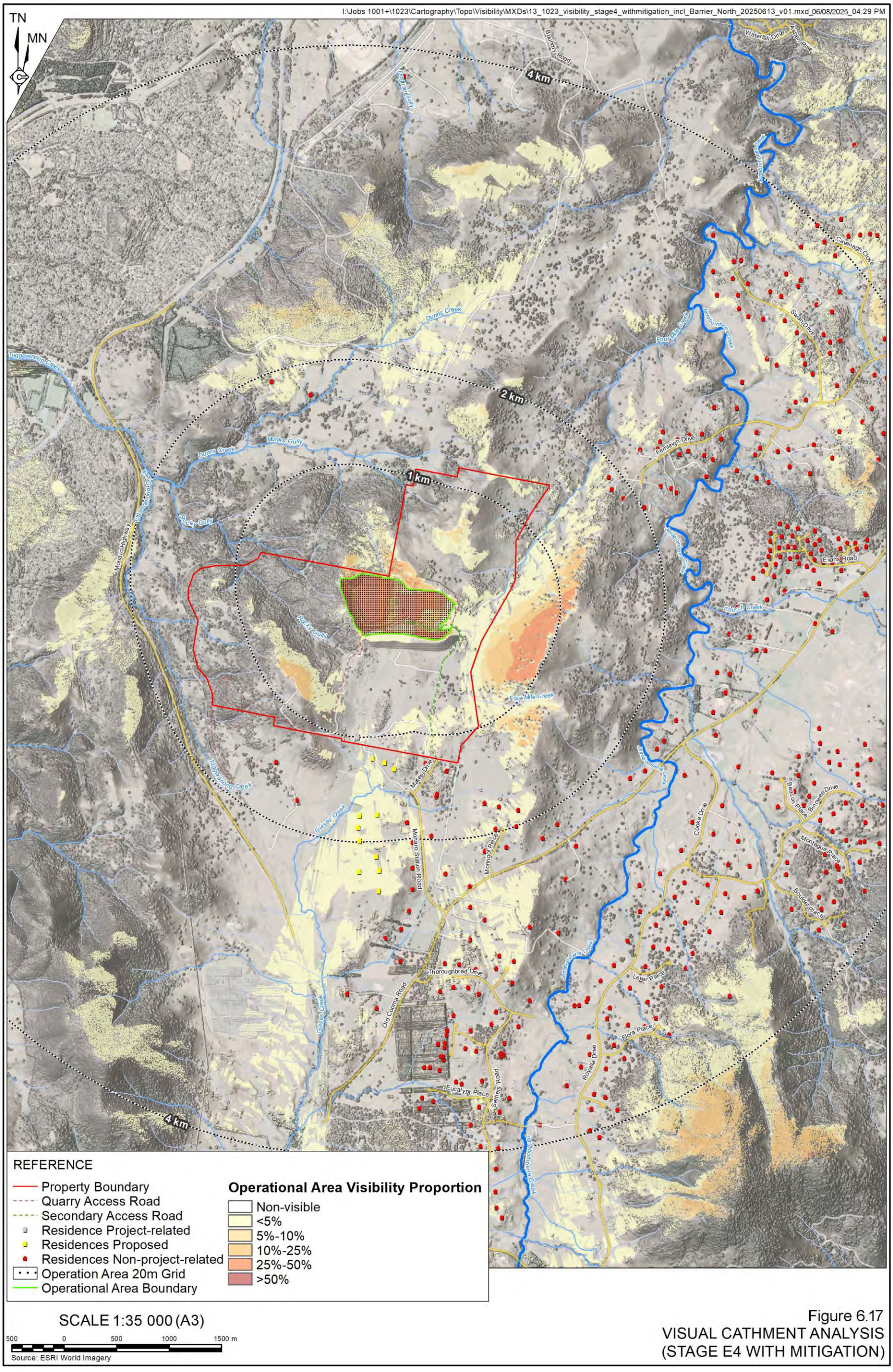


Figure 6.17
VISUAL CATHMENT ANALYSIS
(STAGE E4 WITH MITIGATION)

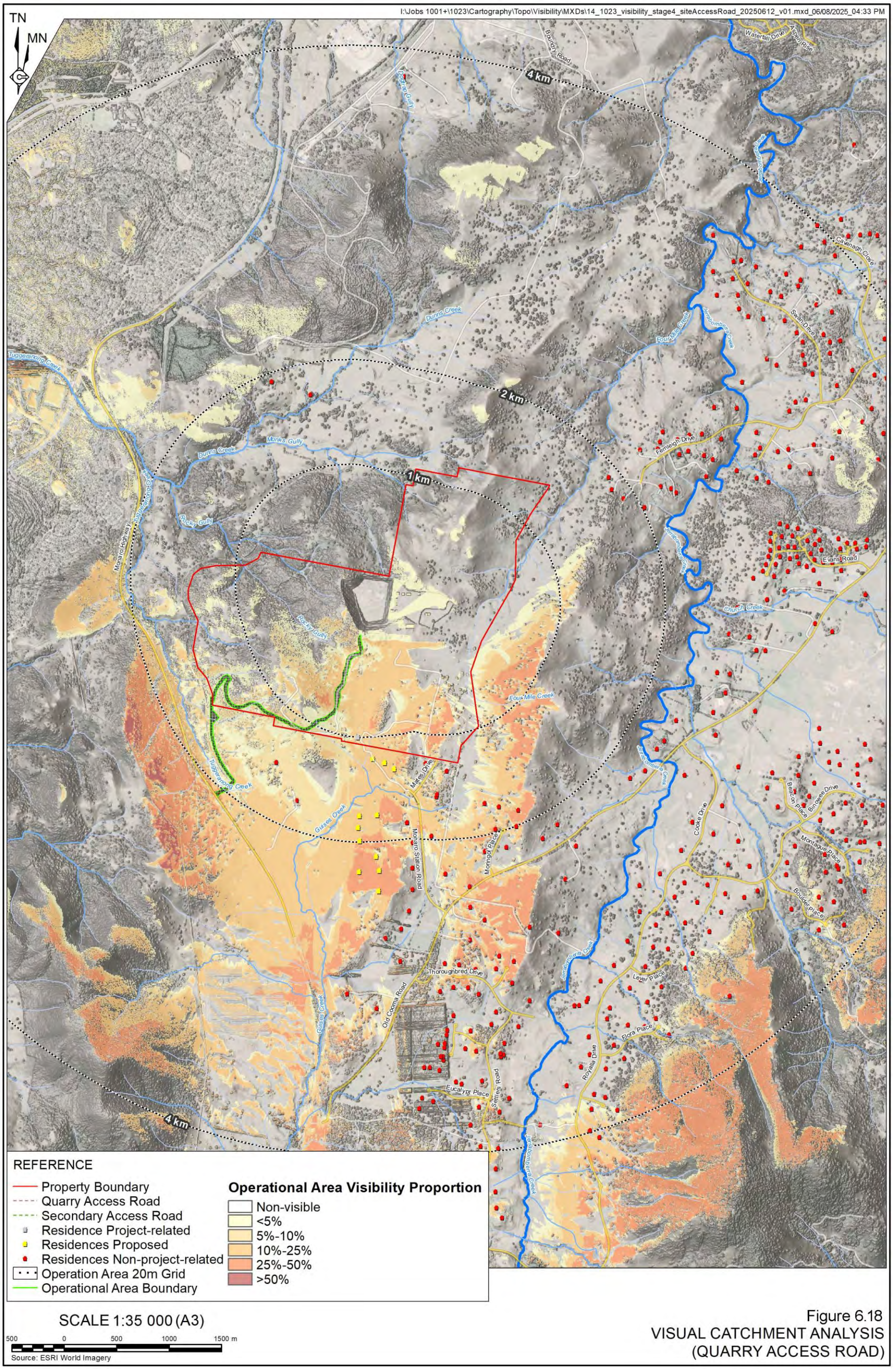


Figure 6.18
VISUAL CATCHMENT ANALYSIS
(QUARRY ACCESS ROAD)

6.6.5.2 Receptor Zones

Three primary receptor zones were then identified based on proximity, elevation, and orientation relative to the Project Site.

- Residences to the south and southeast of the Project Site (Locations A to C).
- Residences to the northeast of the Project Site (Locations D and E).
- The residence to the south of Enchanted Hill (Location F).

Six representative viewpoints (Locations A–F) were selected to reflect a range of viewing conditions and receptor types (**Figure 6.19**). These locations were used to assess the visibility of key project components, including the Extraction Area, Infrastructure Area, Visibility Barrier, and Quarry Access Road.

6.6.5.3 Predicted Visual Impacts by Location

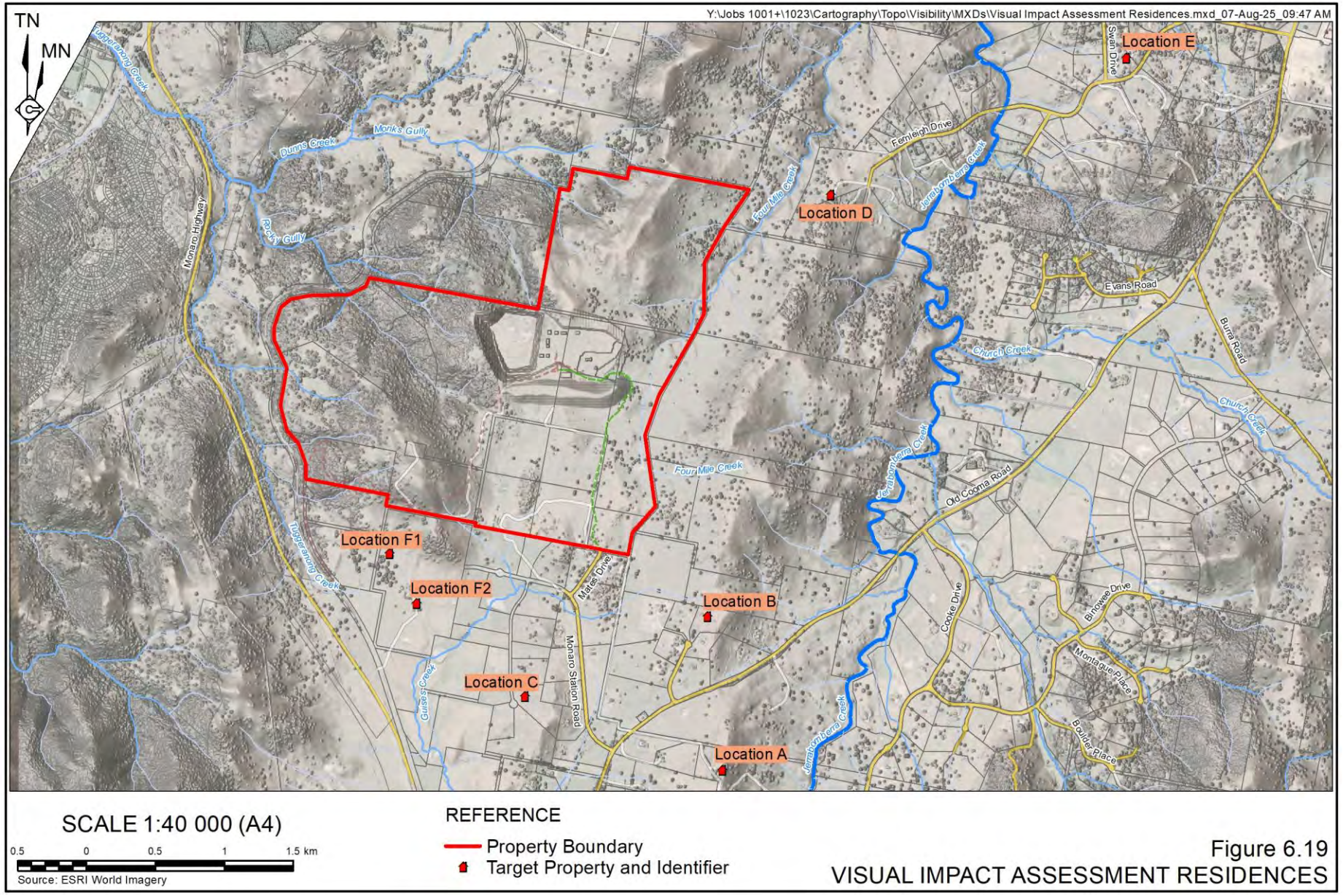
The following section summarises the predicted visual impacts for each of the six representative receptor locations identified in the Visual Impact Assessment (RWC, 2025). These locations were selected to reflect a range of viewing distances, elevations, and orientations relative to the Project Site. Impacts are described in terms of view composition, degree of change, and anticipated residual effects following implementation of mitigation.

Residences to the South of the Project Site

This group includes Locations A, B, and C, representing residential properties in Royalla and Moringol Place, as well as an approved subdivision. These receptors are located between approximately 1.0km and 3.7km southeast of the Project Site. Views from these locations are generally filtered by intervening ridgelines and vegetation, though partial visibility of the Extraction Area and Quarry Access Road may occur, particularly from elevated vantage points.

Figure 6.20 presents visual transects illustrating the predicted visibility of the Project from these southern residences under both unmitigated and mitigated scenarios.

- **Location A** – Royalla (Elevated, ~3.7km SE)
  - Predicted visual impact at Location A includes distant views of upper benches and Quarry Access Road.
  - Visibility is filtered by ridgelines and vegetation.
  - Low residual impact, due to distance and effective screening.
- **Location B** – Moringol Place (~2.5km SE)
  - Predicted visual impact at Location B includes partial views from elevated points.
  - Visibility Barrier and roadside vegetation would mitigate and reduce exposure.
  - Low residual impact, with minor visual change.


Y:\Jobs 1001+\1023\Cartography\Topo\Visibility\MXDs\Visual Impact Assessment Residences.mxd_07-Aug-25_09:47 AM
TN
MN
Location E
Location D
Location F1
Location F2
Location B
Location C
Location A
Monaro Highway
Monks Gully
Dunns Creek
Rocky Gully
Four Mile Creek
Jerrabomberra Creek
Church Creek
Old Cooma Road
Evans Road
Burra Road
Cooke Drive
Monaro Station Road
Mates Drive
Gulses Creek
Tuggeranong Creek
Femleigh Drive
Swan Drive
Binowee Drive
Montague Place
Boulder Place
SCALE 1:40 000 (A4)
0.5 0 0.5 1 1.5 km
Source: ESRI World Imagery
REFERENCE
Property Boundary
Target Property and Identifier
Figure 6.19
VISUAL IMPACT ASSESSMENT RESIDENCES

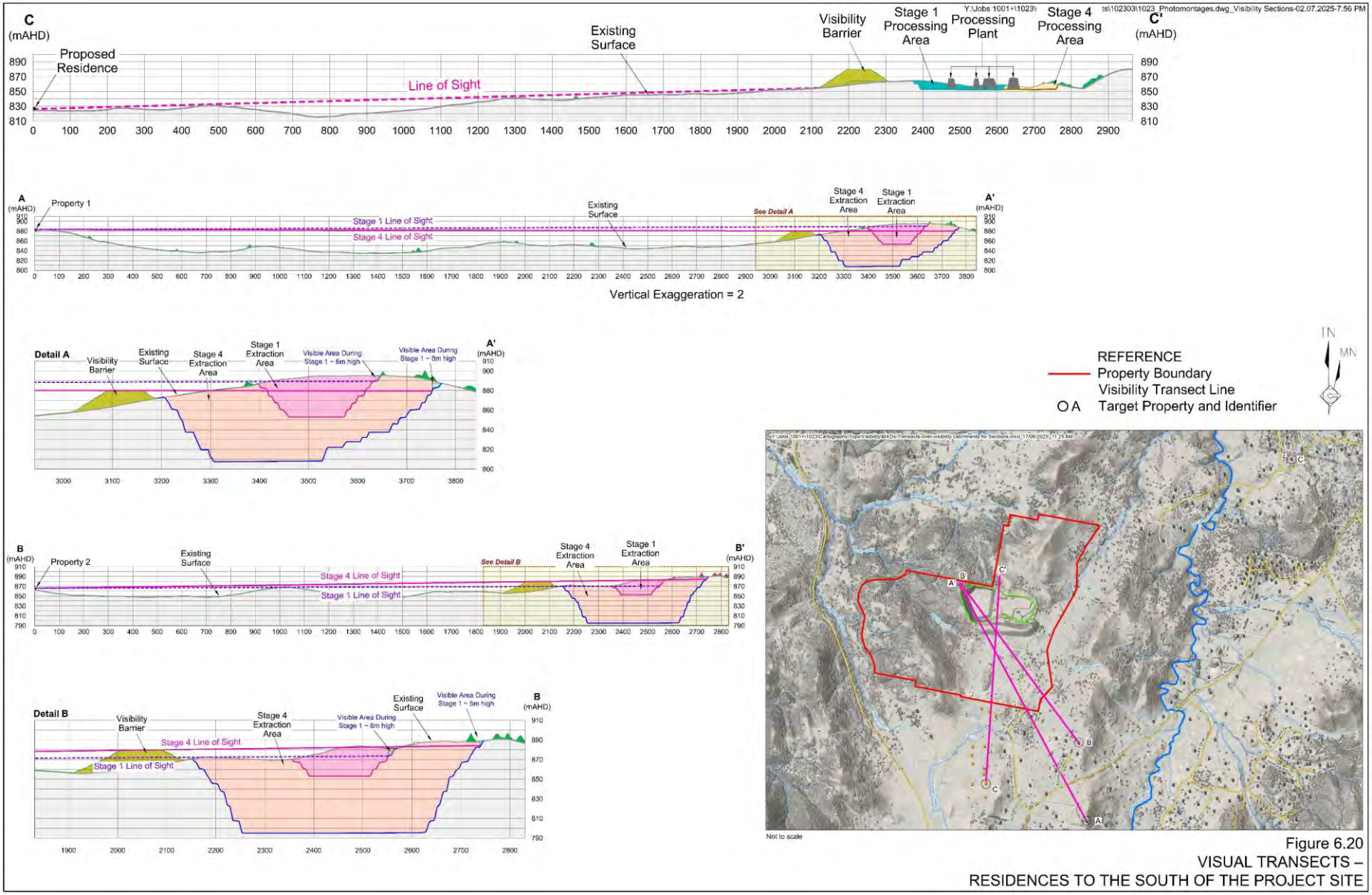


Figure 6.20
VISUAL TRANSECTS –
RESIDENCES TO THE SOUTH OF THE PROJECT SITE

- **Location C** – Approved Subdivision (~1.0–3.0km SE)
  - Predicted visual impact at Location C includes possible direct views of the Visibility Barrier and Access Road from closest lots.
  - Progressive revegetation would mitigate and soften visual impact.
  - Low to Moderate residual impact, depending on lot location.

Residences to the North of the Project Site

Locations D and E represent elevated residential properties within Fernleigh Park, located approximately 2.4km to 5.1km north and northeast of the Project Site. The Extraction Area is not visible from these locations due to intervening topography; however, partial views of the Infrastructure Area and southern face of the Visibility Barrier may occur.

Figure 6.21 presents visual transects illustrating the predicted visibility of the Project from northern residences, highlighting the effectiveness of screening and topographic shielding.

- **Location D** – Fernleigh Park (Northwest) (~2.4km N)
  - Predicted visual impact at Location D includes no views of Extraction Area; partial views of Infrastructure Area.
  - Tree screening and rehabilitation would reduce visibility.
  - Low to Moderate residual impact, with limited exposure.
- **Location E** – Fernleigh Park (Elevated) (~4.6-5.1km NE)
  - Predicted visual impact at Location E includes highly filtered views of the top of the Visibility Barrier.
  - No visibility of the proposed quarrying operations.
  - Low residual impact, due to distance and minimal change.

Residence to the south of Enchanted Hill

Location F represents a rural residential property located approximately 350m west of the Project Site, near Enchanted Hill and the Monaro Highway. Due to its proximity and lower elevation, this receptor has potential for direct views of the Quarry Access Road and acoustic fence. A Seen Area Analysis was undertaken to model visibility from this location, including residences F1 and F2.

Figure 6.22 presents the results of the Seen Area Analysis, showing the extent of visibility from Location F and confirming that no views of the operational areas of the Project Site would occur.

- **Location F** – South of Enchanted Hill (~350m W)
  - Predicted visual impact at Location F includes direct views of the Quarry Access Road and acoustic fence.
  - No visibility of the proposed quarrying operations.
  - Vegetation, fence design and lighting controls would mitigate visual impact.
  - Moderate residual impact, due to proximity and direct line of sight.

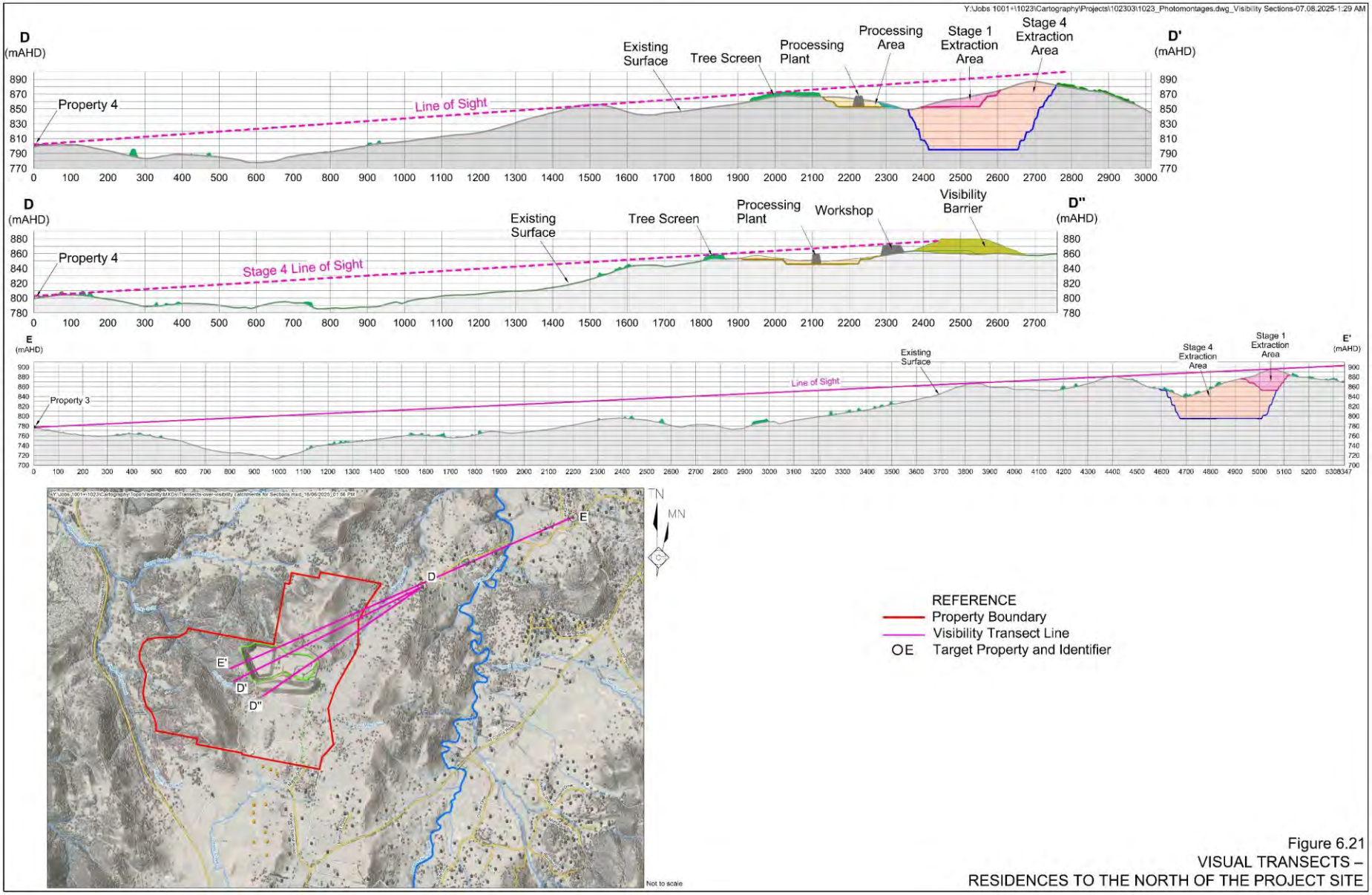


Figure 6.21
VISUAL TRANSECTS –
RESIDENCES TO THE NORTH OF THE PROJECT SITE

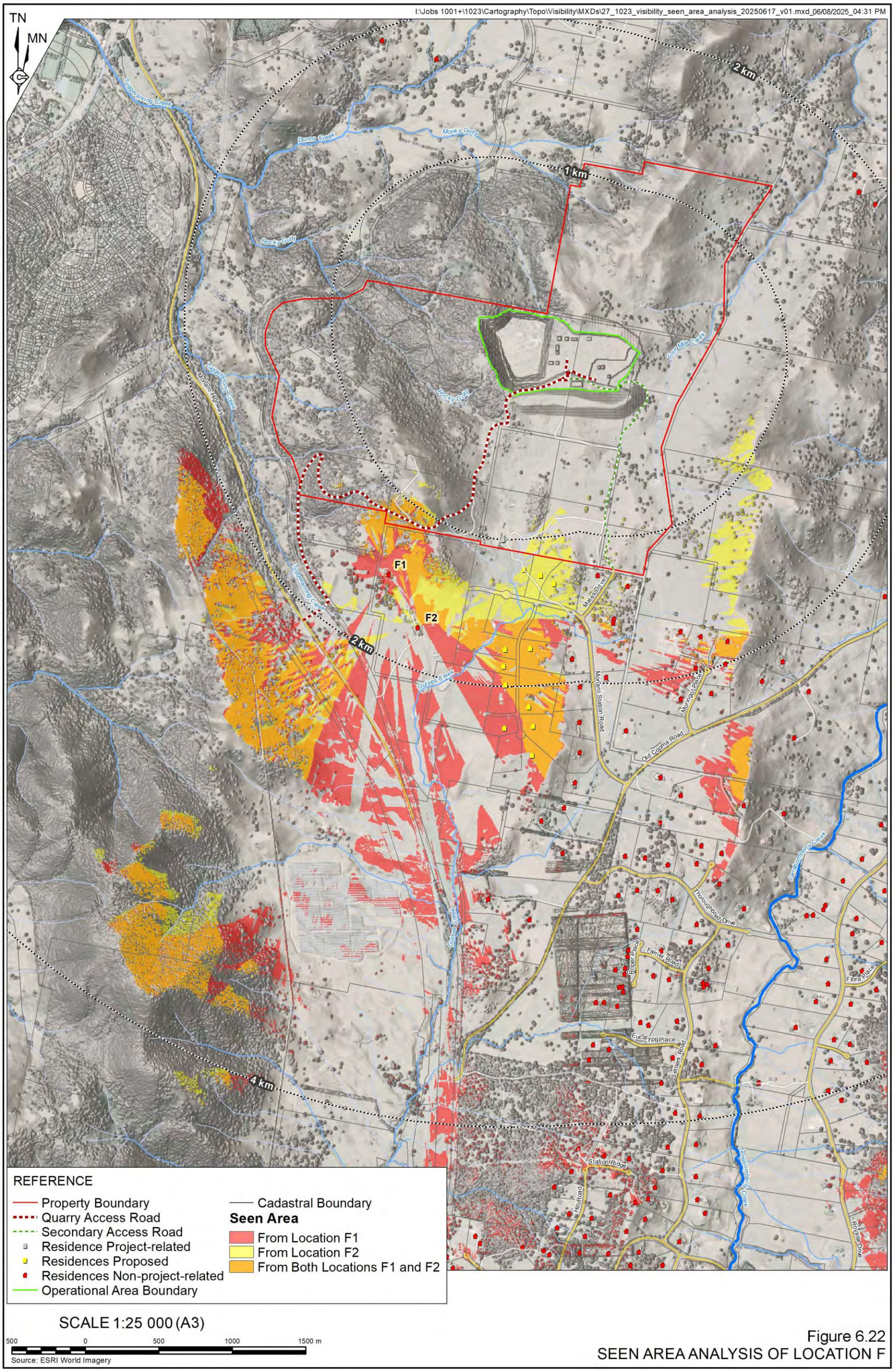


Figure 6.22
SEEN AREA ANALYSIS OF LOCATION F

Table 6.47 provides a summary of the visual impact assessment outcomes for each representative location, including sensitivity ratings, magnitude of impact, and final visual impact classification. The table reflects both unmitigated and mitigated scenarios, with notes on how mitigation measures influence the final outcome.

Table 6.47
Summary of Visual Impact Assessment Outcomes

Representative Location	Viewpoint Sensitivity (Residential)	Viewpoint Sensitivity (Scenic Quality)	Visual Sensitivity	Magnitude of Impact	Visual Impact Outcome
Residences to the South of the Project Site					
Location A	Moderate	Low	Moderate	Low	Low
Location B	Moderate	Low	Moderate	Low	Low
Location C	Moderate	Low	Moderate	Low	Low/Moderate#
Residences to the North of the Project Site					
Location D	Moderate	Low	Moderate	Low/Moderate	Low/Moderate*
Location E	Moderate	Low	Moderate	Low	Low
Residences to the South of Enchanted Hill					
Location F	Moderate	Low	Moderate	Moderate	Moderate
# Outcome is low for views of the operational areas of the Project Site and moderate for views of the Quarry Access Road. * Outcome is low for mitigated scenario; without mitigation the outcome would be moderate.					
Source: RWC (2025) – Table 3					

6.6.6 Conclusion

The Project would introduce new landforms and infrastructure into a rural landscape. However, the magnitude of visual impact is assessed as low to moderate due to:

- the distance between the Project Site and surrounding residences;
- the implementation of design and operational mitigation measures; and
- the progressive rehabilitation of landforms to blend with the surrounding environment.

The success of mitigation measures, particularly vegetation establishment, would be critical to long-term visual outcomes. Clear objectives and performance criteria should be established in a Biodiversity and Rehabilitation Management Plan to improve the success of these activities. With these measures in place, the Project is expected to result in no substantive long-term impacts to visual amenity.

6.7 Biodiversity

6.7.1 Introduction

The SEARs for the Project require the EIS to include an assessment of the following potential impacts of the Project on biodiversity.

- Accurate predictions of any vegetation clearing on site.
- A detailed assessment of the likely biodiversity impacts of the development, paying particular attention to threatened species, populations and ecological communities and groundwater dependent ecosystems, undertaken in accordance with the *Biodiversity Assessment Method* and documented in a Biodiversity Development Assessment Report (BDAR).
- A strategy to offset any residual impacts of the development in accordance with the *Biodiversity Offsets Scheme*.

The assessment requirements of Conservation Programs, Heritage and Regulation (CPHR) (the then Biodiversity and Conservation Directorate (BCD)) with the NSW DCCEEW, Mining, Exploration and Geoscience (MEG), Department of Primary Industries (DPI) – Agriculture and Council were also considered during the preparation of the biodiversity assessment. A summary of the SEARs and the requirements of the above agencies are listed within **Appendix 2** with a record of where each requirement is addressed in the EIS.

As an SSD in NSW that requires the removal of native vegetation, the EIS must be supported by a Biodiversity Development Assessment Report (BDAR) prepared in accordance with the NSW Biodiversity Assessment Method (BAM)(NSW Government, 2020) that assesses the proposed impacts on biodiversity listed as threatened under the NSW Biodiversity Conservation Act 2016 (BC Act). The BDAR for the Project was prepared by Capital Ecology Pty Ltd (Capital Ecology) and is presented as **Appendix G** and hereafter referred to as the BDAR or Capital Ecology (2025). The following subsections provide a summary of the BDAR outcomes and describe the operational safeguards and management measures that would be implemented by the Applicant. The biodiversity offsetting obligations of the Project are presented in Section 3.17.

The BDAR also presents a level of assessment that would permit consideration of the Project under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as the Project is expected to be considered a 'controlled activity'.

6.7.2 Statutory Context

The statutory context for the development application is presented in Section 4 of the EIS. The following presents the statutory context specific to the preparation of the BDAR and assessment of biodiversity-related matters in NSW and nationally.

The BDAR has been prepared in accordance with the NSW Biodiversity Offset Scheme that is regulated under the BC Act. The BC Act establishes triggers for the application of the scheme and procedures for assessment. Further, the BAM provides the requirements for BDARs prepared in NSW, including that the report be prepared by an appropriately accredited person. Both Mr Sam Reid and Mr Rob Spiers of Capital Ecology are accredited assessors under the BAM with Mr Reid the lead author of the BDAR.

While not the subject of development assessment in NSW, the BDAR has been prepared to address relevant matters under the EPBC Act consistent with the bilateral agreement in place between the Commonwealth and NSW Governments. The EPBC Act is the legislation that controls the assessment and approval of proposed actions that may impact upon 'Matters of National Environmental Significance' (MNES). MNES currently listed under the EPBC Act are as follows.

- World heritage properties.
- National heritage places.
- Wetlands of international importance (listed under the Ramsar Convention).
- Threatened species and ecological communities.
- Migratory species (protected under international agreements).
- Commonwealth marine areas.
- The Great Barrier Reef Marine Park.
- Nuclear actions (including uranium mining).
- A water resource, in relation to coal seam gas development and large coal mining development.

Where a potential impact on a MNES may occur as a result of a proposed action, the significance of that impact must be assessed. The Project has the potential to impact upon threatened species and/or migratory species listed under the EPBC Act. The EPBC Act *Matters of National Environmental Significance - Significant Impact Guidelines 1.1* (Commonwealth of Australia 2013) provide a number of criteria for use in determining whether an 'action' will have, or is likely to have, a significant impact upon a species listed as threatened under the EPBC Act.

6.7.3 Assessment Methodology

Stage 1 of the BAM provides guidance on applicable methods to establish the site context and to inform impact assessment processes. Capital Ecology (2025) provided a detailed analysis of the site context through reference to the following aspects.

- The landscape context including landscape features that may support biodiversity.
- The use of desktop research and field surveys to gather information on the presence of native vegetation, threatened ecological communities and to assess vegetation integrity.
- The habitat suitability for threatened species determined through available background data, habitat features and targeted field survey.

Section 2 of the BDAR presents a detailed summary of how Capital Ecology (2025) has satisfied Stage 1 of the BAM. The following subsections summarise the methods used to address the data and information requirements of the BAM.

6.7.3.1 Database and Literature Review

A database and literature review of the following resources was undertaken as part of Capital Ecology (2025) to inform the field survey design and effort.

- EPBC Act Protected Matters Search Tool (PMST)
- NSW Wildlife Atlas (BioNet)
- NatureMapr (formally Canberra Nature Map)
- Final determinations, NSW DPHI species profiles, and other available information pertaining to threatened species known to occur in the locality.

6.7.3.2 Field Surveys

Capital Ecology (2025) undertook field surveys within the Project Site between 27 October 2020 and 5 December 2024, comprising of the following survey methods. Detailed mapping of the survey effort is provided in Section 2.3 of Capital Ecology (2025).

- Plant Community Type (PCT) and Vegetation Zone assessment and mapping.
  - PCT and Vegetation Zone mapping were determined following a total of 18 survey effort hours, using a random meander technique. The on-ground boundaries of each PCT in the Project Site were mapped by marking boundaries directly onto high resolution orthorectified aerial photograph field maps. Vegetation zones were established based on vegetation structure, floristic composition and overall condition.
- BAM plots.
  - Vegetation assessments were completed in each vegetation zone that occurs within the Limit of Disturbance using a series of BAM plots. Each BAM plot involved one 20m x 20m plot to assess composition and structure, one 20m x 50m plot to assess function, and five $1m^2$ sub-plots to assess litter cover.
  - All BAM plot locations were selected randomly within the vegetation zones, but deliberately evenly spread out. A total of 40 BAM plots were completed across eight vegetation zones to satisfy the density requirements of the BAM.
- Threatened flora surveys via transects, random meander, surveys of rocky areas, and opportunistic observations.
  - Threatened flora identified by the BAM as potentially occurring within the Project Site were surveyed using a total of 178.5 survey effort hours of transects and random meanders, and 255.5 hours of opportunistic observations.
- Threatened bird surveys via areas searches and opportunistic observations.
  - Threatened bird species identified by the BAM as potentially occurring within the Project Site were surveyed using a total of 65.5 survey effort hours of area searches, and 452 hours of opportunistic observations.

- Threatened forest owl / nocturnal fauna surveys via call-playback and spotlighting.
  - Threatened nocturnal fauna species identified by the BAM as potentially occurring within the Project Site were surveyed using a total of 36 survey effort hours of call playback and spotlighting.
- Surveys for the Pink-tailed Legless Lizard (*Aprasia parapulchella*) via intensive rock turning surveys.
  - Surveys comprising 77.5 survey effort hours of rock turning were undertaken to determine the likelihood of the Pink-tailed Legless Lizard occurring within the Project Site.
- Surveys for the Golden Sun Moth Synemon plana via random meander and transects through potential habitat during the flying season.
  - Surveys comprising 24 survey effort hours of rock turning were undertaken to determine the likelihood of the Golden Sun Moth occurring within the Project Site.
- Surveys for Key's Matchstick Grasshopper *Keyacris scurra* via transects, random meander, and opportunistic observations.
  - Surveys comprising 24 survey effort hours of rock turning were undertaken to determine the likelihood of the Golden Sun Moth occurring within the Project Site.

6.7.3.3 Indirect Impacts

Indirect impacts may occur to land adjacent to operating areas through the effects of noise, air quality (dust) and edge effects. To account for possible indirect impacts, Capital Ecology (2025) applied the following reductions in biodiversity value for the purpose of the BDAR.

1. A 20% reduction in biodiversity value within 50m of the extraction, processing, and stockpiling areas.
2. A 20% reduction in biodiversity value within 30 m of the unsealed section of the Quarry Access Road.
3. A 10% reduction in biodiversity value within 100 m of the extraction, processing, and stockpiling areas.
4. A 10% reduction in biodiversity value within 30 m of the sealed section of the Quarry Access Road.

Indirect impacts have been captured in the BAM Calculator through altering vegetation integrity scores (composition, structure, and function scores) by the nominated value. This generates an ecosystem credit offset obligation.

Impacts to species credit species are not included in the assessment as noise is unlikely to effect flora species and it is known that both flora and fauna species considered in the assessment persist in close proximity to roads or similar development and therefore impacts on these specific species are less likely. Using ecosystem credits to account for possible impact is considered a thorough and reasonable approach to this impact.

6.7.4 Survey Results

6.7.4.1 Plant Community Types

Plant Community Types (PCTs) within the Project Site were identified and mapped. The native vegetation on the Project Site can be divided into two PCTs:

- PCT3375 - Monaro-Queanbeyan Rolling Hills Grassy Forest; and
- PCT3376 - Southern Tableland Grassy Box Woodland.

The details of each present PCT are displayed in **Table 6.48**. The PCT mapping can be seen on **Figure 6.23**.

Table 6.48
Summary of PCTs on Project Site

PCT	PCT Name	PCT Description	Occurrence in Project Site	TEC status	Area of Disturbance	PCT% Historically Cleared
3375	Monaro-Queanbeyan Rolling Hills Grassy Forest	A tall grassy sclerophyll open forest of quartz-rich hilly country in the Monaro rain-shadow corridor of the upper Murrumbidgee and Snowy River catchments. Occurs at elevations of 550-1000 m. Composition of the tree canopy is variable, including occasional *Eucalyptus bridgesiana* and rarely *E. viminalis, E. dives* or *E. nortonii.* Scattered shrubs commonly include *Bursaria spinosa* and occasionally *Acacia dealbata*, *Ozothamnus conditus*, *Cassinia longifolia* or *A. mearnsii*, over a grassy ground layer of *Elymus scaber*, *Poa sieberiana, Austrostipa scabra, Themeda triandra* and occasionally *Bothriochloa macra*.	Mapped on the hillslopes and higher elevated aspects of the Project Site.	Not listed.	55.39ha	61%
3376	Southern Tableland Grassy Box Woodland	A tall sclerophyll woodland with a dry shrub layer and a mid dense, grassy groundcover. The canopy almost always includes *Eucalyptus melliodora* or *E. bridgesiana*, occasionally associated with *E. blakelyi* which may be locally prominent in lower parts of the landscape. The shrub layer is sparse to absent with occasional, scattered *Melichrus urceolatus, Lassanthe strigosa* or various *Acacia* species.	Mapped across the flatter, more gently sloping foothills of the Project Site.	Critically Endangered (Commonwealth and NSW) when occurring in a condition consistent with the listing criteria of the TEC.	22.44ha	93%
Source: Capital Ecology (2025) – modified after Table 7, Table 10 and Table 11						

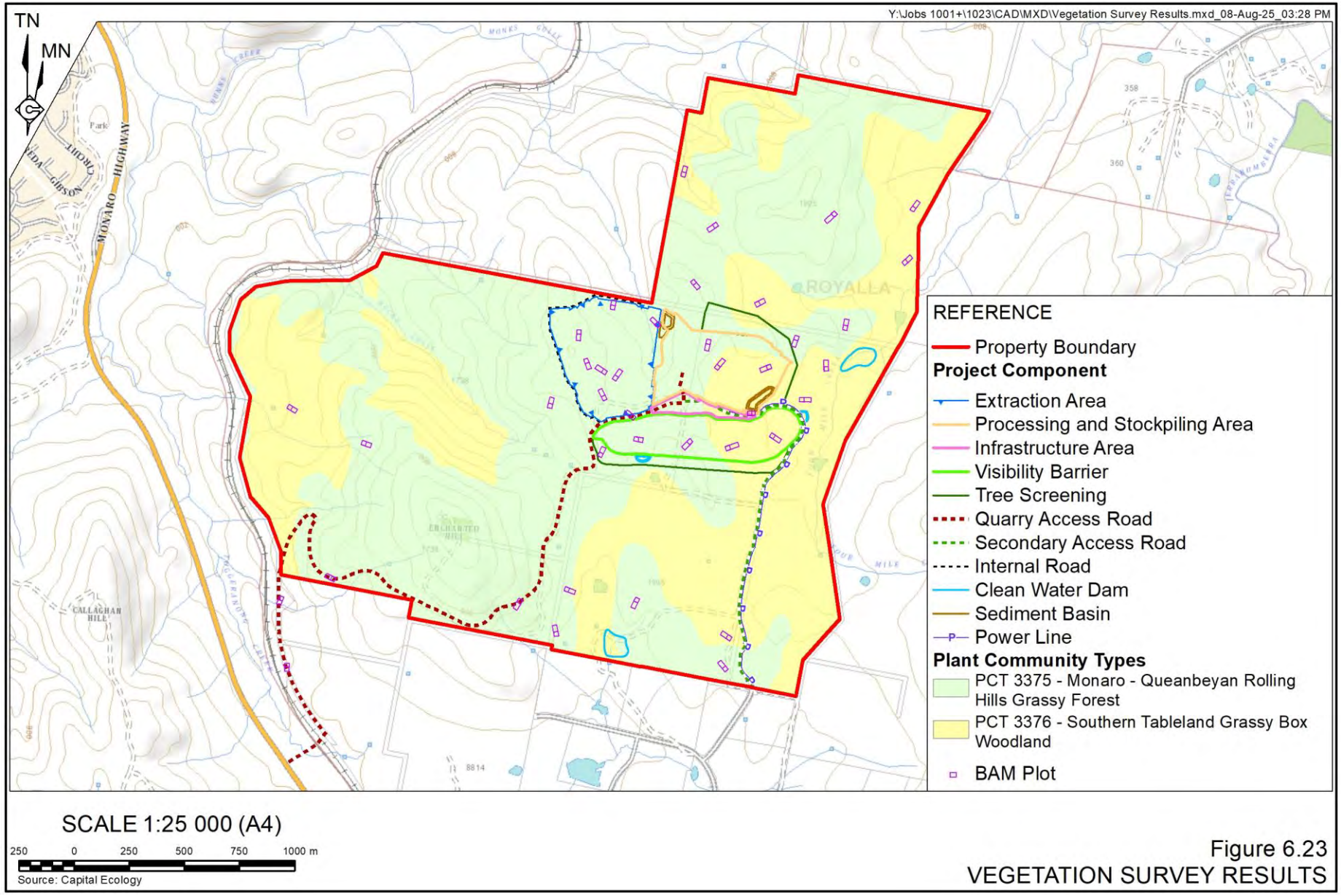


Figure 6.23
VEGETATION SURVEY RESULTS

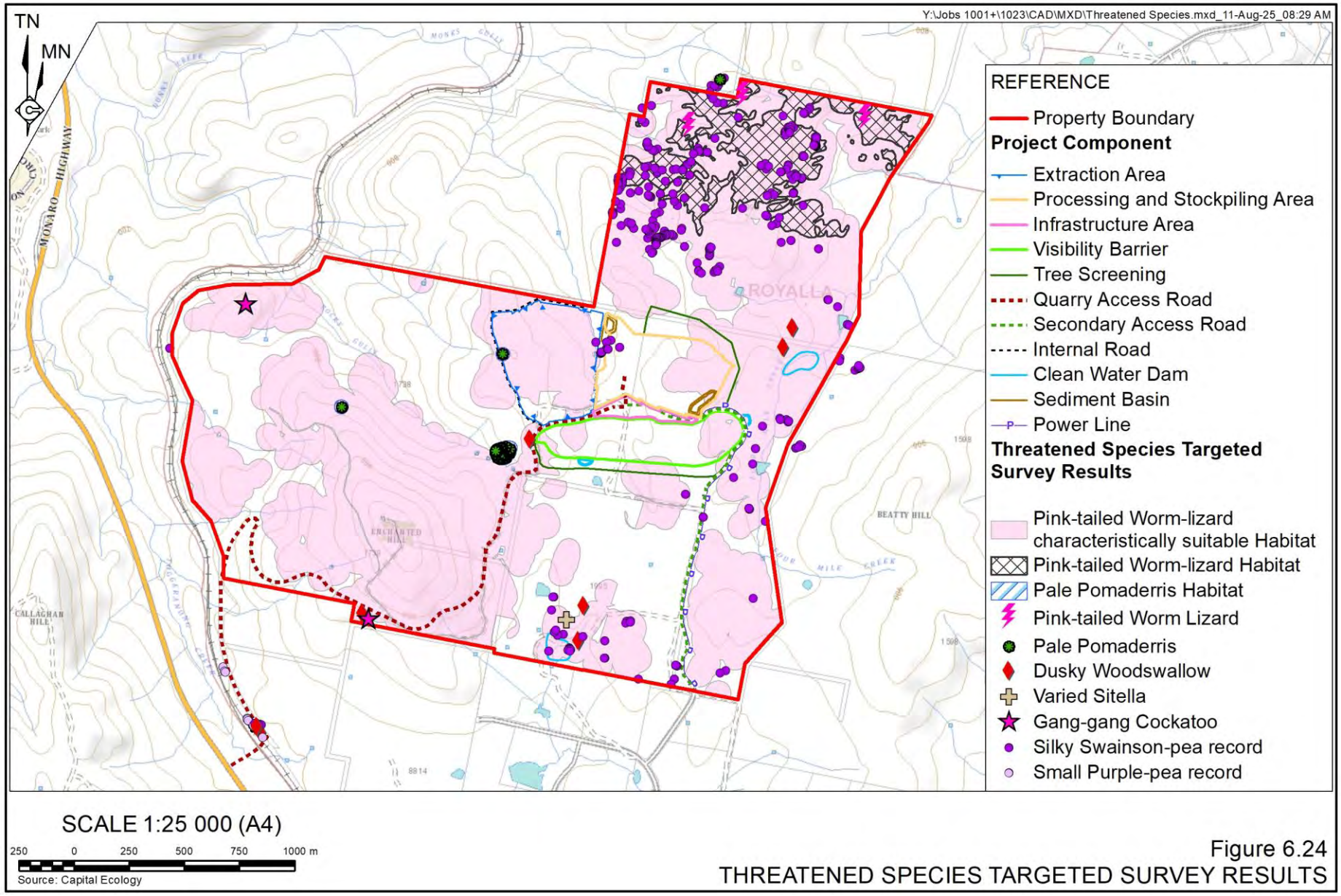


Figure 6.24
THREATENED SPECIES TARGETED SURVEY RESULTS

6.7.4.2 Vegetation Zones

PCT 3375 and PCT 3376 were classified into six zones and three zones respectively, based on the presence of a canopy layer, the diversity level and whether it is dominantly native or exotic vegetation.

Excluding Zone 6, each vegetation zone meets the definition of 'native vegetation' under the BC Act.

PCT3375 – *Monaro-Queanbeyan Rolling Hills Grassy Forest*

- Zone 1 – Canopy – Native Dominant – Mod-High Diversity.
- Zone 2 – No Canopy – Native Dominant – Mod-High Diversity.
- Zone 3 – Canopy – Native Dominant – Low Diversity.
- Zone 4 – No Canopy – Native Dominant – Low Diversity.
- Zone 5 – Canopy – Exotic Dominant – Low Diversity.
- Zone 6 – No Canopy – Exotic Dominant – Low Diversity.

PCT3376 – *Southern Tableland Grassy Box Woodland*

- Zone 1 – Canopy – Native Dominant – Mod-High Diversity (EPBC Act / BC Act Box-Gum Woodland).
- Zone 2 – No Canopy – Native Dominant – Mod-High Diversity (EPBC Act / BC Act Box-Gum Woodland).
- Zone 6 – No Canopy – Exotic Dominant – Low Diversity.

6.7.4.3 Threatened Ecological Communities

PCT3376 is consistent with the critically endangered Box-Gum Woodland ecological community. Capital Ecology (2025) determined the entire portion of the property mapped as PCT3376 would have once supported the climax community of this threatened ecological community. Box-Gum Woodland is listed as a threatened community under both the BC Act and the EPBC Act and its presence was assessed as follows.

- White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland (EPBC Act Box-Gum Woodland) is listed as critically endangered under the EPBC Act. Capital Ecology (2025) assessed each zone of PCT3376 against the criteria listed under the EPBC Act and the *Approved Conservation Advice for the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (DCCEEW 2023a)*. The assessment found that Zone 1 and Zone 2 of PCT3376 meet the criteria for EPBC Act Box-Gum Woodland.
- White Box – Yellow Box – Blakely's Red Gum Woodland (BC Act Box-Gum Woodland) is listed as critically endangered under the BC Act. Capital Ecology (2025) assessed each zone of PCT3376 against the criteria listed under the NSW

Final Determination: White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland (NSW Threatened Species Scientific Committee 2020). The assessment found that Zone 1 and Zone 2 of PCT3376 meet the criteria for EPBC Act Box-Gum Woodland.

A total of 218.11ha of EPBC Act listed Box Gum Woodland is present on the property and approximately 22.44ha of this vegetation would be directly impacted by the Project.

6.7.4.4 Threatened Flora

Capital Ecology (2025) considered the suitability of habitat within the property to support threatened flora that are:

- ecosystem credit species (that is, the presence of an ecological community determines that the species presence should be assumed).
- Species credit species (that is, species that are listed in the BAM as species credit species and potentially likely to occur); or
- Species listed in the EPBC Act that are not listed as ecosystem credit species or species credit species under the BAM.

A total of 314 flora species were recorded during targeted field surveys of the property, comprising 231 native species and 83 exotic species. Further details on the recorded flora species are presented in Appendix B of Capital Ecology (2025). The following threatened flora species were identified during targeted survey.

- Silky Swainson-pea *Swainsona sericea* (BC Act Vulnerable).
- Pale Pomaderris *Pomaderris pallida* (EPBC Act and BC Act Vulnerable).
- Small Purple-pea *Swainsona recta* (EPBC Act and BC Act Endangered).
- Hoary Sunray *Leucochrysum albicans subsp. tricolor* (EPBC Act and BC Act Endangered).

Other threatened flora species considered potentially likely to be present were not identified despite comprehensive survey and are therefore considered unlikely to occur and were not considered further.

Silky Swainson-pea

Silky Swainson-pea was recorded in a large number of locations along the eastern half of the Project Site and in two locations on the western edge of the Project Site. Capital Ecology (2025) estimated the Project site supports over 30,000 individual plants throughout PCT3375 Zone 1 and 2, and PCT3376 Zone 1 and 2.

The Project would directly impact 2.66ha (2.9%) of habitat within the Project Site, which is estimated to support approximately 1,000 plants.

Pale Pomaderris

Pale Pomaderris was recorded at six locations in the western half of the Project Site in PCT3375 Zone 1 and PCT3376 Zone 1. Most of the recorded Pale Pomaderris occurred as a single plant, with only two patches supporting multiple plants, the largest of which contained approximately 250 plants.

The Project would directly impact 0.56ha (22.2%) of the identified habitat, which is estimated to support a total of two plants.

Small Purple-pea

At least 150 Small Purple-pea plants were recorded in multiple locations along the south-western boundary of the Project Site. All plants were located within the fenced area of the Goulburn Bombala Rail Line, which is known as an important area for the species.

The Project would directly impact 0.13 ha of habitat, which supports approximately seven plants. Approximately 0.42ha of habitat for this plant exists within the Project Site and 2.98ha is present within the fenced area of the Goulburn Bombala Rail Line.

Hoary Sunray

A single Hoary Sunray plant was recorded in the north-east of the Project Site in PCT3375 Zone 1, however, the Project would not directly impact the species.

6.7.4.5 Threatened Fauna

Capital Ecology (2025) considered the suitability of habitat within the property to support threatened fauna that are:

- ecosystem credit species (that is the presence of an ecological communities determines that the species presence should be assumed).
- Species credit species (that is, species that are listed in the BAM as species credit species and potentially likely to occur); or
- Species listed in the EPBC Act that are not listed as ecosystem credit species or species credit species under the BAM.

A total of 103 native fauna species were recorded during targeted field surveys, comprising 75 bird species, 10 reptile species, 13 mammal species, four amphibian species, and one insect species. The following threatened fauna species were identified by Capital Ecology (2025) during targeted surveys.

- Woodland birds including the following.
  - (Dusky Woodswallow *Artamus cyanopterus* [BC Act Vulnerable], Gang-gang Cockatoo *Callocephalon fimbriatum* [BC Act / EPBC Act Endangered], Speckled Warbler *Chthonicola sagittate* [BC Act Vulnerable], Varied Sittella *Daphoenositta chrysoptera* [BC Act Vulnerable], Scarlet Robin *Petroica boodang* [BC Act Vulnerable], Flame Robin *Petroica phoenicea* [BC Act Vulnerable]).

- Latham's Snipe Gallinago hardwickii (EPBC Act Vulnerable, marine, and migratory).
- Pink-tailed Legless Lizard Aprasia parapulchella (BC Act / EPBC Act Vulnerable).
- Key's Matchstick Grasshopper Keyacris scurra (BC Act / EPBC Act Endangered).

Other threatened fauna species considered potentially likely to be present were not identified despite comprehensive survey and are therefore considered unlikely to occur and were not considered further. This includes the Golden Sun Moth (*Synemon plana*)

Woodland Birds

Dusky Woodswallow, Gang-gang Cockatoo (foraging), Speckled Warbler, Varied Sittella, Scarlet Robin, and Flame Robin are assumed to occur in the Project Site. These species are therefore not considered in greater detail by Capital Ecology (2025) as any impact to them is captured through the generation of ecosystem credits.

Gang-gang Cockatoo were observed by on two occasions, both of which were in PCT3375 Zone 1, and therefore, further targeted surveys were undertaken on 3 October 2024 and 11 October 2024. During both these targeted surveys and 197 hours of opportunistic observations, no other Gang-gang Cockatoos were observed. Capital Ecology (2025) therefore determined that it is unlikely the species breeds within the Project Site. Based on the observations, Capital Ecology (2025) determined that the Project Site is estimated to support 348.57ha of Gang-gang Cockatoo foraging habitat. The Project would directly impact 48.08ha (14%) of the identified Gang-gang Cockatoo foraging habitat.

Latham's Snipe

Four Latham's Snipe were observed incidentally during Golden Sun Moth surveys on 27 November 2020, presumably foraging in the soak between two dams in the south of the Project Site. Latham's Snipe is not identified as either an ecosystem credit species or species credit species pursuant to the BOS and so cannot be added to the BAM Calculator.

Capital Ecology (2025) determined that the Project Site does not meet the definition of nationally or internationally 'important habitat' for Latham's Snipe. Additionally, the Project would not directly impact the area where the Latham's Snipe were recorded foraging. Capital Ecology (2025) determined that the observed Latham's Snipe were likely foraging and roosting for a short, temporary period.

Pink-tailed Legless Lizard

Capital Ecology (2025) recorded six adult Pink-tailed Legless Lizards during targeted surveys over four days, all close to the northern boundary of the Project Site. Based on the survey results, Capital Ecology (2025) calculated that the property supports approximately 75.99ha of occupied habitat, however, the Project is not proposed to disturb any of this habitat.

Further to this, Capital Ecology (2025) has considered habitat that is characteristically suitable for the species within the property but not considered to be occupied extent of characteristically suitable has been determined by:

- mapping all areas that support loose surface rock via analysis of aerial imagery and subsequent refinement during on-ground field surveys;

- excluding areas of surface rock that occur under a dense canopy (i.e. areas with >50% opaque crown cover, which is roughly equal > 25% projected foliage cover);
- calculating a 50m buffer to all areas of remaining potential habitat; and
- excluding areas that that occur in an exotic dominant groundstorey.

Using these methods, Capital Ecology (2025) has estimated that approximately 367.51ha of characteristically suitable habitat exists within the property. The Project would directly impact 39.95ha (10.9%) of the characteristically suitable habitat.

Key's Matchstick Grasshopper

Capital Ecology (2025) observed Key's Matchstick Grasshopper in two locations, both of which were adjacent to the Goulburn Bombala Rail Line. Areas of habitat were characterised by a partially open canopy combined with a diverse and native dominate groundstorey that contained areas of bare ground and a substantial component of Kangaroo Grass.

Capital Ecology (2025) calculated that the property is estimated to support 3.08 ha of Key's Matchstick Grasshopper habitat and the Project would directly impact 2.34 ha (76.3%).

6.7.4.6 High Threat Weeds

Table 6.49 lists the ten high threat weeds that were identified within the Project Site. High threat weeds were not found to be widespread or occurring at a high density.

Table 6.49
High Threat Weeds

Species Name	Common Name	Status
Trees		
Pinus sp.	Pine tree	-
Shrubs		
Crataegus monogyna	Common Hawthorn	-
Rosa rubiginosa	Briar Rose	-
Rubus fruticosus aggregate	Blackberry	WoNS, LM/AP
Forb		
Carthamus lanatus	Saffron Thistle	-
Hypericum perforatum	St John's Wort	LM
Rumex acetosella	Sheep's Sorrel	-
Grass		
Eragrostis curvula	African Lovegrass	AP
Nassella trichotoma	Serrated Tussock	WoNS, C
Paspalum dilatatum	Paspalum Grass	-
Table key. Commonwealth Weed of National Significance = WoNS. Regional Priority Weed in the South East Local Land Services region under the NSW Biosecurity Act 2015: P = Prevention; E = Eradication; C = Containment; AP = Asset Protection; LM = Species subject to Local Management programs		
Source: Capital Ecology (2025) – modified after Table 22		

6.7.5 Avoidance, Management and Mitigation Measures

6.7.5.1 Introduction

The Applicant has designed the Project to avoid impacts to biodiversity values where feasible, to mitigate any unavoidable impacts, and to offset any residual impacts. The following subsections present the process followed to avoid impacts, outlines the proposed mitigation measures, and summarises the proposed biodiversity offset strategy.

6.7.5.2 Avoidance of Impacts

Preliminary biodiversity field surveys were commissioned in October 2020, 10 months before the Scoping Report for the Project was completed. The intention of commissioning this work so early in Project planning was so that biodiversity constraints might inform early decision making for planning and design of the development. The entire property was surveyed at that time.

Section 2.7 presents a detailed summary of alternatives considered for the Project and where changes were made to the design of the Project Site that avoided native vegetation impacts. A summary of those actions are as follows.

- Three options were considered for the location of the Extraction Area and ancillary infrastructure. The final decision on the location of this infrastructure was informed by the possibility of avoiding impacts to Pink-tailed Legless Lizard habitat, high density Silky Swainson-pea populations and to reduce impacts to good condition Box-Gum Woodland.
- The final extent of the Extraction Area was refined to avoid good condition vegetation that was also habitat for Pale Pomaderris and foraging habitat for the Gang-gang Cockatoo to the west of the extraction area and to avoid impacts to culturally modified trees on the property (identified by Aboriginal stakeholders).
- The location of the Quarry Access Road was subject to detailed scrutiny that ultimately avoided impact to good condition vegetation on the west of the property including Box-Gum Woodland. This decision was also informed by community preferences and proximity to private residences.
- Two options for access to the Project were subject to detailed biodiversity and archaeological assessment prior to a decision being made on the final configuration. The outcomes of the biodiversity field surveys informed the decision to develop the Quarry Access Road to the southwest of the operating area.

6.7.5.3 Mitigation of Impacts

The Applicant would implement the management measures recommended by Capital Ecology (2025) to minimise the unavoidable direct and indirect residual impacts on biodiversity values.

Design and Operational Controls

- Successful development of the proposed Visibility Barrier and Tree Screening Areas.
- Clear signage for no-go areas
- Lights that meet Australian Standards with the light source shielded to face downwards.
- Progressive rehabilitation of areas no longer required for the operation.

Management Measures

- The implementation of the environmental of environmental management measures as specified in the relevant environmental management plan including:
  - Traffic Management Plan
  - Surface Water Management Plan including an Erosion and Sediment Control Plan
  - Noise Management System
  - Air Quality and Greenhouse Gas Management System
- Reactive / adaptive management strategies as specified in a Biodiversity and Rehabilitation Management Plan including the following.
  - Disturbance of land outside of the development footprint.
  - Pre-clearance and/or clearance protocols are not followed.
  - Identification of invasive weeds or feral animals.
  - Rehabilitation does not follow the committed strategy.
  - Non-compliance incident.
  - Pollution incident.
- Adherence to a Driver's Code of Conduct including limited vehicle speeds within the quarry (30km/h speed limit on unsealed roads).
- No machinery would be left running outside of operational hours.

Vegetation Clearing Protocols

- Staged clearing protocol would be established.
- Marking and protecting areas of retained vegetation and habitat during construction, including erecting temporary fencing to protect significant environmental features, where necessary.
- Pre-clearance survey by a qualified or suitably experienced ecologist or wildlife handler.

- Clearing habitat trees (e.g. hollow-bearing trees, nest trees) outside of the breeding season of most of the locally occurring native fauna (i.e. August to December).
- Fauna rescue and relocation procedures using a suitably qualified wildlife handler.
- Stockpiling stripped topsoil for use in rehabilitation activities.
- Salvage and relocation of key habitat features (e.g. fallen timber, tree hollows, surface rock)

Weed and Feral Animal Control

- Hygiene protocols to prevent the spread of weeds and/or pathogens.
- Annual weed monitoring, mapping and control within 200m of the disturbance footprint (where possible based on land ownership).
- Weed control to be implemented in consultation with surrounding landholders.
- Annual inspections for signs of feral animals within 200m of the disturbance footprint (where possible based on land ownership).
- Control programs to also be to be implemented in consultation with surrounding landholders and informed by incidental sightings or any other reports.
- Environmental management measures to reduce availability of additional resources for pest fauna (e.g. management of waste).

Erosion and Sediment Control

- As described in Section 6.12, an Erosion and Sediment Control Plan (ESCP) would be implemented for the Project in accordance with the following principles.
  - Separate clean and dirty water.
  - Maintain water quality through the capture of sediment laden water and treatment before discharge.
  - Avoid physical damage to water bodies such as through scouring or erosional impacts.

Biodiversity Monitoring

- The following ecological monitoring would occur annually.
  - Monitoring of revegetation success using BAM plots at fixed locations within tree screening areas and rehabilitation areas.
  - Monitoring of Small Purple-pea populations in the portion of the Goulburn Bombala Rail Line that occurs adjacent to the development footprint.
  - Annual weed monitoring and mapping.
  - Annual inspections for signs of feral animals.

- Visual inspections of the condition of the quarry site, including indications of direct disturbance outside approved areas, indications of indirect impacts to vegetation / habitat outside of approved disturbance areas, signs of erosion, and fence and road conditions.

- The result of monitoring would be assessed against performance measures and to help inform reactive / adaptive management activities.

Reporting and Review

- The outcomes of biodiversity monitoring and management including a summary of revegetation performance would be included in the Annual Review reporting each year and made publicly available on the Company website.

6.7.5.4 Offsetting of Impacts

Direct Impacts

The removal of approximately 77.83ha of vegetation would be a direct residual impact of the Project. Capital Ecology (2025) determined the ecosystem credits required for the Project using the BAM Calculator. **Table 6.50** identifies the number of credits required to be retired to offset residual biodiversity impacts.

Table 6.50
Ecosystem Credit Requirements

PCT and Vegetation Zone	Clearing Area (ha)	Vegetation Integrity Loss	Credits Required
PCT3375 Monaro-Queanbeyan Rolling Hills Grassy Forest			
Zone 1	29.57	81.3	1,052
Zone 2	15.92	21.0	146
Zone 3	5.49	52.4	126
Zone 4	2.88	10.9	0
Zone 5	0.73	20.4	7
Zone 6	0.80	6.7	0
Total			1,331
PCT3376 Southern Tableland Grassy Box Woodland			
Zone 1	12.29	59.3	455
Zone 2	10.15	14.4	0
Total			455
Source: Capital Ecology (2025) – modified after Table 31			

Table 6.51 identifies the number of species credits required for the Project in accordance with the BAM Calculator.

Table 6.51
Species Credit Requirements

Species	PCT & Vegetation Zone	Area (ha)	Credits Required
Aprasia parapulchella Pink-tailed Legless Lizard	PCT3375 Zone 1	17.50	711
	PCT3375 Zone 2	5.61	59
	PCT3375 Zone 3	3.39	89
	PCT3375 Zone 4	2.29	13
	PCT3376 Zone 1	7.80	231
	PCT3376 Zone 2	3.36	24
		TOTAL	**1,127**
Keyacris scurra Key's Matchstick Grasshopper	PCT3375 Zone 1	2.06	84
	PCT3376 Zone 1	0.29	9
		TOTAL	**93**
Pomaderris pallida Pale Pomaderris	PCT3375 Zone 1	0.56	34
		TOTAL	**34**
Swainsona recta Small Purple-pea	PCT3375 Zone 1	0.06	2
	PCT3376 Zone 1	0.07	2
		TOTAL	**4**
Swainsona sericea Silky Swainson-pea	PCT3375 Zone 1	1.60	65
	PCT3375 Zone 2	0.42	4
	PCT3376 Zone 1	0.10	3
	PCT3376 Zone 2	0.54	4
		TOTAL	**76**
Source: Capital Ecology (2025) – modified after Table 33			

Indirect Impacts

Capital Ecology (2025) determined that the Project has the potential to indirectly impact approximately 43.19ha of surrounding native vegetation resulting in a reduction in quality. In order to offset the indirect impacts associated with the Project, the Applicant has committed to retire the ecosystem credits displayed in **Table 6.52**.

Table 6.52
Indirect Impact Credits

PCT & Vegetation Zone	Area (ha)	Credits Required
PCT3375 Monaro-Queanbeyan Rolling Hills Grassy Forest		
Zone 1	28.78	57
Zone 2	7.67	11
Zone 3	0.48	2
Zone 4	0.50	0
Zone 6	0.37	0
	Total	70
PCT3376 Southern Tableland Grassy Box Woodland		
Zone 1	4.73	10
Zone 2	0.66	0
	Total	10
Source: Capital Ecology (2025) – modified after Table 31		

A preliminary biodiversity offsetting strategy is discussed in Section 3.17.4. Capital Ecology has undertaken initial investigations to identify:

- credits that may be generated by establishing a Biodiversity Stewardship Site on land owned by the Applicant adjacent to the Project Site.
- credits available for purchase from landowners that have established Biodiversity Stewardship Sites in the Monaro / Murrumbateman IBRA Subregions; and
- the costs of satisfying credit requirements through payment into the Biodiversity Conservation Fund (BCF).

Assessment in accordance with the BAM has established that the residual impacts to biodiversity associated with the development footprint may be offset in accordance with the Biodiversity Offset Scheme.

6.7.6 Assessment of Impacts

This subsection presents an assessment of the anticipated Project-related impacts on flora and fauna species and communities. Both direct and indirect impacts are considered together with relevant legislative considerations. It is noted that the assessment of significance does not incorporate the likely benefit of establishing or supporting biodiversity offsets in perpetuity.

6.7.6.1 Direct Impacts

In total, the proposed development would result in the clearance of 77.83ha of vegetation, which includes the following.

- 55.39ha of native vegetation comprising PCT3375 Monaro-Queanbeyan Rolling Hills Grassy Forest (0.8ha of this vegetation is considered to be non-native due to invasive species domination).
- 22.44ha of native vegetation comprising PCT3376 Southern Tableland Grassy Box Woodland.
- 22.44ha of EPBC Act / BC Act Box-Gum Woodland.
- 39.95ha of characteristically suitable Pink-tailed Legless Lizard habitat, noting that no known occupied habitat would be impacted.
- 2.35ha of Key's Matchstick Grasshopper habitat.
- 0.56ha of Pale Pomaderris habitat.
- 0.13ha of Small Purple-pea habitat.
- 2.66ha of Silky Swainson-pea habitat.

6.7.6.2 Indirect Impacts

Despite the Applicant's commitment to the mitigation measures presented in Section 6.7.5 there remains the potential for indirect impacts to affect adjacent areas. Indirect impacts associated with the Project have been assessed to potentially impact 43.19ha of surrounding native vegetation resulting in a 10% to 30% loss in biodiversity value.

6.7.6.3 Prescribed Impacts

Prescribed biodiversity impacts relate to impacts that may impact biodiversity values but that do not feature vegetation clearing. They may involve impacts associated with biodiversity interactions in man-made environments such as unusual habitat, wind turbines, vehicle strikes as well as impacts to connectivity in the landscape. Capital Ecology (2025) identified a variety of possible 'prescribed biodiversity impacts' throughout the biodiversity assessment. However, upon further assessment, it was determined that they are not anticipated to occur as part of the Project, as they are unlikely to impact threatened species habitat or threatened ecological communities

Section 3.2.3 of Capital Ecology (2025) provides further detail on the assessment of potential prescribed biodiversity impacts.

6.7.6.4 Cumulative Biodiversity Impacts

The Project requires a separate approval for the development of land within the ACT for the construction of a portion of the Quarry Access Road and an intersection with the Monaro Highway. The ACT portion of the Project may would require the following.

- Clearance of 2.94ha of native vegetation, which includes 1.43ha of ACT *Nature Conservation Act 2014* Box-Gum Woodland of which 0.67ha is also EPBC Act Box-Gum Woodland.
- Clearance of a number of remnant native trees within the road corridor with a Diameter at Breast Height (DBH) >30cm, including several with a DBH >50cm and/or hollows.
- Clearance of foraging habitat for bird species listed as threatened pursuant to the EPBC Act and/or NC Act.

In total, the Monaro Rock Quarry project would therefore have a combined impact of 78.65ha of native vegetation, which includes 23.87ha of Box-Gum Woodland of which 23.11ha is also EPBC Act Box-Gum Woodland. While the impacts that occur in the ACT will be assessed pursuant to the relevant ACT legislation, impacts to MNES (i.e. EPBC Act Box-Gum Woodland) must consider the combined impact within the ACT and NSW. This combined impact, while not assessed as part of this BDAR, will be included in the EPBC Act referral. Regardless, review of the cumulative impacts of the Project indicates no change to the outcomes of assessment related to the significance of impacts.

6.7.6.5 Serious and Irreversible Impacts

The Project is anticipated to result in the clearance of 22.44ha of BC Act Box-Gum Woodland, indirect impact to 5.39ha of BC Act Box-Gum Woodland, and clearance of 0.56ha of Pale Pomaderris habitat. These ecological communities are considered by DCCEEW NSW to potentially be the subject of Serious and Irreversible Impacts (SAII). Capital Ecology (2025) assessed the potential the Project has to impact SAII entities.

Box-Gum Woodland

Desktop assessments and field surveys were used to identify the extent of the population of Box-Gum Woodland in NSW which varies widely between estimates. The following information was taken from Table 2a of the *Conservation Assessment of White Box-Yellow Box-Blakely's Red Gum Grass Woodland and Derived Native Grassland* (NSW Threatened Species Scientific Committee 2020c).

- Former (pre-1750) extent in NSW = 3,717,366ha.
- Current extent in NSW = 250,729 ha (93% cleared).

The proposed development would directly impact 22.44ha of BC Act Box-Gum Woodland, all of which meets the criteria for this TEC in high condition (i.e. PCT3376 Zone 1 and Zone 2). This impact represents 0.009% of the total extent in NSW. The proposed development is also assumed to have an indirect impact on 5.39ha of BC Act Box-Gum Woodland. The proposed development of the Project Site would therefore have an impact on 27.83ha of BC Act Box-Gum Woodland.

The average minimum distance between all patches of the threatened ecological community within 500m of the Project Site is 39.13m and would not be impacted by the Project. The average area to perimeter ratio for all patches of the TEC within 500m of the Project Site is 57.3, and if the remnant is removed for the Project, the ratio would be 54.4. This would result in an average decrease of 2.9 (5.17%).

The Project Site and the surrounding 500m supports an estimated total of 562.53ha of BC Act Box-Gum Woodland (Capital Ecology 2025). Following completion of the Project, the remaining areas of BC Act Box-Gum Woodland would not be functionally isolated and are considered to be of a sufficient size to ensure the existing level of ecosystem function is not compromised.

Pale Pomaderris

Pale Pomaderris is listed under the NSW BC Act as a Vulnerable species. Two plants of Pale Pomaderris would be impacted by the Project. In an attempt to gain a greater understanding of the current status of the species in NSW and the ACT, records from BioNet and NatureMapr have been combined by Capital Ecology (2025) and obvious duplicates removed. In summary:

- the species has been recorded from 213 locations;
- the Extent of Occurrence (EOO) is 1,446,918ha;
- the Area of Occupation (AOO), which has been calculated by applying a 30m buffer to each record, is 47.58ha; and

- population size is estimated to be between 7,558 and 35,542 plants, with the large variation due population size range estimates in the data (e.g. population size recorded as being "between 16 and 100 plants").

The BAM defines local as '*the population that occurs in the subject land'*. The property therefore supports a local population with the following characteristics.

- Recorded in six locations.
- A total of 164 to 264 plants, which the largest subpopulation supporting 150 to 250 plants. The remaining subpopulations support 1 to 10 plants.
- A total of 2.52ha of habitat.

The Project would impact two of the locations, each of which supports a single plant. In total, the Project would therefore impact 0.56ha of habitat. This impact represents:

- 0.8% to 1.2% of the plants that occur in the Project Site.
- 22.2% of the habitat that occurs in the Project Site.
- 0.006 to 0.026% of the plants that occur in the EOO.
- 1.2% of the AOO.

Although the Project would impact two plants (0.56ha of habitat), Capital Ecology (2025) considers the minimisation and mitigation measures detailed in Section 6.7.5 are considered sufficient to control the risk presented by the above identified threats.

6.7.6.6 Matters of National Environmental Significance

The proposed development would result in the following impacts to EPBC Act listed MNES in the NSW portion of the Project Site.

- Clearance of 20.56ha of EPBC Act Box-Gum Woodland (EPBC Act critically endangered) and indirect impact of 12.33ha of EPBC Act Box-Gum Woodland.
- Clearance of 39.95ha of Pink-tailed Legless Lizard habitat (EPBC Act & BC Act Vulnerable).
- Clearance of 2.35ha of Key's Matchstick Grasshopper habitat (EPBC Act Endangered).
- Clearance of 0.56ha of Pale Pomaderris habitat (EPBC Act Vulnerable).
- Clearance of 0.13ha of Small Purple-pea habitat (EPBC Act Endangered).
- Clearance of 47.05ha of Gang-gang Cockatoo foraging habitat (EPBC Act Endangered) and indirect impact of 56.58ha of Gang-gang Cockatoo foraging habitat, being composed of PCT3375 Zones 1, 3, and 5 and PCT3376 Zone 1.

In light of the above, it is anticipated that the Project will require assessment and approval under the EPBC Act. Appendix H of the BDAR presents an assessment of the significance of impact to MNES in accordance with the *EPBC Act Matters of National Environmental Significance - Significant Impact Guidelines 1.1* (Commonwealth of Australia 2013). Capital Ecology has concluded that the Project is likely to result in a significant impact to the following MNES.

- EPBC Act Box-Gum Woodland through a reduction in the extent of the ecological community by 22.44ha and indirect impact to an additional 5.39ha
- Gang-gang Cockatoo as a result of the removal of 48.08ha of foraging habitat.
- Key's Matchstick Grasshopper through a reduction in the Area of Occupation by 2.35ha and possible fragmentation of two or more populations of the species that may affect the breeding cycle of a population.
- Small Purple-pea through a reduction in the Area of Occupation by 0.13ha

Capital Ecology concluded that the Project is unlikely to result in a significant impact to Pale Pomaderris.

6.7.7 Conclusion

Capital Ecology has completed comprehensive field survey and assessment of the biodiversity values of the Project Site in accordance with the NSW Biodiversity Assessment Method. The information gathered in these surveys has been used to inform Project planning and design and impacts to biodiversity have been avoided where possible. Commitments to ongoing management and monitoring would ensure impacts are mitigated where practical. Two plant community types have been identified within the Project Site, one of which is the critically endangered Box-Gum Woodland. A number of threatened flora and fauna species have also been identified within the property and the Project Site.

Guidelines for the consideration of threatened entities for NSW and Commonwealth legislation direct the assessment of significance of impact as a result of proposed development. The assessment of the significance of the Project has identified that the Box-Gum Woodland and Pale Pomaderris are SAII entities under the NSW BC Act and residual impacts should be considered in light of this.

Assessment under the EPBC Act indicates that there are likely to be significant impacts to Commonwealth-listed Box-Gum Woodland and to Gang-gang Cockatoo foraging habitat, Key's Matchstick Grasshopper habitat, and Small Purple-pea habitat. These impacts would require approval under the EPBC Act. The assessment of significance does not take into account the required offset of impacts to account for loss to biodiversity value.

Residual impacts of the Project would be offset in accordance with the NSW Biodiversity Offsetting Scheme which would see the conservation of habitat in perpetuity. The Applicant may establish a Biodiversity Stewardship Site on land adjacent the Project Site to meet this obligation, as initial survey of this land indicates it would generate suitable ecosystem and species credits. Other options to satisfy the obligation include the purchase of credits directly from landowners that hold Biodiversity Stewardship Sites or the payment of a contribution to the Biodiversity Conservation Fund. The final biodiversity offsetting strategy would be established post-approval.

6.8 Aboriginal Heritage

6.8.1 Introduction

The SEARs for the Project identified Aboriginal heritage as a key issue, requiring that the EIS include an assessment of the potential impacts on Aboriginal heritage (cultural and archaeological), including evidence of appropriate consultation with relevant Aboriginal communities/parties and documentation of the views of these stakeholders regarding the likely impact of the development on their cultural heritage.

The assessment requirements of Heritage NSW were also considered during the assessment of potential impacts to Aboriginal cultural heritage. A summary of the SEARs and the requirements of Heritage NSW are listed within **Appendix 2** with a record of where each requirement is addressed in the EIS.

An Aboriginal Cultural Heritage Assessment (ACHA) for the Project was undertaken by Past Traces Pty Ltd (Past Traces) and the report is presented as **Appendix H** and hereafter referred to as Past Traces (2025a).

The ACHA was prepared by Past Traces in accordance with the following guidance.

- *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011)
- *The Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010).
- *The Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW, 2010).
- *The Burra Charter* (ICOMOS, 2013)

The following subsections provide a summary of the ACHA and describe the operational safeguards and management measures that would be implemented by the Applicant.

6.8.2 Aboriginal Cultural Heritage Context

6.8.2.1 Ethnohistory

The Project Site is within the traditional lands of the Ngarigo and Wolgalu people. The boundaries of the Ngarigo lands cover most of the Monaro Tablelands and extend into the Australian Alps covering the area of Mt Kosciusko and Jindabyne. The major language group identified within the region by Norman Tindale (1974) in his seminal work on Aboriginal tribal boundaries are the Ngarigo and Wolgalu people.

To the south of Bombala the Bidewal people occupied the area to the coast. The distribution with minor amendments is still accepted and the review of tribal boundaries undertaken in the 1990s (Horton, 1996) confirmed these earlier linguistic divisions. The area of Queanbeyan was probably visited by people from both groups and the area of Canberra was the traditional lands of the Ngambri and Ngunnawal people (Past Traces, 2025a).

The Ngarigo lived permanently on the Monaro but did travel to other areas for trade and ceremonies. Their northern tribal boundaries approximated that of the Cooma-Monaro Shite, probably about one third of their territory which extended over to Thredbo, down to Bombala and across the NSW Victorian border to Suggan Buggan (Plowman, 2007).

Helms (1985) reflected on the Aboriginal life of the region as a functioning hunter gatherer lifestyle with a cycle of repeated visits to areas at times of seasonable resource availability and a ceremonial life that imposed duties and responsibilities on members of the group. Helms' (1985) reflections should be viewed as from a white perspective and filtered through his cultural traditions as with all cross-cultural ethnography.

Mitchell (1926) notes that the Ngarigo were numerous with gatherings of over 500 occurring not unusual. The Bogong Moth was hunted annually with other 'tribes' joining the Ngarigo in the mountains, often a time of tribal exchange of goods and information (Kamminga 1992). These times represented a time of plenty with a focus on ceremonial and social activities, strengthening familial and trading networks across boundaries (Past Traces, 2025a).

Contact with European Settlement was disastrous for the Ngarigo traditional way of life with their almost complete disappearance noted by Mitchell (1926). However, the Aboriginal community was resilient and today descendants are present throughout the region and actively work on strengthening community and cultural knowledge through different websites, communities and organisations (Past Traces, 2025a).

6.8.2.2 Archaeological Context

Past Traces (2025a) note that the prior to European settlement the area probably supported open-forest (dry sclerophyll forest) to low woodland on exposed crests and bordering frost hollows. They also note the potential for remnant mature native Eucalypt trees to contain Aboriginal cultural scars.

The soil landscapes within the Project Site are defined on the Soil Landscapes of the Canberra 1:100,000 Sheet (DCCEEW, 2024) as Campbell and Burra soil landscapes. Past Traces (2025a) note that the likelihood of burials of Aboriginal persons within the Project Site is low due to the lack of optimally conditioned deep sandy soils on eastern facing slopes.

The Project Site is confined to undulating slopes, spur line crests, side slopes and creek flats. Past Traces (2025a) note that creek lines would have been a focus of activity as water is a main resource, based on their experience mapping other sites in the region. However, while they also state that the Aboriginal groups would have travelled across and utilised the area, that there are no known areas of specific or clustered resources appears to be present suggesting frequent visitation or larger group activities.

6.8.2.3 Historical Context

The following presents a summary of the historical context for the Project Site described in Section 3.4 of the ACHA (Past Traces, 2025a). The rural locality of Royalla was formally known as Rob Roy, taking its name from the nearby Mount Rob Roy to the west with the name changed to Royalla in 1905. The township began as a railway settlement along the Bombala railway line, which was completed in stages between Queanbeyan and Cooma from 1887 to 1888.

Early exploration in the region (1823) described the area that later became Royalla as an area 'of fine forest country intersected by stony ridges'. By 1829, the Canberra, Monaro, Queanbeyan and Royalla regions were declared the County of Murray, including the Limestone Plains, Queanbeyan and Royalla areas and by the 1830s a small European farming population had been established in the Royalla district growing pasture and running horses, cattle and sheep. The Project Site was under the ownership of Dennis Flannagan and Andrew Cunningham of Tuggeranong Station in maps produced in 1889 (Tuggeranong Parish Map). The Project Site was only a portion of their landholdings.

The construction of the Bombala railway line provided economic opportunities to farmers, industries and communities along its route. As railway workers completed sections of the line, produce markets were set up by local producers to provide them with goods and supplies. The rail line reached Queanbeyan in September 1887 and Michelago by December that same year. The second Archibald McDonald at Royalla obtained slaughtering licences and began a local delivery service to the railway worker's camps. This allowed the expansion of Royalla station to over 4,000 acres.

The Monaro Highway was created in 1938 along the earlier road alignment and has been duplicated and upgraded many times since its original construction. Modern Royalla is a popular semi-rural suburb that consists of both original farming areas and small rural residential lots with an approximate population of 1063 people (ABS, 2021).

6.8.2.4 Aboriginal Community Involvement

Aboriginal Community Consultation

Initial consultation with registered Aboriginal parties (RAP) occurred on 26 March 2021 after completing steps 4.1.2 of the *Aboriginal Cultural Heritage Community Consultation Requirements for Proponents* (DECCW, 2010a). Following the public notice and letters, eighteen (18) Aboriginal stakeholders registered their interest and are as follows.

- Dige Ngunawal Aboriginal Corporation
- Kalari Ngunnawal Pajong/Wallabaloa Descendents
- Muragadi Aboriginal Corporation
- Buru Ngunawal Aboriginal Corporation
- Ngunawal Heritage Aboriginal Corporation
- Thunderstone Aboriginal Corporation
- Djirringanj Elders Foundation
- Ngarigu Currawong Clan
- PD Ngunawal Consultancy
- King Brown Tribal Group
- Ngambri LALC
- Mirrabee
- Ngarigo Elders
- Freeman and Marx
- Corroboree
- Konango
- Yurwang Gundana

The RAPs were sent further details regarding the Project including a methodology pack outlining proposed methodology to be followed for the survey. The RAPs were invited to provide comments on the proposed methodology and to provide any information that they may hold in relation to the cultural values of the Project Site. In relation to the methodology undertaken and the results of the heritage assessment, no information was provided by the

RAPs during the consultation period demonstrating that the Project Site holds specific cultural values or that known heritage sites are located within the Project Site that have not been identified during the heritage assessment. An archaeological survey of the Project Site was undertaken by Past Traces alongside the participation of three RAP groups from 13 to 15 September 2021. The members of the RAP groups were John Dixon of Ngarigo/Djirringanj Elders Foundation, Daniel Williams of Ngambri LALC, and Robert Williams of Ngunnawal Elders Corporation.

An alternative option for the access road was also considered, with a supplementary survey of this alternative proposed route conducted by Past Traces and one RAP member, Sonione Rogos of Ngambri LALC on 25 August 2022. No concerns were expressed by the RAP participants during the 2021 surveys.

A renewal of consultation was conducted in 2024 to reassess the Project following the redesign of the Project Site and revised management and mitigation measures. Relevant stakeholders from the Aboriginal community were identified using a process consistent with the *Aboriginal Cultural Heritage Community Consultation Requirements for Proponents* (DECCW, 2010a). Following the completion of Steps 4.1.2 and 4.1.3 of these *Consultation Requirements*, twenty-three (23) Aboriginal stakeholders registered as groups or individuals that may hold cultural knowledge relevant to determining the Aboriginal cultural values within the Project Site were identified. The twenty-three (23) registered Aboriginal stakeholders were as follows.

- Ngambri LALC
- Serena Williams
- Byamee Williams
- MAH – Rob Williams on behalf of Arnold Williams
- John Dixon
- Adrian Brown
- James Mundy
- Coroboree
- Didge Ngunawal
- Kamilaroi
- Sonione Rogers
- King Brown
- Bradley Bell
- Konnango
- Mirrabee
- Jason Davison
- Clorine Lyons
- Merrigarn
- Buru Ngunawal
- Guntawang
- Mundawari
- Ngunawal Elder
- Little Gudgenby

The RAPs were sent a letter inviting them to register their interest in a process of community consultation to aid in determining the significance of Aboriginal object(s) and/or places in the vicinity of the Project Site. The purpose of the proposed methodology was to explain the Project and consultation process in detail, define the roles of the RAPs and the Applicant, identify any protocols for obtaining and using sensitive cultural information and to give the RAPs an opportunity to comment on the proposed assessment method and provide any relevant information on the cultural significance of the Project Site.

No objections to the Project have been raised by the RAPs following the avoidance of high significance sites by the Applicant and resulting mitigation and management measures recommended by Past Traces (2025a).

6.8.2.5 Desktop Review and Predictive Model

A desktop search of the NSW Heritage Aboriginal Information Management System (AHIMS) database was conducted on 18 February 2021 and 26 August 2024 covering the 1km surrounding area centred on the Project Site. The purpose of this search was to identify any potential previously recorded heritage values within and immediately surrounding the Project Site. A simple analysis of the site types in relation to the search date shows the proportion of sites across site types. The results of these searches are presented in **Table 6.53**.

Table 6.53
Summary of AHIMS Database search for Aboriginal Cultural Heritage

Date	Site Type	No.	Proportion (%)
18 February 2021	Potential Archaeological Deposit	5	19.2%
	Isolated finds	7	26.9%
	Artefact scatters	11	42.3%
	Scarred trees	3	11.5%
26 August 2024	Potential Archaeological Deposit	2	4.9%
	Sites with PADs	5	12.2%
	Artefact scatters/isolate finds	29	70.7%
	Scarred trees	5	12.2%
Source: Past Traces (2025a) – Compiled from Table 1 and 2			

The predictive model developed for the Quarry Site, based on the body of previous heritage work (AHS, 1999; CHMA, 2013; CHMA, 2014; NOHC, 2013), the landscape context and previous disturbance to the area, indicated that a variety of site types may be located within the Project Site. These site types include isolated finds and surface scatters of stone artefacts, Potential Archaeological Deposits (PADs), Culturally Modified Trees (CMTs), and Stone quarries/Ochre sources. Furthermore, Past Traces' (2025a) predictive model lists nil probability to encounter stone arrangements, axe grinding grooves, and burials of aboriginal persons. These sites are listed as a nil probability due as the Project Site does not contain optimal or suitable conditions to encounter such sites.

Past Traces (2025a) note that a number of previous archaeological surveys have been undertaken in the vicinity of the Project Site. They were commissioned mainly due to residential developments and rural subdivisions, but regional studies of the Tinderry Reserve and infrastructure projects have also been undertaken. The finds of these surveys are detailed in the Section 3.2.1 of Past Traces (2025a). In summary, the previous assessments for the Royalla region returned consistent results and confirmed the importance of level areas adjacent to water ways such as permanent creek lines for site location (Past Traces, 2025a). As a result, the areas of level terrace or rises in the vicinity of creek lines are considered to hold moderate potential (dependent of degree of disturbance) along creek lines, but sites should be small and consist of common materials.

6.8.3 Survey Methodology and Results

Past Traces (2025a) conducted archaeological survey of the Project Site from 13 to 15 September 2021 with three RAP group members, John Dixon of Ngarigo/Djirringanj Elders Foundation, Daniel Williams of Ngambri LALC, and Robert Williams of Ngunnawal Elders Corporation. Further survey of the Project Site occurred on 22 August 2022 to assess Aboriginal heritage sites along an alternative to the Quarry Access Road. That survey was attended by Sonione Rogos of Ngambri LALC. A final field survey was undertaken by Past Traces on 5 May 2025 to assess the presence of sites at two proposed dams on the property (Clean Water Dam 1 and 2).

6.8.3.1 Effective Survey Coverage

The survey was conducted when surface visibility was low to moderate across the Project Site, with some areas of consistent grass coverage with an average grass length of approximately 1m. Ground Surface Visibility (GSV) was generally moderate across the Quarry Site with consistent grass coverage of varying lengths with some areas of high GSV with sparse grass coverage. Numerous regular exposures of bare land occurred along existing access roads, dam walls, fence lines, drainage bunds, beneath trees and stock trails. These exposures of bare land allowed 80-90% GSV. Therefore, the survey is considered to be effective in ground coverage (Past Traces, 2025a).

Survey methods consisted of a meandering transect across the areas of the Project Site. Survey team members were spread approximately 10m apart during the pedestrian walkover, considered to be the maximum distance of effective coverage (Burke and Smith, 2004). All archaeological surveys were conducted in accordance with the archaeological survey requirements of the Code of Practice (DECCW, 2010).

As a result of the background research, Aboriginal heritage field survey and consultation with the local Aboriginal community 32 Aboriginal heritage sites were identified within the survey area consisting of the following.

- 16 isolated finds or artefact scatters,
- Two culturally modified trees (CMTs),
- Eight isolated finds or artefact scatters with areas of PAD
- Six areas of PAD.

The design of the Project Site has been modified to avoid impact to the two CMTs as these were recognised as significant and rare by RAPs. Of the sites identified, 19 occur within the Project Site and would be impacted with 13 sites located adjacent to the Project Site that would not be directly impacted and would be fenced off during construction activities. The locations of the sites are presented in **Figure 6.25**.

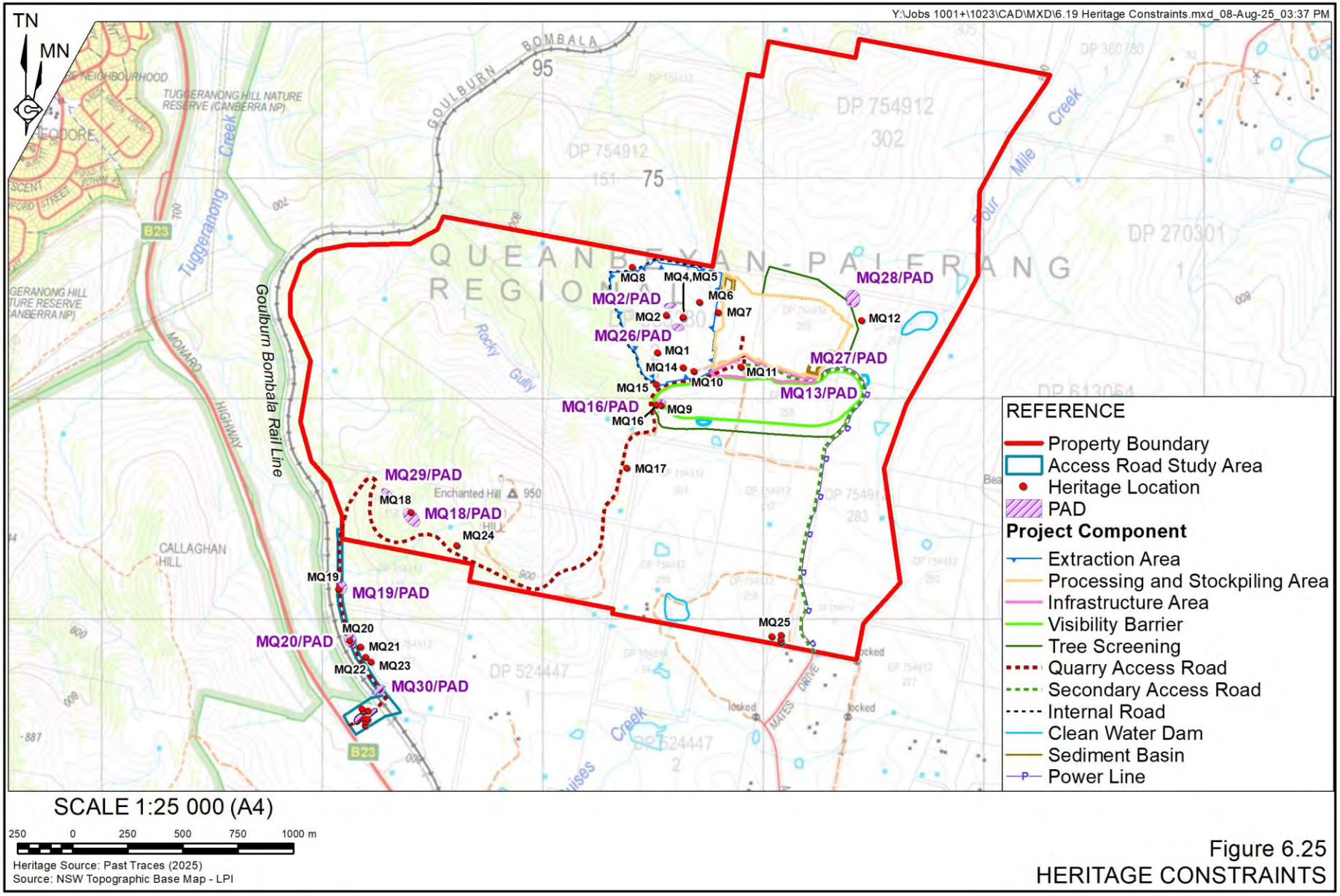


Figure 6.25
HERITAGE CONSTRAINTS

6.8.3.2 Isolated Finds and Artefact Scatters

The archaeological survey resulted in the identification of 16 isolated finds and artefact scatters. Isolated finds included several quartz, chert and silcrete flakes, a hatchet blank or manuport fragment, anvils with pitting, as well as broken and intact hammer stones.

More detail on the archaeological significance of the isolated finds and artefact scatters is provided in **Table 6.54**.

6.8.3.3 Culturally Modified Trees

A ring tree was identified on the crest of the western most ridgeline of the property overlooking south Canberra and Namadgi National Park to the west. The tree is a large gum tree with a ring on the northern side of the tree as presented in **Plate 6.3**. Ring Trees are a rare site type and have only been recorded within the region in the last decade (Past Traces, 2025a). Due to the redesign of the Extraction Area to avoid the ring tree, no impacts would occur to this location (Past Traces, 2025a).

A scarred tree, the remaining trunk of a gum tree, was identified on a creek flat of the southwest area, as per **Plate 6.4**. Impacts to this culturally modified tree have also been avoided through redesign of the Visibility Barrier.



Plate 6.3 Ring Tree - facing east (MQ8 Tree)
(Source: Past Traces, 2025a)



Plate 6.4 Scarred tree - facing south (MQ9 Tree)
(Source: Past Traces, 2025a)

6.8.3.4 Aboriginal Areas of PAD

Past Traces identified 13 areas of Potential Archaeological Deposit (PAD) within the Project Site or within close proximity during their archaeological field survey. Of these areas of PAD, eight are associated with surface sites, with six additional areas of PAD based on landform (two of which are within the Project Site). The remaining three sites are distant to works, separated by boundary fencing and should not be impacted by development.

PADs were primarily associated with creek lines that traverse through the Project Site, as well as raised areas overlooking the creek flats, associated ridgelines and crests, mid-slopes and spur-lines (Past Traces, 2025). These locations are consistent with the predictive model developed for the region as per Section 3 of the ACHA (**Appendix H**).

6.8.4 Significance Assessment

Past Traces (2025) assessed the archaeological significance of the sites recorded within the Project Site in accordance with Requirement 11 of the Code of practice for Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW, 2010). Measures of representativeness, condition, research potential and a rating of scientific significance were gathered from the Burra Charter assessment criteria. The results of the archaeological significance assessment are provided in **Table 6.54** with sites that would be directly impacted by the Project shaded in grey.

Table 6.54
Scientific Significance Assessment of Archaeological Sites within the Project Site

AHIMS	Site Name	Site Type	Research Potential	Representativeness	Condition	Scientific Significance
57-2-1216	MQ1	Isolated Find	Low	Common	Disturbed/poor	Low
52-2-4636	MQ2	Artefact Scatter/PAD	Low	Common	Disturbed/poor	Low
52-2-4637	MQ3	Isolated Find	Low	Common	Disturbed/poor	Low
52-2-4638	MQ4	Isolated Find	Low	Common	Fair	Low
52-2-4639	MQ5	Isolated Find	Low	Common	Fair	Low
57-2-1217	MQ6	Isolated Find	Low	Common	Fair	Low
57-2-1218	MQ7	Isolated Find	Low	Common	Fair	Low
57-2-1219	MQ8	Ring Tree	High	Rare	Good	High
57-2-1220	MQ9	Scarred Tree	High	Uncommon	Good	High
57-2-1221	MQ10	Isolated Find	Low	Common	Fair	Low
57-2-1222	MQ11	Isolated Find	Low	Common	Fair	Low
57-2-1223	MQ12	Isolated Find	Low	Common	Fair	Low
57-2-1224	MQ13	Isolated Find/PAD	Low	Common	Fair	Low
57-2-1225	MQ14	Isolated Find	Low	Common	Fair	Low
57-2-1215	MQ15	Isolated Find	Low	Common	Fair	Low
57-2-1213	MQ16	Isolated Find/PAD	Low	Common	Fair	Low

Table 6.54 (Cont'd)
Scientific Significance Assessment of Archaeological Sites within the Project Site

AHIMS	Site Name	Site Type	Research Potential	Representativeness	Condition	Scientific Significance
57-2-1205	MQ17	Artefact Scatter	Low	Common	Fair	Low
57-2-1206	MQ18	Isolated Find/PAD	Moderate	Common	Fair	Low
57-2-1211	MQ19	Isolated Find/PAD	Moderate	Common	Fair	Low
57-2-1207	MQ20	Isolated Find/PAD	Moderate	Common	Fair	Low
57-2-1208	MQ21	Isolated Find/PAD	Moderate	Common	Fair	Low
57-2-1209	MQ22	Artefact Scatter	Low	Common	Fair	Low
57-2-1210	MQ23	Isolated Find	Low	Common	Fair	Low
57-2-1212	MQ24	Isolated Find	Low	Common	Fair	Low
57-2-1214	MQ25	Artefact Scatter	Low	Common	Fair	Low
NA	MQ26	PAD	Moderate	Common	Fair	Low
NA	MQ27	PAD	Moderate	Common	Fair	Low
NA	MQ28	PAD	Moderate	Common	Fair	Low
NA	MQ29	PAD	Moderate	Common	Fair	Low
NA	MQ30	PAD	Moderate	Common	Fair	Low
NA	MQ31	PAD	Moderate	Common	Fair	Low
NA	MQ32	Artefact Scatter/PAD	Low	Common	Fair	Low

Source: Past Traces (2025) – Adapted from Table 5

6.8.5 Cumulative Impacts

Past Traces has also prepared an Aboriginal Cultural Heritage Assessment for works proposed in the ACT (Past Traces, 2025b). Sites within the ACT are present on the Quarry Access Road to the project area. Separate archaeological field survey with Representative Aboriginal Organisations identified seven sites consisting of two isolated finds, four artefact scatters and one historical heritage site associated with the railway construction. One site contained an associated area of PAD. Separate approvals would be required from the ACT Heritage Council for works to proceed.

All sites were considered to be common site types in fair or poor condition and with low scientific value (Past Traces, 2025b). Should the development proceed, all sites would be salvaged and the area of PAD subject to subsurface investigation.

When considered cumulatively, the outcomes do not represent any new or unexpected outcomes and do not change the overall conclusions of assessment.

6.8.6 Management and Mitigation Measures

In accordance with the recommendations of the RAPs and Past Traces (2025), the Applicant has committed to implement the mitigation measures outlined in **Table 6.55** for the identified impacted sites.

Table 6.55
Surface Site Management Measures

Site Type	Location	Identified Sites	Management Measure
Artefact Scatter or Isolated Find	Within the development area	MQ1, MQ3, MQ4, MQ5, MQ6, MQ7, MQ10, MQ11, MQ14, MQ15, and MQ17	Salvage collection
Artefact Scatter or Isolated Find with PAD	Within the development area	MQ2, MQ13, MQ16, MQ19, MQ20 and MQ32	Salvage collection and subsurface investigation
PAD	Within the development area	MQ26 and MQ30	Subsurface investigation
Artefact Scatter or Isolated Find with or without PAD	Adjacent to the development area	MQ12, MQ18, MQ21, MQ22, MQ23, MQ24, MQ25, MQ29	Barrier fencing must be installed to establish a 10m buffer.
Culturally modified Trees	Adjacent to the development area	MQ8 and MQ9	Barrier fencing must be installed to establish a 10m buffer.
PAD	Distant to works	MQ27, MQ28, and MQ31	Mark sites on construction mapping and include them in site inductions. Barrier fencing must be installed prior to work commencing if works are to be undertaken within 20m of the sites.

Past Traces (2025) has recommended a salvage (surface collection) methodology that includes the following.

- Returning to GPS location and flagging all surface artefacts within a 10m radius of site location.
- Each artefact to be collected, given a number and bagged individually with their GPS location.
- Artefacts to be analysed (noting materials, basic technological attributes) and an AHIP Compliance works report submitted to NSW Heritage including the results of the surface collection.

In addition, the subsurface investigations of areas of PAD would be undertaken in line with the following methodology:

- Field team to return to PAD location and excavate a series of 50 x 50cm test pits on a 10m grid or on transects across the areas of PAD. Excavation will be by hand and in accordance with the Code of Practice.
- Excavation will be sieved through a 5mm mesh.

- All artefacts will be bagged, labelled with their provenance and analysed with recording of technical attributes.
- Test pit photos, soil samples will be taken for each square.
- At the completion of excavation, sieved soil will be returned to the excavated area.

The recovered artefacts from the surface collection and the test pitting program would be returned to country following their analysis. A return to country protocol would be determined in consultation with RAPs pending the results of the surface collection and subsurface testing programs. This would form part of the Heritage Management System for the Project.

Additional management measures that would be described in the Heritage Management System for the Project would include the following.

- The location and construction of fencing of heritage sites should be undertaken in consultation with an archaeologist or other suitably qualified person.
- An unexpected finds protocol should be implemented for the Project as described in Appendix 4 of Past Traces (2025). This protocol would include a requirement to immediately stop works in an area where a suspected site of Aboriginal cultural heritage is identified.
- The location of known sites and a summary of the predictive model of the local area for the Aboriginal community would be included in training and induction processes at the Project Site.
- Continued consultation with the RAPs for the project would be undertaken including for any further changes in Project design or scope, further investigations or finds.

6.8.7 Conclusion

Comprehensive field survey undertaken in consultation with stakeholders from the Aboriginal community has identified 32 sites within the Property that have Aboriginal cultural heritage value. Each of the sites is consistent with the predictive model prepared by Past Traces (2025) and while the cultural significance of these sites remains high, most are considered common and of low scientific value. Two culturally modified trees were identified that held high scientific and research significance with impact to these sites avoided by the Applicant. Further subsurface investigation of area of PAD would occur following approval of the Project, however these sites are unlikely to result in significant finds that would influence Project outcomes. It is unlikely that there would be any unidentified items of high significance within the Project Site that would preclude development with the Project.

The Extraction Area and Visibility Barrier were redesigned to avoid the items of high significance within the Project Site, particularly the culturally modified ring tree which is a rare site type. With the implementation of the management and mitigation measures proposed by the Applicant, there would be no significant impacts to Aboriginal cultural heritage.

6.9 Historic Heritage

6.9.1 Introduction

The SEARs for the Project do not require the EIS to include an assessment of historic heritage for the Project.

The assessment requirements of Heritage NSW outlined the following considerations with regard to the Project Site.

- The Project Site is not listed on the State Heritage Register (SHR), nor is it in the immediate vicinity of any SHR items
- The site does not contain any known historical archaeological relics.

Therefore, Heritage Council of NSW indicated that no referral is required and DPHI does not need to refer subsequent stages of this Project to the Heritage Council of NSW.

Field surveys undertaken for the Aboriginal Cultural Heritage Assessment (ACHA) prepared by Past Traces (2025a) and described in Section 6.8 did not identify any sites of historic heritage significance in the Project Site within NSW. Field surveys undertaken within the ACT identified an historical structure considered to be associated with the railway construction period. The photos of the site are presented in **Plate 6.5**. The site contains an area of mounded earth with stones, bricks and brick fragments, scattering northwards from the mounded area. Past Traces (2025b) considered this site to be highly disturbed and not warranting recording or preservation.

It is therefore concluded that there would be no impact to sites or locations of historic heritage significance within NSW and, from a cumulative perspective, considering impacts proposed within the ACT, there remains only minor impacts to a single site of limited heritage significance.



Plate 6.5 Historic Heritage Site within the ACT (historical rubble)

Source: Past Traces (2025b)

6.10 Traffic and Transport

6.10.1 Introduction

The SEARs for the Project require the EIS to include an assessment of the following potential impacts of the Project on traffic and transportation.

- Accurate predictions of the road traffic generated by the development, including a description of the types of vehicles likely to be used for transportation of quarry products.
- A detailed assessment of potential traffic impacts on the capacity, condition, safety and efficiency of the local and State road network (as identified above), including undertaking a road safety audit.
- A description of the measures that would be implemented to mitigate any impacts on road network performance, dilapidation and safety.
- Concept plans of any proposed upgrades, developed in consultation with the relevant road and rail authorities, in particular the proposed level crossing of the Tuggeranong to Bombala railway corridor in accordance with Transport for NSW guidelines.

The assessment requirements identified by Transport for NSW (TfNSW), DPI - Agriculture and Council were also considered during the preparation of the traffic and transport impact assessment. A summary of the SEARs and requirements of the above agencies are listed within **Appendix 2** with a record of where each requirement is addressed in the EIS.

A Road Transport Assessment for the Project was undertaken by The Transport Planning Partnership Pty Ltd (TTPP) and is presented as **Appendix I** and hereafter referred to as TTPP (2025). The following subsections provide a summary of TTPP (2025) and describe the existing road network and traffic environment, predicted changes to the traffic environment as a result of the Project, proposed management and mitigation measures and an assessment of traffic-related impacts.

The majority of transportation activities would occur within the ACT as the Quarry Access Road crosses the NSW/ACT border and would enter the public road network at a dedicated intersection with the Monaro Highway. Therefore, the transport assessment requirements within NSW relate only to the occasional use of the Secondary Access Road. However, the assessment of the impacts within the ACT is presented in the Road Transport Assessment and this subsection to consider the potential impacts of the Project as a whole. Approval under SSD-27223807 would relate only to activities up to and including the rail crossing. A separate development application and approval would be required for activities in the ACT (as described in Section 3.1.2).

Consultation with the Development Coordination Branch of Transport Canberra and City Services (now within the City and Environment Directorate) confirms general support for the preferred intersection configuration as presented in Section 3.8 of the EIS and Appendix C of TTPP (2025). Correspondence with the ACT City and Environment Directorate confirming this support is presented in **Appendix 7**. It is noted that this correspondence does not approve the intersection for construction but supports progress to detailed design supported by a Road Safety Audit.

An application for Approval in Principle for the railway bridge crossing has been submitted to UGL Linx who manage transport assets on behalf of TfNSW. A meeting with the Configuration Change Board on 26 June 2025 resulted in approval for the crossing design to proceed to detailed design (subject to approval of the Project). The Applicant is currently awaiting formal Approval in Principle for the crossing design from UGL Linx but understands there is no remaining impediment to this occurring. It is noted that an existing underbridge that is noted in TfNSW the asset register refers to a finger drain and lies outside the area of proposed impact for the railway bridge crossing.

6.10.2 Methodology

The Road Transport Assessment was undertaken using SIDRA INTERSECTION 10 to assess peak hour operating characteristics of the proposed intersection of the Monaro Highway with the Quarry Access Road. The ACT Transport Canberra and City Services (TCCS) *Guidelines for Transport Impact Assessment* (TCCS, 2020) indicate that TCCS has adopted the NSW Roads and Maritime Services (RMS, now TfNSW) *Traffic Modelling Guidelines* (RMS, 2013) for SIDRA modelling purposes.

Midblock level of service impacts were assessed by TTPP (2025) in accordance with the *Highway Capacity Manual* (HCM) (Transportation Research Board, 2016).

ACT TCCS was consulted during preparation of the traffic and transportation assessment and requested that the assessment consider data from the Canberra Strategic Transport Model (CSTM) for roads in the vicinity of the Project Site. TTPP obtained that data for the relevant roads for existing and future conditions over the potential life of the Project, including AM and PM peak hour data for 2021, 2026, 2031, and 2041.

A program of traffic surveys was conducted between May 2021 and June 2021 to quantify traffic volumes in the vicinity of the Project Site. The program included automatic tube counters on:

- Monaro Highway north of Old Cooma Road from Thursday 27 May to Wednesday 9 June (inclusive);
- Old Cooma Road south of Monaro Station Road from Monday 24 May to Sunday 6 June 2021 (inclusive); and
- Monaro Station Road west of Old Cooma Road from Monday 24 May to Sunday 6 June 2021 (inclusive).

The program also included an intersection turning movement survey at the Monaro Highway / Old Cooma Road intersection between 6:00am and 9:00am and between 3:00pm and 6:00pm on Thursday, 27 May 2021.

TTPP (2025) notes that the traffic surveys were conducted prior to the implementation of travel restrictions in NSW associated with the COVID-19 pandemic, as lockdown restrictions commenced at the end of June 2021. Additionally, Monday 31 May 2021 was a public holiday in the ACT and ski season opened at Perisher and Thredbo during the survey period, noting that Monaro Highway is the principal route to those locations from Sydney to Canberra.

6.10.3 *Existing Traffic Environment*

6.10.3.1 Roads

Figure 6.26 presents an overview of the local road network in the vicinity of the Project Site. In summary, the local road network may be descried as follows.

- Monaro Highway

  In the vicinity of the Project Site, Monaro Highway has a posted speed limit of 100km/hr and is typically a sealed two-way road with sealed shoulders, centre line markings, edge lines, and overtaking lanes. Monaro Highway has two southbound lanes and one northbound lanes between Johnson Drive at Tuggeranong and approximately 2.6km north of the Monaro Highway / Old Cooma Road Intersection. South of that point to approximately 1km south of the Monaro Highway / Old Cooma Road intersection, Monaro Highway has a single travel lane in each direction.

  Monaro Highway is an approved route for B-doubles.

  Monaro Highway provides direct access to a number of properties in the vicinity of the Project Site (e.g. Royalla Solar Farm at 8785 Monaro Highway and rural properties at 8814 and 8827 Monaro Highway). These direct accesses are basic T-intersections with no auxiliary turn lanes and are located where the Monaro Highway has a single travel land in each direction.

- Old Cooma Road

  In the vicinity of the Project Site, Old Cooma Road is a two-way, two-lane rural road with centre line markings, edge lines, and narrow sealed shoulders.

  Old Cooma Road provides for direct access to residential properties and local residential streets.

- Monaro Station Road and Mates Drive

  Monaro Station Road and Mates Drive are local roads which have a single travel lane in each direction, posted speed limits of 70km/hr, and are constructed as rural roads with no kerb or gutter. Monaro Station Road and Mates Drive provide property access only, with no through connection.

6.10.3.2 Intersections

In summary, relevant intersections which form part of the local road network may be descried as follows.

- Monaro Highway / Old Cooma Road Intersection

  Old Cooma Road forms the minor road at the priority-controlled Monaro Highway / Old Cooma Road T-intersection. There is a painted median island at the intersection and traffic leaving Old Cooma Road is controlled by line markings and a “give way” sign. Monaro Highway has a channelised right turn bay and a channelised left turn lane for vehicles turning onto Old Cooma Road. Vehicles turning left onto Old Cooma Road are required to give way to vehicles turning right onto Old Cooma Road and are controlled by line markings and a “give way” sign.

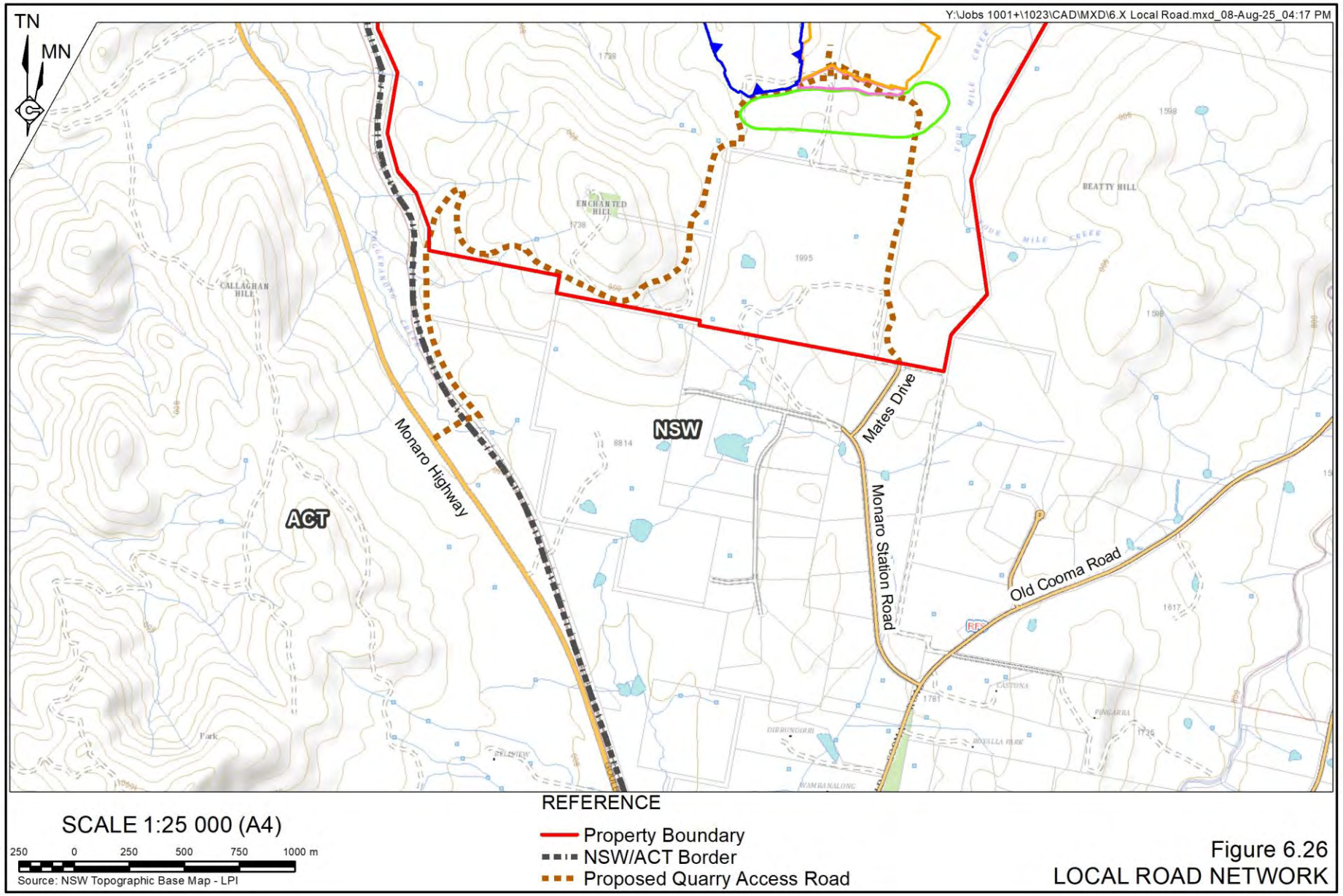


Figure 6.26
LOCAL ROAD NETWORK

- Old Cooma Road / Monaro Station Road Intersection

  At the Old Cooma Road / Monaro Station Road intersection, Monaro Station Road is flared and a southbound auxiliary lane is provided on Old Cooma Road to assist through vehicles to pass around vehicles turning right into Monaro Station Road.

- Monaro Station Road / Mates Drive Intersection

  The Monaro Station Road / Mates Drive intersection is a basic rural T-intersection, with no auxiliary lanes.

6.10.3.3 Railway Level Crossings

The Goulburn Bombala Railway south of Queanbeyan, although not formally closed, has been in disuse since 2007. A 2020 feasibility study found that reopening the line and extending it to link between Canberra Airport and Eden would not be viable due to high costs and low benefits. Therefore, there is currently no interaction between road and rail traffic at existing level crossings located:

- on Old Cooma Road approximately 160m from its intersection with the Monaro Highway; and
- on the property access road for 8814 Monaro Highway.

NSW Government funds were allocated in 2022 to the development of a plan for a possible rail trail between Queanbeyan and Bombala, known as the Monaro Rail Trail Project. A funding agreement has been made between the Snowy Monaro Regional Council and the Federal Department of Infrastructure, Transport, Regional Development, Communication and the Arts to commence rail trail construction at Bombala.

6.10.3.4 Traffic Volumes

Table 6.56 presents a summary of the peak hourly traffic volumes at the surveyed locations over the average weekday (excluding the public holiday Monday and the preceding Friday).

Table 6.56
Surveyed Peak Hourly Two-Way Traffic Volumes 2021

Survey Location	Hour	Vehicles per Hour			
		Light	Rigid	Articulated	Total
Weekday AM Peak Hour					
Monaro Highway	8:00am	622	50	20	692
Old Cooma Road	8:00am	148	8	3	159
Monaro Station Road	7:00am	5	3	0	8
Weekday PM Peak Hour					
Monaro Highway	4:00pm	634	42	19	695
Old Cooma Road	4:00pm	183	12	3	198
Monaro Station Road	4:00pm	7	3	0	10

Table 6.56 (Cont'd)
Surveyed Peak Hourly Two-Way Traffic Volumes 2021

Survey Location	Hour	Vehicles per Hour			
		Light	Rigid	Articulated	Total
Saturday AM Peak Hour					
Monaro Highway	11:00am	647	42	8	697
Old Cooma Road	10:00am	183	8	1	192
Monaro Station Road	10:00am	8	1	1	10
Saturday PM Peak Hour					
Monaro Highway	4:00pm	663	35	5	703
Old Cooma Road	3:00pm	183	11	3	197
Monaro Station Road	1:00pm	10	2	1	13
Source: TTPP (2025) – after Table 2.3.					

Analysis of the intersection turning movement survey data for the Monaro Highway / Old Cooma Road intersection indicates that peak hourly vehicle movements occurred between 8:00am and 9:00am (AM peak) and between 5:00pm and 6:00pm (PM peak). In summary, the intersection turning movement survey data indicated the following.

- The number of vehicles turning right into Old Cooma Road was relatively low during AM and PM peak hours (28 and 33 vehicles per hour respectively).
- There was a demand of 164 vehicles exiting Old Cooma Road by right turn towards the north during the AM peak hour.
- There was a demand of 109 vehicles per hour entering Old Cooma Road from the north during the PM peak hour.

This indicates frequent use of this intersection to access Old Cooma Road and nearby suburbs including Royalla, Fernleigh Park and Googong.

6.10.3.5 Road Safety History

A review of published road crash data obtained from the ACT Government for the Monaro Highway for the five-year period between 1 January 2020 and 31 December 2024 identified 22 crashes between Old Cooma Road and south of the roundabout at Johnson Drive. The following crashes are noted, and details of all crashes are provided in Tables 2.4 and 2.5 of TTPP (2025).

- Four crashes occurred over a road length of approximately 200m on a bend located approximately 2km south of Johnson Drive. However, other than the general location and with the exception that two crashes involved a vehicle leaving the road and striking an object, there was little similarity between these four crashes.
- Three crashes occurred at the Monaro Highway / Old Cooma Road intersection. All three crashes occurred in the evening and involved a vehicle turning right colliding with oncoming traffic, although the data does not indicate whether the vehicles were turning into or out of Old Cooma Road.

- Two crashes occurred during foggy conditions, one involving a head-on collision during darkness and one involving a collision with a pedestrian during daylight.

TTPP (2025) concluded that the road crash data do not highlight any specific location with a notably poor crash history which may suggest an inherent concern with the road layout at that location.

6.10.4 Management and Mitigation Measures

The Applicant would employ the following management and mitigation measures to ensure that traffic and transport-related impacts are minimised.

- Construct the Monaro Highway / Quarry Access Road in accordance with the intersection concept design described in Section 3.8 and presented in Appendix C of TTPP (2025).
- Ensure that all oversize loads are transported during daylight hours only, access the Project Site to/from the south via the Monaro Highway, travel with all relevant permits required by the regulatory authorities (ACT and/or NSW, where relevant), and travel in accordance with a Traffic Management Plan developed by the transport contractor.
- Ensure that a Road Safety Audit of the proposed Monaro Highway / Quarry Access Road intersection is prepared and submitted to the ACT City and Environment Directorate prior to the completion of detailed design.
- Ensure that drivers of Project-related trucks are subject to operational protocols relating to driver behaviour and interaction with other road users. These protocols, to be included in a Traffic Management Plan for the Project and a Driver's Code of Conduct, would address:
  - compliance with access routes;
  - road rules, laws and regulations, including the use of mobile phones;
  - respecting the rights of other road users and displaying courtesy to other motorists;
  - maintaining safe following distances between vehicles and increasing separation in poor weather;
  - vehicle condition and maintenance;
  - medical fitness of the driver;
  - covering of loads;
  - reporting of any unsafe driving practices or incidents;
  - management of transport operations during adverse weather conditions (e.g. foggy conditions); and
  - driver behaviour expectations at any specific locations or situations on the public road network, including near schools.

Subject to the outcomes of the proposed Road Safety Audit, the Applicant proposes to request a review of the speed limit on Monaro Highway in the vicinity of the proposed intersection with the Quarry Access Road.

6.10.5 Assessment of Impacts

6.10.5.1 Construction Traffic Impacts

During the construction period (approximately 6 months), the Project is expected to generate the following vehicle trips.

- Up to 40 light vehicle trips per day, with light vehicles typically arriving at around 7:00am on weekdays and at 8:00am on Saturdays and departing at around 6:00pm on weekdays and 1:00pm on Saturdays.
- Up to four heavy vehicle trips per day, with heavy vehicles making deliveries arriving at any time during construction hours.
- Up to 10 heavy vehicle trips associated with plant delivery and removal on one day at the start and at the end of the constriction period.

Access to the Project Site for construction vehicles (light and heavy vehicles) would be via the Secondary Access Road, Mates Drive, Monaro Station Road, and Old Cooma Road until construction of the Quarry Access Road has been completed.

Table 6.57 provides a summary of the forecast peak hour two-way traffic volumes on Old Cooma Road and Monaro Station Road during the construction period.

Table 6.57
Forecast Peak Hour Traffic

Location	2026 Without Project Construction		2026 With Project Construction	
	Hour Starting	Vehicles per Hour	Hour Starting	Vehicles per Hour
Weekday AM Peak Hour				
Old Cooma Road	8:00am	163	8:00am	165
Monaro Station Road	7:00am	8	6:00am	22
Weekday PM Peak Hour				
Old Cooma Road	4:00pm	204	4:00pm	206
Monaro Station Road	4:00pm	11	6:00pm	24
Saturday AM Peak Hour				
Old Cooma Road	10:00am	196	10:00am	198
Monaro Station Road	10:00am	8	10:00am	12
Saturday PM Peak Hour				
Old Cooma Road	3:00pm	202	3:00pm	202
Monaro Station Road	1:00pm	12	1:00pm	32
Source: TTPP (2025) – After Table 4.1				

TTPP (2025) concluded that forecast future traffic volumes on Old Cooma Road and Monaro Station Road during the Project construction period (prior to the completion of the Quarry Access Road) would be well within the capacity of those roads and intersections. Traffic generated by Project-related construction activities would have a negligible impact on traffic conditions during future peak hours on Old Cooma Road. Forecast peak hourly traffic volumes on Monaro Station Road (12 to 32 vehicles per hour) are well below the level at which traffic would impact residential amenity (TTPP, 2025).

6.10.5.2 Operational Traffic Impacts

Table 6.58 provides a summary of the forecast (2031 and 2014) future peak hourly and weekday two-way traffic volumes on Monaro Highway during the Project's operational period. TTPP (2025) notes that the forecast traffic volumes may be applied to the Monaro Highway north or south of the Quarry Access Road as the values conservatively assume that all Project-related traffic (i.e. workforce, visitors, haulage trips) during the peak hour occur either to and from the north or to and from the south only.

Table 6.58
Forecast Baseline and Future Traffic Volumes on Monaro Highway

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Period	2031			2041		
	Light Vehicles	Heavy Vehicles	Total Vehicles	Light Vehicles	Heavy Vehicles	Total Vehicles
Baseline Weekday – No Project						
8:00am to 9:00am	829	93	922	1,103	123	1,226
4:00pm to 5:00pm	843	80	923	1,123	107	1,230
Daily	9,198	1,247	10,445	12,241	1,660	13,901
Baseline Saturday – No Project						
11:00am to 12:00pm	962	67	929	1,146	88	1,234
4:00pm to 5:00pm	882	53	935	1,175	71	1,246
Daily	9,750	729	10,479	12,977	970	13,947
Weekday – with Project Maximum Heavy Vehicle Activity in One Direction						
8:00am to 9:00am	829	169	998	1,103	199	1,302
4:00pm to 5:00pm	845	156	1,001	1,125	183	1,308
Daily	9,254	1,747	11,001	12,297	2,160	14,457
Saturday – with Project Maximum Heavy Vehicle Activity in One Direction						
11:00am to 12:00pm	864	143	1,007	1,148	164	1,312
4:00pm to 5:00pm	884	103	987	1,177	121	1,298
Daily						

Source: TTPP (2025) – After Table 4.5.

Table 6.59 summarises the midblock level of service (LOS) for the Monaro Highway should all Project-related traffic accessing the Project Site travel to and from the south only. As the part of the Monaro Highway south of the Quarry Access Road has a single travel lane in each direction, LOS is defined only in terms of the percent time spent following (PTSF) in accordance with the *Highway Capacity Manual* (Transportation Research Board, 2016).

Table 6.59
Midblock Level of Service – Monaro Highway South of the Project Site

Peak Hour Period	Direction	Baseline – No Project				Project Haulage to/from South Only			
		2031		2041		2031		2041	
		PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS
Weekday AM	Northbound	77.9	D	84.6	D	80.4	D	86.8	E
	Southbound	44.5	B	53.2	B	48.2	B	56.3	C
Weekday PM	Northbound	53.5	B	62.0	C	56.1	C	63.9	C
	Southbound	77.0	D	84.3	D	77.7	D	84.9	D
Saturday AM	Northbound	71.2	D	77.1	D	72.2	D	78.1	D
	Southbound	69.1	C	75.6	D	70.3	D	76.7	D
Saturday PM	Northbound	63.7	C	71.4	D	65.8	C	72.8	D
	Southbound	73.9	D	79.9	D	75	D	81.2	D
LOS = Level of Service, PTSF = Percent Time Spent Following									
Source: TTPP (2025) – After Table 4.6.									

The results presented in **Table 6.59** predict the impact on LOS in the event that maximum haulage activity to and from the south of the Project Site should occur concurrently with peak hour traffic on the Monaro Highway in 2041. Under these conditions, the PTSF in the peak flow direction on the two-lane, two-way section of the Monaro Highway south of the Project Site would increase by up to 2.2% compared to conditions without the project. The highest increase would occur for northbound traffic on Monaro Highway during the weekday AM Peak hour, with LOS in 2041 forecast to reach the lower end of the PTSF range for LOS E.

Table 6.60 summarises the midblock LOS for the Monaro Highway should all Project-related traffic accessing the Project Site travel to and from the north only. As the part of the Monaro Highway north of the Quarry Access Road has two southbound lanes and one northbound lane, the southbound (only) density and LOS have been evaluated in accordance with the *Highway Capacity Manual* (Transportation Research Board, 2016).

Table 6.60
Midblock Level of Service – Monaro Highway North of the Project Site

Peak Hour Period	Baseline – No Project				Project Haulage to/from North Only			
	2031		2041		2031		2041	
	Density	LOS	Density	LOS	Density	LOS	Density	LOS
Weekday AM	1.8	A	2.4	A	2.2	A	2.8	A
Weekday PM	4.2	A	5.6	A	4.6	A	6.0	A
Saturday AM	3.1	A	4.1	A	3.5	A	4.5	A
Saturday PM	3.6	A	4.7	A	3.9	A	5.1	A
LOS = Level of Service								
Source: TTPP (2025) – After Table 4.7.								

The results presented in **Table 6.60** predict the impact on LOS in the event that maximum haulage activity to and from the north of the Project Site should occur concurrently with peak hour traffic on the Monaro Highway in 2041. Under these conditions, the density of southbound traffic during peak hours would result in a good LOS and the northbound LOS would be consistent with that calculated for northbound traffic on that part of the Monaro Highway which is a two-way two-lane road.

Table 6.61 presents a summary of the forecast peak operating characteristics of the proposed Monaro Highway / Quarry Access Road intersection with maximum haulage activity to either the north or south of the Project Site. As the intersection would be under priority control, the reported average delay represents the movement with the highest average delay per vehicle and is inclusive of stop-line delay, geometric delay, and (where relevant) downstream merger delay for outbound vehicles travelling north. TTPP (2025) notes that the conditions assessed using SIDRA are conservatively high as they assume the following.

- Maximum hourly Project haulage coincides with peak hourly background traffic conditions, which would not occur on a day-to-day basis.
- All heavy vehicles generated by the Project (except for concrete agitator trucks) are articulated trucks, which require larger gaps in opposing traffic and therefore generate longer delays compared to rigid trucks which would make up a proportion of heavy vehicles generated.
- The assumed background traffic growth rate of 2.9% per annum for the Monaro Highway exceeds the historical growth rate of 1.19% per annum between 2015 and 2024 and exceeds the default growth rate of 2.0% per annum adopted by TCCS.

Table 6.61
Monaro Highway / Quarry Access Road Intersection Operating Conditions

Period	Project Transport to/from North Only			Project Transport to/from South Only		
	X-Value[1]	Average Delay[2] (seconds per vehicle)	LOS[3]	X-Value[1]	Average Delay[2] (seconds per vehicle)	LOS[3]
2031 – with Project Maximum Haulage						
Weekday 8:00am to 9:00am	0.386	26.9	B	0.386	18.6	B
Weekday 4:00pm to 5:00pm	0.206	31.3	C	0.206	29.5	C
Saturday 11:00am to 12:00pm	0.273	27.6	B	0.273	23.9	B
Saturday 4:00pm to 5:00pm	0.234	28.5	C	0.234	25.8	B
2041 – with Project Maximum Haulage						
Weekday 8:00am to 9:00am	0.514	42.6	D	0.514	21.2	B
Weekday 4:00pm to 5:00pm	0.258	40.1	C	0.257	36.5	C
Saturday 11:00am to 12:00pm	0.362	35.9	C	0.362	28.7	C
Saturday 4:00pm to 5:00pm	0.312	36.7	C	0.312	31.6	C

Note 1: X-value = The degree of saturation, or x-value, is the ratio of the arrival rate of vehicles to the capacity.
Note 2: Average delay = seconds per vehicle for the movement with the highest average delay per vehicle.
Note 3: LOS = Level of Service.

Source: TTPP (2025) – After table 4.9.

Given the results presented in **Table 6.61**, TTPP (2025) concluded that, with 2.9% per annum background traffic growth and maximum Project-related haulage occurring to and from the north only or the south only, the proposed Monaro Highway / Quarry Access Road intersection would have adequate capacity and turning vehicles would experience acceptable delays. Overall, the operation of the intersection is expected to be satisfactory and through traffic on Monaro Highway would not experience delays as a result of the intersection (TTPP, 2025). In the event that all Project-generated transport occur to and from the south only, the queue would not overflow the storage lane into the northbound through lane as the 95th percentile queue of vehicles turning right into the Quarry Access Road would be less than one vehicle.

6.10.5.3 Road Safety Impacts

The proposed Monaro Highway / Quarry Access Road intersection concept design (see Section 3.8) has been developed with regard to the relevant Austroads guidelines, treatments in the major road, adequacy of acceleration and deceleration lane lengths, and safe intersection sight distances. Compliance with the Austroad requirements is reasonably considered appropriate to ensure the safe operation of the intersection. Furthermore, the concept design has been developed to minimise potential safety issues associated with the introduction of a new intersection as it would minimise the interaction between turning and through vehicles, would meet or exceed sight distance requirements (subject to appropriate vegetation management), and is forecast to operate with acceptable delays under peak conditions (TTPP, 2025).

A Road Safety Audit is not required for assessment of the safe use of roads in NSW given the minimal use of the road network in NSW. Section 6.10.5.1 discussed road use impacts during the site establishment and construction stage. As described in Section 6.10.4, a Road Safety Audit would be submitted to the ACT City and Environment Directorate as part of the next stage of assessment for the proposed intersection with the Monaro Highway and to support a request for review of the speed limit of the Monaro Highway in the vicinity of the Project.

6.10.5.4 Railway Bridge Crossing

The proposed railway bridge crossing would provide grade separation from the existing railway line and be designed to meet the requirements of TfNSW. The railway bridge crossing would not impact any future re-opening of the Goulburn Bombala Railway Line or the future development of a rail trail along this line.

6.10.6 Conclusion

The Road Transport Assessment prepared by TTPP (2025) concluded the following with regard to potential Project-related traffic impacts.

- Construction-related traffic on local roads and intersections (Mates Drive, Monaro Station Road, and Old Cooma Road) would be accommodated within the capacity of those roads with impacts to peak traffic flow expected to be negligible. Once operations commence, these roads would only be used occasionally for light vehicle access or in an emergency.

- Maximum hourly heavy vehicle traffic generated by the Project either to or from the north only or to or from the south only on the Monaro Highway would have acceptable impacts on the road network.
- The proposed Monaro Highway / Quarry Access Road intersection would provide adequate capacity for forecast maximum hourly Project-related traffic.
- Existing approved heavy vehicle routes to be utilised by Project-related traffic are of an adequate standard to accommodate Project-related heavy vehicles.

Overall, it is considered that the proposed transportation activities of the Project would remain within the capacity of the road network and would not result in substantial delays during peak hour periods. Traffic safety risks would be managed through the design of the proposed intersection and through the management of driver behaviour through a Drivers Code of Conduct. It is accepted that during certain busy periods, transport operations would have to adapt to traffic congestion along the transport route, however the same impacts apply to all road users during these periods. These times may be managed by pre-planning and coordination of transport requirements.

It is acknowledged that although risks associated with transport-related conflict on local roads in Royalla, Fernleigh Park and Googong would largely be avoided through the selected location of the Quarry Access Road, vehicles travelling from these areas may experience Project traffic if they enter the Monaro Highway. Despite this, the configuration of the Quarry Access Road and the intersection with the Monaro Highway remains the preferred access option.

6.11 Soil and Land Capability

6.11.1 Introduction

The SEARs for the Project require the EIS to include an assessment of the following potential impacts of the Project on soil and land capability.

- Potential impacts on soils and land capability (including potential erosion and land contamination).
- Potential impacts on landforms (topography), paying particular attention to the long-term geotechnical stability of any new landforms (such as overburden dumps, bunds, etc.).
- The compatibility of the development with other land uses in the vicinity of the development in accordance with the requirements in Clauses 2.17 and 2.18 of *State Environmental Planning Policy (Resources and Energy) 2021*, paying particular attention to the rural land use in the region.

The assessment requirements of the EPA and DPI - Agriculture were also considered during the preparation of the soil and land capability assessment. A summary of the SEARs and the requirements of the above agencies are listed within **Appendix 2** with a record of where each requirement is addressed in the EIS.

A Soil and Land Capability Assessment for the Project was undertaken by Strategic Environmental and Engineering Consulting (SEEC). The resulting report is presented as **Appendix J** and hereafter referred to as SEEC (2025a). The following subsections provide a summary of SEEC (2025a) and describe the operational safeguards and management measures that would be implemented by the Applicant.

6.11.2 Soil Characteristics

The Project Site is located within land mapped as the Campbell and Burra Soil Landscapes on the NSW eSpade[3] portal. SEEC (2025a) excavated ten soil test pits within the Project area, the locations of which are shown in **Figure 6.27**. Samples of topsoil and subsoil were collected, where present, and basic chemical and physical testing of the samples defined four soil units in the Project area, as shown in **Table 6.62**.

Table 6.62
Identified Soil Units in Stage 7

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Soil Unit	Landscape Conditions	Soil Conditions	Key Soil Features	Representative Test Pits
1	• Steep ridges and sideslopes on the Campbell Soil Landscape • Geology is a mixture of volcanics and sediments	Shallow, stony, rapidly drained Rudosols with gravelly imperfectly drained subsoils	• Topsoil approximately 200mm deep • Massive to weakly pedal • Low fertility • Abundant coarse fragments (subsoil)	5, 6, 7, 8

[3] https://www.environment.nsw.gov.au/eSpade2Webapp

Table 6.62 (Cont'd)
Identified Soil Units in Stage 7

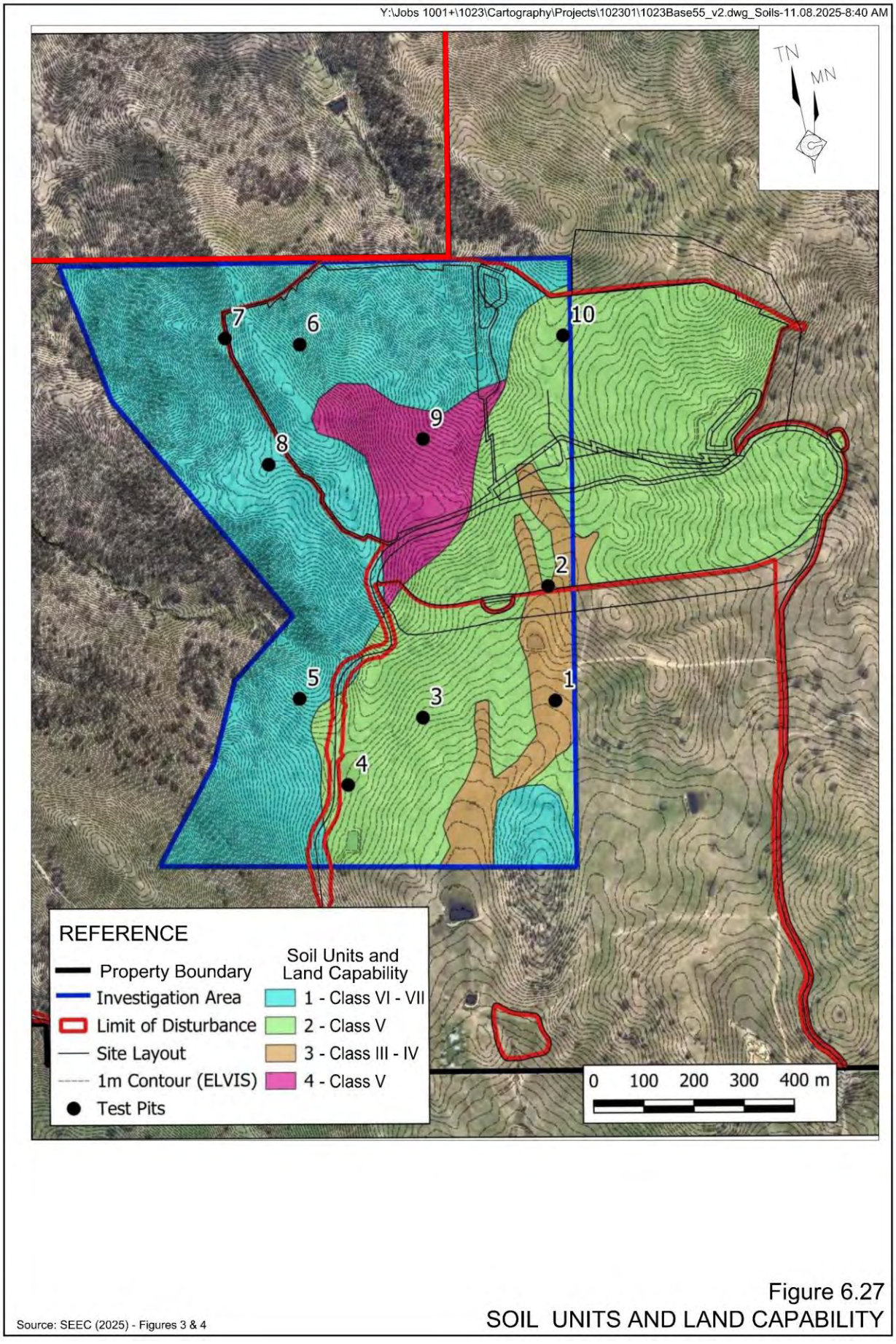
Soil Unit	Landscape Conditions	Soil Conditions	Key Soil Features	Representative Test Pits
2	• Moderately inclined crests, saddles and sideslopes on the Burra Soil Landscape	Moderately deep well-drained Red and Brown Kurosols and Kandosols	• Strongly acidic (topsoil) • Low fertility	3, 4, 10
3	• Gently inclined, broad drainage depressions, fans and footslopes on the Burra Soil Landscape	Moderately deep, poorly drained Brown and Yellow Kurosols and Sodosols	• Higher subsoil clay content • Low to moderate fertility	1, 2
4	• Moderately inclined sideslopes on the Campbell Soil Landscape • Geology is mainly volcanic	Moderately deep, moderately well drained Brown Chromosols	• Subsoil below 250mm • Abundant coarse fragments • Low fertility	9
Source: SEEC (2025a) – Table 4				

Basic chemical and physical tests were undertaken on all samples, and eight representative samples were sent to a NATA-registered soil laboratory for further analytical testing. A summary of the analytical results is provided in **Table 6.63**. In summary, the soils within the Project area:

- have a variable infiltration rate ranging from very slow to very rapid;
- have a high wind erodibility rating;
- are moderately to highly dispersible;
- are non-saline;
- are moderately to strongly acidic;
- are non sodic (excepting the sample from Test Pit 2); and
- are very weak to weakly leached (indicating their limited capacity to hold any additional nutrients applied).

Table 6.63
Soil Test Results – Physical and Chemical Characteristics

Test Pit	Soil Unit[1]	Potential Infiltration Rate	Wind Erodibility Rating	Dispersion Significance	Salinity	Acidity	Sodicity	Leaching
1, 2	3	Moderately rapid	NT[2]	NT[2]	Non saline	Strongly acidic	Non sodic	Very weak
2	3	Slow	NT[2]	NT[2]	Non saline	Strongly acidic	Sodic	Very weak
4, 10	2	Very rapid	NT[2]	NT[2]	Non saline	Strongly acidic	NT[2]	Very weak
4	2	Slow	High	Moderate	Non saline	Moderately acidic	Non sodic	Very weak
5, 7	1	Very rapid	NT[2]	NT[2]	Non saline	Strongly acidic	NT[2]	Very weak
5, 7	1	Very slow	High	High	Non saline	Moderately acidic	Non sodic	Weak
9	4	Very rapid	NT[2]	NT[2]	Non saline	Strongly acidic	Non sodic	Very weak
9	4	Very rapid	NT[2]	NT[2]	Non saline	Strongly acidic	Non sodic	Very weak
Note 1: See **Figure 6.27** Note 2: NT = Not tested								
Source: SEEC (2025a) – modified after Tables 6 to 10 and 13								



Source: SEEC (2025) - Figures 3 & 4

Figure 6.27
SOIL UNITS AND LAND CAPABILITY

Cation Exchange Capacity (CEC) indicates a soil's ability to hold and exchange cations and is a major controlling factor for soil structural stability and nutrient availability for plant growth. It also influences soil pH and a soil's reaction to fertilizers and ameliorants. **Table 6.64** provides an analysis of each cation concentration as a percentage of CEC in respect to each representative soil sample, along with organic carbon values.

Table 6.64
Available Nutrients and Organic Matter

Test Pit	Soil Unit[1]	Aluminium		Calcium		Magnesium		Potassium		Sodium		Organic Carbon % & Rating
		% of CEC	Desirable Range	% of CEC	Desirable Range	% of CEC	Desirable Range	% of CEC	Desirable Range	% of CEC	Desirable Range	
1, 2	3	3	<1	61	65 - 80	28	10 - 20	4.2	3 - 8	3.7	<1	1.3 - Mod
2	3	13	<1	1.5	65 - 80	77	10 - 20	2.1	3 - 8	7.1	<1	NT[2]
4, 10	2	5.6	<1	68	65 - 80	19	10 - 20	7	3 - 8	NT	<1	0.71 - Low
4	2	17	<1	40	65 - 80	37	10 - 20	4.7	3 - 8	2.2	<1	0.59 – Very low
5, 7	1	4	<1	70	65 - 80	20	10 - 20	6	3 - 8	NT	<1	1.9 - High
5, 7	1	35	<1	20	65 - 80	37	10 - 20	5.6	3 - 8	2.7	<1	0.46 – Very low
9	4	5.1	<1	74	65 - 80	13	10 - 20	7.2	3 - 8	0.65	<1	1.7 - High
9	4	8	<1	45	65 - 80	37	10 - 20	8	3 - 8	1.8	<1	NT[2]
Note 1: See **Figure 6.27** Note 2: NT = Not tested												
Source: SEEC (2025a) – modified after Tables 12 and 14												

All samples were found to have low to very low CEC, indicating soils within the Project Site have low capacity to retain and respond to applied nutrients (e.g. fertilisers). Calcium deficiency in Project soils has the potential to limit pasture growth however application of lime can be used to address this. Soils from soil units 1, 3 and 4 are not likely to required addition of organic fertiliser (e.g. compost) to promote vegetation growth, however, soils from unit 2 would benefit from an addition of an organic fertiliser.

6.11.3 Land Capability

Based on the soil properties and the local environment for surface water, geology, rock outcrop and topography, SEEC (2025a) assessed the existing land capability of the Project area as varying from Class III to Class VII, with the majority being Class V to VI, as shown in **Figure 6.27**. A summary of the land capability within the Project area, as described in Section 5 of SEEC (2025a), is provided in **Table 6.65**.

Table 6.65
Land Capability within the Project Area

Page 1 of 2

Soil Unit[1]	Land Capability Class	Description
1	VI to VII	Land has very high limitations for high-impact land uses. Land use restricted to low-impact land uses such as grazing, forestry and nature conservation. Careful management of limitations is required to prevent severe land and environmental degradation.

Table 6.65 (Cont'd)
Land Capability within the Project Area

Soil Unit[1]	Land Capability Class	Description
2	V	Land has high limitations for high-impact land uses. Will largely restrict land uses to grazing, some horticulture (orchards), forestry and nature conservation. The limitations need to be carefully managed to prevent long-term degradation.
3	III to IV	Moderate to high capability land. Land has moderate to high limitations that can sustain high-impact land uses, such as cropping, high-intensity grazing or horticulture, but only if intensive, sometimes-specialised but widely accepted management practices are adopted. Careful management of limitations is required for cropping and intensive grazing to avoid land and environmental degradation,
4	V	Land has high limitations for high-impact land uses. Will largely restrict land uses to grazing, some horticulture (orchards), forestry and nature conservation. The limitations need to be carefully managed to prevent long-term degradation.
Note 1: See **Figure 6.27**		
Source: SEEC (2025a) – modified after Table 20		

6.11.4 Land Uses

Surrounding land uses are described in Section 2.4.2 and **Figure 2.8** and predominantly comprise the following.

- Grazing – native vegetation
- Grazing – modified pastures
- Residential and farm infrastructure
- Transport and communication
- Rivers

The Project Site would predominantly be developed on private land with an access road constructed on a Crown road parcel. Impacts that extend over the identified boundaries would be limited and would comply with the required environmental management regulations (as described in this section of the EIS). The Project would be able to co-exist with existing agricultural practices retained on the Property and continued on adjacent properties. The development of the Project would not preclude future land uses including for agriculture. The Project Site including the Quarry Access Road has been sited to avoid fragmentation of agricultural land.

Amenity impacts associated with noise and dust generation and change to outlook may occur but would not represent significant impacts. However, it is acknowledged that the local community values the rural character of the locality. Comprehensive programs for ongoing environmental management and monitoring would ensure responsible environmental outcomes are achieved and reporting on these outcomes would demonstrate the environmental performance of the Project.

As the Project would not compromise the successful use of neighbouring land a Land Use Conflict Risk Assessment is not required.

6.11.5 Management and Mitigation Measures

The Applicant would implement the following management and mitigation measures throughout the Project life to minimise the potential for unacceptable soil and land capability-related impacts.

- Clearly mark areas for stripping and stockpiling.
- Strip topsoil from all areas of disturbance and store in stockpiles on relatively flat areas (<10% slope) orientated parallel to the contours no more than 2m high.
- Strip subsoil (where present) from areas of disturbance and store in stockpiles no more than 4m high.
- Refrain from stripping or placing soil during wet conditions.
- Ensure that the soil stockpile surfaces have a surface that is as 'rough' as possible, in a micro-scale, to assist in surface water runoff control and seed retention and germination.
- Spread seed of a suitable cover crop on all soil stockpiles to facilitate early vegetation and apply water, if required.
- Ensure that soil stockpiles are constructed with side slopes of 1:3 (V:H) or less and that the surface of all stockpiles achieves an effective 70% vegetation cover as soon as practicable. This would be achieved through the use of mulches, spray on polymer-based products or other practices that would allow a vegetative cover to become established.
- Signpost the soil stockpiles and limit operation of machinery on the stockpile to minimise compaction and further degradation of soil structure.
- Rip or scarify all areas to be respread with topsoil to allow the respread material to be keyed into the underlying material.

A range of additional management measures would be implemented to mitigate amenity impacts associated with the change in land use. These measures are described throughout this EIS and are summarised in **Appendix 6**. Ongoing engagement with the community would ensure that concerns and impacts can be communicated to the Applicant and a robust protocol for responding to community complaints would be in place.

6.11.6 Assessment of Impacts

SEEC (2025a) completed an assessment of the soils within the Project Site and determined that the majority of soil units (soil units 2, 3 and 4) can provide a suitable topsoil resource for use in rehabilitation, subject to amelioration and fertilising as described in SEEC (2025a). Adherence to the recommended soil and growth medium stripping, handling, stockpiling procedures and other management practices, together with appropriate rehabilitation practices would result in a minimal impact to soils and land capability within the Project Site. The Project would not impact adversely on the agricultural potential of the land given the existing land uses both within and immediately surrounding the Site and the prevalence of moderate to low capability soils.

Risks of conflict or impact to other land uses in the locality would be minor and unlikely to occur, however, where these land uses relate to the value placed on local amenity, impacts may be experienced by the community. These impacts are recognised and would be mitigated as much as practical.

6.12 Surface Water

6.12.1 Introduction

The SEARs for the Project require the EIS to include the following in relation to surface water.

- A detailed site water balance for the dry, average and wet rainfall years, including a description of site water demands, water disposal methods (inclusive of volume and frequency of any water discharges) for all scenarios, water supply infrastructure and water storage structures.
- Identification of any licensing requirements or other approvals under the *Water Act 1912* and/or *Water Management Act 2000*.
- Demonstration that water for the operation of the development can be obtained from an appropriately authorised and reliable supply in accordance with the operating rules of any relevant Water Sharing Plan (WSP).
- A description of the measures proposed to ensure the development can operate in accordance with the requirements of any relevant WSP or water source embargo.
- An assessment of any likely flooding impacts of the development.
- An assessment of the likely impacts on the quality and quantity of existing surface water resources, including a detailed assessment of proposed water discharge quantities and quality against receiving water quality, flow objectives and sensitive downstream receiving environments.
- An assessment of the likely impacts of the development on watercourses, riparian land, water-related infrastructure, and other water users.
- A detailed description of the proposed water management system, water monitoring program and other measures to mitigate surface water impacts.

The assessment requirements of the then DPIE Water, BCD, EPA, DPI - Agriculture, and Council were also considered during the preparation of the surface water assessment. A summary of the SEARs and the requirements of the other agencies are listed within **Appendix 2** with a record of where each requirement is addressed in the EIS.

A Surface Water Management Report for the Project was prepared by Strategic Environmental & Engineering Consulting (SEEC). The resulting report is presented as **Appendix K** and is hereafter referred to as SEEC (2025b). The report assesses the need for water management of the Project Site and presents the outcomes of assessment with proposed measures to meet the expected need. The report includes the following key components.

- A summary of the existing environment and legislative context that inform water management for the Project.
- Water quality objectives for the Project.
- A system for erosion and sediment control for the Project.
- A water management strategy for the Project.

- A water balance for the Project taking into account dry, average and wet periods and including a summary of water supply reliability for the Project.
- Discussion of proposed ongoing water monitoring and reporting.

6.12.2 Existing Environment and Legislative Context

Key features of the local setting that influence water management and water supply reliability include the following.

- Local climatic conditions including rainfall and evaporation. Reliance was also placed on data sourced from the Scientific Information for Landowners (SILO) database. Local climate conditions are summarised in Section 6.1. Rainfall is generally consistent throughout the year with high levels of evaporation that vary consistent with seasonal expectations.
- Landscape features and topography influence how water would behave in the local setting and determine key considerations such as the size of catchments, the rates of runoff and the formation of local drainage features or floodplains. The local setting is characterised by key topographic features (Beatty Hill and Enchanted Hill) and northwest trending ridgelines. Drainage either runs generally to the west towards Tuggeranong Creek or to east of the Project Site towards Four Mile Creek that lies between the Project Site and Beatty Hill. Some drainage lines direct water to the south towards Guises Creek. There are a number of existing farm dams on the property that are used to support agricultural land use.
- Catchment land uses may determine reliance on water or historical management of water. On a regional scale, the land use in the Murrumbidgee catchment is predominantly for extensive agriculture. Land uses surrounding the Project Site predominantly comprise grazing and rural lifestyle activities. A recent subdivision of rural lifestyle land has been approved to the south of the Project Site.
- Local land capability and soil conditions influence erosion risks within the project Site. Land capability and soil conditions were assessed by SEEC (2025a) (see Section 6.11) with the results indicating that future land uses for agriculture would be limited and the soils are highly susceptible to erosion, are poorly fertile with limited water holding capacity.
- The local groundwater setting would influence how water may travel in the landscape and whether groundwater contributions to local watercourses are a feature of the environment. A Groundwater Impact Assessment has been completed by The Hydrogeologist (2025) see Section 6.13 and determined that groundwater lies between 5m to 50m below the ground surface and would not provide baseflow to local surface water features.

The Project Site is located within the Murrumbidgee catchment within the Murrumbidgee II Water Source sub-catchment of the *Water Sharing Plan for the Murrumbidgee Unregulated River Water Sources 2012*. The Murrumbidgee II Water Source sub-catchment has a total of 34 water access licences, including a total share component of 6,615ML (based on Water NSW reporting as of November 2024).

In accordance with Clause 21 of the *Water Sharing Plan for the Murrumbidgee Unregulated River Water Sources 2012* a landowner is entitled to capture and store water within the maximum harvestable right capacity of the property. The basic landowner rights of a landowner with regards to water management are described in Chapter 3 of the *Water Management Act 2000* with Section 53 of that Act describing the harvestable rights that permit the construction of a water supply works for the purpose of capturing and storing water and the use of that water. The Maximum Harvestable Right Capacity of land is dependent on the size and location of the property and may be calculated online at the relevant WaterNSW website[4].

Under the *Water Management Act 2000*, the Project has a maximum harvestable right of 38.71ML, based on a Project Site area of 553ha. There are 19 existing dams located on the Project Site. **Table 6.66** presents the estimated volumes for existing dams at the Project Site, including those that would be filled in prior to the Project commencement. The total capacity of the existing dams, excluding those that would be filled, is 4.10ML. Therefore, the remaining harvestable rights capacity is 34.61ML.

Table 6.66
Existing Dams – Estimated Volumes

Dam	Area (m^2)	Volume (ML)
Dam 1*	2,253	2.80
Dam 2	1,184	1.20
Dam 3	706	0.60
Dam 4*	559	0.44
Dam 5*	907	0.84
Dam 6*	401	0.29
Dam 7*	322	0.21
Dam 8	153	0.08
Dam 9*	895	0.83
Dam 10	793	0.70
Dam 11	104	0.05
Dam 12	277	0.18
Dam 13	160	0.09
Dam 14	513	0.40
Dam 15	397	0.28
Dam 16	796	0.71
Dam 17	369	0.26
Dam 18*	83	0.04
Dam 19*	923	0.86
Existing Total Storage (ML)		**10.84**
Total Storage Excluding Filled Dams (ML)		**4.53**
Additional Storage Available for Use (ML)		**34.18**
* Dams to be filled prior to Project commencement		
Source: SEEC (2025b) – modified after Table 5		

[4] See https://www.waternsw.com.au/customer-services/water-licensing/maximum-harvestable-rights-calculator

Schedule 1 Clause 3 of the *Water Management (General) Regulation 2018* provides an exemption from the requirement for a Water Access Licence under Schedule 1 Clause 3 for dams used solely for the capture, containment and recirculation of drainage to prevent contamination of a water source located on a minor stream. Runoff captured from active areas of the Project Site would be used for dust suppression and other on-site requirements.

6.12.3 Water Quality Objectives

SEEC (2025b) reviewed water quality objectives for NSW and the environmental values desired by the community that include water use for aquatic ecosystems, irrigation, drinking water and stock watering as well as for recreation and aesthetic reasons.

SEEC (2025a) considered that sediment or the turbidity of water would be the key risk of impact given the nature of operation and the environment surrounding the Project Site.

More information on the local water quality objectives considered by SEEC (2025b) is presented in Section 4 of the Surface Water Management Report.

6.12.4 Management and Mitigation Measures

6.12.4.1 Water Management Strategy

The proposed Water Management Strategy for the Project has been developed in order to ensure that water is managed in a manner that maximises opportunities for reuse and recycling and minimises the possibility of uncontrolled discharge. Water management infrastructure that would be constructed for the Project is described in Section 3.10 and presented in **Figure 6.28**.

The management of runoff would be based on the class of water to be managed. There would be two classes of water that would be managed on the Project Site as follows.

- "Clean" refers to runoff from those catchments unaffected by quarrying activities (regardless of water quality) or from rehabilitated surfaces with sufficient groundcover to minimise the disturbance and transport of sediment.
- "Sediment-laden" or "dirty" refers to runoff from disturbed or active sections of the Project Site with the potential to contain suspended sediment.

The site water management system has been developed in a manner that enables the:

- Separation of clean water from externally draining catchments and dirty water from internally draining catchments.
- Efficient recovery and use of water from within the Quarry Site to minimise external water use.
- Effective management of available storage volumes that prevents uncontrolled discharge to receiving environments.
- Effective water quality management strategies that prevent discharge of dirty water to receiving environments.

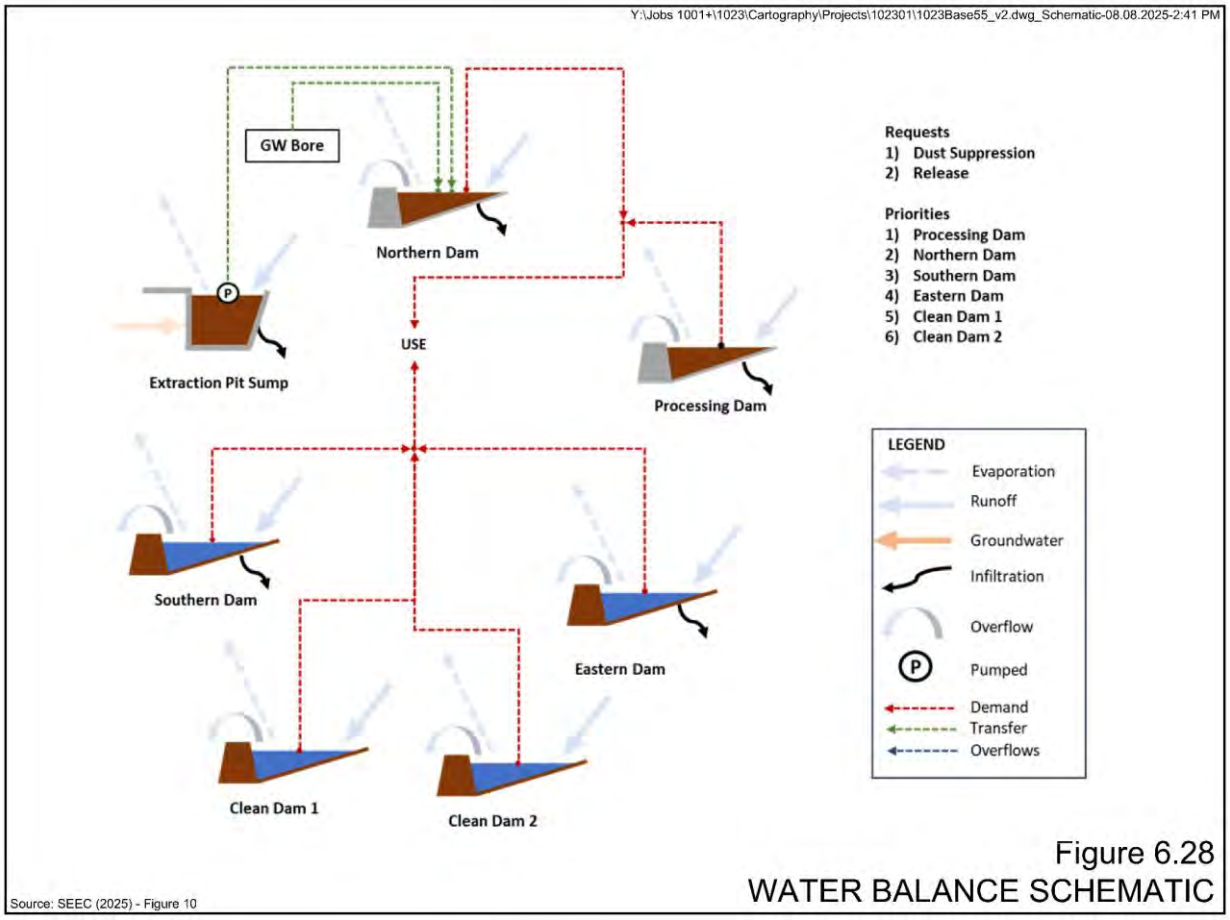


Figure 6.28
WATER BALANCE SCHEMATIC

A Water Management Plan would be prepared and implemented prior to commencement of the Project that describes the Water Management Strategy and includes protocols for monitoring, reporting and actions to be taken in response to a pollution incident (should it occur).

6.12.4.2 Erosion and Sediment Control

SEEC (2025b) prepared an Erosion and Sediment Control Plan across four stages of Project development.

- Site establishment and construction that includes development of Stage E1 of extraction, with associated development of Stage P1 of processing and Stage V1 of the Visibility Barrier.
- Development of Stage E2 of extraction, with associated development of Stage P1 of processing and Stage V2 of the Visibility Barrier.
- Development of Stage E3 of extraction, with associated development of Stage P2 of processing and Stage V2 of the Visibility Barrier.
- Development of Stage E4 of extraction, with associated development of Stage P2 of processing and Stage V2 of the Visibility Barrier.

The Erosion and Sediment Control Plan supports the management of clean and sediment laden (or dirty) water. Key features of the Erosion and Sediment Control Plan include the following.

- Clean water dams for the capture and storage of water for use within the Project Site.
- Sediment Basins for the management of potentially sediment laden water within the Project Site.
- Clean water drains to direct upstream clean water around the Quarry Site.
- A series of low flow earth banks within the Project Site to direct potentially sediment laden water to sediment basins.
- Discharge points for the removal of treated or clean water from the Project Site in order to ensure that water management infrastructure retains sufficient capacity for rainfall events in accordance with the Blue Book (Landcom, 2024).

Supplementary erosion and sediment control measures may be used within the Project Site depending on the activity and stage of the development.

- Sediment fencing may be used during progressive development of areas where dirty water runoff may enter clean catchments.
- Coir log filters and check dams may be used to support drains and outlets.
- Rosk armouring and jute mesh may be applied to drains or dams to support the structure of these features.
- Supplementary planting of cover crops in response to rainfall events that damage existing rehabilitation works.

6.12.4.3 Sediment Basin Storage Requirements

The minimum basin sizing to meet Erosion Sediment Control (ESC) requirements of each dirty water catchment are presented in **Table 6.67**. Sediment basins have been sized based on the following criteria (Landcom, 2004 and DECC, 2008).

- Design rainfall depth: 45.1mm (5-day, 95th percentile for Queanbeyan).
- Basins designed for Type F/D (dispersible) sediment.
- Volumetric runoff coefficient (Cv): 0.58 (Hydrologic Group C) for all areas.

Table 6.67
Minimum Sediment Basin Sizing Requirements

Structure	Catchment (ha)	Minimum Capacity for ESC (ML)			Adopted Basin Volume (ML)
		Settling Zone Volume	Sediment Storage Zone Volume	Total Basin Volume	
Northern Dam	21.1	3.6	1.8	7.58	11.1
Processing Dam	32.6	5.5	2.7	8.2	10.7
Southern Dam	4.1	0.7	0.3	1.0	1.6
Eastern Dam	11.1	1.9	0.9	2.8	2.8

It is noted that the proposed capacity of some the dams is greater than the minimum required size in order to provide additional water storage and/or to minimise the number of uncontrolled discharges.

The sediment basins would be inspected within five days of a rain event with captured runoff treated and discharged to ensure that sufficient freeboard was available to accept the settling volume listed in **Table 6.67**. Should water be required for on-site use, the water can be retained, however the basins must be capable of capturing the nominated settling volume prior to a rain event. Note that if rain occurs within the 5-day maintenance period, the 5-day treatment period resets.

6.12.4.4 Water Storages

Table 6.68 presents all water storage infrastructure that would be developed for the Project and includes the land use and size of each catchment that would flow to the respective storage. As the Project is progressively developed and the catchment area either increases or changes from a source of clean water to dirty water, the use of water storages would change. Additional water storages would be added to the Project Site to ensure water supply reliability and some may be removed from the system. SEEC (2025b) has demonstrated that the maximum harvestable right capacity of the property would not be exceeded at any time during development of the Project.

Table 6.68
Water Management Storages

Storage	Capacity (ML)	Land Use	Catchment Area (ha) and Year					
			1	4	8	15	16-30	>30 Years
Extraction Pit Sump	5[1]	Quarry	6.4	6.4	12	21.1	21.1	21.1
Northern Dam	11.1	Natural	3.3	-	-	-	-	-
		Hardstand	5.8	-	-	-	-	-
Processing Dam	10.7	Stockpile	2.9	5.4	5.4	6.2	6.2	-
		Natural	12.7	5.4	5.4	-	-	-
		Hardstand	3.4	21.2	21.2	20.2	20.2	-
Southern Dam	1.63	Natural	6.8	4.1	4.1	4.1	4.1	-
Eastern Dam	2.8	Natural	11.1	9.8	9.8	9.8	9.8	-
Farm Dam[2]	4.9	Natural	71.4	-	-	-	-	-
Clean Dam 1	16	Natural	-	100.0	100.0	100.0	100.0	100.0
Clean Dam 2	3.1	Natural	-	-	-	81.2	81.2	81.2
Water Tanks	0.05	-	-	-	-	-	-	-

Note 1: The capacity of the Extraction Pit Sump may vary over the life of the Project.
Note 2: The current capacity of the Farm Dam is 2.8ML and would be increased to 4.9ML to support water supply for the Project.
Source: SEEC (2025b) – Table 10

The capacity of the Extraction Area Sump may vary over the life of the Project. For the purpose of the Water Balance Assessment it has been modelled with a capacity of 5ML. The Extraction Pit Sump would overtop during periods of extreme rain with water captured within the Extraction Area or water management infrastructure within the Project Site.

6.12.4.5 Clean Water Management

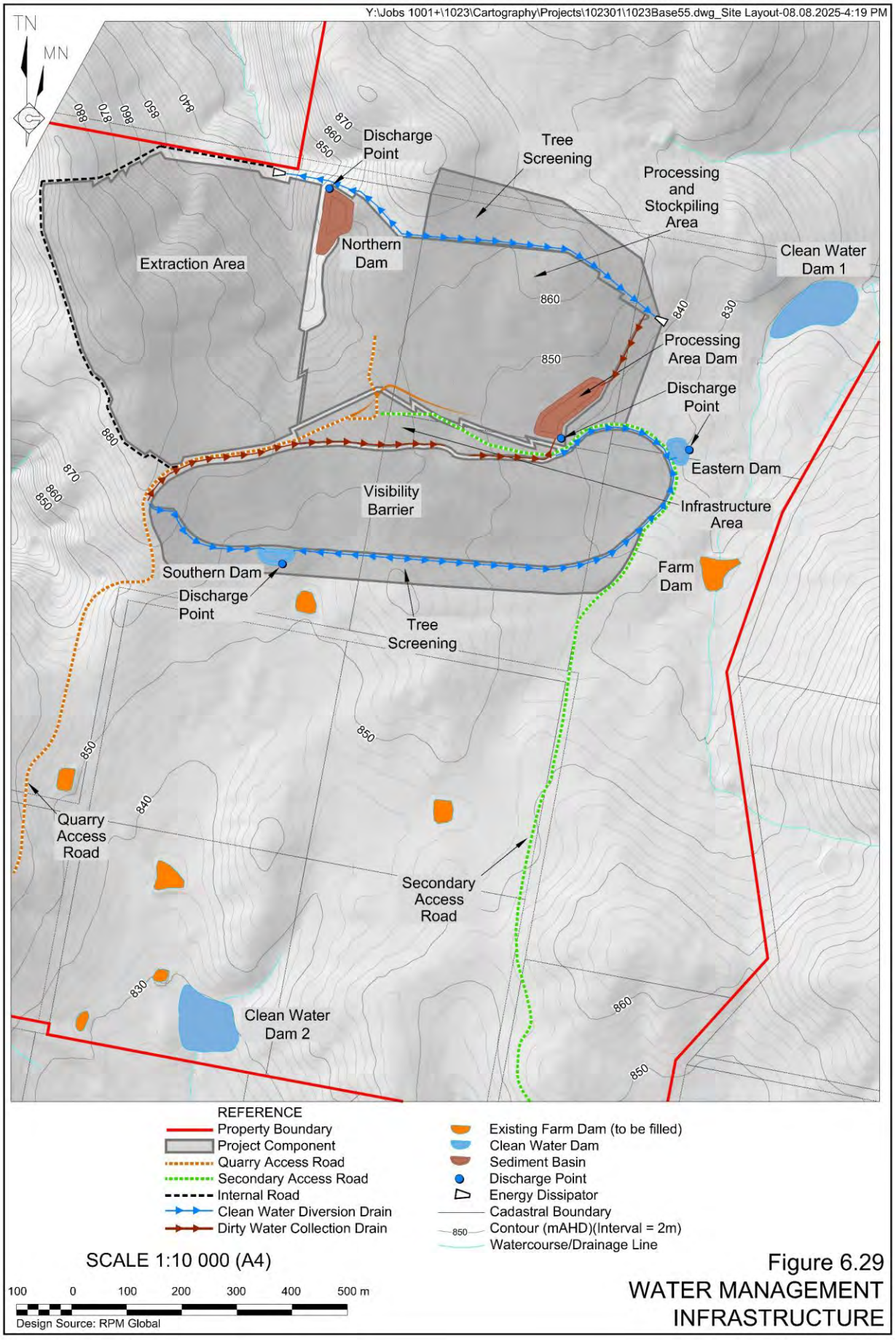
Runoff from undisturbed catchments north of the Processing and Stockpiling Area, and south and east of the Visibility Barrier would be directed away from the Project Site using clean water diversion drains. Clean water diversion drains would direct runoff to one of two clean water dams (Southern Dam or Eastern Dam) or via an energy dissipating drainage structure that would direct clean runoff water to the natural environment. These diversion drains, drainage structures and clean water dams would ensure that clean water would be diverted around the Project Site without mixing with other classes of water and/or stored for use under the Project's harvestable rights allocation (e.g. for dust suppression or processing). Details of the clean water management structures that would be installed on the Project Site are presented in **Figure 6.29** and their function summarised as follows.

- Eastern Dam – This dam would collect clean water diverted from the north-east and southeast facing slopes of the Visibility Barrier and includes a nominated discharge point. Water from this dam would be transferred to water tanks within the Project Site.
- Southern Dam – This dam would collect water diverted from the south-west facing side of the Visibility Barrier and upslope of the Visibility Barrier and includes a nominated discharge point. Water from this dam would be transferred to water tanks within the Project Site.
- An existing Farm Dam and two clean water dams (Clean Dam 1 and Clean Dam 2) would also be used on the property to capture water for use under the Project's harvestable rights capacity. Water from these dams would be transferred to the water tanks as a priority but also to sediment basins for use for dust suppression.
- Clean water diversions north of the Processing and Stockpiling Area would either direct water from the north-western catchment to an unnamed Monks Gully tributary, or from the north-eastern catchment towards Four Mile Creek.

6.12.4.6 Dirty Water Management

A series of low flow earth banks would be progressively constructed within operating areas of the Project Site (**Figure 6.29**). The banks would divert sediment-laden water into a series of progressively constructed sediment basins (the Northern Dam and Processing Area Dam). The sediment basins are displayed in **Figure 6.29** and the function of dirty water management infrastructure summarised as follows.

- Northern Dam – This sediment basin would capture potentially sediment-laden water from within the Processing and Stockpiling Area (Stage P1) and active areas within the Extraction Area. Water captured in the Extraction Area sump would be transferred here for management and treatment. When capacity in the basin is exceeded, water would be discharged to a clean water drain that flows to the natural environment.


Y:\Jobs 1001+\1023\Cartography\Projects\102301\1023Base55.dwg_Site Layout-08.08.2025-4:19 PM
TN
MN
Discharge Point
Tree Screening
Processing and Stockpiling Area
Clean Water Dam 1
Extraction Area
Northern Dam
Processing Area Dam
Discharge Point
Eastern Dam
Visibility Barrier
Infrastructure Area
Farm Dam
Southern Dam
Discharge Point
Tree Screening
Quarry Access Road
Secondary Access Road
Clean Water Dam 2
REFERENCE
Property Boundary
Project Component
Quarry Access Road
Secondary Access Road
Internal Road
Clean Water Diversion Drain
Dirty Water Collection Drain
Existing Farm Dam (to be filled)
Clean Water Dam
Sediment Basin
Discharge Point
Energy Dissipator
Cadastral Boundary
Contour (mAHD)(Interval = 2m)
Watercourse/Drainage Line
SCALE 1:10 000 (A4)
100 0 100 200 300 400 500 m
Design Source: RPM Global
Figure 6.29
WATER MANAGEMENT INFRASTRUCTURE

- Processing Area Dam – This sediment basin would capture water drained from the Processing and Stockpiling Area and from the active areas of the Visibility Barrier (via a drain). Water in the basin would be stored and treated to avoid pollution risks and may be used for operations. When capacity in the basin is exceeded, water would be discharged via a piped outlet and spillway.
- Extraction Area Sump – The location of this sump would vary over the life of the Project as required. Water captured in the sump would be transferred to the Northern Dam as needed.
- Dirty water drains (low flow earth banks) would direct water from active areas of the Project Site to sediment basins to ensure this water is captured and not released to the natural environment.

Sediment basins would be actively managed to maintain sufficient capacity to capture water from a 5-day, 95th percentile rainfall event (45.1mm for Queanbeyan, see Section 6.12.4.3). Following any rainfall event, the basins would be inspected and within five days the water managed to return the required available storage capacity. This may include pumped transfer to other storage infrastructure or treatment and discharge of water.

6.12.4.7 Discharge Management

Whilst the volumes of clean and sediment-laden water held in the Project dams are key sources of water for operations at the Quarry, it is recognised that there is potential for discharge from the dams to the receiving environment to occur. During operations, water would be pumped around the Project Site to limit the occurrence of spills/overflows and facilitate treatment of water for release.

If there is sufficient rainfall, the clean water dams would naturally fill and spill, with a spillway created to ensure orderly spill to the natural environment.

For sediment basins, treatment and pumping of water (controlled releases) would be required in most circumstances. Discharge may also be controlled by an outlet pipe and gravity fed to a spillway or diversion drain. Pumped discharge has been assessed as occurring at a rate of 50L/sec to ensure physical impacts to water management infrastructure are avoided. The final rate of pumping would be determined in detailed design of the system, taking into account the dam and drainage structures and the capacity of the infrastructure. The frequency and volume of discharge would be reduced by the use of stored water to meet on-site water usage requirements (i.e. dust suppression). Detailed procedures for the discharge of water would be described in the Water Management Plan for the Project.

The Water Balance Assessment considers the likely frequency and volume of controlled discharge for the operation. It is noted that the estimated capacity of the Northern Dam is greater than the minimum basin capacity requirement for sediment control (**Table 6.68**) due to the requirement for this dam to accept pumped water from the Extraction Area and to provide a higher level of water supply security. Water discharged from the Processing Area Dam would travel to Four Mile Creek before entering Clean Water Dam 1, where any sediments would have further opportunities to settle.

Chemical coagulants and/or flocculants may be required to treat detained surface water and achieve the discharge limits required by the development consent and/or the EPL.

Any discharge from sediment basis would meet the requirements of the Environment Protection Licence to ensure water that is discharged is within the expected water quality limits. These include the following.

- pH – 6.5 – 8.5.
- Electrical conductivity – 30-350µS/cm
- Total Suspended Solids – 50 mg/L.
- Turbidity - 2-25 NTU (aquatic systems)
- Dissolved oxygen (%)
- Visual clarity and colour and the absence of oil and grease.

Any discharge that does not meet these limits would be considered an incident and the non-compliance immediately notified to the DPHI and EPA. The exceedance would be investigated and a report prepared and submitted to the relevant Government agencies. Protocols for incident management would be described in the Water Management Plan.

6.12.4.8 Sewage and Effluent Management

Sewage and effluent disposal would be managed on location through a septic system. The system would either be established as a biocycle system or would regularly be pumped clean by a licenced contractor.

6.12.5 Water Balance

Introduction

SEEC (2025b) prepared a daily timestep water balance model for the Project using GoldSim modelling software. The objectives of the water balance modelling were as follows.

- Estimate the process water demands and water inputs over the life of the Project for a full range of climatic conditions (dry year, median year and wet year).
- Demonstrate the ability of the proposed surface water management system to manage surface water runoff that would occur during periods of prolonged or extreme wet weather.
- Assess the drought security of the Project and identify the risk of process water shortages.
- Demonstrate that water would be managed effectively to meet the relevant NSW water quality objectives and satisfy the requirements of the NSW EPA.

Operating Rules

Figure 6.28 provides a schematic of the Project Site water balance. SEEC (2025b) applied rules established under the Water Management Strategy (Section 6.12.4) to prepare the water balance settings.

Expected water demand for the operation and water supply sources are described in Section 3.10. For the purpose of the water balance assessment these are considered gains (inputs) and losses (outputs) and are summarised as follows.

- **Inputs:** These include water sourced from the groundwater bore, groundwater inflow to the extraction area, and rainfall and associated runoff from the contributing Project Site catchments that would be captured in one of the clean water dams, sediment dams, water tanks or the extraction area sump.
- **Losses:** These include water required for dust suppression, concrete production, and evaporative losses.

Inputs

Rainfall and evapotranspiration data utilised in the GoldSim model were sourced from the SILO (Scientific Information for Land Owners) database for the closest available grid location to site (Latitude -35.45, Longitude 149.15).

Extraction Area Stages E1, E2 and E3 would not intersect the groundwater table. Inflows during Stage E4 would be approximately 30m^3/day with an expected short term inflow rate of up to 50m^3/day. The water balance has adopted the more consistent inflow rate of 20 m^3/day.

A groundwater bore is proposed to supplement the Northern Dam. It has been assumed that the bore would provide water at a rate of up to 1L/s and use for a period of 18 to 20 hours per day (a peak daily total of 72m^3/d, or 22.5ML/yr assuming six working days per week).

Losses

Water usage at the Project Site has been estimated as follows.

- Dust Suppression – Water requirements for dust suppression are estimated to be an average of 12ML per year for access roads and between 5ML and 13ML per year for operating areas (varying for stage of development).
- Concrete Production – An estimated 180L of water is required to produce 1m^3 of concrete. Assuming a maximum of 50,000m^3 of concrete produced per year, up to 9ML per year of water would be required.
- Infiltration and Evaporation – All water storages would lose water through infiltration and evaporation. Infiltration is assumed to be 0.08mm/hr. Evaporation from each dam is a function of the dams surface area at a given time and daily Class A Pan Evaporation, as sourced from SILO.

Results

Staging for the Water Balance Assessment generally aligns with the staging for the ESCP presented in SEEC (2025b). **Table 6.69** presents the water balance results for the Project during the five operational stages outlined below.

- Site Establishment (Year 1) – Development to Stage E1 Extraction Area, Stage P1 Processing Area with production up to 100,000tpa.
- Year 4 – Development to Stage E1 Extraction Area, Stage P2 Processing Area with production up to 500,000tpa.
- Year 8 – Development to Stage E2 Extraction Area, Stage P3 Processing Area with production up to 750,000tpa.
- Year 15 – Development to Stage 4 Extraction Area, Stage P3 Processing Area with production up to 1,000,000tpa
- Year 16-30 – Development to Stage 4 Extraction Area, Stage P3 Processing Area with production up to 1,000,000tpa with groundwater inflows occurring.

The Water Balance Assessment was run to assess average conditions (of all years run) plus the individual results for a dry year (10th percentile based on rainfall), median year (50th percentile based on rainfall) and a wet year (90th percentile based on rainfall).

Table 6.69
Water Balance Results Summary

Year	Demand Request (ML/a)	Demand Shortfall (ML/a)	Uncontrolled Overflow Events[1] (num/a)	Uncontrolled Overflow Volume (ML/a)	Controlled Release Volume (ML/a)
Year 1					
Entire Run*	26.0	0.3	4.1	13.3	18.2
1919 (10%ile)	27.4	1.8	0.0	0.0	0.2
1971 (50%ile)	27.7	0.0	5.0	7.4	14.6
2016 (90%ile)	22.7	0.0	13.0	38.7	35.1
Year 4					
Entire Run*	34.2	1.7	5.6	22.7	21.8
1919 (10%ile)	36.3	9.1	0.0	0.0	0.9
1971 (50%ile)	36.7	0.0	4.0	18.2	13.3
2016 (90%ile)	29.3	0.0	20.0	58.9	37.4
Year 8					
Entire Run*	34.2	1.2	6.6	22.9	24.4
1919 (10%ile)	36.3	7.1	0.0	0.0	0.6
1971 (50%ile)	36.7	0.0	4.0	19.8	16.7
2016 (90%ile)	29.3	0.0	19.0	57.4	33.7
Year 15					
Entire Run*	34.2	1.2	6.3	15.9	26.6
1919 (10%ile)	36.3	7.6	1.0	0.4	2.9
1971 (50%ile)	36.7	0.0	7.0	14.4	19.1
2016 (90%ile)	29.3	0.0	9.0	34.7	31.3

Table 6.69 (Cont'd)
Water Balance Results Summary

Year	Demand Request (ML/a)	Demand Shortfall (ML/a)	Uncontrolled Overflow Events[1] (num/a)	Uncontrolled Overflow Volume (ML/a)	Controlled Release Volume (ML/a)
Years 16-30					
Entire Run*	34.2	1.2	6.5	16.1	28.6
1919 (10%ile)	36.3	7.6	1.0	0.4	5.6
1971 (50%ile)	36.7	0.0	4.0	13.8	17.2
2016 (90%ile)	29.3	0.0	10.0	35.4	34.8
* 1900-2023 (123 years)					
Note 1: Cumulative overflow events from all sediment dams Note 2: Total uncontrolled volume from all sediment dams					
Source: SEEC (2025b) – Table 17					

The Water Balance Assessment indicates that the Project water demand varies between stages but may reach up to 37ML per annum. This demand would largely be met for the operation, however during dry years, a shortfall is predicted (up to 9.1ML per annum) that may require supplementary water from an external supply. The average shortfall in the worst scenario is predicted to be 1.7ML per annum. The discharge of water would be frequent during wet years (up to 20 times per year) with uncontrolled discharge (from clean water dams) and controlled discharge (from within the Project Site) separated in **Table 6.69**.

Post-closure groundwater would flow into the final void would continue to an equilibrium level of 800m AHD (35m from the lowest point at ground level). Modelling of the final void lake level indicated it would fluctuate between 799m AHD and 803m AHD post-closure and therefore would not be likely to overflow to the natural environment.

6.12.6 Assessment of Impacts

Based on the implementation of the proposed water management for the Project Site as well as the installation of the proposed water management infrastructure, the potential impacts of the Project, with regard to surface water would be as follows.

6.12.6.1 Water Availability

Water balance results indicate that the Project is likely to experience a shortfall in water supply during very dry years (**Table 6.69**). SEEC (2025b) calculated water reliability based on days within the water balance model that were supplied the full volume of water requested, i.e. the percentage of days that received their full demand allocation (refer to Equation 1). This was also repeated for water volume and years (**Table 6.70**).

$$Reliability\ \% = 1 - \left(\frac{Shortage\ (volume,days,years)}{Total\ (volume,days,years)}\right) \qquad \text{Eq. 1}$$

Table 6.70
Water Balance – Full Demand Supply Reliability

Stage	Full Reliability %		
	Volume	Days	Years
Year 1	98.8	98.8	83.1
Year 4	95.1	93.5	63.7
Year 8	96.5	95.6	71.8
Year 15	96.4	95.8	72.6
Year 16-30	96.6	95.9	72.6
Source: SEEC (2025b) – Table 18			

Table 6.70 demonstrates that the water demand requirements for the Project area met >95% of the time based on total volume and on >93% of modelled days with short falls predicted to occur between 63.7% and 83.1% of years modelled. This indicates a high level of water supply reliability but that it was likely that in some years during the proposed 35-year Project life water use would require considered management. During extremely dry periods, there would be insufficient water in surface water storages and groundwater production would not meet total demand on its own.

Should the water requirements of the Project exceed the volume of available stored water, the Project would implement the following measures.

- Reduce water usage through the use of chemical dust suppressants.
- Seek an external water source and tanker water to the quarry.
- Temporarily reduce the scale of the operation and limit concrete production, to ensure the dust management objectives are being achieved

Given the maximum predicted shortfall is equal to the demand required for concrete batching (approximately 9ML per year), the curtailing of concrete production during dry periods would reduce water demand to a suitable level. Water supply reliability for dust suppression would be the first priority for water use.

6.12.6.2 Water Quality

Each sediment basin proposed for the Project Site has been designed to capture and store a runoff volume that meets or exceeds the design criteria established in the Blue Book (see Section 6.12.4.3). Discharge of water from the Project Site would only occur when all beneficial reuse options (e.g. dust suppression, watering of revegetated areas) are exhausted and the water level within the sediment basin exceeds the minimum freeboard requirements (settling zone volume in **Table 6.67**). This typically would occur when:

- heavy rainfall has made the site too wet for beneficial onsite re-use such as dust suppression; and/or
- the volume of detained surface water exceeds what can be feasibly re-used onsite prior to the next rainfall event; and/or

- heavy rainfall has made land application onto nearby vegetated or revegetation areas impossible; and/or
- there are no suitable onsite re-use options available in reasonable proximity to the detained body of surface water.

Prior to any discharge event, water stored within the sediment dams would be treated to achieve the discharge limits outlined within the development consent and/or EPL and described in Section 6.12.4.7.

The controlled discharge of water as described in Section 6.12.4.7 is intended to prevent uncontrolled discharge and associated scouring, wall failure and erosion of Quarry infrastructure that would result in high sediment loads entering the natural environment.

Consequently, the capture and retention of sediment on site using the best practice management principles outlined in the Blue Book decreases the potential for sediment-laden runoff entering the receiving environment. The likelihood of sediment-laden discharge from the Project Site is considered to be low.

6.12.6.3 Flow and Water Course Function

Section 6.12.4.7 describes procedures for water discharge that include controlling the flow rate from sediment basins, with water discharged to existing water diversion drains or via a spillway. Assuming the orderly management of water within the Project Site and the implementation of protocols for water discharge, it is not expected that water flows or the function of water courses in the vicinity of the Project Site would be impacted.

6.12.6.4 Flooding

The Project Site is not situated within a flood planning area or a zone where inundation from floodwater could be expected to occur. Subsequently, neither the development itself nor neighbouring properties would be adversely impacted by the Project from floodwater.

6.12.7 Water Licensing and Approvals

All water used for the Project would be captured from sediment basins or dams constructed in accordance with the property rights of the Applicant (maximum harvestable rights). Therefore, surface water licensing is not required. Groundwater licensing requirements are nominated in Section 6.13.6.4.

6.12.8 Monitoring and Reporting

Monitoring undertaken to demonstrate compliance with best practice for surface water management would include the monitoring of water management infrastructure and monitoring of water quality during periods of discharge.

6.12.8.1 Water Management Infrastructure Monitoring

Regular inspections would be undertaken of all water management infrastructure on the Project Site. Inspections would also be undertaken following a significant rainfall event of >15mm/24hr. Inspections would aim to confirm freeboard levels, identify any uncontrolled discharge and to ensure structural adequacy is maintained.

Monthly water quality monitoring would be undertaken for water infrastructure in proximity to the Project Site including the following.

- Northern Dam
- Processing Area Dam
- Eastern Dam
- Southern Dam

All water quality monitoring would be compared to the trigger limits described in Section 6.12.4.7. Achievement of these limits is not required for water storages unless water discharge is imminent.

In any areas where active erosion is observed, additional erosion and sediment controls would be installed, as required.

6.12.8.2 Discharge Water Quality and Volume

Records would be kept of the volume of any controlled water discharged from the Project Site using flow meters on outlets of the Northern Dam and Processing Area Dam.

Water quality monitoring would be conducted within 24hrs of any discharge from the sediment basins within the Project Site. Surface water discharge sampling results would be compared to the trigger limits described in Section 6.12.4.7. As described in Section 6.12.4.7, any exceedance of proposed water quality limits would be considered a pollution incident and require notification and investigation in consultation with the NSW EPA and DPHI.

6.12.8.3 Water Management Reporting

The outcomes of water quality management would be recorded by Quarry personnel and a summary of monitoring outcomes presented on the Company website. All water management outcomes, including monitoring would be presented in the Annual Review reporting for the Project that would be submitted to DPHI each year and provided for public access on the Company website.

6.12.9 Conclusion

The Project Site has been designed to include erosion and sediment controls that would support the management of water. The Project would generate sediment-laden runoff which would be directed to sediment dams within the Project Site. The accumulated water would either be used

for dust suppression and watering of rehabilitated areas, or tested, and if necessary treated, to ensure that it meets quality criteria nominated in the Project's EPL, prior to controlled discharge after rainfall events through the Project's proposed licensed discharge point(s). As a result, the Project would not have a significant impact on surface water quality in downstream environments.

Water demand for the Project would be met by rainfall and runoff captured on-site, and supplemented by a groundwater bore, and during the final extraction stage, by groundwater inflows to the extraction area. This proposed water management strategy of capture, re-use and recycling provides for the efficient use of water resources whilst simultaneously reducing the likelihood of uncontrolled discharge from the Project Site.

During dry periods, water supply via rainfall runoff would be limited and active management of water sources may be required and/or water intensive uses such as concrete batching curtailed. Water supply for dust suppression would be reliable and prioritised.

6.13 Groundwater

6.13.1 Introduction

The SEARs require the EIS to include an assessment of the following potential impacts of the Project on water, which include the following requirements relevant to the assessment of groundwater resources.

- Identification of any licensing requirements or other approvals under the *Water Act 1912* and/or *Water Management Act 2000*.
- Demonstration that water for the development can be obtained from an appropriately authorised and reliable supply in accordance with the operating rules of any relevant Water Sharing Plan (WSP).
- A description of the measures proposed to ensure the development can operate in accordance with the requirements of any relevant WSP or water source embargo.
- An assessment of the likely impacts on the quality and quantity of existing groundwater resources, including a detailed assessment of proposed water discharge quantities and quality against receiving water quality, flow objectives and sensitive downstream receiving environments.
- An assessment of the likely impacts of the development on aquifers, watercourses, riparian land, water-related infrastructure, and other water users in particular for domestic and commercial purposes.
- A detailed description of the proposed water management system, water monitoring program and other measures to mitigate groundwater impacts.

The assessment requirements of the then DPIE Water, BCD, EPA and Council were also considered during the preparation of the groundwater assessment. A summary of the SEARs and the requirements of the above agencies are listed within **Appendix 2** with a record of where each requirement is addressed in the EIS.

A Groundwater Impact Assessment for the Project was undertaken by Hydrogeologist.com.au and is presented as **Appendix L** and hereafter referred to as Hydrogeologist (2025). The following sub-sections provide a summary of the groundwater assessment and associated groundwater modelling and describes the operational safeguards and management measures to be implemented by the Applicant.

6.13.2 Existing Groundwater Environment

6.13.2.1 Climate

An overview of the meteorological conditions relevant to the Project Site is presented in Section 6.1.3.

6.13.2.2 Topography

An overview of the local and Project Site topography is presented in Section 6.1.2.

6.13.2.3 Hydrogeological Setting

The Project is located within the *Water Sharing Plan* (WSP) *for the Lachlan Fold Belt MDB Groundwater Source*. The Project Site is specifically covered by the Lachlan Fold Belt MDB (Other) Management Zone, which encompasses the parishes of Galambine, Wilbertree, Eurundury, and Bumberra, in the County of Phillip.

6.13.2.4 Surrounding Groundwater Dependent Ecosystems

The presence of Groundwater Dependent Ecosystems was considered by Capital Ecology (2025) in the BDAR (Section 3.2.3.3 of that document). GDEs are defined as 'ecosystems that need access to groundwater to meet all or some of their water requirements to maintain their communities of plants and animals, ecological processes, and ecosystem services'.

Capital Ecology (2025) considered the GDE Ecological Value (HEAVE) spatial database, GDE Atlas and the Spatial Layer of Probable Vegetation Groundwater Dependent Ecosystems in NSW. No GDEs were identified as occurring within the Project Site. However, patches of native vegetation has low to moderate GDE probability. There is no evidence of springs, swamps, or groundwater baseflow to creeks within or adjacent to the Project Site. Therefore, it is unlikely that there are GDEs within Four Mile Creek or Rocky Creek given the absence of permanent flow.

6.13.2.5 Groundwater Flow and Levels

Groundwater level data from Site monitoring bores were used to characterise groundwater flow directions, gradients, and velocities within the vicinity of the Project Site (Hydrogeologist (2025). Groundwater flow in the vicinity of the Project Site is from the north and north-west, to the south-west and west towards the region of lower topography (**Figure 6.30**). The low to moderate permeability of the bores suggests that the Deakin Volcanics and Colinton Volcanics act as aquitards with localised fractures providing increased hydraulic conductivity.

Seasonal rainfall and surface water flow at the Project Site infiltrate the ground surface and flow through the unsaturated colluvium and weathered profile to recharge the groundwater table, which is located in the underlying Deakin Volcanics and Colinton Volcanics. All creeks in the vicinity of the Project are ephemeral, with no measurable baseflow and therefore there is no groundwater contribution to surface water flow (i.e. the groundwater table does not intersect the ground surface in creek beds in the vicinity of the Project Site).

The groundwater table is located at depths between 5 m and 50 m below ground level within the majority of the Project Site and is generally shallower to the east and south-east of the Project Site. The groundwater table is located in the Deakin Volcanics within the Project Site and within the Colinton Volcanics to the east of the Project Site.

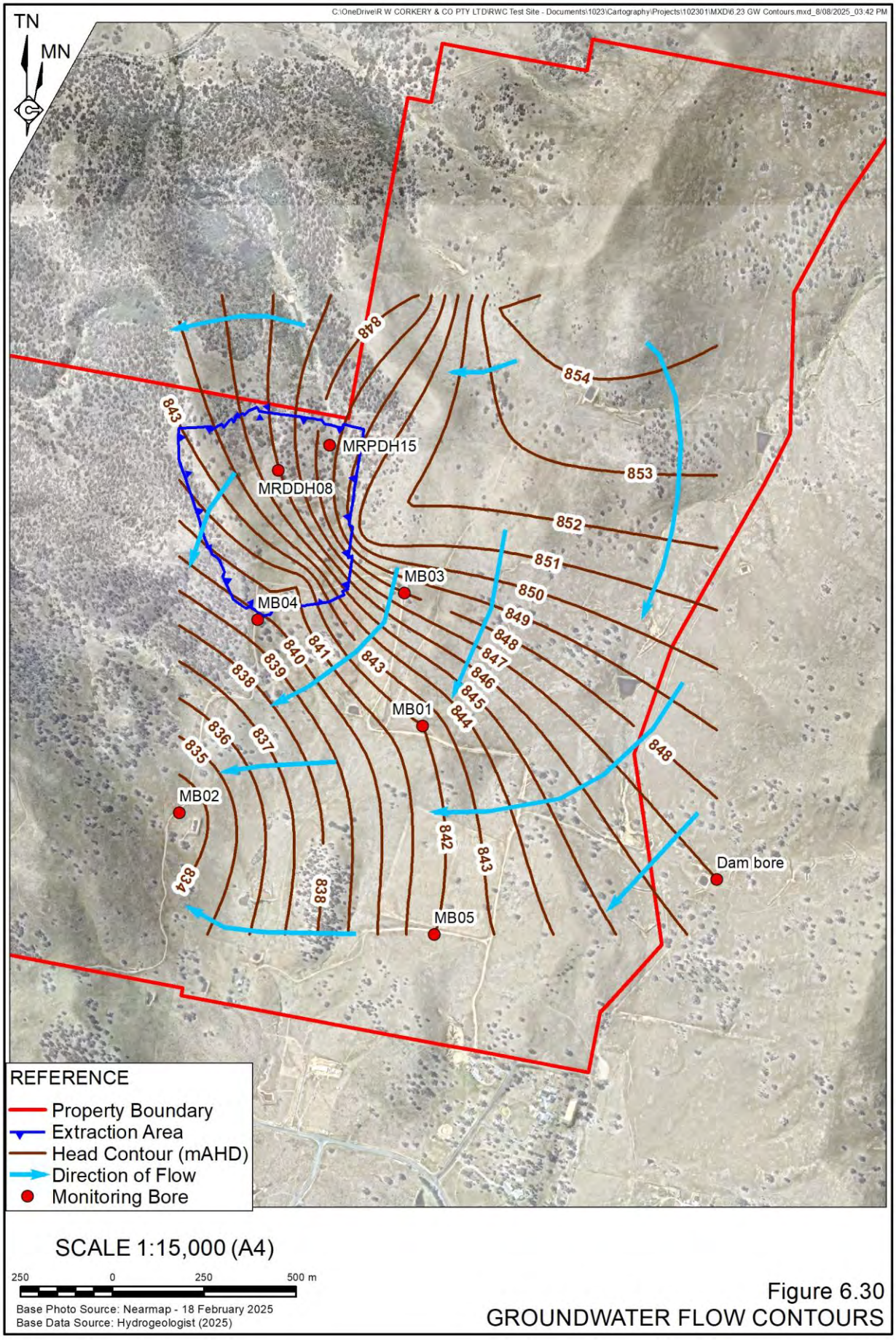


Figure 6.30
GROUNDWATER FLOW CONTOURS

6.13.2.6 Groundwater Quality

Groundwater within the Project Site is neutral to slightly acidic and fresh to brackish, with low concentrations of metals, metalloids, and other solutes (Hydrogeologist, 2025). The monitoring bores generally exhibit moderate electrical conductivity (EC) of between 1100 µS/cm to 2300 µS/cm, except for two bores which show notably lower EC (120 µS/cm and 130 µS/cm), indicating influxes of fresher water during recharge events. A full summary of the groundwater quality monitoring results is provided in Hydrogeologist (2025).

6.13.2.7 Groundwater Use

A review of the National Groundwater Information System (NGIS) database identified a total of 70 registered groundwater bores within a 3km radius of the Project Site, all of which are located outside the Project Site boundary. Of these bores, 69 are located in NSW and only one water supply bore is located within the ACT (Hydrogeologist, 2025).

The registered groundwater bores located within a 3km radius of the Project Site boundary are shown in **Figure 6.31** The status and use of these bores are summarised in **Table 6.71**. The closest of these private groundwater supply bores is located approximately 1.5km from the extraction area. The majority of the bores lie within the Colinton Volcanics. There is a general lack of private groundwater supply bores within the Deakin Volcanics.

Table 6.71
Purpose and Status of Registered Groundwater Bores within 3km of the Project Site Boundary

Purpose	Status	Number of Bores
Household water supply	In use	38
	Unknown	21
Livestock water supply	In use	1
	Unknown	1
Irrigation	Unknown	2
Groundwater monitoring	Unknown	1
Community water supply	Unknown	1
Unknown	Unknown	5
Source: Hydrogeologist (2025) – Table 5		

6.13.2.8 Conceptual Hydrogeology

The local groundwater regime comprises the following geological units:

- weathered profile;
- Deakin Volcanics;
- Royalla Fault; and the
- Colinton Volcanics.

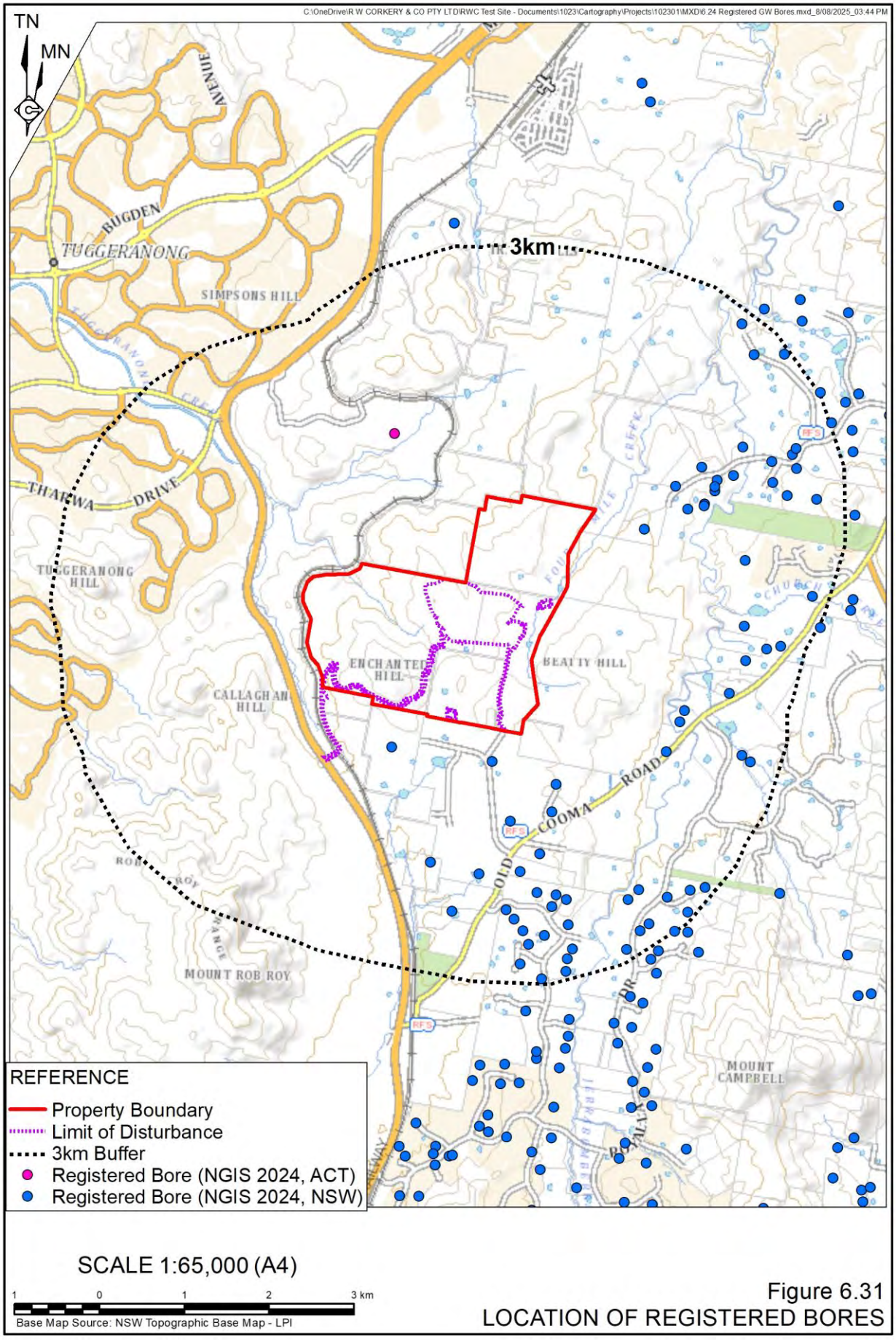


Figure 6.31
LOCATION OF REGISTERED BORES

Figure 6.32 presents the conceptual hydro-stratigraphic cross section for the Project Site and surrounding region.

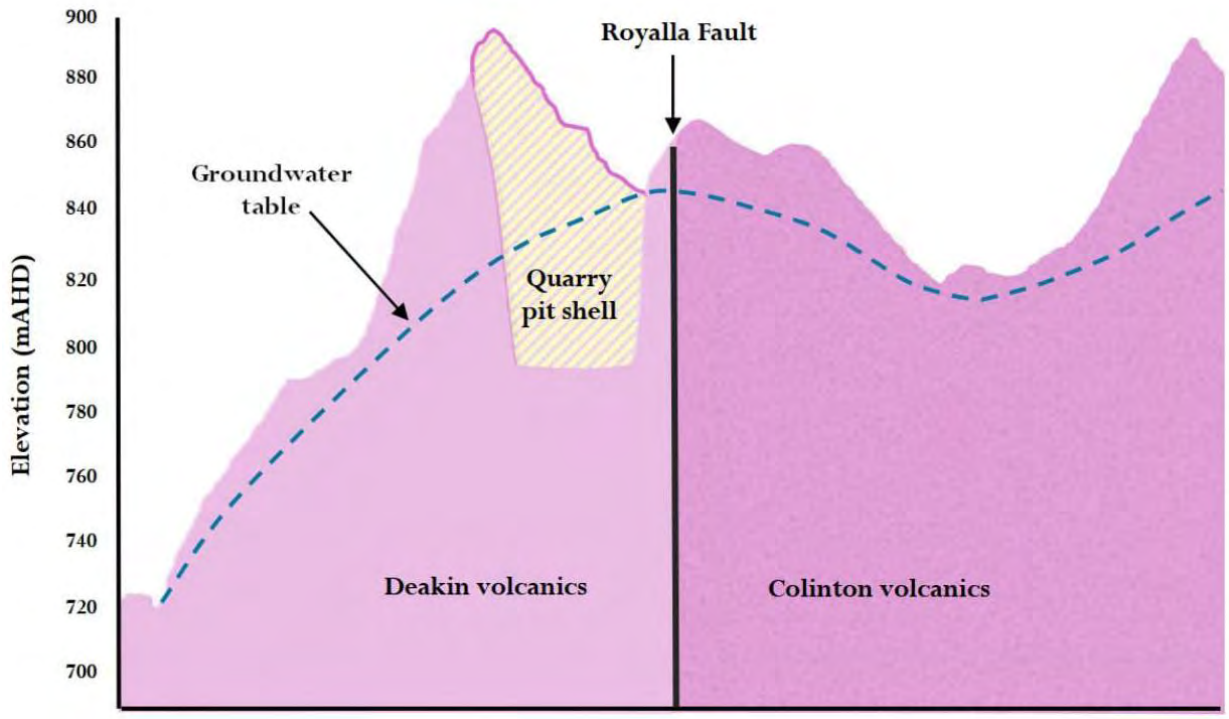


Figure 6.32
CONCEPTUAL HYDRO-STRATIGRAPHIC CROSS-SECTION

The weathered profile, which is up to 30 metres thick across the Project Site and deepest along the alignment of the Royalla Fault, comprises a veneer of slightly higher permeability regolith when compared to the underlying parent rock. The weathered profile within the Project Site is typically dry and unsaturated except immediately after significant rainfall events. Groundwater levels across the Site demonstrate a temporal pulse of groundwater that migrates vertically through the weathered profile into the underlying bedrock.

The Deakin Volcanics are assessed to be a low permeability, confined, bedrock aquitard (implied through the lack of groundwater intersection during exploration drilling; Hydrogeologist (2025)). The Deakin Volcanics are the target formation for the proposed quarrying operations.

The Colinton Volcanics are assessed to be a low to moderate permeability, fractured bedrock aquifer, supporting numerous private groundwater supply bores to the east of the Project site. Quarrying operations would not occur within the Colinton Volcanics.

The Royalla Fault separates the Deakin Volcanics and the Colinton Volcanics and presents as a 100 m wide zone of heavily sheared material. Hydrogeologist (2025) indicates that the fault zone likely contains a significant amount of clay gouge and is therefore assessed to be a low to moderate permeability aquitard, promoting similar hydrogeological conditions to the Deakin Volcanics and the Colinton Volcanics. Quarrying operations will not intersect the Royalla Fault.

6.13.3 Assessment Criteria

6.13.3.1 Water Management Act 2000

The *Water Management Act 2000* (WM Act) includes water sharing plans (WSPs) that aim to maintain the health of river and groundwater systems and provide equitable access for water users and opportunity to trade water. The Project area is covered by the WSP for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2020.

6.13.3.2 NSW Murray Darling Basin Fractured Rock Groundwater Sources 2020

The Project lies within the *Lachlan Fold Belt MDB Groundwater Source* (Section 6.13.2.3). Therefore, all rules of this source apply to all water contained within all rocks within outcropped and buried areas and all alluvial sediments within the outcropped areas, with the boundaries of the Lachlan Fold Belt MDB Groundwater Source. A water access license (WAL) is generally required to extract water from rivers or aquifers to use for irrigation, industrial or commercial purposes (Hydrogeologist, 2025). The Applicant is committed to obtaining the necessary WALs prior to undertaking operations and will seek to have this commitment conditioned into the Development Consent.

6.13.3.3 Aquifer interference policy

The NSW Aquifer Interference Policy (AIP) provides a framework for the assessment of impacts of the extraction of water for proposed developments. **Table 6.72** presents the salinity and aquifer yield criteria for the NSW AIP. Hydrogeologist (2025) considers the geology within the Project site to generally fall within the "less productive" category.

Table 6.72
NSW Aquifer Interference Policy Criteria

Criteria		Salinity (Total Dissolved Solids)	
		Less than 1,500mg/L	More than 1,500mg/L
Aquifer yield	More than 5L/s	Highly productive	Less productive
	Less than 5L/s	Less productive	

Source: Hydrogeologist (2025) – adapted from Table 2

The AIP specifies minimal impact considerations for "highly productive" and "less productive" aquifers within each WSP. The considerations include thresholds ranked as either being 'level 1 minimal impact' or 'level 2 exceeding minimal impact'. Given that the Project is assumed to lie within a "less productive" fractured rock source, the applicable minimal impact considerations are summarised in Table 3 of Hydrogeologist (2025).

6.13.4 Assessment methodology

6.13.4.1 Conceptual Groundwater Model

Between September 2022 and November 2024, Hydrogeologist (2025) conducted a hydrogeological field investigation program to characterise the hydrogeological conditions within the Project Site. The following activities were performed throughout the investigation.

- Construction of two monitoring bores within exploration drill holes
- Drilling and construction of five site-specific groundwater monitoring bores within the Deakin Volcanics and the Colinton Volcanics.
- Measure static groundwater levels following bore completion and development.
- Install automatic water level loggers in each groundwater monitoring bore following bore completion and development.
- Test permeability (falling head testing, constant head testing, pumping test) to measure the hydraulic conductivity of the screened hydrostratigraphic unit.
- Regular field measurement and laboratory analysis of groundwater samples to characterise and compare the groundwater quality within key formations.

Table 6.73 summarises the location of the groundwater monitoring bores installed by Hydrogeologist (2025).

Table 6.73
Project Monitoring Bore Details

Bore ID	Easting[1]	Northing[1]	Ground Elevation (mAHD)[2]	Water Level (mbGL)[3]	Total Depth (mbGL)[3]	Bore Diameter (mm)	Casing Type
MB01	695975	6073761	859.1	839.85	52.0	130	PVC
MB02	695312	6073524	854.6	832.30	47.5	130	PVC
MB03	695924	6074123	864.8	Dry	50.5	130	PVC
MB04	695526	6074050	878.1	Dry	50.0	130	PVC
MB05	696007	6073193	849.8	839.22	33.5	130	PVC
MRDDH08	695586	6074456	869	810.25	100	96	PVC
MRPDH15	695717	6074520	841	839.18	50	96	PVC
Dam bore	696775	6073343	859	848.02	-	-	-
Note 1: Coordinates provided in (datum)							
Note 2: mAHD denotes metres above Australian Height Datum							
Note 3: mbGL denotes metres below ground level							
Source: Hydrogeologist (2025) – adapted from Table 6							

The field studies conducted by Hydrogeologist (2025) on the listed bores in **Table 6.74** involved constant head tests (CHT) at MB 01, MB03 and MB04, falling head tests (FHTs) at MB02 and MB05, and a pumping test at the Dam bore. A CHT was attempted at MRDDH08, however this was unsuccessful due to rapid rate of water flow out of the bore making testing impossible. As a result, Hydrogeologist (2025) noted that a feature with high hydraulic

conductivity above the standing water level may be present. This inference led to the use of a high bulk hydraulic conductivity value at drill hole MRDDH08. **Table 6.74** presents the results of the field studies.

Table 6.74
Summary of Hydraulic Conductivity Data

Bore ID	Hydrostratigraphic Unit	SWL (mbtoc)	Screened Interval (mbGL)	FHT Hvorslev K (m/day)	FHT Bouwer & Rice K (m/day)	CHT K (m/day)	Pump Test-Cooper & Jacob K (m//day)
MB01	Colinton Volcanics	17	44.0-50.0	-	-	0.014	-
MB02	Deakin Volcanics	22	44.5-47.5	0.12	0.14	-	-
MB03	Colinton Volcanics	Dry	47.5-50.5	-	-	0.0017	-
MB04	Deakin Volcanics	Dry	44.0-50.0	-	-	0.072	-
MB05	Colinton Volcanics	7	30.5-33.5	0.11	0.098	-	-
MRDDH08	Deakin Volcanics	58	81.4-86.6	-	-	X	-
MRPDH15	Deakin Volcanics	2.91	38.1-43.3	-	-	0.10	-
Existing 'Dam' bore	Colinton Volcanics	11	Unknown	-	-	-	0.0071
Note: X – a constant head test was attempted at MRDHH08 however the bore could not be filled to the top of the casing.							
Source: Hydrogeologist (2025) – adapted from Table 7							

Hydrogeologist (2025) observed that all monitoring bores exhibit low to moderate permeability, suggesting that the Deakin Volcanics and Colinton Volcanics act as aquitards with localised fractures providing increased hydraulic conductivity. The hydraulic conductivity of both the Colinton Volcanics and Deakin Volcanics would likely reduce with depth below ground (Hydrogeologist, 2025).

6.13.4.2 Numerical Model

A 3D numerical groundwater flow model was developed for the Project using the United States Geological Survey (USGS) modelling code, MODFLOW-6. Further detail regarding the modelling methodology is provided in **Appendix L**. The modelling process considered the Australian Groundwater Modelling Guidelines (Barnett et al., 2012) at all stages.

A two-layered geological model was used by Hydrogeologist (2025) to represent site hydro stratigraphy in the groundwater model. This layering comprised a weathered rock aquifer (layer 1) and underlying fresh basement rock aquifer (layer 2). The simplification of site hydro stratigraphy was deemed appropriate by initial modelling as vertical variations in properties are relatively low with minimal differences in observed data and model responses across Deakin volcanics and Colinton volcanics.

Hydrogeologist (2025) created the model domain to extend approximately 20km north-south and 20km east-west, with the Project site located in the centre of the model domain. Physical structure of the model was based on the captured DEM with 5m resolution and 30m SRTM (Shuttle Radar Topography Mission). A 40m uniform thickness was used for the base of weathering, corresponding to the base of layer 1.

Hydrogeologist (2025) utilised a transient (time-variant) calibration, considering change in groundwater levels and flow from pre-development conditions up to and including current conditions (January 2024). The groundwater flow model was calibrated to transient groundwater levels from six observation sites, where transient data was available. A detailed description of the calibration method is provided in **Appendix L**. The model calibration was deemed robust and fit for purpose (Hydrogeologist, 2025). The calibrated groundwater levels and flow patterns replicate measured data and groundwater trends achieving a 2.74% scaled root mean squared (SRMS) error for calibration targets within acceptable limits (i.e. 10%).

The calibrated groundwater model was used by Hydrogeologist (2025) to predict groundwater inflows and changes in groundwater levels in response to the open cut quarrying and associated well pumping at the Project. No other groundwater impacting activities were simulated in the model (i.e. no cumulative impact).

Hydrogeologist (2025) utilised the base model calibrated values presented in **Table 6.75** for horizontal hydraulic conductivity (kh), vertical K anisotropy factors (kvf), specific storage (ss), specific yield (sy), recharge rate (r) and evapotranspiration (evt) parameters (depth and rate).

Table 6.75
Summary of Calibrated Parameters

Parameter Name	Parameter Explanation	Unit	Calibrated Value
kh_101	Horizontal K for Layer 1	m/day	1.42E-02
kh_102	Horizontal K for Layer 2	m/day	4.23E-03
kvf_101	Vertical anisotropy in Layer 1 (kvf)	-	0.16
kvf_102	Vertical anisotropy in Layer 2 (kvf)	-	0.11
ss_101	Specific storage for Layer 1	m^{-1}	4.92E-06
ss_102	Specific storage for Layer 2	m^{-1}	5.23E-06
sy_101	Specific yield for Layer 1	-	3.59E-03
sy_102	Specific yield for Layer 2	-	1.48E-04
cond_riv	Dam conductance	m^2/day	2.16E-03
r_fac	Recharge rate (ratio of rainfall)	-	0.03
evt_depth	Maximum depth of evapotranspiration	M	4.26
e_fac_z1	Evapotranspiration	-	0.20
Source: Hydrogeologist (2025) – adapted from Appendix C - Table 6			

An uncertainty analysis was performed on surrounding model parameterisation and subsequent predictions.

6.13.5 Groundwater Model Peer Review

An independent technical peer review of the numerical groundwater model was conducted by Manewell Groundwater and is presented as Appendix D of the Groundwater Impact Assessment. The peer review was undertaken in accordance with the principles and guidelines outlined in the *Australian Groundwater Modelling Guidelines* (Barnett et al, 2012) and incorporated best practices for uncertainty analysis methods as presented in *Uncertainty analysis—Guidance for groundwater modelling within a risk management framework* (Middlemis and Peeters, 2023).

The peer review concluded the following.

> *The model is indeed useable, reliable and feasible in accordance with the IESC uncertainty note criteria. Given the conservative assumptions applied to spatial connectivity, particularly in a groundwater system shown to exhibit significant compartmentalisation, and the simulation of abstraction as continuous use, the risk of impact is considered low. Should observed drawdown fall significantly outside the ensemble of simulated predictions, refinement of the model would be warranted to further reduce predictive uncertainty ahead of quarry dewatering and bore abstraction.*

6.13.6 Management and Mitigation Measures

The Applicant would implement the following management and mitigation measures to ensure that groundwater-related impacts associated with the Project are minimised to the greater extent practicable.

- Prepare and implement a Groundwater Management Plan that addresses the following matters.
  - Implementing a groundwater monitoring program at all existing Project monitoring bores as per Section 6.13.9.
  - Meter groundwater supply bores and any pumpable volumes of groundwater inflow to the extraction area.
  - Subject to accessibility and suitability of the bores, conduct annual monitoring of private landholder bores GW402921 and GW40276 to enable for an assessment of impact for any make good agreement.
  - Trigger Action Response Plans to address un-anticipated groundwater impacts.
- Implementing appropriate make good provisions (e.g. replacement of impacted bores) in the event that existing groundwater bores are impacted beyond the relevant Aquifer Interference Policy Minimal Impact Considerations.
- Prepare and implement a Pollution Incident Response Management Plan, including associated protocols for communicating pollution incident to potentially affected parties, throughout the life of the Project.
- Prepare and implement spill response procedures, including training and standard practices for hydrocarbon and chemical spill control, containment and clean up, in the event of accidental spills or leaks.
- Ensure that adequate water access licenses and associated allocations are obtained for water used within the proposed quarrying operations.
- Ensure that all chemicals and hydrocarbons are stored in accordance with the manufacturer's specifications or the relevant Australian Standard to prevent contamination of groundwater.

6.13.7 Assessment of Impacts

6.13.7.1 Groundwater Inflow

Hydrogeologist (2025) predicts that the groundwater inflow rate at the Project Site would peak at 49.51m^3/d or 18.1ML over a year (in Year 16) due to dewatering of the Extraction Area. Groundwater inflows are not predicted during Stages 1 to 3 of the Project as the groundwater table is below the quarry floor elevation throughout those stages. Pit inflows are predicted at the commencement of Stage E4 of the Extraction Area. Estimated groundwater inflows are then expected to decrease over the life of the Project to approximately 28.82m^3/d at the end of extraction operations.

Groundwater take across the life of the Project would mostly occur through the proposed production bore. To be conservative, Hydrogeologist modelled the production bore as operating to extract groundwater at a rate of 1L/s over 24hr per day. This would be unlikely to occur given the impracticality of leaving pumps operating outside of operating hours.

The predicted cumulative groundwater use rates include groundwater inflow and the groundwater supply bore. The cumulative groundwater take for the Project by each modelled year is presented in **Table 6.76** with the peak year (Year 16) presented in bold.

Table 6.76
Predicted Groundwater Take for Each Modelled Year

Page 1 of 2

Year	Groundwater Inflow Rate		Groundwater Bore Extraction Rate		Cumulative Rate for Inflow and Bore Extraction	
	(m^3/day)	ML/yr	(m^3/day)	ML/yr	(m^3/day)	ML/yr
1	0.00	0.0	76.81	28.0	76.81	28.0
2	0.00	0.0	71.43	26.1	71.43	26.1
3	0.00	0.0	70.28	25.7	70.28	25.7
4	0.00	0.0	69.75	25.5	69.75	25.5
5	0.00	0.0	69.42	25.3	69.42	25.3
6	0.00	0.0	69.19	25.3	69.19	25.3
7	0.00	0.0	69.02	25.2	69.02	25.2
8	0.00	0.0	68.89	25.1	68.89	25.1
9	0.00	0.0	68.79	25.1	68.79	25.1
10	0.00	0.0	68.70	25.1	68.70	25.1
11	0.00	0.0	68.63	25.0	68.63	25.0
12	0.00	0.0	68.57	25.0	68.57	25.0
13	0.00	0.0	68.52	25.0	68.52	25.0
14	0.00	0.0	68.48	25.0	68.48	25.0
15	0.00	0.0	68.44	25.0	68.44	25.0
16	**49.51**	**18.1**	**66.65**	**24.3**	**116.16**	**42.4**
17	34.99	12.8	66.17	24.2	101.16	36.9
18	32.87	12.0	66.00	24.1	98.87	36.1
19	31.81	11.6	65.92	24.1	97.73	35.7
20	31.14	11.4	65.87	24.0	97.01	35.4

Table 6.76 (Cont'd)
Predicted Groundwater Take for Each Modelled Year

Year	Groundwater Inflow Rate		Groundwater Bore Extraction Rate		Cumulative Rate for Inflow and Bore Extraction	
	(m^3/day)	ML/yr	(m^3/day)	ML/yr	(m^3/day)	ML/yr
21	30.67	11.2	65.84	24.0	96.51	35.2
22	30.30	11.1	65.81	24.0	96.11	35.1
23	30.01	11.0	65.80	24.0	95.81	35.0
24	29.76	10.9	65.78	24.0	95.54	34.9
25	29.55	10.8	65.77	24.0	95.32	34.8
26	29.36	10.7	65.76	24.0	95.12	34.7
27	29.20	10.7	65.75	24.0	94.95	34.7
28	29.06	10.6	65.74	24.0	94.80	34.6
29	28.94	10.6	65.73	24.0	94.67	34.6
30	28.82	10.5	65.72	24.0	94.54	34.5
Source: Hydrogeologist (2025) – modified after Table 10						

It is noted however, that the actual volume of groundwater pumped from the Extraction Area is expected to be less than the inflows predicted by the numerical model due to evaporation of water from the quarry walls which is not accounted for by the model (Hydrogeologist, 2025). Water balance modelling undertaken by SEEC (2025) and presented in Section 6.12.5 allowed for the capture of water from inflow at rate of 20m^3/day to account for this loss.

6.13.7.2 Groundwater Model Water Balance

The cumulative water balance for the complete calibration model duration is summarised in **Table 6.77**, including all modelled inflows and outflows from the model.

Table 6.77
Summary Cumulative Water Balance at End of Calibration Period (Base Model)

Water Budget Item	Inflow (m^3)	Outflow (m^3)
Storage	4,635,457	8,129,842
Recharge	28,474,547	0
Evapotranspiration	0	21,992,413
River	2	2,987,751
Total	33,110,007	33,110,007
Mass balance error	0.00%	
Note: Rounding effects may cause totals to vary slightly		
Source: Hydrogeologist (2025) – Appendix C - Table 8		

The mass balance error is calculated as the difference between the model inflows and outflows, with a value of 1% or lower generally considered acceptable indicating a stable model. Hydrogeologist (2025) reports the mass balance error as 0.00%, therefore the base calibrated model is considered numerically stable with accurate numerical solution.

The water budget determined by Hydrogeologist (2025) reflects and quantifies flows entering and leaving the model domain. **Table 6.78** presents a summary of the flow rates and volumes across individual boundaries. Water flows are categorised into the following boundary conditions.

- During the prediction/recovery period
  - Diffuse aerial recharge (RCH boundary condition)
- During the prediction period
  - Surface drainage (RIV boundary condition)
  - Evapotranspiration (EVT boundary condition)
  - Bores (WEL boundary condition)
  - Extraction (DRN boundary condition)

Water outflow from DRNs during extraction includes the direct removal of water and outgoing pit inflows.

Table 6.78
Numerical Model – Water Balance Summary

Boundary Condition		Transient – Prediction	
		Cumulative Volume (m^3)	Average Flow Rate (m^3/day*)
Inflow	RCH	245,704,932	22,422
	RIV	24	0
Outflow	RIV	29,946,550	2,733
	EVT	218,612,303	19,950
	DRN	29,963	3
	WEL	753,469	69
Note: * Number of days: 10,958			
Source: Hydrogeologist (2025) – Appendix C - Table 9			

6.13.7.3 Groundwater Drawdown

Hydrogeologist (2025) notes that there are 70 registered bores within 3km of the Project boundary and that it is likely that some of these private landholders may experience some measurable drawdown over the life of the Project.

Figure 6.33 presents the modelled groundwater level drawdown in the vicinity of the Project at the end of the Quarry life (i.e. end of Stage 4). In summary, bores identified as GW402921 and GW402076 would experience 2m and 1m drawdown levels, respectively (Hydrogeologist, 2025). These bores are located in NSW, within 2km of the proposed Extraction Area. The status of these bores is presently unknown; however, it is known that GW402076 serves as an irrigation bore and GW402921 is used for stock and domestic purposes.

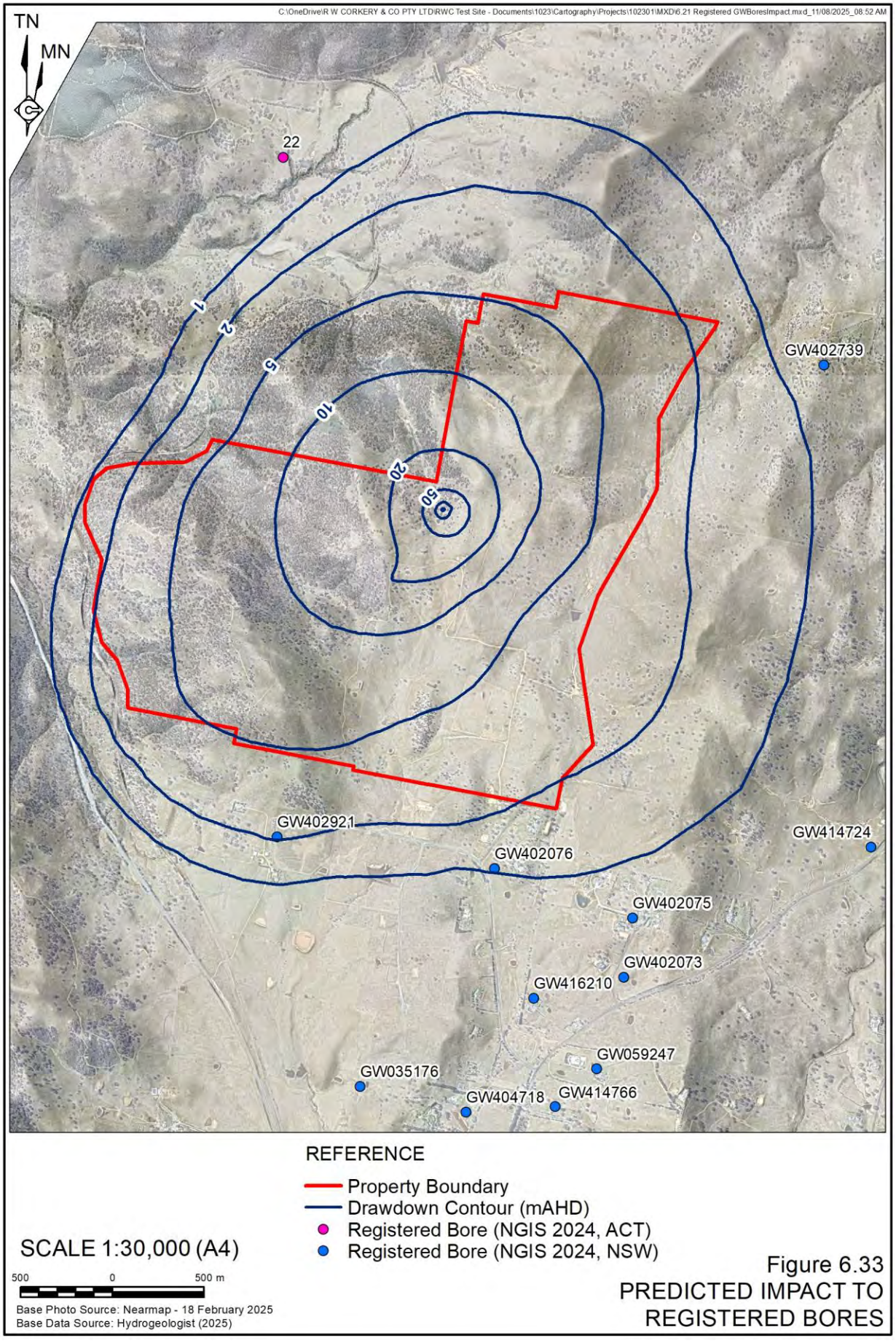


Figure 6.33
PREDICTED IMPACT TO REGISTERED BORES

6.13.7.4 Final Void

Following completion of extraction activities, groundwater impacts are likely to continue as groundwater inflow to the final void continues. Without removal of this water, the final void would slowly start to fill with water until an equilibrium level is reached where the level of water in the void balances with the regional groundwater levels. Once water reaches an elevation of 809m AHD the flow to the void is predicted to cease.

Surface water balance modelling of ongoing rainfall and evaporation once equilibrium is reached indicated that the final void lake level would fluctuate between 799m AHD and 803m AHD over time (see Section 6.12.5). As the final void would feature safety bunding, the void would be separated from any overland runoff contributions. SEEC (2025b) has confirmed that a total of 89ML of water per year of would be lost from the final void through evaporation which would be offset by rainfall but contribute to the variation in water levels (as predicted in Section 7.6 of SEEC (2025b)).

6.13.7.5 Groundwater Quality

Hydrogeologist (2025) indicate that the Project is unlikely to lower the beneficial use category beyond a distance of 40m from the Project Area. This is consistent with the *NSW Aquifer Interference Policy* (DPI, 2012) Minimal Impact Consideration criteria.

The Project does present a low risk of groundwater contamination in the event that spills or leaks of hazardous materials (e.g. fuels, lubricants or hydraulic oils) occur during extraction operations. Potential contamination impacts were assessed by Hydrogeologist (2025) as low risk and would be mitigated as outlined in Section 6.13.6.

6.13.7.6 Local Groundwater Use

As per Section 6.13.7.3, bores identified as GW402921 and GW402076 would experience 2m and 1m drawdown levels, respectively (Hydrogeologist, 2025). Hydrogeologist (2025) undertook an uncertainty analysis of the results at these locations that indicated that the calibrated model was predicting results in the upper end of the analysed results and was therefore a conservative estimate.

The Applicant commits to negotiating make good provisions with the landholder of this bore. The make good provisions should be conditioned to include on-going groundwater monitoring and regular assessment of impacts.

6.13.7.7 Groundwater Dependent Ecosystems

Patches of native vegetation across the western half of the Property are mapped as having a moderate GDE probability in the *Spatial Layer of Probable Vegetation Groundwater Dependent Ecosystems in NSW*. Groundwater is estimated to be located at depths between 5m and 50m below ground level within the majority of the development footprint. With respect to the areas to the west of the development footprint the groundwater table occurs at a depth of approximately 20m to 50m. Given that an ecological community is more likely to rely on

groundwater when it occurs close to the surface, the vegetation west of the development footprint would likely be more reliant on soil moisture in the capillary zone and groundwater at the soil-rock interface, rather than on the deeper regional groundwater table.

Finally, aside from disturbance impacts at the surface, changes to the groundwater setting are not expected until Stage E4 of extraction when the void extends below 852m AHD (in approximately Year 16 of operation). The zone of impact is predicted to occur in the weathered rock layer that occurs at surface. While there is groundwater drawdown predicted in the basement rock (a separate layer from a hydrogeological perspective), this is considered unlikely to impact vegetation due to the depth of this change.

6.13.8 Water Licencing and Approvals

The groundwater resources within the Project Site are part of the Lachlan Fold Belt MBD Groundwater Source managed under the Lachlan Fold Belt MBD (Other) Management Zone WSP. The long-term annual extraction limit for this Source identified in Clause 25(2) of the WSP is 253,788 ML/year.

As identified in Section 6.13.7.1, at its peak groundwater take for the Project would remove up to 42.4ML per year of groundwater (116.16m^3 per day in year 16). The Applicant is in the process of purchasing a 45ML allocation within the Lachlan Fold Belt MBD Groundwater Source to account for this groundwater take. It is noted that groundwater take due to the use of a production bore are only required once that bore is constructed and that indirect take of groundwater through inflows to the final void are not expected until Year 16 of development once groundwater table is intersected (Stage E4 of the Extraction Area).

As the Project is State significant development a separate application and assessment for water use or water works approvals associated with the proposed production bore are not required.

6.13.9 Monitoring

Monthly monitoring of groundwater levels and groundwater quality within the Quarry's existing groundwater monitoring bore network (MB01, MB02, MB03, MB04, MB05, MRDDH08, MRPDH15, and Dam bore) would occur over an initial 12-month period to establish baseline groundwater quality and assess any seasonal effects. Following the initial 12-month period monitoring frequency would be reduced to quarterly in consultation with DPE Water. Hydrogeologist (2025) noted that there was no current need for additional groundwater monitoring bores at this time, as the current network is considered suitable for confirming baseline trends and verifying groundwater impacts. High-resolution water level data would be retrieved from the dataloggers at the monitoring bores during each sampling event. The need for groundwater monitoring post-extraction would be determined based on an assessment of groundwater conditions at the end of the extraction activities within Project Site.

Groundwater take would be quantified by metering the groundwater supply bore. Hydrogeologist (2025) notes that part of the predicted groundwater inflows to the extraction area would be lost to evaporation. A procedure for estimating inflow rates would be established in the Groundwater Management Plan for the Project.

The Applicant would also endeavour to monitoring the private landholder bores GW402921 and GW40276 on an annual basis, subject to the accessibility and suitability of the bores. Monitoring of these bores would allow for an assessment of impact for any make good agreement.

6.13.10 Conclusion

A numerical groundwater model has been developed by Hydrogeologist (2025) to replicate the groundwater setting and predict changes to groundwater setting as a result of the development of the Extraction Area for the Project. The groundwater model is considered fit for the purpose of predicting groundwater impacts in this locality and this has been confirmed through independent peer review.

The groundwater impact assessment identified the potential for aquifer drawdown to exceed the *NSW Aquifer Interference Policy's* Minimal Impact Considerations threshold (2m) at one registered private bore. However, this prediction is considered conservative and it is unlikely that the predicted impacts would occur. Regardless, should access be granted, the Applicant would monitor water levels in the bore and if impacts from the Project are identified, make good provisions would be triggered. The make good provisions available to the landowner would be agreed in consultation, however options for make good would be described in the Groundwater Management Plan for the operation.

Impacts to groundwater dependent ecosystems are not expected and there would be no change to groundwater quality or the beneficial use category of the groundwater source beyond 40m from the Project Site.

Regardless of the above, a Groundwater Management Plan would be prepared and implemented for the Project that would include management and mitigation measures including triggers for reactive management and the protocols to be followed in the event of a groundwater incident. A groundwater monitoring program would be established that would record any changes to the groundwater setting and inform reactive management.

The Project would require up to 42.4ML per year of groundwater from the Lachlan Fold Belt MBD Groundwater Source of the Water Sharing Plan for the Lachlan Fold Belt MBD (Other) Management Zone Groundwater Sources. The Applicant is in the process of securing the necessary entitlements.

With the implementation of the proposed management and mitigation measures, the Project is considered a low risk to groundwater systems in the vicinity of the Project Site.

6.14 Public Safety Hazards

6.14.1 Introduction

The SEARs for the Project require the EIS to include an assessment of potential hazards, including an assessment of the likely risks to public safety, paying particular attention to potential bush fire risks, and the transport, storage, handling and use of any hazardous or dangerous goods. In addition, the NSW Rural Fire Service (RFS), DPI Agriculture and Council requested assessment of bush fire risk in their assessment requirements.

The key hazards that Monaro Rock need to manage as they relate to public safety are related to bush fire and an accident involving the mobile manufacturing unit delivering explosives to the Project Area. The environmental risk assessment presented in **Appendix 3** considered hazards, and identifies that whilst the likelihood of these events is rare, the consequences would be major or catastrophic. Hence, a medium risk is assigned to both hazards.

Monaro Rock would manage these hazards in accordance with an *Emergency Management and Evacuation Management Plan*, that will be prepared following approval of the Project. No hazardous or dangerous goods would be stored within the Project Area and all hydrocarbons would be managed on site in a manner that complies with the *Emergency Management and Evacuation Management Plan*.

6.14.2 Bush Fire

6.14.2.1 Introduction

Section 4.14 of the EP&A Act details the requirement for certain types of development located within bush fire prone land to conform to the specifications and requirements of the document entitled "*Planning for Bush Fire Protection*" (Rural Fire Service (RFS), 2019). As the Project is a State significant development these requirements do not apply. However, a bush fire assessment has been prepared applying the methods detailed in that document to identify the potential bush fire hazards for the Project in accordance with RFS (2019).

6.14.2.2 Bush Fire Management Objectives

The objectives of RFS (2019) are to:

- afford occupants of any building adequate protection from exposure to a bush fire;
- provide for a defendable space to be located around buildings;
- provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent the likely fire spread to buildings;
- ensure that appropriate operational access and egress for emergency service personnel and residents is available;
- provide for ongoing management and maintenance of bush fire protection measures; and
- ensure that utility services are adequate to meet the needs of fire fighters.

As an extractive industry, the Project would be classified as "Other Development" with its category most closely aligned with mining (open cut) as described in Section 8.3.6 of RFS (2019). As identified in Section 8.1 of RFS (2019), the following conditions must be met in order for the Project to comply with the guidance.

- Satisfy the objectives of RFS (2019) listed above.
- Consider any issues listed for the specific purpose for the Project set out in Chapter 8 of RFS (2019).
- Propose an appropriate combination of bush fire protection measures.

The following bush fire hazard assessment was prepared by RWC in satisfaction of the above conditions. The following sections use the RFS (2019) procedure to determine the Category of Bush Fire Attack (or bush fire hazard) for areas containing infrastructure[5].

6.14.2.3 Bushfire Prone Lane and Vegetation Category Mapping

The RFS has published the *Guide for Bush Fire Prone Land Mapping (*RFS, 2015) to guide Councils within NSW on land mapping processes. The guidance describes the following three categories of vegetation with regards to bushfire planning and land that may be excluded from mapping.

- Vegetation Category 1 – The highest risk areas for bushfire due to having the highest combustibility and likelihood of forming developed fires. It usually consists of forest, woodlands, heaths (tall and short), forested wetlands and timber plantations.
- Vegetation Category 2 – The lowest risk areas (within bushfire prone land) as it has lower combustibility and limited potential fire size. This vegetation usually comprises rainforest and low risk land that features remnant vegetation or has active land management practices applied that would reduce bushfire risk.
- Vegetation Category 3 – A medium risk area that usually features grasslands, freshwater wetlands, semi-arid woodlands, alpine complex and arid shrubland.
- Excluded land – A range of areas that are excluded from mapping due to the scale, management practices applied or as they are agricultural land or not vegetated.

Figure 6.34 displays the bush fire prone land within and surrounding the Project Area and includes the strategic bush fire management zones applicable in the ACT.

[5] The Processing and Stockpiling Area (plant and equipment) and the Infrastructure Area (workshop, administration and fuel storage).

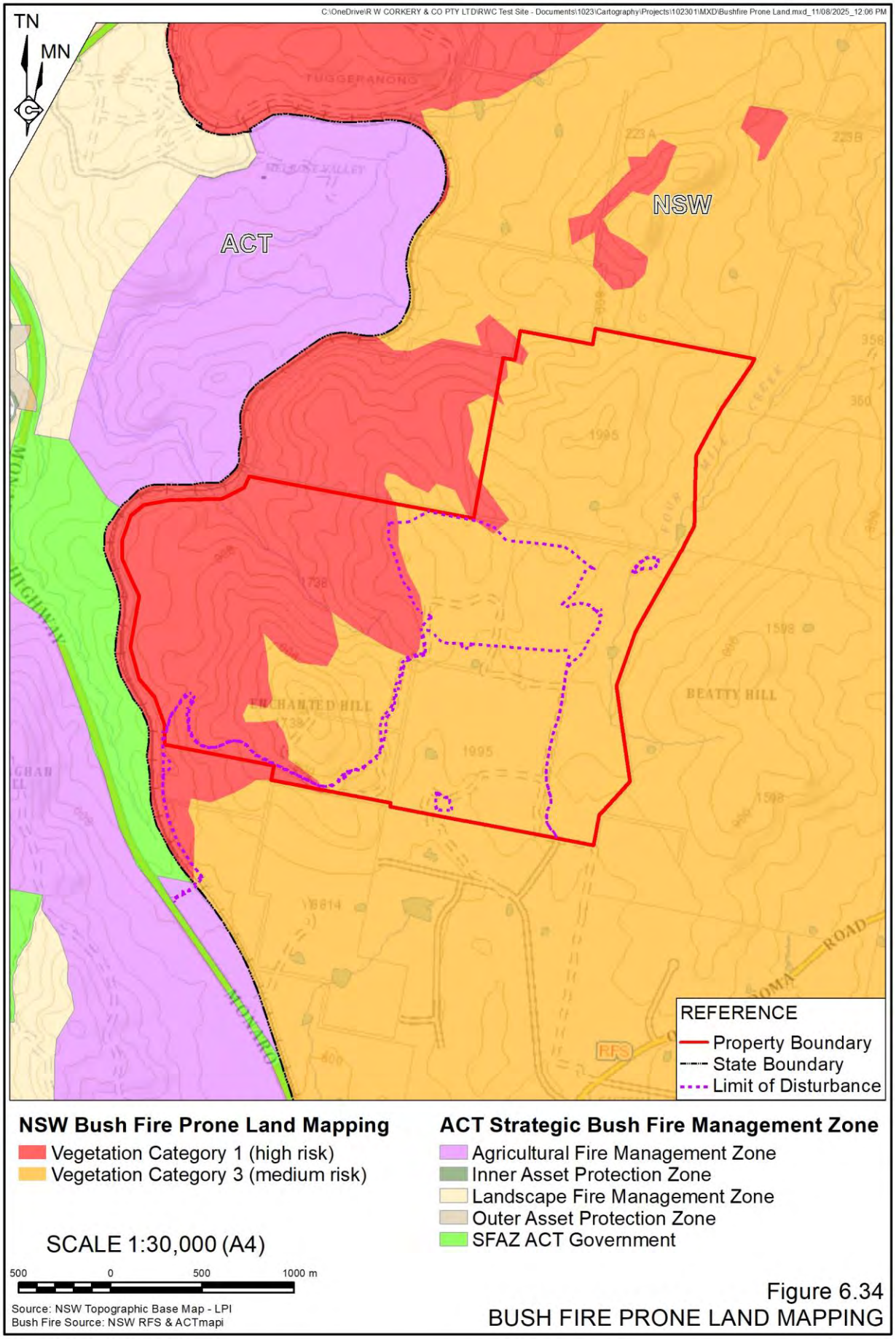


Figure 6.34
BUSH FIRE PRONE LAND MAPPING

6.14.2.4 Assessment of Bush Fire Hazard

The following sections use the RFS (2019) procedure to determine the Category of Bush Fire Attack (or bush fire hazard) for the Project Site.

Bush Fire Prone Land Mapping

Figure 6.34 identifies the Project Site as being within a designated bush fire prone area containing Vegetation Category 1 and Vegetation Category 3 land. Vegetation Category 1 land that has a high risk for bush fire. With the Project Site this land is predominantly associated with the Quarry Access Road and the western extent of the Extraction Area would be within 100m of this land (the required buffer). Vegetation Category 3 is considered to be medium bush fire risk and includes all Project infrastructure – the Infrastructure Area.

Fire Weather

The Queanbeyan-Palerang LGA occurs within the Southern Ranges Fire Area. Both the Queanbeyan-Palerang LGA and the ACT are designated a Fire Danger Index of 100.

Vegetation Formation

Vegetation categorisation for the hazard assessment is based on information on vegetation surveyed by Capital Ecology for the BDAR (see Section 6.7). Two vegetation communities have been mapped on the Project Site.

- PCT3375 – Monaro-Queanbeyan Rolling Hills Grassy Forest.
- PCT3376 – Southern Tableland Grassy Box Woodland.

Vegetation communities feature forest or woodland vegetation, although in the vicinity of the Infrastructure Area only remnant trees remain following clearing for agricultural use and may be considered a grassland. The forest vegetation class has been applied for the purpose of this assessment.

Effective Slope and Separation Distance

All vegetation in proximity to infrastructure is upslope and therefore the maximum effective slopes within 100m of the Infrastructure Area is 0^{o}.

While the area in proximity to infrastructure is predominantly cleared of canopy vegetation, a separation distance of 25m has been allowed to account for areas to the north of the Processing and Stockpiling Area and for planned tree screening areas.

Assessment of Hazard

It is possible to calculate the bush fire hazard (referred to as the Bush Fire Attack Level (BAL) in RFS, 2019) from a combination of the Fire Danger Index, vegetation formation, effective slope and the proximity of activities to the bush fire hazard. **Table 6.79** summarises the Bush Fire Attack characteristics calculated for the Infrastructure Area as well as the recommended minimum Asset Protection Zone (APZ) to be maintained between built structures and each vegetation zone.

Table 6.79
Bush Fire Attack Levels – Infrastructure Area

Fire Danger Index	Predominant Vegetation Formation	Maximum Effective Slope	Separation Distance (m)	Bush Fire Attack Level	Outer Protection Area (m)	APZ (m)
100	Forest	0°	25m	BAL-29	10	24
Based on RFS (2019) Note: This guideline relates to residential developments only but has been applied for the Project.						

The Bush Fire Attack Level of BAL-29 has been adopted in accordance with Table A1.12.5 of Appendix 1 of RFS (2019). It is noted that this refers to residential developments but has been selected for the Project as the guideline does not provide guidance on determining the BAL for 'Other Development'.

The following descriptions of the predicted bush fire attack and levels of exposure are provided for the Category of Bush Fire Attack (or bush fire hazard) in AS2959.2009.

- BAL-Low: There is insufficient risk to warrant specific construction requirements.
- BAL-12.5: Ember attack.
- BAL-19: Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux.
- BAL-29: Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux.
- BAL-40: Increasing levels of ember attack and burning debris ignited by windborne embers together with increasing heat flux with the increased likelihood of exposure to flames.
- BAL-FZ: Direct exposure to flames from fire front in addition to heat flux and ember attack.

Based on the information provided in **Table 6.79** and in accordance with Table A1.12.2 of RFS (2019), an APZ of approximately 24m should be maintained between any infrastructure and surrounding vegetation. An outer protection area of 10m within the APZ may be maintained in accordance with Table A1.12.4 of RFS (2019).

6.14.2.5 Management and Mitigation Measures

It is recognised that some areas of the Property would remain vegetated and, therefore, it would be possible for bush fire to spread both within the Project Site and adjacent to the Project Site if management measures are not adopted to mitigate this hazard.

In terms of potential impacts, the assets considered at risk include employees and the local community. In order to protect these assets, bush fire management would be documented in an *Emergency Management and Evacuation Management Plan* that would be prepared in consultation with the local RFS. The bush fire management section of the *Emergency Management and Evacuation Management Plan* would include the following.

- A review of bush fire hazards and identification.
- A summary of controls and management measures including fire response equipment and locations.

- Emergency contact details.
- Training requirements.

Various activities that may increase the risk of fire on the Project Site and transport route, and the controls proposed to limit the risk posed by these are presented in **Table 6.80**.

Table 6.80
Bushfire Hazard – Activities and Controls

Activity	Possible Ignition Source	Safeguards and/or Controls
Refuelling	Spilt fuel or dry grass ignited by spark.	• Refuelling undertaken within cleared areas of the Project Site. • Engines in all vehicles to be turned off during refuelling. • No smoking policy to be enforced in designated areas of the Project Site. • Fire extinguishers maintained within all site vehicles and mobile earthmoving equipment.
General Activities	Cigarettes, Rubbish, e.g. glass, metal.	• No smoking policy to be enforced in designated areas of the Project Site. • No throwing cigarette butts from product trucks along the Quarry Access Road. • Focus on housekeeping to be maintained by the Quarry Manager. • Water cart available for firefighting purposes. • All site vehicles and mobile earthmoving equipment to carry a fire extinguisher.

More general bush fire management measures to assist in the event of a local bush fire event are as follows.

- All employees would be trained in the proper use of the firefighting equipment on site.
- The water cart used for dust suppression would be made available for firefighting purposes in the event of a bush fire.
- A protocol would be developed for restricting work in vegetated areas during high fire danger periods of the bush fire season (in accordance with the hazard category notifications).
- The local RFS would be consulted prior to each bush fire season to discuss the planned controls during the following season for asset protection and/or ecological management, status of access tracks, and equipment availability.

Emergency and Evacuation Management Procedures would include procedures in the event of a local bush fire originating beyond the Project Site.

6.14.2.6 Assessment of Impacts

With the implementation of the proposed safeguards and controls, it is considered that the bush fire hazard associated with the Project would be acceptable and the Project would not significantly contribute to raising the risk of bush fires impacting the community, property or environmental assets.

Bush fire management would equally apply to operations in the ACT and therefore cumulative bush fire risks would be limited.

No additional native vegetation (that is, in addition to that assessed in the BDAR as presented in Section 6.7) would be required to be removed for bush fire management.

6.14.3 Hazardous Materials

Potentially hazardous materials identified under the *Australian Code for the Transport for Dangerous Goods by Road & Rail Edition 7.8* (National Transport Commission, 2022) that would be transported to and stored within the Project Site would be limited to diesel fuel. Diesel is a Class 9 dangerous good and does not have a threshold for a Preliminary Hazard Analysis (PHA), so a PHA is not required.

In order to minimise the potential for hydrocarbon contamination, the following controls and safeguards would be implemented.

- Hydrocarbons and hazardous materials would only be purchased from licensed suppliers for the transport of dangerous goods in accordance with *Dangerous Goods (Road and Rail Transport) Act 2008 No 95*. A self-bunded trailer or similar would be used to transport diesel to the Project Site, as required.
- Any bulk diesel or other hydrocarbons would be stored within a self-bunded storage tank or trailer that meet the requirements of *AS1940 The storage and handling of flammable and combustible liquids*. Bunding would have the capacity to hold 110% of the total storage capacity of the tank or trailer.
- Hydrocarbon waste would be removed from the Project Site and disposed of at a licenced waste facility.
- Hydrocarbon spill kits would be appropriately located within the Workshop, Concrete and Asphalt Plant, Administration and Fuel Storage Area to ensure spill response and clean up can be carried out immediately following the detection of any spills.
- In the event of a hydrocarbon leak or spill, the Applicant would implement the following spill management procedure.
  - Phase 1 – Source Control: isolate the source of spill or leak and stop the leak either by maintenance or placing the leaking item within or over the fuel/oil storage area.
  - Phase 2 – Recovery: recover as much as possible at the source by pumping free hydrocarbon from the surface and excavating hydrocarbon-contaminated materials. Contaminated materials would be stockpiled on site under cover and on an impermeable surface, e.g. a high-density polyethylene sheet. This material would later be bio-remediated on site and/or transported to an approved waste facility.
  - Phase 3 – Remediation: transport the contaminated material to a facility licensed to accept and treat hydrocarbon contaminated material.
- Spills or leaks of other pollutants would be handled in accordance with the relevant Safety Data Sheet.

It is anticipated that with the proposed hydrocarbon management practices and the controls and safeguards, potential hazards as a result of hydrocarbon and hazardous materials to be used on the Project Site would be minimised.

6.14.4 Truck Delivery of Explosives

Monaro Rock would contract the delivery, loading and initiation of explosives to an accredited blasting contractor. The delivery of the components of the blasting materials would be undertaken using a licenced mobile manufacturing unit. All blasting materials would be transported to the Project Area on the day of each blast as none are stored within the Project Site.

The blasting contractor would operate its equipment in accordance with an emergency response system which documents the required response to an incident involving the mobile manufacturing unit either on the public road network or within the property owned by the Applicant.

In the unlikely event of an accident involving the mobile manufacturing unit, the adoption of the emergency response system would avoid or minimise the adverse impacts of the incident upon public safety.

6.15 Economic Impacts

6.15.1 Introduction

The SEARs for the Project require the EIS to include a detailed assessment of the likely economic impacts of the development, paying particular attention to:

- the significance of the resource;
- the costs and benefits of the Project; identifying whether the development as a whole would result in a net benefit to NSW; and
- the demand on local infrastructure and services.

The assessment requirements of Council were also considered during the preparation of the Economic Assessment. A summary of the SEARs and the requirements of Council are listed within **Appendix 2** with a record of where each requirement is addressed in the EIS.

An Economic Assessment for the Project was undertaken by Gillespie Economics and is presented as **Appendix M** and hereafter referred to as Gillespie Economics (2025). The following subsections provide a summary of the methods applied and outcomes of the economic assessment of the Project.

The significance of the resource is discussed in Section 2.2 and Section 3.3. As the resource is not a mineral for the purpose of the *Mining Act 1992*, royalties are not payable to the State of NSW and therefore the resource itself does not have economic significance to NSW.

6.15.2 Approach to the Economic Impact Assessment

In addition to the requirements outlined within the SEARs, Gillespie Economics (2025) has undertaken an economic assessment for the Project in accordance with the following.

- Clause 7(1)(f) of Schedule 2 of the EP&A Regulation which requires environmental impact statements to provide "*the reasons justifying the carrying out of the development, activity or infrastructure in the manner proposed, having regard to biophysical, economic and social considerations…*". The Note to Clause 7(1)(f) provides as follows. "*A cost benefit analysis may be submitted or referred to in the reasons justifying the carrying out of the development, activity or infrastructure.*"
- Economic aspects of Section 4.15 of the EP&A Act which requires the following matters to be taken into consideration.
  - The public interest (taken as the collective public interest of households in NSW).
  - The likely impacts of the development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality.
- The following standards, guidelines and policies.
  - NSW Treasury (2017) NSW Government Guide to Cost-Benefit Analysis.

While there are no specific economic assessment guidelines for extractive industries, the *Guidelines for Economic Assessment of Mining and Coal Seam Gas Proposals* (NSW Government, 2015) and the *Technical Notes Supporting the Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals* (NSW Government, 2018) provide guidance on the economic assessment techniques that are appropriate for addressing the requirements under the EP&A Act.

Quantifying the economic impacts of developing the Project is essential to demonstrate that the aggregate value created, through jobs, supplier expenditure and public revenues, outweighs all associated costs, including environmental mitigation and infrastructure upgrades. In order to meet the above requirements, two types of analysis are required, namely:

- Cost-Benefit Analysis (CBA) to evaluate net improvements in economic efficiency and public interest for NSW households; and
- Local Effects Analysis (LEA) to quantify direct and indirect impacts on the Queanbeyan-Palerang LGA economy, focusing on employment, wages, and retained supplier expenditure.

Together, these analyses demonstrate that the Project is justified on economic grounds, delivers net social benefits to NSW, and generates substantial positive impacts for the host region.

Gillespie Economics (2025) follows the aforementioned State Significant Development Guidelines and Technical Notes. Key steps include defining "without" and "with" Project scenarios; identifying incremental costs and benefits (including externalities); consolidating values by discounting; sensitivity testing of major assumptions; and summarising the distribution of impacts across stakeholders.

- Cost-Benefit Analysis (CBA) in base-year 2025 values (inflation-adjusted), discounting at 7% (sensitivities at 4% and 10%) over a 32-year evaluation period (30-year consent plus two years pre-commencement)[6].
- Local Effects Analysis (LEA) focused on the Queanbeyan-Palerang LGA, including:
  - direct effects on resident employment and net household incomes;
  - local share of non-labour supplier expenditure; and
  - second-round (flow-on) impacts via a bespoke regional Input–Output model.

6.15.3 Cost Benefit Analysis

6.15.3.1 Methodology

The Cost-Benefit Analysis (CBA) was conducted by Gillespie (2025) to assess the net economic value of the Project to the State of NSW. The analysis compared two scenarios.

- Base case (without the project): The site remains in use for low-value grazing.
- Project case (with the quarry): The site is developed for extractive industry, generating revenue through the sale of quarry products.

[6] This was a conservative assumption based on the proposed Project Life of 30-35 years as described in Section 3.13.

The assessment considered capital and operating costs, revenue from product sales, and a range of environmental and social impacts, including biodiversity, noise, traffic, and greenhouse gas emissions. Mitigation and offset measures proposed by the Applicant were incorporated, and all values were discounted to present-day terms in accordance with NSW Government guidelines for economic evaluation of major projects.

Relative to the base case, the Project introduces a range of incremental economic benefits and costs. Key benefits include net production value from extraction and transport services, company tax contributions, net producer surplus, and residual land value at the end of operations. Additional gains may arise from employment-related wage increases, supplier activity, and potential uplift for existing landholders, although some of these are not readily quantifiable.

Costs include capital outlays, operating expenses, rehabilitation and decommissioning, and the opportunity cost of land use. Environmental, social, and cultural impacts, such as those related to air quality, biodiversity, heritage, and visual amenity, are largely internalised through mitigation, offsetting, and compensation measures. Where residual impacts remain, such as minor greenhouse gas emissions, they are quantified and included in the analysis.

6.15.3.2 Assessment of Impacts

The Project is expected to deliver a net economic benefit of approximately $41 million to NSW. Most environmental and social impacts are addressed through mitigation or offset measures, including:

- Biodiversity offsets
- Road infrastructure upgrades
- Noise and dust management
- Water access licences
- Aboriginal heritage mitigation

Residual impacts are minimal, with the only quantified external cost the greenhouse gas emissions over the life of the Project[7]. The analysis concludes that the Project is economically efficient and would contribute positively to the State's overall welfare.

Table 6.81 presents the net production benefits of the Project, breaking down the financial costs and benefits across two components: quarrying and ex-quarry transport. It includes the following.

- Capital and operating costs: $228 million total, with quarrying comprising the bulk.
- Revenue and residual values: $278 million total, showing strong market value for extracted materials.
- Net production benefits: $50 million overall, with $41 million accruing to NSW.

[7] Mitigation and offsetting costs are considered capital costs for the purpose of the cost benefit analysis

Table 6.81
Net Production Benefits of the Project ($M Present Values at 7% Discount Rate)

	Quarrying	Ex Quarry Transport	Total
Costs			
Opportunity cost of land	$4	-	-
Opportunity cost of capital	$0	-	-
Capital costs	$61	-	-
Operating costs	$100	$63	-
Decommissioning and rehabilitation costs	$0	-	-
Sub-total	***$165***	***$63***	***$228***
Benefits			
Revenue	$208	$69	-
Residual value of land	$0	-	-
Residual value of capital	$0	-	-
Sub-total	***$209***	***$69***	***$278***
Global Net Production Benefits	**$44**	**$6**	**$50**
Company Tax	$11	$2	-
Residual Net Production Benefits	$33	$5	-
Global Net Production Benefits	**$44**	**$6**	**$50**
Company Tax	$11	$2	-
Residual Net Production Benefits	$34	$5	-
Australian Net Production Benefits	**$44**	**$6**	**$50**
Company Tax	$3	$0	-
Residual Net Production Benefits	$33	$5	-
NSW Net Production Benefits	**$36**	**$5**	**$41**
* Differences in totals are due to rounding			
Source: Gillespie Economics (2025) – Table 3.4			

Table 6.81 demonstrates that the Project would be economically viable, with revenues exceeding costs by a significant margin. Benefits would be distributed across Australia and NSW, confirming that NSW households and government would receive the majority of the gains.

Table 6.82 summarises the net social benefits, including externalities, incorporating externalities, such as greenhouse gas emissions, and showing their minimal impact.

- Total benefits to NSW: $41 million
- Total quantified costs: $0.003 million (greenhouse gas emissions)
- Other impacts: Air quality, noise, biodiversity, and infrastructure are all mitigated or offset.

Table 6.82 table confirms that the Project would deliver strong net social benefits even after accounting for environmental and social costs. Residual impacts are negligible and well-managed, supporting the conclusion that the Project is in the public interest.

Table 6.82
Net Social Benefits of the Project ($M present value @ 7% discount rate)

Benefits	Australia	NSW
Net Production Benefits Quarrying		
Company Tax	$11	$3
Residual Net Production Benefits	$33	$33
Sub-total	***$44***	***$44***
Net Production Benefits Ex-Quarry Transport		
Company Tax	$2	$0
Residual Net Production Benefits	$5	$5
Sub-total	***$6***	***$5***
Other Benefits		
Economic benefits to existing landholders other than Monaro Rock	No impact	No impact
Economic benefits to suppliers	Unquantified	Unquantified
Wage benefits to employment	Unquantified	Unquantified
Sub-total	***Unquantified***	***Unquantified***
Total Benefits	**$50**	**$41**
Costs		
Greenhouse gas emissions (Scope 1 and 3)	$0.01	$0.003
Air Quality	Meets relevant criteria- no material residual impact	
Noise and Blasting	Meets relevant criteria- no material residual impact	
Road transport	Cost of interaction upgrade and roads included in capital costs No material residual impact	
Surface water	No material residual impact	
Groundwater	Cost of WALs included in capital costs No material residual impact	
Biodiversity	Impacts on biodiversity are offset – cost of offsets included in capital costs	
Aboriginal heritage	No impact to high significance items. Cost of mitigation included in capital costs.	
Historic heritage	No impact	
Visual	No material residual impact	
Net public infrastructure costs	No impact	
Sub-total	***$0.01***	***$0.003***
Net Social Benefits	**$50**	**$41**
Source: Gillespie Economics (2025) – Table 3.6		

Table 6.83 presents sensitivity testing results for the assessment, confirming robust net benefits under all tested scenarios.

- Discount rates tested: 4%, 7%, and 10%
- Variables adjusted: Capital costs, operating costs, product value, land value, etc.
- Where greenhouse gas mitigation costs are attributed wholly to NSW rather than globally or nationally.

Table 6.83
NSW CBA Results Sensitivity Testing ($M Present Value)

	4% Discount Rate	7% Discount Rate	10% Discount Rate
Central Analysis	$93	$41	$15
INCREASE 20%			
Opportunity cost of land	$92	$41	$15
Quarry capital costs	$81	$31	$6
Quarry operating costs	$65	$25	$4
Decommissioning and rehabilitation costs	$93	$41	$15
Value of quarry products	$150	$76	$38
Residual value of land	$93	$41	$15
Net transport revenue	$95	$42	$16
Greenhouse gas emission costs	$93	$41	$15
DECREASE 20%			
Opportunity cost of land	$93	$42	$16
Quarry capital costs	$105	$51	$24
Quarry operating costs	$120	$58	$26
Decommissioning and rehabilitation costs	$93	$41	$15
Value of quarry products	$36	$7	-$7
Residual value of land	$93	$41	$15
Net transport revenue	$91	$40	$15
Greenhouse gas emission costs	$93	$41	$15
Global Greenhouse Gas Emission Costs	**$90**	**$39**	**$13**

Source: Gillespie Economics (2025) – Table 3.8

Even under pessimistic scenarios (e.g. 20% increase in costs), the Project would still deliver positive net benefits. **Table 6.83** demonstrates the robustness of the economic case. The Project remains beneficial under a wide range of assumptions, reducing risk and uncertainty in the approval process.

6.15.4 Local Effects Analysis

6.15.4.1 Methodology

The Local Effects Analysis (LEA) aims to address the consequences of the Project in its "locality" as required by Section 4.15 of the EP&A Act. It is intended to complement the Cost Benefit Analysis by translating effects at the NSW level to impacts on the communities located near the Project Site. It also provides additional information to describe changes that are anticipated within a locality, such as employment changes. LEA is intended to inform the scale of change rather than being representative of costs and benefits to the local community.

Gillespie Economics (2025) conducted the LEA using a bespoke Input–Output model calibrated to Queanbeyan-Palerang LGA data. The methodology captures:

- direct local effects on resident employment, net household wage gains, and locally-sourced supplier expenditure; and
- flow-on (Type IIA) effects across the regional economy, estimating total output, value-added, labour income, and employment impacts.

6.15.4.2 Assessments of Impacts

At full operation, the Project would generate:

- 30 direct jobs, including 20 quarry and 10 transport roles
- 12 of these jobs filled by existing local residents
- $782,204 in net income to local households annually
- $9.5 million in supplier expenditure retained locally each year

Flow-on effects are expected to support an additional 23 indirect jobs, resulting in a total of 53 jobs across the region.

Table 6.84 highlights the tangible benefits to the local economy, including job creation, wage retention, and supplier spending. It also confirms that there are no significant adverse impacts on housing, wages, or infrastructure.

Table 6.84
Summary of Effects on the Local Community

Annual Local Effects	Quarry	Transport	Total
Direct employment working in the local area (no.)	20	10	30
Direct employment filled by those who already reside in the local area (no.)	8	4	12
Total net income to those that already reside in the local area ($)	$495,464	$286,740	$782,204
Total non-labour expenditure ($M)	$11.7	$7.6	$19.3
Total non-labour expenditure in the local area	$5.6	$3.9	$9.5

Annual Regional Impacts	Direct	Flow-on	Total
Output ($)	36	14	50
Value-added ($M)	16	9	25
Income ($M)	2	1	4
Employment	30	23	53

Other local Economic Impacts	
Displaced activities	No material impact*
Wage rise impacts	No material impact*
Housing impacts	No material impact*
Demand on local infrastructure and services	Monaro Rock will fully fund the demand it has for local infrastructure and services for the production process, e.g. roads and intersections, etc.

Table 6.84 (Cont'd)
Summary of Effects on the Local Community

Local Environmental Impacts	
Greenhouse gas emissions (Scope 1 and 2)	$0.0003M**
Road Transport	Intersection upgrade and roads all internalised into cost of the Project
Biodiversity	Impacts on local biodiversity are offset
Aboriginal heritage	No impact to high significance items. Cost of mitigation included in capital costs.
* Materiality refers to whether valuation of these impacts would have any bearing on the estimated net social benefits of the Project. NSW Government (2012) identified that if a Project has an NPV of say "$20 million, costs or benefits valued at less than $1 million are unlikely to be material." ** This figure is the estimated impact on NSW households apportioned to households in the Local Area. The regional population is 0.8% of the NSW population. *** Unless otherwise specified monetary amounts are in 2025 dollars.	
Source: Gillespie Economics (2025) – Table ES1	

No significant adverse impacts were identified in relation to:

- Housing availability or affordability
- Wage inflation
- Displacement of existing agricultural land uses

The Applicant would fully fund all required road upgrades, ensuring no cost burden to Council.

6.15.5 Mitigation and Management Measures

Gillespie Economics recommends, and Monaro Rock would implement, the following measures to maximise local economic benefits and control residual impacts:

- Local employment strategies, targeting suitably skilled local residents.
- Local procurement policies that prioritise regional suppliers where cost and quality criteria are met.
- An investment fund provided through a Planning Agreement fund to support local community initiatives (see Section 2.7).
- Ongoing stakeholder engagement through regional business forums and workforce training programs.

Modelled by Gillespie Economics (2025), these initiatives have the potential to increase regional retention of supplier expenditure and job creation by up to 10% compared to a business-as-usual procurement approach.

6.15.6 Conclusion

Gillespie Economics' comprehensive economic assessments confirm that the Project:

- delivers a net social benefit to NSW of $41 million (present value) at a 7% discount rate, with robust outcomes under all tested sensitivities;
- generates substantial economic uplift for the Queanbeyan-Palerang LGA, including 30 direct local jobs (53 total including flow-ons), $782 000 in new annual wages retained by residents, and $9.5 million in retained supplier expenditure each year; and
- fully internalises environmental externalities via best-practice mitigation, offsets, and infrastructure funding by the Applicant.

These findings affirm the Project's merit in delivering economic efficiency, net social benefit, and a meaningful regional contribution. Overall, the assessment confirms that the Project's benefits would substantially outweigh its costs, with most externalities either mitigated or immaterial in scale.

6.16 Social Impacts

6.16.1 Introduction

The SEARs for the Project require the EIS to include a detailed assessment of the potential social impacts of the development, in accordance with the *NSW Government Social Impact Assessment Guideline for State Significant Projects* (2023)[8]. Council also requested consideration of social impacts in its assessment requirements for the Project.

A Social Impact Assessment (SIA) for the Project was undertaken by Landscape Research + Communications (Landscape) and is presented as **Appendix N** and hereafter referred to as Landscape (2025).

The SIA was prepared in accordance with the 2023 Guideline and its companion document, the *Social Impact Assessment Technical Supplement for State Significant Projects* (2023), issued by the NSW Department of Planning, Housing and Infrastructure (DPHI), and was reviewed against updated guidance released in July 2025. The assessment demonstrates compliance with the updated framework and incorporates refinements to address themes such as significance assessment, uncertainty, and diverse experiences.

A peer review of the SIA was undertaken by Dr Jamie Seaton of The Social Aspect and is presented as Appendix 3 of the SIA. The outcome of the peer review is summarised in the following statement by Dr Seaton:

> *"In my opinion the SIA report is aligned with best practice SIA concepts and principles and is compliant with the Social Impact Assessment Guideline (SIA Guideline) (NSW DPHI, 2023) and the Undertaking Engagement Guidelines for State Significant Projects (NSW DPHI, 2024)."*

6.16.2 The Social Locality

For the purpose of establishing a social baseline for the SIA, Landscape (2025) defines the Project's social locality as the area where people are expected to experience project impacts. This area is the focus of demographic data analysis that informed the engagement strategy and assessment of potential social impacts. The nominated social locality is Royalla[9], encompassing an area of approximately 42.9 km² with the geographic area presented in **Figure 6.35**. Royalla is a rural residential locality situated on the NSW–ACT border, characterised by large blocks, high home ownership, and a strong rural lifestyle identity. The community exhibits a well-defined sense of place, reinforced by long-standing social ties and shared values, while residents also prize privacy and peaceful surroundings.

[8] It is noted that an updated guideline was published in July 2025. As the SIA was already drafted by July 2025, the reference to the guideline have not been updated. However, the intent of the updated guideline is considered to be satisfied in the final draft SIA.
[9] Corresponding to ABS Suburb and Locality (SAL) code 13449

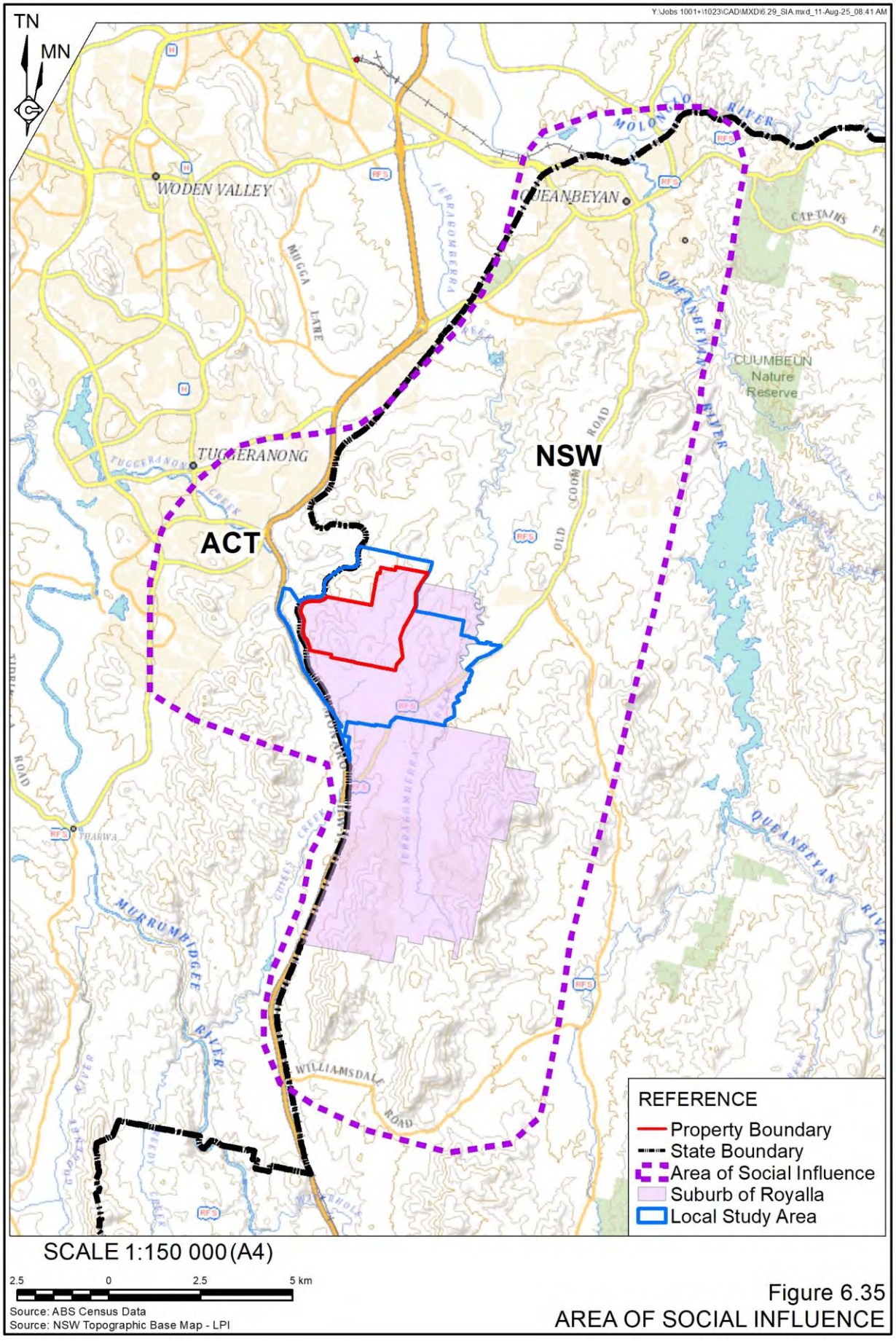


Figure 6.35
AREA OF SOCIAL INFLUENCE

The social baseline was refined as a result of engagement outcomes and further research and an Area of Social Influence developed that also addresses information gathered on the broader geographic area in which direct, indirect or cumulative impacts may be experienced. The Area of Social Influence includes Fernleigh Park, Googong, and parts of Tuggeranong in the ACT, particularly suburbs located south and east of the Tuggeranong town centre. **Figure 6.35** presents the Area of Social Influence. While all of this area is not expected to experience significant amenity impacts, its inclusion reflects regional connectivity and potential perceptual or cumulative effects.

Further to the above, the Local Study Area is defined as the area that has the greatest potential to experience social impacts. For the Project, these relate to changes to visual outlook, noise, dust, traffic and landscape character. The area is determined through review of the physical footprint of the Project and the spatial extent of key impacts (i.e. noise, dust, traffic, visual) as identified in technical reports. **Figure 6.35** also presents the Local Study Area applied in the SIA.

Aboriginal and European History

Prior to European settlement, the Royalla region was inhabited by Indigenous Australian communities. The broader area is known to have been occupied by groups including the Ngambri and Ngunnawal peoples, who utilised the region for its rich resources and as a meeting place. The area holds cultural significance for these communities.

European settlement began in the 19th century, with the land primarily used for sheep grazing and crop cultivation. In 1838, Captain James Richard Booth became the first recorded landowner in the area, acquiring 1,200 acres known as “Booth’s Flat.” Royalla Station was later purchased by Archibald McDonald in 1860, and five generations of the McDonald family have since lived in the area. The development of the Bombala railway line in the late 1800s was pivotal to the region’s growth, with a station established at Rob Roy (renamed Royalla in 1905).

Quarrying and Land Use in the Region

While the Project Site itself is a greenfield location with no prior industrial use, the broader region has a long-standing association with quarrying and other industrial activities. From the early 20th century, the area was recognised for its high-quality hard rock formations. Several major quarries have operated in the region:

- Mugga Quarry (Boral Resources Pty. Limited) – Located just north of the ACT’s main waste management facility; commenced operations in the early 1920s.
- Cooma Road Quarry (Holcim Australia Pty Ltd) – Located approximately 6km south of Queanbeyan and northeast of Royalla; commenced operations in 1959 and is nearing resource exhaustion.
- Williamsdale Quarry (Heidelberg Materials Australia Pty Ltd.) – Located about 4km north of Williamsdale and approximately 10 km from the Project Site; has been operational since the early 2000s.

These existing operations have shaped community expectations and contributed to perceptions of industrial encroachment (cumulative effects). Although Royalla has not previously hosted quarrying activity, residents are familiar with the amenity and environmental impacts associated with nearby quarries. The Project represents a significant land use transition from rural residential to extractive industry, which has heightened community sensitivity and concern.

In recent years, the region has also seen further industrial development, including the establishment of the Royalla Solar Farm in the ACT in 2014. At its inception, it was Australia's largest solar farm, featuring 83,000 solar arrays with the capacity to power over 4,500 homes. This development has added to the evolving industrial profile of the area.

Historically, Royalla and its surrounds were known for agricultural activity, and several landholders continue to operate small-scale rural enterprises. These include:

- sheep and cattle grazing;
- equestrian activities and horse agistment; and
- hobby farms with mixed uses (e.g. alpacas, poultry, small orchards).

While not industrial in scale, these rural activities remain economically and culturally significant to many local landholders and influence perceptions of land use compatibility and community identity.

Transition to Rural Residential

Royalla transitioned from farmland to a rural residential area in the late 20th century, attracting residents seeking a quiet lifestyle near Canberra. This shift followed similar development in nearby Jerrabomberra. Now part of Queanbeyan-Palerang Regional Council, Royalla is home to just over 1,000 people across approximately 300 households.

Project Site Context

The Project Site is a greenfield location currently used for low-intensity agricultural purposes, with no history of industrial activity. It is surrounded by:

- rural residential dwellings to the north-east, east, and south; and
- agricultural land, the NSW rail corridor, Monaro Highway, and ACT crown land to the west.

This transition from rural to industrial land use introduces new amenity impacts where none previously existed, contributing to heightened sensitivity and perceived risk in the host locality. Community concerns are shaped by past experiences with other regional quarries, despite the Project Site itself having no prior quarrying activity.

The following local communities were considered in the SIA.

- Royalla – The primary host community, characterised by its rural lifestyle and strong sense of place. Residents in the northern part of Royalla are expected to experience the most direct impacts, including changes in noise, air quality, visual amenity, and traffic. Southern Royalla residents are likely to experience less impact due to greater distance from the Project Site.

- Fernleigh Park Estate – A well-established rural-residential area located about 12km northeast of the Project Site by road. While some households at the southern end of Fernleigh Drive are approximately 3km from the Project Site (across Beatty Hill), the estate is physically separated by significant terrain and lacks direct transport routes or shared infrastructure with the Project. As such, material or perceived social impacts—including traffic, noise, or pressure on services—are considered low. Some visual impacts may occur for residents at the southern edge. Fernleigh Park is not included in the defined Social Locality or Local Study Area but is considered part of the broader Area of Social Influence.
- Surrounding communities – Residents in Williamsdale (16 km), Burra (21 km), Googong (13 km), and Tuggeranong (ACT, 13 km) were consulted during the SIA. These communities are considered too distant to experience significant environmental impacts such as dust, vibration, or noise. However, Monaro Highway users from these areas may notice increased heavy vehicle traffic between the Project Site and Canberra's southern outskirts.

The community's lack of prior experience with quarrying at the Project Site may increase uncertainty and social resistance, particularly in Royalla where lifestyle and environmental values are strongly held. This context underscores the importance of transparent engagement and mitigation strategies to address perceived and actual impacts.

Corridors, Features and Networks

The following key features and networks help define the social and regional context of the Project Site and its potential influence.

- Transport corridors include the Monaro Highway, which may experience increased heavy vehicle traffic and safety risks, while nearby local roads are expected to see minimal impact from light vehicle use.
- Regional economic influence may include job creation and business opportunities, though no significant impact is expected on nearby service catchments.
- Cultural and environmental considerations involve the Ngambri and Ngunnawal peoples' heritage, and biodiversity impacts are being assessed through dedicated studies.
- Local business and services in Royalla are limited, with no commercial centre, so existing home-based operations are unlikely to be affected.
- Community and stakeholder networks include active local groups and online platforms, some of which express opposition to the Project.

Vulnerable or Disadvantages Groups

The following groups in Royalla may be more vulnerable to potential impacts from the proposed quarry development, due to specific lifestyle, health, or cultural factors.

- Older residents may be more affected by quarry-related disruptions due to their sensitivity to noise, dust, and traffic, with a notable retiree population.
- People with health conditions such as respiratory or cardiovascular issues may face increased risks from changes in air and water quality.

- Children, especially younger ones, could be vulnerable to environmental changes, though Royalla has a higher proportion of older children compared to regional averages.
- Residents relying on natural water sources may be disproportionately impacted if operations affect water quality or availability.
- Economically disadvantaged households may lack the resources to adapt to or mitigate environmental impacts from the Project.
- Indigenous communities with cultural ties to the land may be particularly affected by any disturbance to heritage sites.

6.16.3 Assessment Methodology

The SIA (Landscape, 2025) was undertaken in accordance with the NSW *Government Social Impact Assessment Guideline for State Significant Projects* (2023) and its companion Technical Supplement. The methodology aligns with the principles of transparency, proportionality, cultural responsiveness, and distributive equity, and integrates both technical and participatory processes.

6.16.3.1 Data Sources

The SIA was informed by both primary and secondary data sources. Stakeholder engagement was conducted in two phases (2021 and 2024) and extended to public meetings, focus groups, one-on-one interviews, online webinars and social media and written submissions (Section 6.16.3.1). Technical inputs from other disciplines assessing the environmental impact (see all Section 6) of the Project also informed the SIA.

6.16.3.2 Stakeholder Engagement

Stakeholder Identification

The SIA identified a broad range of stakeholders, including directly affected landowners and residents near the Project Site, neighbouring communities such as Fernleigh Park, Googong, Tuggeranong, and Queanbeyan, and vulnerable groups like older people and children. Aboriginal groups, particularly the Ngambri and Ngunnawal peoples, were also recognised due to their cultural ties to the land. Key organisations such as Queanbeyan-Palerang Regional Council (Council), Landcare groups, and Royalla advocacy bodies were included. Stakeholder identification drew on community engagement, public information, and local knowledge, with additional insights gathered throughout the SIA process.

Engagement Objectives

The primary objective of stakeholder engagement was to identify and understand issues of greatest significance to surrounding landowners, the local community, and broader regional stakeholders. Engagement aimed to provide accessible, transparent information about the Project, encourage participation, and gather feedback to inform Project design and environmental planning. A key focus was ensuring that community concerns—particularly

those related to amenity, health, and environmental risks—were addressed through responsive design changes and mitigation strategies. Engagement also sought to build trust and maintain open communication throughout the planning process

Engagement Methods

Engagement commenced in April 2021 and continued throughout the Project's design and assessment phases. A range of methods were used to ensure accessibility and inclusivity, including in-person meetings, online forums, written communications, and direct outreach to government agencies, elected representatives, Aboriginal stakeholders, and community groups. The Applicant also maintained a dedicated Project website and issued regular newsletters and fact sheets to keep stakeholders informed. Feedback gathered through all forms of engagement directly influenced Project planning, including the relocation of infrastructure and refinement of environmental controls. **Table 6.85** summarises the key engagement activities and outcomes.

Table 6.85
Engagement Summary

Engagement Activity	Date(s)	Purpose	Outcome
Initial Community Info Sessions (at gate)	16–17 April 2021	Introduce Project concept and gather early feedback	Attended by 80–120 people; robust feedback informed early design
Community Surveys	April 2021	Capture detailed concerns and questions	Used to identify key community priorities and inform assessment scope
Project Website Launch	2021–ongoing	Provide centralised access to Project info and updates	Enabled registrations, questions, and access to newsletters/fact sheets
Newsletters (posted/email/website)	2021–2025	Share updates, approvals pathway, and engagement opportunities	Maintained community awareness; transitioned to email-based distribution
Fact Sheets (air, biodiversity, groundwater, need)	2022–2024	Address specific community concerns with technical summaries	Provided targeted information; supported transparency and trust
Government Briefings	Various (2021–2025)	Update agencies on Project status and seek feedback	Informed planning refinements; ensured regulatory alignment
QPRC Councillor Presentations	Nov 2022, May 2024	Present Project updates and seek Council input	Provided formal briefings; supported Council awareness and feedback
Aboriginal Stakeholder Engagement	2022–2025	Consult on heritage and social impacts; involve in field surveys	Informed Aboriginal heritage assessments; incorporated RAP feedback
Virtual Community Meeting	11 June 2024	Present updated Project layout and design outcomes	Attended by 60 people; questions addressed live
Project Site Tours	4–5 July 2024	Provide firsthand view of Project Site and discuss design	22 participants; supported transparency and understanding
Virtual Community Meeting	4 June 2025	Present environmental assessment outcomes and address questions	Attended by 24 people; clarified technical findings and mitigation measures
Media Engagement	Various	Respond to media inquiries and share Project information	Increased public awareness across NSW and ACT

Engagement for the Project should be considered separately to targeted engagement undertaken to inform the SIA. Project engagement supplemented SIA engagement but has a different objective and benefits from direct discussion and interaction with potentially affected community members.

Outcomes of Engagement

The engagement process led to several tangible outcomes, including proposals for financial and in-kind support to local Landcare groups and section 355 committees[10]. Community feedback played a direct role in identifying key social risks, shaping mitigation strategies, and refining aspects of the Project design—most notably the alignment of the Quarry Access Road. These outcomes reflect a responsive approach to stakeholder concerns and a commitment to integrating local knowledge into planning decisions. It also identified opportunities for community capacity-building, such as assistance with rail trail development and support for local projects in Royalla, Fernleigh Park, and Googong. The Applicant has committed to ongoing communication and transparency, commissioning technical reports to address specific concerns like health risks and economic justification. These outcomes reflect a responsive approach to community input.

How Feedback Informed the SIA

Stakeholder feedback underpinned the SIA through:

- the identification and prioritisation of potential social impacts;
- the development of mitigation and management measures by the Applicant;
- changes to the Project design and implementation approach by the Applicant; and
- refinements in the scope of the SIA throughout the process.

Several management and mitigation measures were adopted to inform the SIA that influence social impact outcomes, as detailed in Section 6.16.5.

6.16.3.3 Social Impact Assessment

Social impacts were assessed using the typology outlined in the guideline, including way of life, community, access to services and infrastructure, health and wellbeing, surroundings, culture, livelihoods, and decision-making systems. Each impact was evaluated using a structured framework that considered likelihood of occurrence, magnitude of change, significance of the impact, and distribution across affected groups, including vulnerable populations.

Disaggregated analysis was applied to assess differential effects on groups such as older residents, families with children, people with pre-existing health conditions, and those reliant on rainwater or bore water. Sensitivity analysis was also undertaken to test the robustness of assumptions and explore alternative scenarios, including a ‘no project’ case and a ‘worst-case’ scenario.

[10] Section 355 committees are community-based groups established under Section 355 of the *NSW Local Government Act 1993*. They are appointed by local councils to manage or support specific community assets or services—such as halls, reserves, or recreational facilities—and often play a key role in coordinating local events, fundraising, and volunteer activities.

6.16.4 Social Baseline

The social baseline was established using ABS Census data (2016 and 2021), stakeholder engagement, and secondary sources. The following presents a summary of key demographic data, with other relevant data summarised. Section 5.3 of the SIA presents a detailed summary of the demographic data used to develop the engagement program for the SIA and that informed the impact assessment.

Population Characteristics

Between 2016 and 2021, Royalla's population increased by 7%, reaching 1,062 residents. **Table 6.86** presents age distribution data for Royalla, Queanbeyan, and NSW. Royalla's population profile shows a predominance of middle-aged adults and families with children, with notable growth in the 10–14 and 15–19 age cohorts between 2016 and 2021. The median age remained stable at 41, slightly above the state average. The relatively low proportion of residents aged 75 and over suggests a younger ageing population compared to broader NSW trends. These demographics reflect a family-oriented community with long-term residential stability and a growing cohort of school-aged children.

Table 6.86
Population Statistics (Royalla, Queanbeyan, NSW)

	Royalla				Queanbeyan				NSW			
	2016		2021		2016		2021		2016		2021	
Ages	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
0–4 years	40	4.0	38	3.6	3,648	6.5	4,318	6.7	465,135	6.2	468,056	5.8
5–9 years	89	8.9	68	6.4	3,778	6.7	7,207	6.5	478,184	6.4	500,810	6.2
10–14 years	95	9.5	127	12.0	3,539	6.3	4,116	6.4	443,009	5.9	501,0135	6.2
15–19 years	84	8.4	97	9.1	3,523	6.3	3,517	5.4	448,425	6.0	457,896	5.7
20–24 years	57	5.7	65	6.1	3,237	5.8	3,457	5.3	489,673	6.5	496,185	6.1
25–29 years	37	3.7	28	2.6	3,748	6.7	4,343	6.7	527,161	7.0	555,967	6.9
30–34 years	21	2.1	30	2.8	3,923	7.0	5,163	8.0	540,360	7.2	586,057	7.3
35–39 years	51	5.1	54	5.1	3,709	6.6	4,903	7.6	499,724	6.7	580,185	7.2
40–44 years	87	8.7	70	6.6	4,186	7.5	4,304	6.6	503,169	6.7	522,984	6.5
45–49 years	119	11.9	101	9.5	4,625	8.3	4,567	7.0	492,440	6.6	516,915	6.4
50–54 years	96	9.6	112	10.5	4,329	7.7	4,847	7.5	485,546	6.5	500,027	6.2
55–59 years	75	7.5	84	7.9	3,856	6.9	4,470	6.9	469,726	6.3	490,155	6.1
60–64 years	65	6.5	67	6.3	3,113	5.6	3,806	5.9	420,044	5.6	416,493	5.2
65–69 years	43	4.3	58	5.5	2,581	4.6	3,004	4.6	384,470	5.1	416,493	5.2
70–74 years	17	1.7	3	3.4	1,683	3.0	2,443	3.8	292,556	3.9	372,234	4.6
75–79 years	9	0.9	17	1.6	1,175	2.1	1,562	2.4	217,308	2.9	268,110	3.3
80-84 years	8	0.8	7	0.7	698	1.2	1,562	2.4	155,806	2.1	183,409	2.3
85 years+	3	0.3	3	0.3	680	1.2	784	1.2	167,506	2.2	183,895	2.3
Total	**996**		**1062**		**56,031**		**64,796**		**7,480,242**		**8,072,141**	
Median age	**41**		**41**		**38**		**38**		**38**		**39**	

Source: ABS 2016 and 2021 Census

Employment Status

Table 6.87 outlines employment status and labour force participation. Royalla exhibits high levels of full-time employment (64.5%) and low unemployment (2.3%), outperforming both Queanbeyan and NSW averages. Labour force participation is strong, with only 25.5% of residents not in the labour force. These figures suggest a highly engaged and economically active population, with limited reliance on welfare or support services. The low unemployment rate and high full-time work prevalence indicate financial resilience and stable household incomes.

Table 6.87
Employment Statistics (Royalla, Queanbeyan, NSW)

	Royalla				Queanbeyan				NSW			
	2016		2021		2016		2021		2016		2021	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Employed												
Worked full-time*	356	65.2	365	64.5	20,096	65.6	24,065	65.6	2,134,521	59.2	2,136,610	55.2
Work part-time	148	27.1	155	27.4	7,595	24.8	9,312	65.6	1,071,151	29.7	1,151,660	29.7
Away from work**	29	5.3	31	5.5	1,702	5.6	2,169	5.9	174,654	4.8	395,888	10.2
Unemployed	13	2.4	13	2.3	1,235	4.0	1,120	3.1	225,546	6.3	189,852	4.9
Total	**546**		**564**		**30,628**		**36,666**		**3,605,872**		**3,874,010**	
Labour Force Participation												
In the labour force	-	-	566	68.1	-	-	36,668	70.3	-	-	3,874,012	58.7
Not in the labour force	-	-	212	25.5	-	-	12,784	24.5	-	-	2,341,417	35.5
Not stated	-	-	56	6.7	-	-	2,702	5.2	-	-	386,728	5.9
Total	**-**		**834**		**-**		**52,154**		**-**		**6,602,157**	

* Full time is defined as having worked 35 hours or more in all jobs during the week prior to Census night.

** Comprises employed people who did not work any hours in the week prior to Census night.

Source: ABS 2016 and 2021 Census

Industry of Employment

Table 6.88 details the top industries of employment for Royalla and Queanbeyan residents aged 15 and over. Royalla's workforce is heavily concentrated in public sector roles, including central government administration (13.2%), defence (3.1%), and police services (3.1%). This distinguishes the community from broader state trends, where these industries represent a much smaller proportion of employment. The presence of high-skill, stable occupations aligns with the community's high-income levels and educational attainment, reinforcing its profile as a professional, service-oriented population.

Table 6.88
Industry of Employment (Royalla, Queanbeyan, NSW)

	Royalla		Queanbeyan		NSW	
2021 Industry of employment, top 5 responses of Royalla and Queanbeyan residents aged 15+	**No.**	**%**	**No.**	**%**	**No.**	**%**
Central Government Administration	73	13.2	3886	10.9	28,409	0.8
Computer System Design and Related Services	26	4.7	940	2.6	84,575	2.3
Defence	17	3.1	2,691	7.6	23,903	0.6
Police Services	17	3.1	-	-	21,903	0.6
Primary Education	17	3.1	-	-	76,275	2.1
Hospitals (except Psychiatric Hospitals)	-	-	1,053	3.0	153,670	4.2
State Government Administration	-	-	809	2.3	55,670	1.5
Total	**150**	**-**	**7,517**	**-**	**443,347**	**-**
Source: ABS 2021 Census						

Other Relevant Demographic Information

The community is characterised by a combination of demographic stability, affluence, and strong family orientation, as outlined below.

- High home ownership: 66.3% of households have a mortgage, while only 2.7% are rented—indicating a high level of residential investment and long-term settlement.
- Affluence: The median weekly household income is $3,655, nearly double the NSW average, suggesting strong economic capacity and financial resilience.
- Large households: The average household size is 3.4 people, with 78.9% of homes containing four or more bedrooms, reflecting a predominance of family households.
- Education: Residents report high levels of post-secondary education, contributing to skilled workforce participation and informed community engagement.
- Employment and industries: Royalla has low unemployment (2.3%), with dominant industries including central government administration, defence, and police services (see **Table 6.83**), indicating a strong public sector presence.
- Health: No significant anomalies were identified in reported health conditions. The most common conditions include arthritis (8.8%), asthma (8.3%), and mental health conditions (7.6%), which are broadly consistent with regional and state trends.
- Transport: Car ownership and reliance are high, with 53.1% of households owning three or more vehicles and 73.2% of residents commuting by car, reflecting limited public transport access and a car-dependent lifestyle.

Social Infrastructure

Royalla has limited formal infrastructure but is supported by strong community networks and facilities. Key assets include the following.

- Royalla Common: A community-managed green space with a hall, amphitheatre, and Elm Grove, used for events and recreation.

- Fernleigh Park Hall: Recently refurbished, serving nearby communities.
- Googong Community Centre and Club Googong: Multipurpose venues with recreational facilities.
- Emergency services: Supported by NSW and ACT agencies; no local ambulance or hospital.
- Education and childcare: No facilities in Royalla; services accessed in Googong, Queanbeyan, and ACT.
- Health services: Accessed in Queanbeyan and southern ACT suburbs.

Community values are strongly tied to rural lifestyle, self-sufficiency, and environmental quality. Volunteerism is high (30%), and there is a strong sense of identity and intergenerational residency. Residents express concern about industrial change and perceived erosion of lifestyle, with some distrust of regulatory authorities and opposition to the Project.

Community Values – Royalla and Southern Tuggeranong

Royalla residents consistently describe their locality as "wonderfully unique" and "almost like stepping back in time." The area offers a rural lifestyle with proximity to Canberra, attracting those seeking space, nature, and a quieter pace of life. Many moved to Royalla to "avoid city life" and raise children in a "healthier environment away from the noise, pollution and chaos of city living." Large blocks, domestic animals (especially horses), and fresh air are central to the lifestyle, which residents link closely to personal well-being.

Community pride and self-sufficiency are strong. Residents speak of leaving "keys in the truck" and neighbours checking in if someone hasn't been seen. Volunteering is common—30% of residents reported doing voluntary work, compared to 18% across NSW—with examples including community-led events, infrastructure, and bushfire support.

> *"When the fires were on, we all cooked for the firefighters."*

Royalla's car dependency is notable, with over half of households owning three or more vehicles and 75% of employed residents driving to work. The lack of public transport and services means residents are highly sensitive to road conditions and traffic volumes.

Property is tightly held, often sold through word of mouth, with intergenerational residency common.

> *"We purchased this property from my parents, and we are now the second generation to live in this Royalla residence."*

However, some social divisions exist, particularly around lifestyle preferences—"a split down the middle" between horse owners and those with motorbikes or cars—and differing views on the proposed Project. While some oppose the development, others expressed discomfort with the tactics used by vocal campaigners.

> *"People are scared of the likes of [some vocal campaigners]… they'll say nothing because they don't want to lock horns with the devil."*

In southern Tuggeranong, residents value clean air and expressed concern about dust drift from the proposed quarry, despite modelling indicating negligible impacts. These concerns reflect broader ACT values around public health and environmental quality, particularly in areas prone to air pollution due to topography and wood heater use. Including these perspectives ensures the assessment reflects both localised and regional sentiment.

6.16.5 Management and Mitigation Measures That Influence Social Impact Outcomes

This section outlines the Project design refinements and operational enhancements that were introduced prior to and during the SIA process. These measures were not developed as social mitigations per se, but they materially influenced the predicted social impact outcomes by reducing potential risks and responding to community feedback. Their inclusion reflects the iterative nature of the Project's development and the Applicant's commitment to proactively addressing amenity concerns and stakeholder priorities.

These measures differ from the targeted social mitigation and enhancement strategies presented in Section 6.16.7, which were developed in response to the findings of the SIA and are intended to manage residual impacts and support positive social outcomes. Together, both sets of measures contribute to the overall social performance of the Project.

6.16.5.1 Project Design and Operational Enhancements

The Project has been refined through structured design responses and stakeholder engagement to reduce amenity impacts and respond to community feedback.

- Dedicated Quarry Access Road: A private Quarry Access Road directly connecting the Project to the Monaro Highway was introduced to avoid use of local roads such as Old Cooma Road, Monaro Station Road and Mates Drive. This change was made in direct response to community concerns about traffic safety, amenity, and lifestyle impacts.
- Visual and acoustic screening: A Visibility Barrier and tree screening areas have been incorporated into the design to reduce visual intrusion and operational noise. This also includes a 3m high fence along sealed sections of the Quarry Access Road and a Visibility Barrier with vegetation screening to soften views of the extraction area.
- Avoidance of sensitive land: The quarry footprint was refined to avoid high-significance Aboriginal heritage sites and to minimise clearing of critically endangered ecological communities, including Box-Gum Woodland and habitat for listed threatened species.
- Alternative access route assessment: A potential access route via Old Cooma Road around Beatty Hill was assessed and rejected due to transport, biodiversity, visual and design risks.
- Dust mitigation: Inclusion of enclosures on fixed processing equipment and a water suppression systems to reduce dust generation and dispersion.

- Staged extraction and processing: Operations would be sequenced to limit disturbance and manage impacts progressively, with early rehabilitation of upper benches to reduce visual exposure.
- Final land use: The site would be rehabilitated for biodiversity restoration and grazing, with progressive rehabilitation integrated throughout operations.

These refinements demonstrate the Project's responsiveness to community values and its commitment to minimising adverse social impacts.

6.16.5.2 Key Mitigation Measures

Table 6.89 outlines the key mitigation measures proposed to address the social impacts and concerns raised throughout previous engagement. The mitigation measures are proposed to be implemented as part of the Project based on the various specialist studies that have been completed for the EIS.

Table 6.89
Summary of Mitigation Measures

Impact Area	Key Mitigation Measures
Air Quality	Air Quality Management System, real-time monitoring, dust suppression, staff training
Greenhouse Gas Emissions	Efficient vehicles, minimise idling, use B5 fuel where practicable
Human Health	Monitor dust exposure levels; implement dust control to protect community health
Noise	Acoustic barriers, restricted hours, quiet equipment, resident notifications
Blasting	Limit to once/week, community notifications, drone surveillance and sirens/alarms
Visual Amenity	Fencing, visual barriers, non-reflective materials, progressive rehabilitation
Lighting	Shielding and directional lighting
Biodiversity	Rehabilitation plan, staged clearing, fauna handling, weed/pest control, biodiversity offsets
Aboriginal Heritage	Heritage management system, cultural training, unanticipated finds protocols
Traffic and Transportation	Driver's Code of Conduct, truck volume limits, traffic management plan
Soil and Land Capability	Topsoil stockpiling, erosion control, avoid stripping in wet conditions
Surface Water Resources	Surface Water and Erosion Control Plans, regular monitoring, compliant storage
Groundwater	Monitoring, make-good provisions, spill response protocols
Hazards and Public Safety	Emergency plans, fire control, hazardous materials storage, secure access
Economic	Planning agreement with Council to fund local community infrastructure
Social	Community meetings (annually), CCC (every 6 months), complaints protocol (including tracking, resolution timelines and reporting), stakeholder engagement plan

6.16.6 Assessment of Impacts

The SIA (Landscape, 2025) identified a range of potential social impacts associated with the Project, including both beneficial and adverse effects. These impacts were assessed in accordance with the *NSW Government Social Impact Assessment Guideline for State Significant Projects* (2023), considering likelihood, magnitude, and significance, and applying disaggregated analysis to account for differential effects on vulnerable groups.

Table 6.90 summarises the predicted social impacts, affected parties, and the significance of impacts after mitigation, based on Appendix 1 of the SIA. Potential impacts were initially considered in for an unmitigated outcome with any outcomes that resulted in impacts of medium or high significance subject to targeted review and mitigation. The outcome post-mitigation are presented in **Table 6.90**, but it is noted that all outcomes are presented in Appendix 1 of the SIA. **Table 6.90** also includes both general population impacts and disaggregated population impacts, recognising that certain groups may experience impacts differently due to age, health status, financial vulnerability, or cultural connection to place.

It is appreciated that some community members may not agree with the assessed outcomes presented in **Table 6.90**. Experience with exiting impacts from similar operations or the expectation of impacts being higher than predicted would influence the perception of environmental outcomes for the Project. This reflects that social impacts reflect a deeper social reality that may not reflect the technical data. However, it should be clear that conservative assumptions have informed technical assessments, and it is likely that impacts would generally not be as high as predicted.

Predicted Positive Impacts

The Project is expected to generate several positive social outcomes for local and regional communities, as follows.

Employment and economic benefits would be likely for local jobseekers, contractors, and suppliers as well as the Applicant, contributing to regional prosperity and workforce development. Analysis has demonstrated the need for the products of the Project and programs to support local employment and sourcing of contractors would maximise benefits within the area of social influence.

Containing costs for local housing and infrastructure: By supplying aggregate to local markets, the Project is expected to help contain construction costs in Queanbeyan-Palerang and the ACT. This supports affordability for homebuyers and ratepayers, particularly in growth areas such as Googong and South Jerrabomberra. The impact is regionally significant, with high residual significance.

Delivery of community priority projects: The Community Infrastructure Fund would enable delivery of priority projects in Royalla and surrounding areas. These may include recreational upgrades, environmental initiatives, or support for local events. The Fund is a tangible benefit for the host community, with high residual significance.

Community-led decision-making: The Community Infrastructure Fund would be allocated through community-led processes, allowing residents to shape investment priorities. This supports self-determination and ensures that funding reflects local values and needs. The impact is likely and moderate, with high residual significance.

Table 6.90
Summary of Social Impacts

Impact to People	Affected Parties	Project Aspect	Mitigation Measures	Post-Mitigation Impact	Residual Impact Significance
Predicted Positive Impacts					
Employment and economic benefits	Local jobseekers (particularly young people), local contractors, local suppliers	Economic activity	Access to employment, contractor/supplier benefits and economic activity that supports the growth and prosperity of the region, policies focussing on local employment/ contractors/suppliers.	Almost certain/moderate	High
Containing costs for local housing and infrastructure	Local and regional homebuyers (housing) and ratepayers (infrastructure) in Queanbeyan-Palerang and the ACT	Extraction of aggregate to supply local/regional market	Extraction of aggregate to supply local/regional market.	Almost certain/moderate	High
Delivery of community priority projects	Royalla Social Locality	Planning Agreement with Council, Community contributions, Community Infrastructure Fund	Community Infrastructure Fund invested at 12.5c/tonne.	Likely/moderate	High
Land rehabilitation and biodiversity stewardship site (BSS)/offsets ameliorating biodiversity impacts (and associated concerns)	Royalla Social Locality	Progressive land rehabilitation, BSS establishment and management, post-closure remediation	Progressive rehabilitation of disrupted land, remediation of the Site after the Project, establishment of biodiversity stewardship site and investment in biodiversity offsets.	Almost certain/major	Very High
Community cohesion and trust-building	Royalla Social Locality	Community engagement	Community Consultative Committee and Community Infrastructure Fund management.	Almost certain/moderate	High
Self-determination of spending priorities for community infrastructure	Royalla Social Locality	Community contributions via Community Infrastructure Fund	Community-led decision-making on how the Community Infrastructure Fund would be allocated.	Likely/moderate	High

Table 6.90 (Cont'd)
Summary of Social Impacts

Impact to People	Affected Parties	Project Aspect	Mitigation Measures	Post-Mitigation Impact	Residual Impact Significance
Predicted Negative Impacts					
Dust impact on lifestyle (outdoor amenity, cleaning)	LSA residents	Quarry operations - dust generation and dispersion	Partial enclosures on crushing and screening equipment, regular dust suppression on roads and material storage areas, progressive rehabilitation of disturbed areas, surface stabilisation	Possible/minimal	Low
Noise from quarry operations intruding on peaceful lifestyle	LSA residents	Quarry operations	Noise Management System. Noise mitigated by amenity barrier and 3m high acoustic fence constructed along parts of the access road. Best practice standards applied to reduce noise generation. Limited hours of operation	Likely/minor	Medium
Blasting noise experienced more intensely in this part of Royalla	LSA residents	Quarry operations - blasting	Blasting limited to once per week, community notifications, use of drones and alarms	Unlikely/minor	Low
Approval and development of the Project - residents have a strong sense of place and the Project may impact place-based significance, belonging and connection.	Royalla Social Locality	Approval and development of the Project	The Project would be operated in accordance with the policies and guidelines established by the regulatory authorities. The Project has been located at least 1.5km from the closest residence and haulage access is not through Royalla. The Project aims to operate without intruding on the community to the greatest extent possible.	Unlikely/minimal	Low
Impacts to people relying on (quality and quantity of) surface and groundwater in a locality where there is no town water supply	LSA residents	Use of surface and groundwater in operations, impact on surface and groundwater from operations	Surface water and Erosion Control Plans, regular monitoring, compliant storage, groundwater monitoring, make-good provisions, spill response protocols.	Very unlikely/minimal	Low
Commuting / travelling times may be longer with increased heavy vehicle traffic on the Monaro Highway	Monaro Highway users (typically from the Royalla Social Locality)	Heavy vehicles travelling to and from the Project Site via Monaro Highway	Transport Management Plan, controls on numbers of vehicles exiting the Site	Possible/minimal	Low

Table 6.90 (Cont'd)
Summary of Social Impacts

Impact to People	Affected Parties	Project Aspect	Mitigation Measures	Post-Mitigation Impact	Residual Impact Significance
Predicted Negative Impacts (Cont'd)					
Increased heavy vehicles on Monaro Highway heightening safety concerns	Monaro Highway users	Laden heavy vehicles transporting quarry products from the Project Site and empty heavy vehicles accessing the Project Site using the Monaro Highway both ways	Monaro Highway direct access option, Driver's Code of Conduct, Transport Management Plan, driver education, control of numbers (max 25/hour leaving site)	Possible/minor	Medium
Increase in light vehicles using Monaro Station Road and Mates Drive (to reach Project secondary access road)	Residents on Mates Drive and Monaro Station Road	Secondary access road for staff and service vehicles	Restrict use of Mates Drive to light vehicles only (no heavy vehicles), maintain condition of the secondary access road to limit dust and noise generation, community complaints and feedback mechanism	Unlikely/minor	Low
Disruption of areas and/or artefacts with cultural significance to Aboriginal people	Aboriginal people, Royalla Social Locality	Potential clearing of vegetation and removing both individual plants and habitat area	Avoidance of key sites of cultural significance, salvage of impacted artefacts in consultation with the Aboriginal community, protocols to identify and avoid impacts associated with unexpected finds of Aboriginal artefacts.	Likely/minimal	Low
Sense of disconnection from place; change in cultural landscape	Aboriginal people, local people identifying as Aboriginal (3.3% of Royalla Social Locality population)	Landscape change, land use	Continued cultural monitoring; open dialogue with Aboriginal community representatives	Unlikely/minor	Low
Potential health impacts of dust generation and dispersion from quarry operations, exposure to respirable crystalline silica (RCS)	LSA residents, Children <15 years (22% of Royalla population); people with asthma or lung conditions	Quarry operations - dust generation and dispersion	Partial enclosures on crushing and screening equipment, regular dust suppression on roads and material storage, progressive rehabilitation of disturbed areas, surface stabilisation, real-time PM monitoring, complaint response process	Very unlikely/major	Medium

Table 6.90 (Cont'd)
Summary of Social Impacts

Impact to People	Affected Parties	Project Aspect	Mitigation Measures	Post-Mitigation Impact	Residual Impact Significance
Predicted Negative Impacts (Cont'd)					
Changes to visual amenity	LSA residents, other residents with impactful views of the Project Site/ access road	Design and siting of quarry - visual amenity	Visibility Barrier, vegetation screening, upper benches of extraction area immediately rehabilitated.	Unlikely/minor	Low
Noise from quarry operations, disruption of quiet enjoyment of surrounds	LSA residents	Quarry operations	Noise Management System. Noise mitigated by visual amenity barrier and 3m high fence constructed along parts of the access road. Industry standard procedures applied to reduce noise generation. Limited hours of operation	Likely/minor	Medium
Dust impact on surroundings (indoor and outdoor amenity)	LSA residents	Quarry operations - dust generation and dispersion	Partial enclosures on crushing and screening equipment, regular dust suppression on roads and material storage areas, progressive rehabilitation of disturbed areas, surface stabilisation	Possible/minimal	Low
Concerns about clearing of vegetation and impacts on habitat	Royalla Landcare Group, Royalla Social Locality	Project establishment, operations and closure	Progressive rehabilitation of land disrupted during construction/operations, remediation of the Site after the Project, use of offsets.	Likely/minor	Medium
Property values may be affected as a result of the Project	LSA residents	Approval and development for the life of the Project	The Project would be operated in accordance with the policies and guidelines established by the regulatory authorities, Project located at least 1.5km from the closest residence, haulage access not through Royalla, Project aims to operate without intruding on the community to the greatest extent possible	Possible/minimal	Low

Table 6.90 (Cont'd)
Summary of Social Impacts

Impact to People	Affected Parties	Project Aspect	Mitigation Measures	Post-Mitigation Impact	Residual Impact Significance
Predicted Negative Impacts (Cont'd)					
Increased stress and anxiety from impact fatigue: previous impacts of COVID-19 and bushfires following by anticipated impacts of new quarry including heavy vehicles, decreased road safety, loss of peace and quiet, impact on property prices, health impacts	LSA residents	All aspects of the Project	Operating within acceptable limits, all enhancements and mitigations, community engagement, transparent communications, monitoring, regular reporting to the community	Possible/minor	Medium
Source: Landscape (2025) – adapted from Table 1 Appendix 1					

Community cohesion and trust-building: Structured engagement mechanisms—including the Community Consultative Committee and transparent reporting—are expected to strengthen community cohesion and trust. These platforms support ongoing dialogue, grievance resolution, and shared oversight. The impact is almost certain and moderate, with high residual significance.

Land rehabilitation and biodiversity stewardship: Progressive rehabilitation and biodiversity offsetting would restore disturbed land and contribute to long-term environmental outcomes. The proposed Biodiversity Stewardship Site offers a legacy benefit beyond the life of the Project. These measures respond to community concerns about habitat loss and landscape degradation, with a very high residual significance.

Predicted Negative Impacts

The Project is expected to generate several negative social outcomes for local and regional communities as follows.

Sense of place and community identity: Royalla residents have expressed a strong connection to the rural character and peaceful surroundings. While the Project is located at least 1.5km from the nearest residence and avoids haulage through Royalla, its presence may still affect perceptions of place and belonging. The impact is unlikely and minimal, with low residual significance.

Heavy vehicle traffic on Monaro Highway: Increased truck movements may raise concerns about road safety and congestion. Mitigation includes a Transport Management Plan, driver education, and controls on vehicle numbers (max 25/hour). The impact is possible and minor, with medium residual significance.

Noise and dust from trucks: Residents near the access roads may experience increased exposure to noise and dust. Measures such as dust suppression, surface stabilisation, and complaint response protocols aim to reduce these effects. The impact is possible and minimal, with low residual significance.

Cumulative stress and anxiety: For some residents, the Project may compound existing stress from previous events (e.g. COVID-19, bushfires). Transparent communication, monitoring, and community engagement are key mitigation strategies. The impact is possible and minor, with medium residual significance.

Dust generation from quarry operations: Dust from extraction and stockpiling may affect air quality and household cleanliness. Mitigation includes partial enclosures, dust suppression, progressive rehabilitation, and real-time monitoring. The impact is very unlikely and major, with medium residual significance.

Visual amenity impacts: Changes to the landscape may affect scenic views. Mitigation includes a Visibility Barrier, vegetation screening, and immediate rehabilitation of upper benches. The impact is unlikely and minor, with low residual significance.

Operational noise and blasting: Quarry operations and blasting may disrupt quiet enjoyment. Mitigation includes a Noise Management System, acoustic fencing, and limited hours of operation. Blasting is restricted to once per week with community notifications. The impact is likely and minor, with medium residual significance.

Vegetation clearing and habitat disturbance: Clearing of native vegetation may concern residents and environmental groups. Mitigation includes progressive rehabilitation, biodiversity offsets, and post-closure remediation. The impact is likely and minor, with medium residual significance.

Aboriginal cultural heritage impacts: Clearing and extraction may affect Aboriginal connection to Country. Mitigation includes avoidance of key sites, salvage protocols, and continued cultural monitoring. The impact is likely and minimal, with low residual significance.

Water availability and quality: In a locality without town water, concerns about groundwater and surface water are significant. Mitigation includes water management plans, monitoring, spill protocols, and make-good provisions. The impact is very unlikely and minimal, with low residual significance.

Perceived decline in property values: Some residents may fear reduced property values. The Project's location and operational controls aim to minimise intrusion. The impact is possible and minimal, with low residual significance.

Predicted Disaggregated population impacts

The SIA identified that certain population groups may experience impacts differently due to demographic, health, financial, or cultural factors, including the following.

Reduced amenity for PAIA residents: Residents closest to the Project Site may experience changes to visual outlook, noise, and dust exposure. These impacts may affect daily comfort and outdoor use, with mitigation measures in place to reduce severity.

Heightened stress for older residents: Older individuals may be more sensitive to noise and blasting. Limited hours of operation, acoustic barriers, and community notifications aim to reduce disruption and anxiety.

Respiratory risks for children and vulnerable individuals: Children and those with respiratory conditions may be more susceptible to dust exposure. Mitigation includes dust suppression, enclosures, and real-time monitoring to ensure emissions remain within acceptable limits.

These disaggregated impacts reflect the importance of tailoring mitigation strategies to the needs of specific groups and ensuring that monitoring and engagement processes remain inclusive and responsive throughout the life of the Project.

6.16.7 Cumulative Social Impacts

Community members reflected their concern and general fatigue, having endured bushfires and COVID-19, with external pressures on their lives. Community members were aware of existing quarries and felt they had inherently incorporated management strategies for coping with the impacts. This did not lessen their expectation of impact associated with the Project. People engaged for the SIA felt they had accepted impacts in order to experience the benefits the location afforded their lifestyle. For some residents, the prospect of an additional quarry (no matter how well run) and the perceived cumulative impacts was leading to them considering leaving the area.

Although habituation was evident, Landscape (2025) considered that cumulative social impacts remained likely, but that the magnitude would reduce over time to minor resulting in a medium residual impact significance.

6.16.8 Social Impact Management and Mitigation Measures

The SIA (Landscape, 2025) identified a suite of targeted mitigation and enhancement measures to address residual social impacts and support positive community outcomes. These measures respond directly to stakeholder concerns and technical findings and are distinct from design features that shaped the SIA's impact predictions.

A range of mitigations committed to in the EIS resulting from various supporting technical studies would improve social outcomes and are listed in **Table 6.90** and **Appendix 6**. While many of these mitigations informed the assessment, they would also pose as key mitigations for post-assessment social impact management in the community.

- Reducing potential dust and noise impacts with acoustic barriers, quieter equipment, and restricted operating hours to minimise disruption and tracking outcomes through real-time air quality monitoring.
- Blasting controls, including limiting blasts to once per week, advance community notifications, and safety measures.
- Regular opportunities for community input, with annual public meetings and a Community Consultative Committee (CCC) meeting every six months to share updates and hear feedback.
- Clear communication and complaints handling, with a formal protocol in place to track concerns, ensure timely responses, and report outcomes transparently.
- Support for local infrastructure and community-led initiatives through a Planning Agreement with Council that directs contribution based on production outcomes at the Project.

The following measures have been committed to by the Applicant as a direct response to the impacts identified in the SIA (Landscape (2025) to manage social risks and enhance benefits over the life of the Project.

Community Engagement and Governance

The Applicant has committed to a comprehensive and transparent approach to stakeholder engagement throughout the life of the Project. This includes the development and implementation of a Stakeholder and Community Engagement Strategy and Plan to promote openness, dialogue, reliable monitoring, and regular reporting. The strategy is designed to ensure that community concerns are heard and responded to, and that social performance is measured and incorporated into ongoing operations.

Key components of the engagement framework include the following.

- Community Consultative Committee (CCC) established in accordance with NSW departmental guidelines to provide a formal forum for dialogue between the Applicant and key stakeholders. Community members would be invited to nominate themselves for involvement in the CCC to provide advice and feedback on Project-related issues.
- Formal complaints handling protocol, including tracking, resolution procedures, and annual reporting on community engagement activities and relevant social indicators. This would be supported by the adoption and implementation of the complaints management procedure outlined in the EIS.
- Community Infrastructure Fund, with a contribution of 12.5c/tonne of product sold, scaling up to $125,000/year once production reaches 1 million tonnes per annum. The Fund would support local infrastructure and community-led initiatives, with spending priorities determined through community-led decision-making.
- Ongoing stakeholder engagement strategy, incorporating regular community meetings, project updates, and accessible feedback mechanisms to address concerns and inform adaptive management. An annual meeting would be held to provide updates and allow reflection on the Applicant's strategy, progress, and community impacts, with outcomes incorporated into the Project's Annual Review.
- Public reporting of key monitoring outcomes, including noise, dust, traffic, and amenity, to promote accountability and support trust-building. Measures of environmental and social performance would include quantifiable outcomes such as biodiversity mitigation, dust and noise reduction, and local reinvestment.
- Integration of engagement activities within the broader environmental management framework to ensure community input informs the implementation and effectiveness of mitigation measures.
- Appointment of a nominated Project representative with authority and resources to act as the primary point of contact for community enquiries, concerns, and grievances.
- Notification protocol for key messages, including blast notifications and other operational updates, to ensure timely and consistent communication.
- Accessible technical information delivered regularly and made available through a dedicated Project website, to support community understanding and informed participation.

These commitments reflect the Applicant's intention to maintain open communication channels, foster community trust, and respond to evolving expectations over the life of the Project.

Support for Vulnerable and Disaggregated Groups

Table 6.91 demonstrates tailored measures that would be adopted for the Project to support community members that are more sensitive to change.

Table 6.91
Support for Vulnerable and Disaggregated Groups

Group	Mitigation Measures
Older residents	Advance blast notifications, reduced frequency, noise controls
Children & respiratory conditions	Dust suppression, Particulate Matter monitoring, water quality protection
Families	Construction scheduling to avoid peak outdoor times, informal green space enhancements
Mortgage-burdened households and downsizers	Visual and noise controls, rehabilitation commitments, clear communication
Aboriginal community	Avoidance of high-significance sites, salvage protocols, cultural monitoring opportunities

Adaptive Management

To respond to evolving conditions and community expectations, the Applicant would adopt:

- a commitment to review and adjust mitigation measures based on monitoring results, community feedback, and regulatory requirements;
- mechanisms to respond to unanticipated events, breaches, or non-compliance, including trigger-action-response protocols and contingency planning; and
- annual review of social impact performance, with community input incorporated into future engagement and mitigation strategies.

These measures reflect the Applicant's commitment to maintaining trust, accountability, and responsiveness throughout the life of the Project, and meet the intent of the SIMP framework as outlined in the *NSW Social Impact Assessment Guideline* (2023).

6.16.9 Social Impact Monitoring and Adaptive Management

The EIS and supporting technical studies collectively incorporate the essential components of a Social Impact Management Plan (SIMP), including monitoring, engagement, grievance resolution, and adaptive management, consistent with the *NSW Government Social Impact Assessment Guideline (2023)*. A standalone SIMP is therefore not required.

The Applicant's approach to social impact management is embedded within the broader environmental and stakeholder engagement frameworks and reflects a commitment to proactive, transparent, and responsive management over the life of the Project.

6.16.10 Conclusion

The SIA provides a detailed, evidence-based assessment of social risks, benefits and community values, ensuring that affected communities have been heard and their concerns addressed through robust planning and responsive management frameworks. The Project would result in a range of social impacts, both positive and negative, across the construction, operation, and closure phases. The SIA demonstrates that the proposed Project would be developed in a socially responsible manner, with no residual impacts considered unacceptable. While some residual impacts would remain following the implementation of mitigation measures, these are expected to be managed to reduce risks as much as is practical.

The Project has been refined to take into consideration community preferences with a comprehensive consideration of alternatives, and changes to the Project or commitments made to avoid social impacts including proximity to residences, risks of traffic conflict, biodiversity and Aboriginal heritage impact avoidance and commitments to comprehensive environmental management over the life of the Project.

It is appreciated that physical impacts can have social outcomes, and the SIA has demonstrated how social risks have been mitigated either through environmental or economic management or social impact management directly targeted at identified risks. While technical assessments and risk analyses suggested that the residual impacts of the Project are acceptable, these assessment outcomes are not expected to satisfy all community members.

The Royalla community expressed strong and enduring concerns based on experience with impacts from existing quarries, a perceived lack of regulatory enforcement and a broader sense of loss of control over local change. This had resulted in low community confidence in the Applicant and regulators alike, regardless of the predicted technical impact levels. These concerns have not been dismissed. Social acceptability would depend not only on compliance with best practice standards, but on the credibility, transparency and responsiveness of future engagement and adaptive management processes.

While the SIA concludes that residual impacts can be managed to an acceptable level from a regulatory and technical perspective, it is recognised that social acceptability remains contested and that the burden lies with the Applicant to earn, and maintain, community trust over the life of the Project.

Section 7

Evaluation of the Project

PREAMBLE

This section concludes the assessment of the Monaro Rock Quarry Project and presents a justification of the Project with regards to:

- *the Project design and consideration of alternatives;*
- *consistency with the strategic and statutory context;*
- *consistency with community views;*
- *the scale and nature of the environmental, economic, social and impacts of the project, including consistency with the principles of ecologically sustainable development;*
- *ongoing monitoring and reporting of compliance; and*
- *remaining uncertainties associated with the Project.*

The section concludes with a review of the consequences of not proceeding with the Project and a justification of why the Project is in the public interest.

7.1 Action Taken to Avoid / Minimise Impacts

The Project has been subject to a comprehensive and iterative design process, informed by geological investigations, environmental assessments, and strategic planning. The Applicant has also undertaken extensive consultation with local residents, landholders, and government agencies that has informed the Project design. Since initial feasibility studies commenced in 2020, the Applicant has progressively refined the Project to avoid or minimise environmental and social impacts to the greatest extent practicable. Alternatives were considered for the extraction footprint, processing layout, access road alignment, and final landform, with decisions guided by biodiversity values, community feedback, operational feasibility, and long-term sustainability.

Key actions undertaken to avoid or minimise impacts include the following.

- The extraction footprint was refined to avoid high-quality Box-Gum Woodland, Pink-tailed Legless Lizard habitat, and culturally significant Aboriginal sites. The final Project Site excludes areas of dense and good condition vegetation and has been positioned to take advantage of natural topographic features such as Beatty Hill to provide visual and acoustic shielding.
- Multiple access options were assessed, with the final Quarry Access Road alignment selected to minimise proximity to residences, avoid sensitive ecological areas, and respond to community preferences. Although more complex and expensive, the chosen alignment would separate heavy vehicle movements from local traffic and reduce noise and amenity impacts.
- The Visibility Barrier was strategically located and staged to provide immediate and long-term screening of operational areas. Its southern face would be progressively vegetated to mitigate visual impacts from public vantage points and nearby dwellings.
- The Project would be developed in stages, allowing for progressive clearing, infrastructure installation, and production ramp-up. This approach would limit the extent of disturbance at any one time and enable adaptive management based on environmental monitoring and operational needs.

A summary of environmental management measures that would be implemented to minimise or mitigate environmental, social and economic outcomes is presented in **Appendix 6**.

In summary, the Project has been designed with a strong emphasis on impact avoidance, minimisation, and mitigation. The Applicant has demonstrated a commitment to responsible development through detailed planning, stakeholder engagement, and the integration of best-practice environmental management. Should the Project proceed, these measures would ensure that impacts are managed to a level consistent with statutory requirements and community expectations.

7.2 Compliance with Statutory Requirements

7.2.1 Introduction

Section 4 provides an overview of the Project's compliance with relevant statutory requirements with **Tables 4.1** and **4.2** identifying where these various requirements have been addressed. The following subsections address the relevant statutory requirements that have not been considered elsewhere in the document.

7.2.2 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) is the principal legislation regulating development in New South Wales. Development consent for the Project is being sought under Part 4, Division 4.7 of the EP&A Act as the Project meets the criteria for classification as State Significant Development (SSD). Specifically, the Project would extract more than 500,000 tonnes per annum and from a total resource of approximately 5.5 million tonnes.

Section 4.15(1) of the EP&A Act outlines the mandatory matters that must be considered by the consent authority when determining a development application. These matters have been addressed throughout the Environmental Impact Statement (EIS), with a summary provided in Section 4 and statutory compliance detailed **Table 4.1** and **Table 4.2**.

Section 1.3 of the EP&A Act presents the objects of the Act. **Table 7.1** outlines each object and describes how the Monaro Rock Quarry Project is consistent with them.

Table 7.1
Objects of the EP&A Act

Object	Consistency with the Project
a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources	The Project would support regional development by providing a reliable supply of high-quality construction materials to NSW, the ACT and Queanbeyan-Palerang regions. It has been designed to minimise environmental impacts and maximise community benefits, including employment, infrastructure investment, and local procurement.
b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making	The Project has been assessed against the principles of ecologically sustainable development (see Section 7.4.2). It incorporates staged development, progressive rehabilitation, biodiversity offsets, and water-efficient operations to balance environmental protection with economic viability.
c) to promote the orderly and economic use and development of land	The Project would utilise land zoned partially zoned C2 – Environmental Conservation and partially RU2 – Rural Landscape in a manner consistent with strategic planning objectives. The design reflects detailed geological and environmental investigations and allows for staged extraction and rehabilitation.

Table 7.1 (Cont'd)
Objects of the EP&A Act

Object	Consistency with the Project
d) to promote the delivery and maintenance of affordable housing	While not directly related to housing, the Project would support housing delivery by supplying essential construction materials. The availability of aggregates is critical to meeting regional housing targets identified in strategic planning documents, particularly Goal 4 of the *South East and Tableland Regional Plan 2036* which focuses on delivering greater housing supply.
e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats	The Project has been designed to avoid high-quality vegetation and habitat areas where feasible. Residual impacts would be offset in accordance with the Biodiversity Conservation Act 2016. A Biodiversity Development Assessment Report has been prepared and offset strategies identified. A Biodiversity and Rehabilitation Management Plan would direct ongoing management.
f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage)	The Project would avoid culturally significant Aboriginal sites, including a culturally modified ring tree. Artefact salvage and subsurface investigations would be undertaken in consultation with Registered Aboriginal Parties. A Heritage Management System would guide ongoing management.
g) to promote good design and amenity of the built environment	Infrastructure such as the Quarry Access Road and processing areas have been designed to minimise visual and acoustic impacts. A Visibility Barrier and tree screening would be constructed to shield operations from nearby residences and public viewpoints.
h) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants	All buildings and infrastructure would be constructed in accordance with the Building Code of Australia and relevant Australian Standards. Safety measures, including bunding, signage, and emergency protocols, would be implemented.
i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State	The EIS has been prepared in consultation with Queanbeyan-Palerang Regional Council, Transport for NSW, the EPA, and other relevant agencies. Approvals required in the ACT and under Commonwealth legislation have been identified.
j) to provide increased opportunity for community participation in environmental planning and assessment	The Applicant has undertaken extensive community consultation since 2021, including public meetings, online webinars, newsletters, and direct engagement with landholders. A Community Consultative Committee would be established to support ongoing engagement.

7.2.3 Queanbeyan-Palerang Local Environmental Plan 2022

The principal local planning instrument for the Monaro Rock Quarry Project is the *Queanbeyan-Palerang Local Environmental Plan (LEP) 2022*. The Project Site comprises land zoned RU2 – Rural Landscape, C2 – Environmental Conservation, and SP2 – Infrastructure. Section 4.2.2 of the EIS addresses matters relating to the permissibility of the Project, with **Table 4.1** identifying where matters related to the applicable clauses within the Queanbeyan-Palerang LEP are addressed.

Table 7.2 presents an assessment of the Project against the objectives of each applicable zone. While there has been some concern expressed about development of the Project partially on land zoned for environmental conservation, areas of high conservation value have been avoided (as discussed in Section 2.4.2 and presented in the review of tree density within and adjacent the Project Site in **Figure 2.7**).

Table 7.2
Queanbeyan-Palerang LEP Zone Objectives

Objective	Consistency with the Project
Zone RU1 – Rural Landscape	
To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.	The Project would temporarily utilise land currently used for low-intensity grazing to extract a strategically important hard rock resource. The extraction would be staged and confined to a defined footprint, allowing for progressive rehabilitation. Post-quarrying, the land would be returned to a mix of grazing and conservation uses, with soil resources managed to support pasture re-establishment. This approach would maintain the long-term productivity of the land and enhance its value through improved infrastructure and landform stability.
To maintain the rural landscape character of the land.	The Project has been designed to integrate with the surrounding landscape, using natural topographic features such as Beatty Hill and Enchanted Hill to shield operations. A Visibility Barrier and tree screening would be constructed to obscure views of the quarry from nearby residences and public vantage points. Rehabilitation would include revegetation with native species and pasture grasses to restore the rural character of the site.
To provide for a range of compatible land uses, including extensive agriculture.	Extractive industry is permissible under the Resources and Energy SEPP on land where agriculture is permitted. The Project would coexist with surrounding agricultural uses and would not preclude future agricultural activities. The Infrastructure Area and Quarry Access Road have been sited to avoid fragmentation of agricultural land, and the final landform would support grazing and biodiversity conservation.
Zone C2 – Environmental Conservation	
To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values.	The Project has been designed to avoid areas of high-quality vegetation and habitat, including Box-Gum Woodland and Pink-tailed Legless Lizard habitat. The BDAR informed the final layout, and residual impacts would be offset.
To prevent development that could destroy, damage or otherwise have an adverse effect on those values.	The Project footprint was refined to exclude sensitive ecological areas and culturally significant Aboriginal sites, including a culturally modified ring tree. Construction and operational activities would be confined to the approved disturbance area, with clear delineation and limits established.
To encourage rehabilitation and regeneration of ecosystems.	Progressive rehabilitation would be undertaken throughout the life of the Project, with revegetation using native species. The Visibility Barrier would be stabilised and vegetated during construction, with extraction benches rehabilitated post-operations, to support habitat connectivity and landscape resilience.
To provide for a limited range of development and land use activities that support environmental conservation outcomes.	The Project includes offset strategies and the potential establishment of Biodiversity Stewardship Sites on adjacent land owned by the Applicant. These measures would contribute to long-term conservation outcomes and support regional biodiversity goals.
To identify and protect escarpment areas that enhance the visual amenity of Queanbeyan-Palerang Regional local government area and possess special aesthetic or conservational value.	The Project design incorporates visual screening and landform integration to protect scenic values. The upper benches of the Extraction Area have been designed to be shorter and vegetated earlier to reduce amenity impact.
To protect water quality by preventing inappropriate development within catchment areas.	Water management infrastructure has been designed to prevent pollution and manage runoff in accordance with best practice. Clean and dirty water systems would be separated, and sediment basins would be used to treat runoff before discharge or reuse.
Zone SP2 – Infrastructure	
To provide for infrastructure and related uses.	The proposed Quarry Access Road and intersection with the Monaro Highway are consistent with this objective. These components would support safe and efficient transport of quarry products and integrate with existing infrastructure networks.
To prevent development that is not compatible with or that may detract from the provision of infrastructure.	The Project would enhance infrastructure provision by constructing a dedicated access road and intersection designed to accommodate heavy vehicle movements safely and efficiently. The design has been developed in consultation with Transport for NSW and ACT authorities to ensure compatibility and compliance.

7.3 Community Views

Section 5 and Section 6.16 of the EIS, present a comprehensive overview of the community engagement undertaken for the Project and the views expressed by stakeholders throughout the planning and assessment process. **Appendix 5** presents some of the engagement materials provided to the community and Section 4 of the SIA (**Appendix N**) presents engagement undertaken for the purpose of the SIA. Engagement commenced in 2021 and continued through multiple stages of Project refinement, with feedback directly informing the design and mitigation strategies.

The Applicant has undertaken a proactive and transparent approach to community engagement, including newsletters, virtual meetings, site tours, and direct consultation with landholders.

Landholders within and adjacent to the Project Site have been consulted extensively since the Project's inception. While some have expressed support for the Project's economic potential and the Applicant's responsiveness, many have raised concerns regarding:

- dust, noise, and vibration from blasting and processing;
- groundwater availability and water quality;
- visual amenity and changes to the rural landscape;
- road safety and increased traffic on Monaro Highway; and
- property values and long-term land use compatibility.

These concerns have informed key Project refinements, including the selection of an access route via the Monaro Highway, the design of acoustic and visibility barriers, and the implementation of environmental safeguards.

Residents in the Royalla district and surrounding areas have expressed strong and enduring opposition to the Project, citing cumulative impacts from existing quarries, perceived loss of rural character, and a lack of trust in regulatory enforcement. Concerns included:

- health risks associated with dust and crystalline silica;
- loss of lifestyle values and community identity;
- distrust in government and quarry operators; and
- perceived lack of transparency and meaningful influence.

While some residents have engaged constructively through interviews and briefings, others have declined participation or actively opposed the Project through public campaigns and social media.

Registered Aboriginal Parties (RAPs) were consulted throughout the Project's development. The Project footprint was refined to avoid culturally significant sites, including a culturally modified ring tree. A Heritage Management System would guide the salvage and management of artefacts, and ongoing consultation with RAPs would continue throughout the Project life. No RAPs elected to participate in the SIA, and no Aboriginal residents of Royalla were identified during engagement.

The Applicant acknowledges that, while some landholders have engaged positively, the Project has encountered significant community opposition, particularly within the Local Study Area. The views of the community have been actively sought and incorporated into the Project design. Ongoing engagement would be maintained through a Community Consultative Committee, direct contact with neighbours, and transparent reporting via the Monaro Rock website.

The Project reflects a balance between regional development needs and community preferences and would proceed with a commitment to responsible environmental management and meaningful stakeholder engagement.

7.4 Likely Impacts of the Project

7.4.1 Introduction

The Project has been the subject of detailed review, refinement and assessment during design, planning and the preparation of this EIS. The following subsections provide a discussion of how the Project is consistent with the principles of ecologically sustainable development and a summary of the anticipated biophysical, social and economic impacts of the Project, assuming the implementation of the proposed mitigation and management measures.

7.4.2 Ecologically Sustainable Development

Ecologically sustainable development (ESD) refers to development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It requires integrating environmental protection with economic and social considerations in decision-making. In Australia, ESD is a key principle embedded in planning legislation, and Clause 192(1f) of the *Environmental Planning and Assessment Regulation 2021* requires that development applications—such as for the Monaro Rock Quarry—must include justification that considers the ESD principles outlined in Clause 193(1).

Each of the sustainable development principles has been considered throughout the design of the Project. **Table 7.3** presents the features of the Project that reflect the four principles of ESD, namely:

- the precautionary principle;
- the principle of social equity;
- the principle of the conservation of biodiversity and ecological integrity; and
- the principle for the improved valuation and pricing of environmental resources.

Table 7.3
Review of the Principles of Ecologically Sustainable Development

Principle	Description	Discussion
The Precautionary Principle	If there are threats of serious and irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In order to satisfy the principles of ESD, emphasis must be placed on anticipation and prevention of environmental damage, rather than reacting to it.	The Project has been designed with a strong emphasis on prevention, early risk identification, and adaptive management. Specialist consultants were engaged to assess risks and recommend mitigation measures. Key design refinements, such as avoiding high-quality vegetation and a culturally significant ring tree, demonstrate proactive impact avoidance. Worst-case scenarios were modelled, and a comprehensive monitoring program would guide adaptive management throughout the Project's life.
Social Equity	Social equity embraces value concepts of justice and fairness so that the basic needs of all sectors of society are met and there is a fair distribution of costs and benefits to the community. Social equity includes both inter-generational (between generations) and intra-generational (within generations) equity considerations.	The Project addresses both intra- and inter-generational equity through its design and operational commitments. It would generate direct employment for up to 30 people, prioritising local hiring and procurement. A Planning Agreement with Council would support community initiatives and infrastructure. The Project also contributes to regional economic diversification and supports housing and infrastructure development. Long-term environmental safeguards—including progressive rehabilitation, and water resource management—ensure that environmental values are preserved for future generations.
Conservation of Biological Diversity and Ecological Integrity	The protection of biodiversity and maintenance of ecological processes and systems are central goals of sustainability. Developments should not threaten ecological integrity or the conservation of threatened species.	The Project has been designed to avoid and minimise impacts to biodiversity through iterative design and comprehensive ecological assessment. The Extraction Area was refined to avoid high-value vegetation and threatened species habitat. Progressive rehabilitation using native species and locally sourced seed would restore ecological function. Biodiversity offset obligations would be met through stewardship sites and/or credit purchase, ensuring in-perpetuity conservation. The Project is consistent with this principle and would not result in unacceptable ecological impacts.
Improved Valuation and Pricing of Environmental Resources	This principle requires that environmental factors be integrated into asset and service valuation, including the "polluter pays" principle, full life cycle costing, and cost-effective environmental stewardship.	The Project incorporates environmental costs into its design and operations. Progressive rehabilitation, reuse of overburden, and water and dust management systems reflect the Applicant's commitment to responsible development. Biodiversity offsetting obligations would be met through credit purchase or stewardship sites. These measures ensure environmental protection is costed appropriately and align with regulatory and community expectations.

7.4.3 Biophysical Considerations

7.4.3.1 Introduction

Section 6 provides an assessment of Project-related impacts on key biophysical considerations within and surrounding the Project Site. The following subsections provide an overview of those assessments and residual biophysical impacts associated with the Project.

7.4.3.2 Air Quality

Air quality impacts associated with the Project were assessed by Northstar (2025) and considered particulate and odorous emissions from extraction, processing, concrete and asphalt batching, concrete recycling, and transport activities. Key findings include the following.

- Predicted annual and 24-hour concentrations of PM_{10} and $PM_{2.5}$ at all surrounding receptors are below relevant criteria under both operational scenarios. One additional exceedance of the 24-hour $PM_{2.5}$ criterion is predicted at Residence R2 during winter, when background levels are already elevated due to wood heater use. This exceedance is minor and would be managed through real-time monitoring and responsive management.
- Based on petrographic analysis, the resource contains 30–40% quartz. Predicted respirable crystalline silica (RCS) concentrations at receptors are well below the adopted conservative criterion of 3µg/m³, with maximum levels under 0.3µg/m³.
- The assessment confirmed that the Project would not trigger thresholds under the *NSW Voluntary Land Acquisition and Mitigation Policy* and would not result in cumulative impacts with nearby quarries.
- Odour modelling of asphalt batching plant emissions indicates concentrations below 1OU at all receptors, indicating that odour is unlikely to be detectable.

The outcomes of the AQIA reflect the siting of the Project at a distance of approximately 1.5km from the closest private residence and with topographic features including hills and ridgelines influencing likely dust dispersion.

A comprehensive Air Quality Management System will be implemented, including real-time air quality monitoring with proactive and reactive management applied. Management measures would include the use of water carts, dust suppressants, plant enclosures, transport limits, and tree screening. With these controls in place, the Project is expected to comply with all relevant air quality criteria and maintain acceptable amenity levels for surrounding residences. Management of air quality risks on an ongoing basis would ensure that dust levels are kept to an acceptable level and that health risks associated with particulate matter and respirable crystalline silica remain low and acceptable.

7.4.3.3 Greenhouse Gas

Predicted greenhouse gas emissions that would be generated by the Project were assessed by Northstar (2025), with emissions quantified across Scope 1, 2, and 3 categories in line with national and international protocols. The assessment considered fuel use in mobile equipment, batching operations, transport, and electricity consumption. Key findings include the following.

- Scope 1 emissions were estimated at approximately 19,532 t CO_2-e per year, representing less than 0.005% of Australia's total and 0.002% of NSW's total emissions.
- Scope 2 and 3 emissions from electricity use and upstream/downstream fuel impacts were estimated at ~4,982 t CO_2-e per year.
- The Project aligns with the *NSW EPA Climate Change Policy 2023* and would be regulated under an Environment Protection Licence (EPL).

Overall, the Project's greenhouse gas contribution is considered minor and manageable, with mitigation measures in place to reduce emissions further over time.

7.4.3.4 Human Health

A Human Health Risk Assessment (HHRA) was undertaken by EnRisks Pty Ltd (2025) to evaluate potential health risks associated with air emissions from the Project, including particulate matter and respirable crystalline silica (RCS). The assessment followed enHealth guidelines and incorporated air quality modelling from Northstar (2025). Key findings include the following.

- Predicted $PM_{2.5}$ and PM_{10} concentrations at all receptors are well below national health-based guidelines; and the Project's contribution to cumulative concentrations is minor and would not result in discernible changes to ambient air quality.
- Conservative modelling assumed RCS comprises up to 40% of $PM_{2.5}$ and PM_{10}, with additional scenarios assuming 100%; predicted RCS concentrations at worst-case receptors are at least 20 times below the silicosis guideline and 2–3 times below the lung cancer screening level; and the highest incremental RCS concentration (0.1µg/m³) is well below the adopted community air guideline of 3µg/m³.

Real-time air quality monitoring would be implemented including proactive and reactive controls to support health outcomes. Initial air samples would be analysed for RCS to validate model predictions and workplace exposure would be regulated by SafeWork NSW and the Resources Regulator. EnRisks (2025) concluded that the Project poses a low and acceptable risk to human health, with no exceedances of relevant health-based criteria expected.

7.4.3.5 Noise and Vibration

Noise and blasting impacts were assessed by Octave Acoustics (2025), covering construction, operations, transport, and blasting activities. The assessment was conducted in accordance with NSW and ACT noise policies, AS 2187.2:2006, and ANZECC guidelines. Key findings include:

- Predicted operational noise levels at all sensitive receivers comply with relevant criteria under both standard and noise-enhancing conditions. Early morning truck movements (5:00am to 7:00am) were specifically assessed and found to be within sleep disturbance thresholds.
- Noise from the Quarry Access Road construction may exceed the noise-affected level at some receivers but remains below the highly affected threshold. Mitigation includes equipment selection, scheduling, and community notification.
- There would be no intrusive impacts associated with road noise, maximum noise levels and limited risk of sleep disturbance.
- The assessment confirmed that the Project would not trigger thresholds under the *NSW Voluntary Land Acquisition and Mitigation Policy*
- Ground vibration and airblast overpressure from blasting are predicted to comply with human comfort and building damage criteria at all receptors.

Noise mitigation includes a 3m acoustic barrier along the Quarry Access Road, the establishment of the Visibility Barrier and standard measures applied in the quarrying industry with outcomes monitored at representative locations. With these safeguards, the Project is expected to operate within acceptable noise and vibration limits, with minimal disruption to surrounding communities. Regardless, a Noise Management System would be established for the Project that describes both proactive and reactive management of noise-related risks.

A Blast Management System would also be implemented, including community notifications at least 24hrs prior to any blasts.

The outcomes do not mean that the community would not hear or experience the effects of noise and blasting from time to time. However, the operation would satisfy the requirements of the NSW Government with regards to the environmentally responsible operation of the Project. The management of noise and blasting risks would occur over the life of the Project with regular monitoring published on the Company website and in annual reporting for the Project.

7.4.3.6 Flyrock

Flyrock risks associated with blasting were assessed by Fromble Corp (2025). Suitable clearance zones may be established within the Project Site to manage flyrock risks. Management measures: Blasting parameters for initial blasting events would be carefully selected to mitigate possible flyrock and to establish data to inform ongoing blast management. This process would be described in the Blast Management System for the Project.

With these safeguards, risks associated with flyrock would be adequately managed.

7.4.3.7 Visibility

A Visual Impact Assessment was undertaken by RWC (2025) to evaluate the potential visual impacts of the Project on surrounding residences and public viewpoints. The assessment incorporated spatial modelling, site inspections, and photomontage analysis of locations representative of impact to determine the extent and nature of visual change. Key findings include:

- Three primary receptor zones were identified that included residences to the south (Royalla), north (Fernleigh Park), and west (Enchanted Hill vicinity).
- Unmitigated views were compared with scenarios including the staged Visibility Barrier and tree screening. The analysis confirmed that operational areas would be largely screened by topography and vegetation, with only partial views possible from select elevated locations.
- Most receptors would experience low to moderate visual change, with effective mitigation in place; and the residence south of Enchanted Hill (Location F) may experience moderate residual impact due to proximity and direct views of the Quarry Access Road, but not of operational areas.

A Visibility Barrier with revegetated southern batters and tree screening would be constructed to screen possible views of the Project Site. Progressive rehabilitation of Extraction Area benches and a 3m acoustic fence along sealed Quarry Access Road sections would also obscure aspects of the Project Site. With these measures in place, the Project is expected to result in limited substantive long-term impacts to visual amenity, provided vegetation establishment and maintenance are successful.

7.4.3.8 Biodiversity

A Biodiversity Development Assessment Report (BDAR) was prepared by Capital Ecology (2025) in accordance with the NSW *Biodiversity Assessment Method* and *Biodiversity Conservation Act 2016*. The assessment also considered Matters of National Environmental Significance under the EPBC Act. Key findings include the following.

- The Project Site was refined to avoid high-quality vegetation, culturally modified trees, and occupied Pink-tailed Legless Lizard habitat and the Quarry Access Road was designed to avoid Box-Gum Woodland.
- Approximately 78ha of native vegetation would be cleared, including 22.44ha of critically endangered Box-Gum Woodland (EPBC and BC Act listed). Two Plant Community Types (PCTs) were identified within the Project Site including PCT3375 (Monaro-Queanbeyan Rolling Hills Grassy Forest) and PCT3376 (Southern Tableland Grassy Box Woodland). PCT3376 is critically endangered Box-Gum Woodland. Indirect impacts to native vegetation as a result of noise, dust and edge effects have been accounted for in the BDAR and biodiversity offsetting strategy.
- A number of threatened flora and fauna species have also been identified within the property and the Project Site.

- Guidelines for the consideration of threatened entities for NSW and Commonwealth legislation direct the assessment of significance of impact as a result of proposed development. Box-Gum Woodland and Pale Pomaderris are SAII entities under the NSW BC Act.
- Ecosystem and species credits would be retired to offset residual impacts, with options including a Biodiversity Stewardship Site on adjacent land and/or credit purchase.
- Assessment under the EPBC Act indicates that there are likely to be significant impacts to Commonwealth-listed Box-Gum Woodland and to Gang-gang Cockatoo foraging habitat, Key's Matchstick Grasshopper habitat, and Small Purple-pea habitat. These impacts would require approval under the EPBC Act. The assessment of significance does not take into account the required offset of impacts to account for loss to biodiversity value.

With avoidance, mitigation, and offsetting measures in place, the Project is considered to satisfy relevant biodiversity legislation and policies. Residual impacts of the Project would be offset in accordance with the NSW Biodiversity Offsetting Scheme which would see the conservation of habitat in perpetuity.

7.4.3.9 Aboriginal Heritage

An Aboriginal Cultural Heritage Assessment was undertaken by Past Traces (2025a) in accordance with NSW guidelines and in consultation with 23 Registered Aboriginal Parties (RAPs). The assessment included desktop review, predictive modelling, and extensive field surveys with RAP representatives. Key findings include the following.

- 32 Aboriginal heritage items were identified including
  - 16 isolated finds or artefact scatters,
  - Two culturally modified trees (CMTs),
  - Eight isolated finds or artefact scatters with areas of PAD
  - Six areas of PAD.
- Of the sites identified, 19 occur within the Project Site and would be impacted. Each of the sites is consistent with the predictive model prepared by Past Traces (2025) and while the cultural significance of these sites remains high, most are considered common and of low scientific value.
- 13 sites would not be impacted and would be fenced off during construction activities to avoid inadvertent impact.
- The CMTs consisted of a ring tree (MQ8) and scarred tree (MQ9) which were assessed as highly significant and would be avoided by the Project.
- No objections were raised by RAPs regarding the assessment findings or proposed mitigation measures. RAPs participated in field surveys and would be involved in artefact return-to-country protocols.

Targeted surface collections and subsurface investigations for artefact sites and PADs within the disturbance footprint as well as barrier fencing with 10m buffers around retained sites would be implemented. With these safeguards and redesigns in place, the Project is not expected to result in significant impacts to Aboriginal cultural heritage.

7.4.3.10 Historic Heritage

Historic heritage was not identified as a key issue for the Project. The Project Site is not listed on the State Heritage Register, is not near any listed items, and contains no known historical archaeological relics. A single historic heritage site was identified in the ACT within the area proposed for the Quarry Access Road. The site consisted of bricks and other rubble estimated to have been remaining from the original railway line construction. Past Traces (2025b) indicated that this site was not significant and would not warrant inclusion on a heritage register.

7.4.3.11 Traffic and Transportation

A Road Transport Assessment was undertaken by The Transport Planning Partnership (2025) to evaluate the Project's effects on the surrounding road network, including construction and operational phases. The Road Transport Assessment concluded the following with regard to potential Project-related traffic impacts.

- Construction-related traffic on local roads and intersections (Mates Drive, Monaro Station Road, and Old Cooma Road) would be accommodated within the capacity of those roads with impacts to peak traffic flow expected to be negligible. Once operations commence, these roads would only be used occasionally for light vehicle access or in an emergency.
- Maximum hourly heavy vehicle traffic generated by the Project either to or from the north only or to or from the south only on the Monaro Highway would have acceptable impacts on the road network.
- The proposed Monaro Highway / Quarry Access Road intersection would provide adequate capacity for forecast maximum hourly Project-related traffic.
- Existing approved heavy vehicle routes to be utilised by Project-related traffic are of an adequate standard to accommodate Project-related heavy vehicles.

Overall, it is considered that the proposed transportation activities of the Project would remain within the capacity of the road network and would not result in substantial delays during peak hour periods. Traffic safety risks would be managed through the design of the proposed intersection and through the management of driver behaviour through a Drivers Code of Conduct. It is accepted that during certain busy periods, transport operations would have to adapt to traffic congestion along the transport route, however the same impacts apply to all road users during these periods. These times may be managed by pre-planning and coordination of transport requirements.

It is acknowledged that although risks associated with transport-related conflict on local roads in Royalla, Fernleigh Park and Googong would largely be avoided through the selected location of the Quarry Access Road, vehicles travelling from these areas may experience Project traffic if they enter the Monaro Highway. Despite this, the configuration of the Quarry Access Road and the intersection with the Monaro Highway remains the preferred access option.

7.4.3.12 Soils and Land Capability

A Soil and Land Capability Assessment was undertaken by SEEC (2025a) to evaluate the suitability of site soils for rehabilitation and the potential for erosion or contamination. Key findings include the following.

- The majority of soil units (soil units 2, 3 and 4) can provide a suitable topsoil resource for use in rehabilitation, subject to amelioration and fertilising.
- Land capability was mapped as Class III to VII, with most areas classified as Class V-VI that would be suitable for low-impact uses such as grazing and conservation post-rehabilitation.
- Risks of conflict or impact to other land uses in the locality would be minor and unlikely to occur, however, where these land uses relate to the value placed on local amenity, impacts may be experienced by the community.

The Project is expected to maintain soil health and land capability, supporting long-term rehabilitation and land use compatibility. Risks of conflict or impact to other land uses in the locality would be minor and unlikely to occur, however, where these land uses relate to the value placed on local amenity, impacts may be experienced by the community. These impacts are recognised and would be mitigated as much as practical.

7.4.3.13 Surface Water

A Surface Water Management Report was prepared by SEEC (2025b) to develop a water management strategy that incorporates erosion and sediment controls and the outcomes of a water balance assessment.

The Project Site has been designed to include erosion and sediment controls that would support the management of water. The Project would generate sediment-laden runoff which would be directed to sediment dams within the Project Site. The accumulated water would either be used for dust suppression and watering of rehabilitated areas, or tested, and if necessary treated, to ensure that it meets quality criteria nominated in the Project's EPL, prior to controlled discharge after rainfall events through the Project's proposed licensed discharge point(s). As a result, the Project would not have a significant impact on surface water quality in downstream environments.

Water demand for the Project would be met by rainfall and runoff captured on site, and supplemented by a groundwater bore, and during the final extraction stage, by groundwater inflows to the extraction area. This proposed water management strategy of capture, re-use and recycling provides for the efficient use of water resources whilst simultaneously reducing the likelihood of uncontrolled discharge from the Project Site.

During dry periods, water supply via rainfall runoff would be limited and active management of water sources may be required and/or water intensive uses such as concrete batching curtailed. Water supply for dust suppression would be reliable and prioritised.

7.4.3.14 Groundwater

A numerical groundwater model has been developed by Hydrogeologist (2025) to replicate the groundwater setting and predict changes to groundwater setting as a result of the development of the Extraction Area for the Project. The groundwater model is considered fit for the purpose of predicting groundwater impacts in this locality and this has been confirmed through independent peer review.

The groundwater impact assessment identified the potential for aquifer drawdown to exceed the *NSW Aquifer Interference Policy's* Minimal Impact Considerations threshold (2m) at one registered private bore. However, this prediction is considered conservative, and it is unlikely that the predicted impacts would occur. Regardless, should access be granted, the Applicant would monitor water levels in the bore and if impacts from the Project are identified, make good provisions would be triggered. The make good provisions available to the landowner would be agreed in consultation, however options for make good would be described in the Groundwater Management Plan for the operation.

Impacts to groundwater dependent ecosystems are not expected and there would be no change to groundwater quality or the beneficial use category of the groundwater source beyond 40m from the Project Site.

Regardless of the above, a Groundwater Management Plan would be prepared and implemented for the Project that would include management and mitigation measures including triggers for reactive management and the protocols to be followed in the event of a groundwater incident. A groundwater monitoring program would be established that would record any changes to the groundwater setting and inform reactive management.

The Project would require up to 42.4ML per year of groundwater from the Lachlan Fold Belt MBD Groundwater Source of the Water Sharing Plan for the Lachlan Fold Belt MBD (Other) Management Zone Groundwater Sources. The Applicant is in the process of securing the necessary entitlements.

With the implementation of the proposed management and mitigation measures, the Project is considered a low risk to groundwater systems in the vicinity of the Project Site.

7.4.3.15 Hazards

Hazard assessments were undertaken by RWC (2025) to evaluate bushfire risk, hazardous materials handling, and public safety. Key findings include the following.

- Bushfire risk: The Project Site has been mapped as bush fire prone with areas of Vegetation Category 1 (high risk) and Vegetation Category 3 (medium risk). The Project Site was assessed to have a bush fire attack level of BAL-29, requiring a 24m Asset Protection Zone and may include a 10m outer protection zone.
- Hazardous materials: no explosives stored on site; delivered by licensed mobile unit on blast days; diesel and other hydrocarbons stored per Australian Standards; and spill response procedures and Pollution Incident Response Plan to be implemented.

With these measures, the Project is expected to operate safely with low risk to public safety and environmental assets.

7.4.4 Social and Economic Considerations

7.4.4.1 Economic Considerations

An Economic Impact Assessment was undertaken by Gillespie Economics (2025) to evaluate the net economic benefit of the Monaro Rock Quarry Project to NSW and the Queanbeyan-Palerang LGA. The assessment included a Cost-Benefit Analysis (CBA) and Local Effects Analysis (LEA). Key findings include the following.

- The Project would deliver a net social benefit to NSW of $41 million (present value) at a 7% discount rate, with robust outcomes under all tested sensitivities;
- The Project would generate substantial economic uplift for the Queanbeyan-Palerang LGA, including 30 direct local jobs (53 total including flow-ons), $782,000 in new annual wages retained by residents, and $9.5 million in retained supplier expenditure each year
- The Project fully internalises environmental externalities via best-practice mitigation, offsets, and infrastructure funding by the Applicant.

Considering these outcomes, the Project is economically efficient, regionally beneficial, and aligned with public interest objectives

7.4.4.2 Social Considerations

A Social Impact Assessment was undertaken by Landscape Research + Communications (2025) in accordance with the NSW Social Impact Assessment Guideline (2023). The SIA provides a detailed, evidence-based assessment of social risks, benefits and community values, ensuring that affected communities have been heard and their concerns addressed through robust planning and responsive management frameworks. The Project would result in a range of social impacts, both positive and negative, across the construction, operation, and closure phases. The SIA demonstrates that the proposed Project would be developed in a socially responsible manner, with no residual impacts considered unacceptable. While some residual impacts would remain following the implementation of mitigation measures, these are expected to be managed to reduce risks as much as is practical.

The Project has been refined to take into consideration community preferences with a comprehensive consideration of alternatives, and changes to the Project or commitments made to avoid social impacts including proximity to residences, risks of traffic conflict, biodiversity and Aboriginal heritage impact avoidance and commitments to comprehensive environmental management over the life of the Project.

It is appreciated that physical impacts can have social outcomes, and the SIA has demonstrated how social risks have been mitigated either through environmental or economic management or social impact management directly targeted at identified risks. While technical assessments and risk analyses suggested that the residual impacts of the Project are acceptable, these assessment outcomes are not expected to satisfy all community members.

The Royalla community expressed strong and enduring concerns based on experience with impacts from existing quarries, a perceived lack of regulatory enforcement and a broader sense of loss of control over local change. This had resulted in low community confidence in the Applicant and regulators alike, regardless of the predicted technical impact levels. These

concerns have not been dismissed. Social acceptability would depend not only on compliance with best practice standards, but on the credibility, transparency and responsiveness of future engagement and adaptive management processes.

While the SIA concludes that residual impacts can be managed to an acceptable level from a regulatory and technical perspective, it is recognised that social acceptability remains contested and that the burden lies with the Applicant to earn, and maintain, community trust over the life of the Project.

7.5 Cumulative Impacts

Engagement with members of the community has identified existing concerns about the experience of existing quarries in the local area or for residents that live closer to the existing operations. While these operations are too distant from the Project to result in cumulative noise and air quality impacts, it is appreciated that existing operations may use the Monaro Highway and contribute to congestion or risks of conflict between passenger and heavy vehicles. However, impacts associated with existing operations would not be exacerbated or cross any regulatory thresholds due to the presence of the Project.

The Project is unique in that components would be developed in two different States and require separate approval for the development and operation of the single Project. Equally, planning and development guidance in the ACT and NSW varies and the assessment has had to consider possible impacts or management requirements in each State. The assessment has demonstrated that on a cumulative basis impacts would be acceptable.

- **Air quality impacts** have been considered for residences in NSW and within the ACT demonstrating that all outcomes would be acceptable.
- **Greenhouse gas emissions** have been assessed for the Project as a whole, taking into account quarrying operations as well as product transport that would occur with the ACT and NSW.
- **Human health risks** have been considered at privately-owned residences in NSW and the ACT and are predicted to be low and acceptable.
- **Noise-related impacts** may be experienced with NSW and the ACT and assessment has demonstrated that construction and operational noise would be managed over the life of the Project.
- **Blasting risks** associated with airblast overpressure, vibration and flyrock would also be suitable with private residences in both NSW and the ACT considered for assessment. Airplanes approaching Canberra Airport would not be at risk from flyrock based on the outcomes of assessment.
- **Biodiversity impacts** would occur in NSW and the ACT. The BDAR (Capital Ecology, 2025) has considered the cumulative outcome with regards to assessment in both NSW and the ACT and concluded that impact outcomes have been thoroughly assessed in both locations and the cumulative impacts would not exceed any thresholds or introduce new types of impacts not previously considered.

- **Aboriginal heritage impacts** have been assessed in NSW and the ACT and while there are sites and areas of PAD in both areas, the impacts would remain consistent in both regions and would not represent a significant impact to Aboriginal cultural heritage values.
- A single **historic heritage** site has been identified in the ACT that comprised rubble considered to have been present from railway construction. The site does not represent a significant site that warrants inclusion on a heritage register. There were no historic heritage sites identified in NSW.
- **Project traffic** would enter the public road network predominantly in the ACT at a dedicated intersection with the Monaro Highway. Potential transport risks are considered acceptable, and the ACT government has provided preliminary support for the proposed intersection configuration (see **Appendix 7**). Limited traffic would be generated during site establishment on local roads within NSW including Mates Drive, Monaro Station Road and Old Cooma Road. Traffic safety risks for the Project as whole would be managed through a Transport Management Plan and Drivers Code of Conduct.
- **Water** would be sourced predominantly from rainfall runoff and groundwater collected within the Project Site. Water resources are located at the Project Site, but their management may have impacts in the ACT as drawdown may be experienced across the border and any water that leaves the Project Site would eventually enter the ACT through Tuggeranong Creek, Jerrabomberra Creek or Guises Creek. Potential impacts to water resources in NSW and the ACT would be managed over the life of the Project and monitoring would be undertaken to demonstrate management has been successful and outcomes are consistent with assessment predictions.
- **Bush fire risks** existing within NSW and the ACT and would be managed across all aspects of the Project Site. The management of hazardous materials also has the potential to cause impacts in NSW and the ACT through ignited fires or contamination. Risks from hazardous materials would be managed of the life of the Project.
- **Economic outcomes** for the Project would be experienced equally in NSW and the ACT as employment opportunities and supplier benefits may occur across both regions.
- **Social impacts** may be experienced in the Area of Social Influence that encompasses part of the suburbs of Royalla, Fernleigh Park, Googong and Tuggeranong. Social amenity impacts are most likely to be experience closest to the Project Site, but these includes aspects of transportation outcomes as well as noise, dust and visual amenity outcomes that may be experienced in a number of locations.

7.6 Compliance Monitoring and Communication

The Applicant would implement a comprehensive compliance monitoring and communication framework to ensure that environmental performance, operational safety, and stakeholder obligations are met throughout the life of the Project. The framework would be described in a series of environmental management plans and systems that would be prepared following an approval of the Project and implemented during the relevant operations. The environmental management plans and systems would include the following.

- Environmental Management Strategy
- Transport Management Plan
- Biodiversity and Rehabilitation Management Plan
- Water Management Plan (incorporating surface water and groundwater management and an Erosion and Sediment Control Plan)
- Stakeholder and Community Engagement Strategy and Plan
- Blast Management System
- Noise Management System
- Air Quality Management System
- Aboriginal Heritage Management System

The monitoring framework for the Project would be described in the Environmental Management Strategy and relevant management plans or systems and would reflect the commitments made in the EIS and supporting technical studies and aligns with statutory requirements and best-practice guidelines. In summary, the Applicant would:

- Implement Environmental Management Plans and Systems with each incorporating monitoring protocols, reactive and adaptive management mechanisms.
- Undertake real-time and scheduled monitoring of key environmental indicators, including particulate matter, noise levels, water quality, and biodiversity health, with results reviewed promptly for compliance and trend analysis.
- Maintain a secure monitoring database to support data integrity, retrieval, and longitudinal analysis across the life of the Project.
- Report non-compliances to relevant authorities in accordance with approval conditions and licence requirements and implement corrective actions as needed.
- Publish monthly and annual monitoring reports on the Project website, including summaries of dust, noise, traffic, water, and rehabilitation performance.
- Conduct Independent Environmental Audits at regular intervals, with audit outcomes made publicly available.
- Maintain open communication channels with stakeholders, including notifications for key operational activities (e.g. blasting), updates on environmental performance, and opportunities for feedback.

- Support a Community Consultative Committee (CCC) meeting biannually, providing a formal platform for dialogue and shared oversight.
- Implement a formal complaints protocol, including tracking, resolution procedures, and annual reporting.
- Appoint a nominated quarry representative to act as the primary point of contact for enquiries, concerns, and grievances.
- Integrate monitoring outcomes into the Project's Annual Review, with adjustments to mitigation measures made as required under adaptive management protocols.

These measures reflect the Applicant's commitment to regulatory compliance, environmental stewardship, and transparent communication. The compliance framework would be reviewed periodically to ensure alignment with evolving conditions, community expectations, and statutory obligations.

7.7 Remaining Uncertainties

As identified in Section 7.4.2, the Applicant has employed a comprehensive and iterative design process to identify and reduce potential Project-related risks. This process has been informed by detailed technical studies, environmental assessments, and stakeholder engagement, resulting in a Project design that avoids or mitigates impacts to an acceptable level.

Throughout the assessment, the Applicant has adopted a precautionary approach, modelling worst-case scenarios for each key environmental and social risk. As a result, the Applicant contends that there is limited potential for unanticipated Project-related impacts greater than those assessed. Notwithstanding this, **Table 7.4** presents remaining Project-related uncertainties that may result in impacts greater than those assessed, and the mitigation measures proposed to manage each.

Table 7.4
Remaining Uncertainties and Proposed Mitigation Measures

Remaining Uncertainty	Proposed Mitigations Measure(s)
Groundwater drawdown or impacts to surrounding users may be greater than predicted.	Meter all groundwater extraction points; monitor standing water levels in surrounding bores; reconcile monthly volumes; review model predictions and revise if needed; secure additional WALs if required.
Noise or air quality emissions may exceed predictions under certain conditions.	Implement real-time monitoring; respond to complaints with targeted investigations; modify operations or equipment to ensure compliance with relevant criteria.
Rainfall may be substantially lower than predicted.	Although supplementary water sources are available, the Applicant may need to curtail some operations (principally concrete batching) to adapt the operation to available water supply.
Surface water flows may exceed design assumptions, leading to infrastructure failure or uncontrolled discharge.	Inspect and maintain water management infrastructure monthly and after rainfall >15mm/24 hr; apply flocculants/coagulants as needed; ensure sediment basins meet ESC requirements.

Table 7.4 (Cont'd)
Remaining Uncertainties and Proposed Mitigation Measures

Remaining Uncertainty	Proposed Mitigations Measure(s)
Unanticipated Aboriginal or historic heritage objects may be identified during construction.	Implement the Unexpected Finds Protocol; cease work in affected areas; consult RAPs and Heritage NSW; register and manage finds in accordance with statutory requirements.
Additional VENM/ENM or concrete waste may be imported beyond current estimates.	Monitor volumes at weighbridge; ensure compliance with resource recovery exemptions; update management plans and reporting protocols as needed.
Rehabilitation outcomes may not meet proposed completion criteria.	Engage qualified experts to review rehabilitation progress; implement recommended amendments to soil treatment, species selection, or landform design as needed.

7.8 Suitability of the Site

The suitability of the site for the Monaro Rock Quarry Project has been assessed with reference to its physical characteristics, strategic planning alignment, environmental capacity, and compatibility with surrounding land uses. The site is considered highly suitable for the proposed development, based on the following factors.

Physical and Geological Attributes

The site's physical characteristics and underlying geology make it well-suited to long-term quarrying operations, with minimal constraints to extraction, infrastructure, or rehabilitation.

- High-quality resource: The Project Site contains approximately 27.9 million tonnes of rhyodacitic ignimbrite within the Deakin Volcanics, confirmed through extensive drilling and geophysical surveys. The resource is ideal for concrete aggregates, road base, and other construction materials.
- Topography and landform: The site features gently undulating terrain suitable for staged extraction and rehabilitation. The natural ridgelines of Beatty Hill and Enchanted Hill provide acoustic and visual shielding.
- Separation from sensitive receptors: Operational areas are located at least 1.5km from the nearest residence, with additional mitigation measures including a 3m acoustic barrier along the Quarry Access Road and a vegetated Visibility Barrier.

Strategic and Zoning Compatibility

The Project is consistent with applicable zoning provisions and aligns with regional and local planning strategies that support extractive industry development.

- Zoning: The site is zoned RU1 – Primary Production and C2 – Environmental Conservation under the Queanbeyan-Palerang LEP 2022. Extractive industries are permissible with consent under both zones via the Resources and Energy SEPP.
- Planning alignment: The Project supports key directions of the *South East and Tablelands Regional Plan 2036*, including sustainable resource use, regional infrastructure supply, and biodiversity corridor management. It also aligns with the Queanbeyan-Palerang *Local Strategic Planning Statement – Towards 2040* and *Regional Economic Development Strategy 2023*, which promote extractive industry as essential to housing and infrastructure delivery.

Environmental Capacity and Design

Environmental assessments confirm that the Project Site can accommodate the proposed development with appropriate safeguards in place to manage biodiversity, water, and amenity impacts.

- Avoidance of sensitive areas: The extraction footprint was refined to avoid high-quality Box-Gum Woodland, Pink-tailed Legless Lizard habitat, and culturally significant Aboriginal heritage sites.
- Design controls: The Project has been designed to operate within the Maximum Harvestable Right Dam Capacity and includes contingency groundwater supply via licensed bore.

Infrastructure and Community Interface

The Project Site is well-connected to regional infrastructure and has been designed to minimise impacts on surrounding communities while contributing to local economic development.

- Dedicated access: A 4km Quarry Access Road connects the site to the Monaro Highway, avoiding local roads and minimizing amenity impacts. The road includes a sealed section, acoustic fencing, and a grade-separated railway bridge crossing.

Alternatives and Site Selection

The site and design of the Monaro Rock Quarry Project were selected following a comprehensive alternatives assessment, which considered multiple extraction areas, access routes, infrastructure configurations, and operational staging options. The preferred design reflects a balance between resource quality, environmental protection, community feedback, and long-term operational viability.

Principal to this consideration is the separation distance between the operational areas and privately-owned residences. Not only does the 1.5km buffer afford a level of natural mitigation of noise and air quality outcomes, changes to outlook and visual impacts are associated with distant views mitigated by existing topographic features.

The selection of the final configuration of the Quarry Access Road was informed by many factors including design and construction complexity, distance, cost and planning risk, however the most determinative factor was feedback from the community that supported any opportunity to separate heavy vehicle traffic from private residences.

7.9 Consequences of Not Proceeding

If the Project does not proceed, the primary consequence would be the lost opportunity to develop a strategically located hard rock quarry with ancillary activities that support the construction and infrastructure sectors with the Queanbeyan-Palerang and ACT regions. The Project has been designed to supply high-quality hard rock, concrete, asphalt, and recycled materials, and its absence would likely increase reliance on more distant or less suitable sources, with associated environmental and economic costs. Existing hard rock resource and approaching exhaustion and demand for construction material is expected to continue to grow as population increases and building methods transition to more structural concrete formwork. An assessment of the

Economic Need for the Project has identified that without any new hard rock quarry approvals, demand would exceed supply from existing reserves from 2029 onwards, with a cumulative shortfall of resource of approximately 41Mt by 2050.

The Project would deliver significant regional benefits, including the creation of 14–20 full-time jobs and an additional 10 transport-related roles, with a strong focus on local employment. Local procurement strategies and a Planning Agreement with Council would further support community infrastructure, environmental regeneration, and economic resilience. Without the Project, these employment and investment opportunities would not materialise, potentially impacting regional growth and the viability of local businesses.

The Project also represents a significant investment in sustainable resource development, with integrated water management, progressive rehabilitation, and adaptive environmental monitoring. Its refusal could discourage future investment in responsibly managed extractive industries in the region, limiting the potential for further exploration and development.

While not proceeding would avoid some residual environmental and social impacts, these have been assessed as low and manageable with the proposed safeguards. On balance, the Project offers an opportunity to meet regional demand for construction materials while delivering lasting economic, environmental, and social benefits.

7.10 The Public Interest

In accordance with Section 4.15(1)(e) of the Environmental Planning and Assessment Act 1979 (EP&A Act), the consent authority must consider whether the Project is in the public interest. While the concept is inherently multifaceted, encompassing environmental, economic, social, and cultural dimensions, it can be evaluated through the principles of ecologically sustainable development (ESD), statutory compliance, and community expectations.

- As outlined in Section 7.4.2, the principles of ESD emphasise the sustainability of society across generations and the preservation of ecosystem processes on which life depends. These principles require a balanced approach to development—ensuring that outcomes serve the broader public interest, not solely the interests of the Applicant. The Project's design reflects this balance, integrating precautionary planning, social equity, biodiversity conservation, and environmental valuation.
- The objects of the EP&A Act represent key planning and development considerations that must be addressed to ensure development in NSW remains in the public interest. **Table 7.1** demonstrates how each of these objectives would be met by the Project. While some members of the NSW community may disagree with specific objects or question whether the Project satisfies them, this reflects the inherent nature of public interest. Individual views may differ, but broader societal interests must guide decision-making. In this way, the lives of people across NSW, and arguably Australia, are better served by the Project's alignment with the planning and development priorities of the NSW Government.

- Community engagement has revealed a diversity of views. While some landholders and stakeholders support the Project's economic potential and employment opportunities, others—particularly residents in the Royalla district—have expressed concerns about amenity, health, and cumulative quarrying impacts. These concerns have informed key Project refinements, including the selection of a dedicated Monaro Highway access route, the design of acoustic and visibility barriers, and the implementation of environmental safeguards.
- The Applicant currently maintains a presence in the region and anticipates employing up to 30 people directly, with additional roles in transport and supply. A Planning Agreement with Council would support community infrastructure, environmental regeneration, and local economic resilience. The Project would also contribute to the supply of essential construction materials for the ACT and surrounding NSW regions, supporting housing and infrastructure development.
- Public submissions received during the exhibition period will provide further insight into community sentiment. The Applicant will review all submissions and respond to issues raised, ensuring transparency and accountability throughout the assessment process.

On balance, the Project is considered to be in the public interest as it has been designed to accommodate the preferences of the local community and would support the immediate need for resources as well as representing a long-term prospect with lasting benefits for the region.

7.11 Conclusion

The Project represents a 'greenfield' quarry development in a location that has not seen a new quarry approval in over 25 years. A supply and demand analysis for the region has indicated there is a need for a new source of hard rock resources in coming years. The Project would satisfy 30-35% of local demand for aggregates in the long term with future shortfalls in supply expected even with the Project in place. Regardless, the proposed change in land use from existing rural residential and agricultural land use to an industrial land use represents a significant change for some members of the community. The Project represents a source of amenity impacts that are not currently experienced or that have been present for some time and have become habituated (such as existing quarries or traffic on the Monaro Highway). Proposed changes in the local area represent a change that may be perceived by the community as beyond their control.

The Project has been designed in accordance with modern quarrying standards and incorporates feedback from community engagement and government agencies to minimise impacts and enhance outcomes. The Project Site is ideally located to provide a buffer to privately-owned residences and permit access to the Property that avoids traffic-related conflict on local roads. Decisions on Project design and operations have been made with consideration of community input with the community preferences a determinative input to the final location of the Quarry Access Road. The Project would provide a reliable, long-term supply of high-quality construction materials to support infrastructure and housing development in the Queanbeyan-Palerang and ACT regions. It would also deliver direct employment for up to 30 people and stimulate local supply opportunities, contributing to the economic resilience of the Queanbeyan-Palerang region. A Planning Agreement with Council would further support community led initiatives.

Environmental assessments have demonstrated that the Project can be developed and operated in a manner that satisfies relevant statutory criteria. Key design refinements such as the selection of the access road alignment, avoidance of high-value vegetation and a culturally significant ring tree, reflect the Applicant's commitment to environmentally responsible development. Community concerns were raised regarding cumulative impacts, particularly in relation to traffic and amenity. However, technical assessments confirm that the Project would comply with all relevant requirements. Environmental monitoring, adaptive management and regular reporting would ensure that any unexpected issues are addressed transparently and effectively.

While technical assessments and risk analyses suggested that the residual impacts of the Project are acceptable, these assessment outcomes are not expected to satisfy all community members. It is recognised that social acceptability remains contested and that the burden lies with the Applicant to earn and maintain community trust over the life of the Project.

Should it be approved, the Project would represent a modern and responsible approach to resource development that would deliver substantial economic and social benefits while maintaining a strong commitment to environmental best practice.

Section 8

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Appendix G Biodiversity Development Assessment Report

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Appendix 1

Secretary's Environmental Assessment Requirements

(Total No. of pages including blank pages = 12)

Department of Planning and Environment

Our ref: Monaro Rock Quarry Project (SSD-27223807)

Mr John Hewitt
Chief Executive Officer, Monaro Rock Pty Ltd
PO Box 429
Queanbeyan, NSW, 2620

18/08/2023

Subject: Amendment to Planning Secretary's Environmental Assessment Requirements

Dear Mr Hewitt

I refer to your request to modify the Planning Secretary's environmental assessment requirements (SEARs) for the Monaro Rock Quarry Project (SSD-27223807).

The department notes that the Monaro Rock Quarry Project now proposes to extract 1,000,000 tonnes of hard rock material per annum and transport quarry products at a rate of 25 laden trucks per hour and no more than 200 laden trucks per day. Accordingly, please find attached modified SEARs which have been updated to account for these changes to the scope of the proposal.

Your SEARs will expire two years from the date of this amendment. If you would like to seek an extension, you should contact the department at least three months prior to the expiry date.

If your application is not submitted within two years (or by the agreed extension date), you will need to make a new application for SEARs to progress your project.

If you have any questions, please contact Jarrod Blane on 02 8275 1831 or via email at jarrod.blane@dpie.nsw.gov.au.

Yours sincerely,

JEvans

Jessie Evans
Director, Resource Assessments
Resource Assessments

as delegate for the Planning Secretary

Planning Secretary's Environmental Assessment Requirements

Section 4.12(8) of the *Environmental Planning and Assessment Act 1979*

Part 8 of the *Environmental Planning and Assessment Regulation 2021*

Application Number	SSD-27223807
Project	Monaro Rock Quarry Project, which involves: • extraction of up to 1,000,000 tonnes per annum of hard rock aggregates and road construction materials for 30 years; • transporting products from the site via the Monaro Highway at a rate of 25 laden trucks per hour and no more than 200 laden trucks per day; • construction of site infrastructure, such as amenity barriers, internal haul roads and a level crossing of the Tuggeranong to Bombala railway corridor; and • progressively rehabilitating the site.
Location	Mates Drive, Royalla, NSW, 2620 within Queanbeyan-Palerang Local Government Area
Proponent	Monaro Rock Pty Ltd
Date of Issue	18 August 2023
General Requirements	The Environmental Impact Statement (EIS) must meet the minimum form and content requirements as prescribed by Part 8 of the *Environmental Planning and Assessment Regulation 2021* (EP&A Regulation) and must have regard to the *State Significant Development Guidelines*. In particular, the EIS must include: • a stand-alone executive summary; • a full description of the development, including: – the resource to be extracted, including the amount, type and composition; – the site layout and extraction plan, including cross-sectional plans; – the production process and processing activities, including the in-flow and out-flow of materials and points of discharge to the environment; – surface infrastructure and facilities (including any infrastructure that would be required for the development, but be the subject of a separate approvals process); – a waste (overburden, rejects, tailings etc.) management strategy; – a water management strategy; – a rehabilitation strategy to apply during, and after completion of, extraction operations, and proposed final use of site; and – the likely interactions between the development and any existing, approved, or proposed development in the vicinity of the site; • a strategic justification of the development focusing on site selection and the suitability of the proposed site, and the alternatives considered;

- a list of any approvals that must be obtained before the development may commence;
- an assessment of the likely impacts of the development on the environment, focusing on the key issues identified below, including:
  - a description of the existing environment likely to be affected by the development, using sufficient baseline data;
  - an assessment of the likely impacts of all stages of the development, including any cumulative impacts, taking into consideration any relevant laws, environmental planning instruments, guidelines, policies, plans and industry codes of practice;
  - a description of the measures that would be implemented to avoid, minimise, mitigate and/or offset the likely impacts of the development, and an assessment of:
    - whether these measures are consistent with industry best practice, and represent the full range of reasonable and feasible mitigation measures that could be implemented;
    - the likely effectiveness of these measures; and
    - whether contingency measures would be necessary to manage any residual risks; and
  - a description of the measures that would be implemented to monitor and report on the environmental performance of the development;
- a consolidated summary of all the proposed environmental management and monitoring measures, identifying all the commitments in the EIS;
- consideration of the development against all relevant environmental planning instruments (including Part 2 of the *State Environmental Planning Policy (Resources and Energy) 2021)*;
- the reasons why the development should be approved, having regard to:
  - relevant matters for consideration under the *Environmental Planning and Assessment Act 1979* (the Act), including the objects of the Act;
  - the biophysical, economic and social impacts of the development, including the principles of ecologically sustainable development;
  - the suitability of the site with respect to potential land use conflicts with existing and future surrounding land uses;
  - feasible alternatives to the development (and its key components), including the consequences of not carrying out the development;
- a signed declaration from the author of the EIS, certifying that the information contained within the document is neither false nor misleading.

Notwithstanding the key issues specified below, the EIS must include an environmental risk assessment to identify the potential environmental impacts associated with the development.

While not exhaustive, **Attachment 1** contains a list of some of the environmental planning instruments, guidelines, policies, and plans that may be relevant to the environmental assessment of this development.

The EIS must also be accompanied by a Quantity Surveyor Report for Capital Investment Value and Employment, providing:

- a detailed calculation of the estimated capital investment value (CIV) of the development, prepared by a AIQS Certified Quantity Surveyor or RICS Chartered Quantity Surveyor in accordance with *Planning Circular PS 21-020: Calculation of capital investment value*. The calculation of the estimated CIV is to be accurate at the date of application and include details of all components and assumptions from which it is derived.

	• an estimate of the retained and new jobs that would be created during the construction and operational phases, including details of the methodology to determine the figures provided.
Key issues	The EIS must address the following specific matters: **1. Statutory and Strategic Context** Address the statutory provisions applying to the development contained in all relevant environmental planning instruments, including: o SEPP (Resources and Energy) 2021; and o SEPP (Planning Systems) 2021; o SEPP (Transport and Infrastructure) 2021; o SEPP (Biodiversity and Conservation) 2021; o SEPP (Resilience and Hazrads) 2021; and o Queanbeyan Local Environmental Plan 2022. Address the relevant planning provisions, goals and strategic planning objectives in the following: o South East and Tablelands Regional Plan o Queanbeyan Residential and Economic Strategy 2031 o Queanbeyan-Palerang Regional Economic Development Strategy o Queanbeyan-Palerang Regional Council Local Strategic Planning Statement **2. Key Issues** • **Noise & Blasting** – including: - a detailed assessment of the likely construction, operational and off-site transport noise impacts of the development in accordance with the *Interim Construction Noise Guideline*, *NSW Noise Policy for Industry* and the *NSW Road Noise Policy* respectively, and having regard to the *Voluntary Land Acquisition and Mitigation Policy*; - proposed blasting hours, frequency and methods; and - a detailed assessment of the likely blasting impacts of the development (including ground vibrations, overpressure, flyrock, visual and fumes/ odour) on people, animals, buildings/structures, infrastructure and significant natural features, having regard to the relevant guidelines; • **Air Quality** – including: - a detailed assessment of potential construction and operational air quality impacts, in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW,* with a focus on dust emissions including $PM_{2.5}$ and PM_{10}, and having regard to the *Voluntary Land Acquisition and Mitigation Policy*; - a greenhouse gas assessment of the operation of the development having regard to any applicable State or national policies, programs or guidelines; and

- details of proposed mitigation, management and monitoring measures

- **Water** – including:
  - detailed site water balances for the dry, average and wet rainfall years, including a description of site water demands, water disposal methods (inclusive of volume and frequency of any water discharges) for all scenarios, water supply infrastructure and water storage structures;
  - identification of any licensing requirements or other approvals under the *Water Act 1912* and/or *Water Management Act 2000*;
  - demonstration that water for the development can be obtained from an appropriately authorised and reliable supply in accordance with the operating rules of any relevant Water Sharing Plan (WSP);
  - a description of the measures proposed to ensure the development can operate in accordance with the requirements of any relevant WSP or water source embargo;
  - an assessment of any likely flooding impacts of the development;
  - an assessment of the likely impacts on the quality and quantity of existing surface and groundwater resources, including a detailed assessment of proposed water discharge quantities and quality against receiving water quality, flow objectives and sensitive downstream receiving environments;
  - an assessment of the likely impacts of the development on aquifers, watercourses, riparian land, water-related infrastructure, and other water users in particular for domestic and commercial purposes; and
  - a detailed description of the proposed water management system (including sewage), water monitoring program and other measures to mitigate surface and groundwater impacts;
- **Biodiversity** – including:
  - accurate predictions of any vegetation clearing on site;
  - a detailed assessment of the biodiversity impacts of the development, paying particular attention to threatened species, populations and ecological communities and groundwater dependent ecosystems, undertaken in accordance with the *Biodiversity Assessment Method* and documented in a Biodiversity Development Assessment Report (BDAR), unless a BDAR waiver request is issued in respect of the development; and
  - a strategy to offset any residual impacts of the development in accordance with the *Biodiversity Offsets Scheme* (where applicable);
- **Heritage** – including:
  - an assessment of the potential impacts on Aboriginal heritage (cultural and archaeological), including evidence of appropriate consultation in accordance with NSW guidelines with relevant Aboriginal communities/parties and documentation of the views of these stakeholders regarding the likely impact of the development on their cultural heritage;
- **Traffic & Transport** – including:
  - accurate predictions of the road traffic generated by the development, including a description of the types of vehicles likely to be used for transportation of quarry products
  - a detailed assessment of potential traffic impacts on the capacity, condition, safety and efficiency of the local and State road network (as identified above), including undertaking a road safety audit;
  - a description of the measures that would be implemented to mitigate any impacts on road network performance, dilapidation and safety,
  - concept plans of any proposed upgrades, developed in consultation with the relevant road and rail authorities, in particular the proposed level crossing of the Tuggeranong to Bombala railway corridor in

	accordance with Transport for NSW guidelines; • **Land Resources** – including a detailed assessment of: - potential impacts on soils and land capability (including potential erosion and land contamination); - potential impacts on landforms (topography), paying particular attention to the long-term geotechnical stability of any new landforms (such as overburden dumps, bunds etc.); and - the compatibility of the development with other land uses in the vicinity of the development in accordance with the requirements in Clause es 2.17 and 2.18 of State Environmental Planning Policy (Resources and Energy) 2021, paying particular attention to the rural land use in the region; • **Waste –** including estimates of the quantity and nature of the waste streams that would be generated or received by the development and any measures that would be implemented to minimise, manage or dispose of these waste streams; • **Hazards –** including an assessment of the likely risks to public safety, paying particular attention to potential bushfire risks and the transport, handling and use of any hazardous or dangerous goods; • **Visual** – including an assessment of the likely visual impacts of the development (before, during and post-operations) on private landowners in the vicinity of the development and key vantage points in the public domain, paying particular attention to any new landforms; and • **Social** – including a detailed assessment of the potential social impacts of the development that builds on the findings of the Social Impact Assessment Scoping Report, in accordance with the *e Social Impact Assessment Guideline for State significant projects*; • **Economic** – including a detailed assessment of the likely economic impacts of the development, paying particular attention to: - the significance of the resource; - the costs and benefits of the development, identifying whether the development as a whole would result in a net benefit to NSW; and - the demand on local infrastructure and services; and • **Rehabilitation** – including the proposed rehabilitation strategy for the site having regard to the key principles in the *Strategic Framework for Mine Closure*, including: - rehabilitation objectives, methodology, monitoring programs, performance standards and proposed completion criteria; - nominated final land use, having regard to any relevant strategic land use planning or resource management plans or policies; and - the potential for integrating this strategy with any other rehabilitation and/or offset strategies in the region.
Plans and Documents	The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Part 8 of the Regulation. Provide these as part of the EIS rather than as separate documents.
Engagement	During the preparation of the EIS, you must consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners. In particular, you must: • consult with: – affected landowners; – community groups; – Aboriginal stakeholders; – Queanbeyan-Palerang Regional Council

	– Biodiversity, Conservation and Science Directorate within the Department; – Heritage NSW – Aboriginal Cultural Heritage Regulation; – Environment Protection Authority; – Geological Survey of NSW, Mining, Exploration & Geoscience within the Department of Regional NSW; – Resources Regulator within the Department of Regional NSW; – Department of Primary Industries (including NSW Agriculture); – Crown Lands within the Department; – South East Local Land Services; – NSW Health; – NSW Rural Fire Service; and – Transport for NSW; and The EIS must detail the engagement undertaken and demonstrate how it was consistent with the *Undertaking Engagement Guidelines for State Significant Projects*. The EIS must detail how issues raised and feedback provided have been considered and responded to in the project.
Expiry Date	If you do not lodge a development application and EIS for the development within 2 years of the issue date of these SEARs, your SEARs will expire. If an extension to these SEARs will be required, please consult with the Planning Secretary 3 months prior to the expiry date.
References	The assessment of the key issues listed above must take into account relevant guidelines, policies, and plans as identified. While not exhaustive, the following attachment contains a list of some of the guidelines, policies, and plans that may be relevant to the environmental assessment of this proposal.

ATTACHMENT 1

Technical and Policy Guidelines

The following guidelines may assist in the preparation of the environmental impact statement. This list is not exhaustive and not all of these guidelines may be relevant to your proposal.

Many of these documents can be found on the following websites:
http://www.planning.nsw.gov.au
http://www.shop.nsw.gov.au/index.jsp
http://www.australia.gov.au/publications
http://www.epa.nsw.gov.au/
http://www.environment.nsw.gov.au/
http://www.dpi.nsw.gov.au/

Policies, Guidelines & Plans

Air	
	Voluntary Land Acquisition and Mitigation Policy for State Significant Mining, Petroleum and Extractive Industry Developments (DP&E, 2018)
	Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (EPA)
	Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (EPA)
	Generic Guidance and Optimum Model Settings for the CALPUFF Modelling System for Inclusion into the 'Approved Methods for the Modelling and Assessments of Air Pollutants in NSW, Australia' (EPA)
	National Greenhouse Accounts Factors (Commonwealth)
Noise & Blasting	
	Voluntary Land Acquisition and Mitigation Policy for State Significant Mining, Petroleum and Extractive Industry Developments (DP&E)
	NSW Noise Policy for Industry (EPA)
	Interim Construction Noise Guideline (DECC)
	NSW Road Noise Policy (EPA)
	Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration (ANZEC)
Water	
Water Sharing Plans	Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2011
	Water Sharing Plan for the Greater Metropolitan Region Unregulated Water Sources 2011
	Any other relevant Water Sharing Plans (available at https://www.industry.nsw.gov.au/water).
Groundwater	NSW State Groundwater Policy Framework Document (NOW)
	NSW State Groundwater Quality Protection Policy (NOW)
	NSW State Groundwater Quantity Management Policy (NOW)
	NSW Aquifer Interference Policy 2012 (NOW)
	Office of Water Guidelines for Controlled Activities (2012)
	Groundwater Monitoring and Modelling Plans – Information for prospective mining and petroleum exploration activities (NOW)
	Australian Groundwater Modelling Guidelines 2012 (Commonwealth)
	National Water Quality Management Strategy Guidelines for Groundwater Protection

	in Australia (ARMCANZ/ANZECC)
	Guidelines for the Assessment & Management of Groundwater Contamination (EPA)
Surface Water	NSW Government Water Quality and River Flow Objectives (EPA)
	Using the ANZECC Guideline and Water Quality Objectives in NSW (EPA)
	National Water Quality Management Strategy: Australian Guidelines for Fresh and Marine Water Quality (ANZECC/ARMCANZ)
	National Water Quality Management Strategy: Australian Guidelines for Water Quality Monitoring and Reporting (ANZECC/ARMCANZ)
	National Water Quality Management Strategy: Guidelines for Sewerage Systems – Effluent Management (ARMCANZ/ANZECC)
	NSW Water Conservation Strategy (2000)
	State Water Management Outcomes Plan
	NSW State Rivers and Estuary Policy (1993)
	Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (EPA)
	Managing Urban Stormwater: Soils & Construction (Landcom) and associated Volume 2E: Mines and Quarries (EPA)
	Managing Urban Stormwater: Treatment Techniques (EPA)
	Managing Urban Stormwater: Source Control (EPA)
	Technical Guidelines: Bunding & Spill Management (EPA)
	Environmental Guidelines: Use of Effluent by Irrigation (EPA)
	A Rehabilitation Manual for Australian Streams (LWRRDC and CRCCH)
	NSW Guidelines for Controlled Activities on Waterfront Land (NOW)
Land	
	Soil and Landscape Issues in Environmental Impact Assessment (NOW)
	Agfact AC.25: Agricultural Land Classification (NSW Agriculture)
	Agricultural Issues for Extractive Industries (DPI)
	State Environmental Planning Policy (Resilience and Hazards)
	Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC)
	Land Use Conflict Risk Assessment Guide (DPI)
Traffic	
	TfNSW Construction of New Level Crossings Policy
	Guide to Traffic Generating Development (RMS)
	Road Design Guide (RMS) & relevant Austroads Standards
	Austroads Guide to Traffic Management, Part 2, Integrated Traffic Assessments for Developments
Biodiversity	
	Biodiversity Assessment Method (OEH)
	Biodiversity Offsets Scheme
	Fisheries NSW policies and guidelines
	Guidelines for developments adjoining Department of Environment, Climate Change and Water (DECCW, 2010)
	Guidelines for Threatened Species Assessment (DP&E)
	Guidance to assist a decision-maker to determine a serious and irreversible impact (OEH)
	NSW State Groundwater Dependent Ecosystem Policy (NOW)
	Revocation, recategorisation and road adjustment policy (OEH, 2012)
	Risk Assessment Guidelines for Groundwater Dependent Ecosystems (NOW)
	State Environmental Planning Policy (Koala Habitat Protection) 2021
Heritage	

	The Burra Charter (The Australia ICOMOS charter for places of cultural significance)
	Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010)
	Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (DECCW, 2010)
	Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH, 2011)
	NSW Heritage Manual (OEH)
	Statements of Heritage Impact (OEH)
	Archaeological Assessments Guidelines 1996 (Heritage Council)
Hazards	
	State Environmental Planning Policy (Resilience and Hazards)
	Hazardous and Offensive Development Application Guidelines – Applying SEPP 33
	Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis
	Planning for Bush Fire Protection 2019 (RFS)
Waste	
	Waste Classification Guidelines (EPA)
Rehabilitation	
	Mine Rehabilitation – Leading Practice Sustainable Development Program for the Mining Industry (Commonwealth)
	Mine Closure and Completion – Leading Practice Sustainable Development Program for the Mining Industry (Commonwealth)
	Strategic Framework for Mine Closure (ANZMEC-MCA)
Social & Economic	
	Social Impact Assessment Guideline for State Significant Projects

ATTACHMENT 2
Government Authority Responses to Request for Key Issues
For Information Only

Appendix 2

EIS Requirements and where Addressed

(Total No. of pages including blank pages = 19)

Table A2.1
Coverage of Secretary's Environmental Assessment Requirements in the EIS

Summarised or Paraphrased Relevant Requirement	Relevant EIS Section(s)
GENERAL REQUIREMENTS	
The Environmental Impact Statement (EIS) for the development must comply with the requirements in clauses 6 and 7 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation).	4
The EIS must include: • a stand-alone summary of the EIS;	Executive Summary
• a full description of the development, including:	-
– the resource to be extracted, including the amount, type and composition;	3.3
– the site layout and extraction plan, including cross-sectional plans	3.1, 3.3.2
– the production process and processing activities, including the in-flow and out-flow of materials and points of discharge to the environment;	3.6, 3.10
– surface infrastructure and facilities (including any infrastructure that would be required for the development, but be the subject of a separate approvals process);	3.7, 3.11
– a waste (overburden, rejects, tailings etc.) management strategy;	3.9
– a water management strategy;	3.4.2, 3.10, 6.12, 6.13
– a rehabilitation strategy to apply during, and after completion of, extraction operations, and proposed final use of site; and	3.16
– the likely interactions between the development and any existing, approved, or proposed development in the vicinity of the site;	7.5
• a strategic justification of the development focusing on site selection and the suitability of the proposed site, and the alternatives considered;	2
• a list of any approvals that must be obtained before the development may commence;	3.1.2
• an assessment of the likely impacts of the development on the environment, including:	6
– a description of the existing environment likely to be affected by the development, using sufficient baseline data;	6
– an assessment of the likely impacts of all stages of the development, including any cumulative impacts, taking into consideration any relevant laws, environmental planning instruments, guidelines, policies, plans and industry codes of practice;	6
– a description of the measures that would be implemented to avoid, minimise, mitigate and/or offset the likely impacts of the development, and an assessment of:	6
o whether these measures are consistent with industry best practice, and represent the full range of reasonable and feasible mitigation measures that could be implemented;	6
o the likely effectiveness of these measures; and	6
o whether contingency measures would be necessary to manage any residual risks; and	6
– a description of the measures that would be implemented to monitor and report on the environmental performance of the development;	6

Table A2.1 (Cont'd)
Coverage of Secretary's Environmental Assessment Requirements in the EIS

Summarised or Paraphrased Relevant Requirement	Relevant EIS Section(s)
GENERAL REQUIREMENTS (Cont'd)	
• a consolidated summary of all the proposed management and monitoring measures, identifying all commitments in the EIS;	Appendix 5
• consideration of the development against all relevant environmental planning instruments (including part 3 of the *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*);	2
• the reasons why the development should be approved, having regard to: – relevant matters for consideration under the *Environmental Planning and Assessment Act 1979* (the Act), including the objects of the Act;	7
– the biophysical, economic and social impacts of the development;	7
– the suitability of the site with respect to potential land use conflicts with existing and future surrounding land uses;	7
– feasible alternatives to the development (and its key components), including the consequences of not carrying out the development;	2.8
• a signed declaration form from the author of the EIS, certifying that the information contained within the document is neither false or misleading.	iii
The development application must also be accompanied by a signed report from a suitably qualified expert that includes an accurate estimate of the capital investment value (as defined in Clause 3 of the EP&A Regulation) of the development, including details of all assumptions and components form which the capital investment value calculation is derived.	Provided Separately
NOISE AND BLASTING	
• a detailed assessment of the likely construction, operational and off-site transport noise impacts of the development in accordance with the *Interim Construction Noise Guideline*, *NSW Noise Policy for Industry*, NSW *Road Noise Policy* and *Voluntary Land Acquisition and Mitigation Policy* (2018);	6.5
• proposed blasting hours, frequency and methods; and	3.12
• a detailed assessment of the likely blasting impacts of the development (including ground vibrations, overpressure, flyrock, visual and fumes/odour) on people, animals, buildings/structures, infrastructure and significant natural features, having regard to the relevant guidelines;	6.5
AIR QUALITY	
• a detailed assessment of potential construction and operational air quality impacts, in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*, with a focus on dust emissions including $PM_{2.5}$ and PM_{10}, and having regard to the *Voluntary Land Acquisition and Mitigation Policy* (2018);	6.2
• details of proposed mitigation, management and monitoring measures.	6.2.6
GREENHOUSE GAS	
• a greenhouse gas assessment of the operation of the development having regard to any applicable State or national policies, programs or guidelines.	6.3
• details of proposed mitigation, management and monitoring measures.	6.3.5

Table A2.1 (Cont'd)
Coverage of Secretary's Environmental Assessment Requirements in the EIS

Summarised or Paraphrased Relevant Requirement	Relevant EIS Section(s)
WATER	
• detailed site water balances for the dry, average and wet rainfall years, including a description of site water demands, water disposal methods (inclusive of volume and frequency of any water discharges) for all scenarios, water supply infrastructure and water storage structures;	3.10, 6.12.4
• identification of any licensing requirements or other approvals under the *Water Act 1912* and/or *Water Management Act 2000*;	6.13.3.2, 6.13.5
• demonstration that water for the development can be obtained from an appropriately authorised and reliable supply in accordance with the operating rules of any relevant Water Sharing Plan (WSP);	6.13.6
• a description of the measures proposed to ensure the development can operate in accordance with the requirements of any relevant WSP or water source embargo;	6.13.5
• an assessment of any likely flooding impacts of the development;	6.12.6.4
• an assessment of the likely impacts on the quality and quantity of existing surface and groundwater resources, including a detailed assessment of proposed water discharge quantities and quality against receiving water quality, flow objectives and sensitive downstream receiving environments;	6.12, 6.13
• an assessment of the likely impacts of the development on aquifers, watercourses, riparian land, water-related infrastructure, and other water users for domestic and commercial purposes; and	6.13.6
• a detailed description of the proposed water management system (including sewage), water monitoring program and other measures to mitigate surface and groundwater impacts;	3.10, 6.13.5, 6.13.7
BIODIVERSITY	
• accurate predictions of any vegetation clearing on site;	6.7.5
• a detailed assessment of the biodiversity impacts of the development, paying particular attention to threatened species, populations and ecological communities and groundwater dependent ecosystems, undertaken in accordance with the *Biodiversity Assessment Method* and documented in a Biodiversity Development Assessment Report (BDAR), unless a BDAR waiver request is issued in respect of the development; and	6.7, Appendix G
• a strategy to offset any residual impacts of the development in accordance with the *Biodiversity Offsets Scheme* (where applicable);	6.7.4.4, 6.7.5
HERITAGE	
• an assessment of the potential impacts on Aboriginal heritage (cultural and archaeological), including evidence of appropriate consultation in accordance with NSW guidelines with relevant Aboriginal communities/parties and documentation of the views of these stakeholders regarding the likely impact of the development on their cultural heritage;	6.8, 6.8.2.3
TRAFFIC AND TRANSPORT	
• accurate predictions of the road traffic generated by the development, including a description of the types of vehicles likely to be used for transportation of quarry products;	6.10.2
• a detailed assessment of potential traffic impacts on the capacity, condition, safety and efficiency of the local and State road network, including undertaking a road safety audit;	6.10.4

Table A2.1 (Cont'd)
Coverage of Secretary's Environmental Assessment Requirements in the EIS

Summarised or Paraphrased Relevant Requirement	Relevant EIS Section(s)
TRAFFIC AND TRANSPORT (Cont'd)	
• a description of the measures that would be implemented to mitigate any impacts on road network performance, dilapidation and safety;	6.10.3
• concept plans of any proposed upgrades, developed in consultation with the relevant road and rail authorities, in particular the proposed level crossing of the Tuggeranong to Bombala railway corridor in accordance with TfNSW guidelines;	3.8.1
LAND RESOURCES	
• potential impacts on soils and land capability (including potential erosion and land contamination);	6.11, 6.11.6
• potential impacts on landforms (topography), paying particular attention to the long-term geotechnical stability of any new landforms (such as overburden dumps, bunds etc.); and	6.11
• the compatibility of the development with other land uses in the vicinity of the development in accordance with the requirements in Clause 12 of *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*), paying particular attention to the agricultural land use in the region;	6.11.4
WASTE	
• estimates of the quantity and nature of the waste streams that would be generated or received by the development and any measures that would be implemented to minimise, manage or dispose of these waste streams;	3.9
HAZARDS	
• an assessment of the likely risks to public safety, paying particular attention to potential bushfire risks and the transport, handling and use of any hazardous or dangerous goods;	6.14
VISUAL	
• an assessment of the likely visual impacts of the development (before, during and post-operations) on private landowners in the vicinity of the development and key vantage points in the public domain, paying particular attention to any new landforms;	6.6
SOCIAL	
• a detailed assessment of the potential social impacts of the development that builds on the findings of the Social Impact Assessment Scoping Report, in accordance with the *Social impact assessment guideline for State significant mining, petroleum production or extractive industry* (2021);	6.16
ECONOMIC	
• a detailed assessment of the likely economic impacts of the development, including:	6.15
– the significance of the resource;	2.2 and 3.3
– the costs and benefits of the development, identifying whether the development as a whole would result in a net benefit to NSW; and	6.15.3
– the demand on local infrastructure and services;	6.15.4

Table A2.1 (Cont'd)
Coverage of Secretary's Environmental Assessment Requirements in the EIS

Summarised or Paraphrased Relevant Requirement	Relevant EIS Section(s)
REHABILITAITON	
• the proposed rehabilitation strategy for the site having regard to the key principles in the *Strategic Framework for Mine Closure*, including:	3.16
– rehabilitation objectives, methodology, monitoring programs, performance standards and proposed completion criteria;	3.16.2, 3.16.6
– nominated final land use, having regard to any relevant strategic land use planning or resource management plans or policies; and	3.16.3
– the potential for integrating this strategy with any other rehabilitation and/or offset strategies in the region.	3.16
CONSULTATION	
• affected landowners;	5.1.2
• community groups;	5.1.2
• Aboriginal stakeholders;	5.1.2, 6.8.2.3
• Queanbeyan-Palerang Regional Council;	5.2.1
• Biodiversity, Conservation and Science Directorate within DPIE;	5.2.1
• Heritage NSW – Aboriginal Culture Heritage Regulation;	5.2.1
• Environmental Protection Authority;	5.2.1
• Geological Survey of NSW, Mining, Exploration & Geoscience within the Department of Regional NSW;	5.2.1
• Department of Primary Industries (including NSW Agriculture);	5.2.1
• Crown Lands within DPIE	5.2.1
• South East Local Land Services;	5.2.1
• NSW Health;	5.2.1
• NSW Rural Fire Service;	5.2.1
• Transport for NSW; and	5.2.1
• Establish a Community Consultative Committee for the development in accordance with the *Community Consultative Committee Guidelines for State Significant Projects*, and consult with the committee during the preparation of the EIS	Not required in updated guidance
The EIS must: • describe the consultation process used and demonstrate that effective consultation has occurred;	- 5
• describe the issues raised;	5.1.3, 5.2.2
• identify where the design of the development has been amended and/or mitigation proposed to address issues raised; and	Appendix A
• otherwise demonstrate that issues raised have been appropriately addressed in the assessment.	5

Table A2.2
Coverage of Issues Identified by Other Government Agencies for Consideration in the EIS

Agency / Organisation	Summary or Paraphrased Relevant Requirement	Relevant EIS Section(s)
GENERAL REQUIREMENTS		
NSW EPA 13/09/2021	The objectives of the proposal should be clearly stated and refer to: a) the size and type of the operation, the nature of the processes and the products, by-products and wastes produced;	- 3
	b) a life cycle approach to the production, useor disposal of products;	3.5, 3.9
	c) the anticipated level of performance in meeting required environmental standards and cleaner production principles;	Appendix 6
	d) the staging and timing of the proposal and any plans for future expansion; and	3.5
	e) the proposal's relationship to any other industry or facility.	1.3
	Outline the production process including: a) the environmental "mass balance" for the process – quantify in-flow and out-flow of materials, any points of discharge to the environment and their respective destinations; and	- 3.3.3, 3.6, 3.8.3, 3.10.4
	b) any life-cycle strategies for the products.	3.6
	Outline cleaner production actions, including: a) measures to minimise waste (typically through addressing source reduction);	- 3.9
	b) proposals for use or recycling of by-products; and	3.7.1, 3.10
	c) proposed disposal methods for solid and liquid waste.	3.9
	Outline construction works including: a) actions to address any existing soil contamination;	- 6.11
	b) any earthworks or site clearing; re-use and disposal of cleared material (including use of spoil on-site); and	3.17.2, 6.7.4.4
	c) construction timetable and staging; hours of construction; proposed construction methods.	3.5, 3.12
	Include a site diagram showing the site layout and location of environmental controls;	3.1.1
	Provide an overview of the affected environment to place the proposal in its local and regional environmental context including: a) meteorological data;	- 6.1.3.2
	b) topography;	6.1.2
	c) surrounding land uses;	2.4.2
	d) geomorphology;	6.12.6.3
	e) soil types and properties;	6.11.2
	f) ecological information; and	6.7.3
	g) availability of services and the accessibility of the site for passenger and freighttransport.	3.8
	Provide a description of existing environmental conditions for any potentialimpacts.	6

Table A2.2 (Cont'd)
Coverage of Issues Identified by Other Government Agencies for Consideration in the EIS

Agency / Organisation	Summary or Paraphrased Relevant Requirement	Relevant EIS Section(s)
GENERAL REQUIREMENTS (Cont'd)		
Mining, Exploration and Geoscience 14/09/2021	A resource assessment which: • Documents the size and quality of the resource and demonstrates that both have been adequately assessed; and	3.3
	• Documents the methods used to assess the resource and its suitability for the intended applications.	3.3
Queanbeyan-Palerang Regional Council 25/10/2021	Environmental considerations: • Need for EPA License	4
	• Method of supply of electricity	3.11.2
	• Proposed use of residual land	3.11
	Operational requirement / constraints: • Hours of operation	3.12
	• On Site Sewage Management	3.11.6
	• Details of signage	3.11.7
	• Location of fencing and surety measures	3.11.7
	Contributions: • Details of any proposed Local Planning Agreement • Contributions to roads, considering that a large percentage of trucks will require traversing / entering the QPRC LGA road network.	2.7
NOISE AND VIBRATION		
NSW EPA 13/09/2021	Noise and Vibration Management, including assessment of noise and vibration impacts from construction and operation.	6.5.4, 6.5.6
	Include the development of a quantitative noise assessment including consideration of construction, operation and cumulative noise impacts in accordance with relevant EPA guidelines.	6.5.4
	Vibration from all activities to be undertaken on the premises should be assessed using the guidelines contained in *Assessing Vibration: a technical guideline* (DEC, 2006).	6.5.3.2.4, 6.5.6.3
	Blast impacts should be demonstrated to be capable of complying with the guidelines contained *in Australian and New Zealand Environment Council – Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration* (ANZEC, 1990).	6.5.3.2.5, 6.5.6.4, 6.5.4.4
	The increased traffic movements should be accounted for when assessing potential impacts of noise on sensitive receivers.	6.5.3.2.3, 6.5.6.1.3
	Identify all noise sources or potential sources from the development. Detail all potentially noisy activities including ancillary activities such as transport of goods and raw materials.	6.5.4, 6.5.5
	Specify the times of operation for all phases of the development and for all noise producing activities.	3.12
	Identify any noise sensitive locations likely to be affected by activities at the site, such as residential properties, schools, churches, and hospitals. Typically, the location of any noise sensitive locations in relation to the site should be included on a map of the locality.	6.5.2

Table A2.2 (Cont'd)
Coverage of Issues Identified by Other Government Agencies for Consideration in the EIS

Agency / Organisation	Summary or Paraphrased Relevant Requirement	Relevant EIS Section(s)
NOISE AND VIBRATION (Cont'd)		
NSW EPA 13/09/2021 (Cont'd)	Determine the existing background (LA90) and ambient (LAeq) noise levels, as relevant, in accordance with the *NSW Noise Policy for Industry*.	6.5.2.3, 6.5.3.2.1
	Determine the existing road traffic noise levels in accordance with the *NSW Road Noise Policy.*	6.5.6.1.3
	Determine the project noise trigger levels for each identified potentially affected receiver.	6.5.3.2.1
	Maximum noise levels during night-time period (10pm-7am) should be assessed to analyse possible effects on sleep. Determine expected noise level and noise character likely to be generated from noise sources	6.5.6.1.2
	Determine the noise levels likely to be received at the reasonably most affected location(s)	6.5.6.1
	Discuss the findings from the predictive modelling and, where relevant noise criteria have not been met, recommend additional feasible and reasonable mitigation measures.	6.5.6, 6.5.5
	Include details of any mitigation proposed including the attenuation that will be achieved and the revised noise impact predictions following mitigation.	6.5.5.1, 6.5.5.2
Queanbeyan-Palerang Regional Council 25/10/2021	Operational requirement / constraints: • Operational noise • Blasting noise	6.5
TRAFFIC AND TRANSPORT		
Transport for NSW 20/09/2021	A TIS is required to examine any potential transport related implications of the development.	6.10
	Consider traffic related issues relevant to the development and address in 2 distinct stages • *Construction stage* – The transport of materials and equipment/components for the establishment of the quarry	6.10.5.1
	• *Operational stage* – The ongoing traffic generation due to the operation, maintenance and servicing of the various elements of the quarry.	6.10.5.2
	Details of all traffic types (both heavy and light vehicles) including a description of heavy vehicle types that will be used and the routes that will be taken to enable vehicles that are travelling from the north and south to gain access to the site as well as details on the routes that vehicles wishing to leave the site to go north and/or south will take. This including details on the secondary access road and its intended use.	3.8
	Details on the total traffic volumes that are likely to be generated by the development. It should include details on the distribution of the traffic generated that will come from and go to the north and south.	6.10.5

Table A2.2 (Cont'd)
Coverage of Issues Identified by Other Government Agencies for Consideration in the EIS

Agency / Organisation	Summary or Paraphrased Relevant Requirement	Relevant EIS Section(s)
TRAFFIC AND TRANSPORT (Cont'd)		
Transport for NSW 20/09/2021 (Cont'd)	For heavy vehicles, details are required on their size, their associated carrying capacity, etc for both the receipt of materials and the removal of quarried products. Details on the maximum number of vehicles per day and per annum that the development will generate including how these numbers correlate to the daily and annual limits for which approval is being sought.	3.8 and 6.10
	Details on how maximum vehicle numbers will be monitored to ensure ongoing compliance.	6.10
	An assessment of the cumulative impact of traffic from this development and nearby developments on the road network(s) to be used.	6.10
	An assessment of the suitability of the local road connections with the state classified road network at any access point that will result in vehicles entering and leaving the site from NSW roads as well as details on any works required to mitigate and/or manage potential impacts.	6.10
	Swept path diagrams to demonstrate the largest vehicles that will be using the quarry access road can undertake all required manoeuvres to enable access to and from the development site.	6.10
	TfNSW notes that limited information has been provided as part of the scoping report on the specific location of the proposed crossing point of the rail corridor. It is important to note that TfNSW is generally not supportive of building new level crossings wherever possible.	Noted
	The TfNSW *Construction of New Level Crossings Policy* will need to be addressed by the EIS.	3.8
	TfNSW requires the issue of how access across the rail corridor is to be provided.	3.8
	Details on what discussions with JHR and TfNSW concerning access across the rail corridor must be detailed in the EIS.	6.10
	The existing underbridge in the general location where access is proposed will need to be considered.	6.10
	Sufficient information needs to be provided to satisfy the requirements as detailed in Part 3, Division 15, Subdivision 2, Section 84, 86 and 104 of *State Environmental Planning Policy (Infrastructure) 2007*.	4
	Sufficient information needs to be provided to satisfy the requirements as detailed in Part 3, Section 16 of *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*.	4
	A strategic design for works relating to the crossing of the rail corridor will need to be prepared and submitted as part of the EIS.	6.10 and Appendix I
	TfNSW requires further consultation during the preparation of the EIS.	Noted
	Landowners consent will be required as part of any SSD application if it involves works within Lot 5403.	Noted
NSW DPI Agriculture 09/09/2021	Detail the volume and route of traffic movements for the proposed development and how potential impacts on surrounding agricultural land uses are proposed to be mitigated.	3.8 and 6.11.4
	Include consideration of Travelling Stock Reserves (TSR) and the movement of livestock or farm vehicles along / across the affected roads.	Not present

Table A2.2 (Cont'd)
Coverage of Issues Identified by Other Government Agencies for Consideration in the EIS

Agency / Organisation	Summary or Paraphrased Relevant Requirement	Relevant EIS Section(s)
TRAFFIC AND TRANSPORT (Cont'd)		
Queanbeyan-Palerang Regional Council 25/10/2021	Access: • Controls and restrictions regarding any access via Mates Drive • Access over rail corridor and into the ACT	3.8
AIR QUALITY		
NSW EPA 13/09/2021	The EIS for the proposal must include an Air Quality Impact Assessment (AQIA) prepared in accordance with the Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales. The AQIA must;	6.2
	• Identify all potential discharges of fugitive and point source emissions of pollutants including dust for all stages of the proposal and assess the risk associated with those emissions. All processes that could results in air emissions must be identified and described. Sufficient detail to accurately communicate the characteristics and quantity of all emissions must be provided. Assessment of risk relates to environmental harm, risk to human health and amenity.	6.2.3
	• Justify the level of assessment undertaken on the basis of risk factors;	6.2.4
	• Describe the receiving environment in detail;	6.2.2
	• Account for cumulative impacts associated with existing emission sources as well as any currently approved development linked to the receiving environment;	6.2.2.4, 6.2.7.4
	• Detail emission control techniques/practices, employed by the proposal;	6.2.6.1
	• Include a consideration of 'worst case', emission scenarios and impacts at proposed emission limits;	6.2.5.1
	• Include air dispersion modelling conducted in accordance with the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW. Consideration must be given to recent amendments to air pollutant standards contained in the National Environment Protection (Ambient Air Quality) Measure;	6.2.5
	• Demonstrate the proposal's ability to comply with the relevant regulatory framework, specifically the POEO Act and the POEO (Clean Air) Regulation 2010; and	6.2.5
	• Detail emission control techniques/practices that will be employed by the proposal and the development of a Trigger Action Response Plan (TARP).	6.2.6
	Identify all sources or potential sources of air emissions from the development.	6.2.3
	Provide details of the project that are essential for predicting and assessing air impacts including:	-
	a) the quantities and physio-chemical parameters;	6.2.7
	b) an outline of procedures for handling, transport, production and storage; and	6.2.6
	c) management of solid, liquid and gaseous waste streams with potential to generate emissions to air.	Not required

Table A2.2 (Cont'd)
Coverage of Issues Identified by Other Government Agencies for Consideration in the EIS

Agency / Organisation	Summary or Paraphrased Relevant Requirement	Relevant EIS Section(s)
AIR QUALITY (Cont'd)		
NSW EPA 13/09/2021 (Cont'd)	Describe surrounding buildings that may affect plume dispersion.	None present
	Provide and analyse site representative data on following meteorological parameters: a) temperature and humidity;	6.2.5
	b) rainfall, evaporation and cloud cover;	
	c) wind speed and direction;	
	d) atmospheric stability class	
	e) mixing heigh (the height that emissions will be ultimately missed in the atmosphere);	
	f) katabatic air drainage; and	
	g) air re-circulation.	
	Identify all pollutants of concern and estimate emissions by quantity (and size for particles), source and discharge point.	6.2.3, 6.2.7
	Estimate the resulting ground level concentrations of all pollutants.	6.2.7
	Describe the effects and significance of pollutant concentration on the environment, human health, amenity and regional ambient air quality standards.	6.2.7
	Describe the contribution that the development will make to regional and global pollution.	6.2.2.4
	Reference should be made to: • *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (DEC, 2016); and • *Approved Methods for the Sampling and Analysis of Air Pollutants in NSW* (DEC, 2007);	6.2.4
	Outline specifications of pollution control equipment.	6.2.6
Queanbeyan-Palerang Regional Council 25/10/2021	Operational requirement / constraints: • Dust impacts, given the pre-dominate wind conditions in the direction of existing residential development	6.2
WASTE MANAGEMENT		
NSW EPA 13/09/2021	The EIS should:	-
	• Identify, characterise and classify all waste that will be generated onsite including proposed quantities of the waste. Waste must be classified in accordance with EPA's *Waste Classification Guidelines*.	3.9
	• Provide details of how waste and product stockpiles will be handled and managed onsite to minimise pollution; and	3.9, 3.16.6.1
	• Provide details of how any waste will be handled and managed during transport to a lawful facility.	3.9
	Outline measures to minimise the consumption of natural resources.	3.9
	Outline measures to avoid the generation of waste and promote the re-use and recycling and reprocessing of any waste.	3.7.1, 3.9

Table A2.2 (Cont'd)
Coverage of Issues Identified by Other Government Agencies for Consideration in the EIS

Agency / Organisation	Summary or Paraphrased Relevant Requirement	Relevant EIS Section(s)
WASTE MANAGEMENT (Cont'd)		
NSW EPA 13/09/2021 (Cont'd)	Outline measures to support any approved regional or industry waste plans.	Not relevant due to small volumes
	Identify the extent that the receiving environment is already stressed by existing development and background levels of emissions to which this proposal will contribute.	Not relevant due to small volumes
WATER		
NSW EPA 13/09/2021	Provide details of the project that are essential for predicting and assessing impacts to waters including: a) quantity and physio-chemical properties of all potential water pollutants and the risks they pose to the environment and human health, including the risks they pose to Water Quality Objectives in the ambient waters (as defined on http://www.environment.nsw.gov.au/ieo/index.htm, using technical criteria derived from *the Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, ANZECC 2000).	6.12, 6.13 6.12
	b) the management of discharges with potential for water impacts; and	6.12.3
	c) drainage works and associated infrastructure; land-forming and excavations; working capacity of structures; and water resource requirements of the proposal.	6.12.2, 3.10
	Outline site layout, demonstrating efforts to avoid proximity to water resources.	3.1.1, 3.10
	Outline total water balance for the development, water requirements and proposed storm and wastewater disposal.	6.12.4, 6.12.3.7
	Describe the catchment including proximity of the development to any waterways and provide an assessment of their sensitivity/significance from a public health, ecological and/or economic perspective.	6.12.2
	Describe existing surface and groundwater quality.	6.12.2, 6.13.2.6
	Provide site drainage details and surface runoff yield.	6.12.2.3, 6.12.3
	State the ambient Water Quality and River Flow Objectives for the receiving waters.	6.13.2.6,
	State the indicators and associated trigger values or criteria for the identified environmental values.	6.13.3, 6.12.3
	State any locally specific objectives, criteria or targets, which have been endorsed by the government.	6.12.3
	Describe the state of the receiving waters and relate this to the relevant Water Quality and River Flow Objectives.	6.12.3
	Identify and estimate the quantity of all pollutants that may be introduced into the water cycle by source and discharge point.	6.13.6.6, 6.12.5
	Describe the effects and significance of any pollutant loads on the receiving environment.	6.13.6.6, 6.12.5
	Describe water quality impacts resulting from changes to hydrologic flow regimes	6.12.5

Table A2.2 (Cont'd)
Coverage of Issues Identified by Other Government Agencies for Consideration in the EIS

Agency / Organisation	Summary or Paraphrased Relevant Requirement	Relevant EIS Section(s)
WATER (Cont'd)		
NSW EPA 13/09/2021 (Cont'd)	Identify any potential impacts on quality or quantity of groundwater describing their source.	6.13.6
	Identify potential impacts associated with geomorphological activities.	6.12.6
	Identify impacts associated with the disturbance of acid sulfate soils and potential acid sulfate soils.	Not Present
	Reference should be made to: • *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004), • *Guidelines for Fresh and Marine Water Quality ANZECC 2000), Environmental Guidelines: Use of effluent by Irrigation* (DEC, 2004)	6.12
	Outline stormwater management to control pollutants at the source and contain them within the site.	6.12.3
	Describe measures for maintaining and monitoring any stormwater controls.	6.12.3
	Outline erosion and sediment control measures.	6.12.3.5
	Describe waste water treatment measures.	6.12.3.5
	Outline pollution control measures.	6.12.3
	Describe hydrological impact mitigation measures.	6.12.3
	Describe groundwater impact mitigation measures	6.13.5
	Describe geomorphological impact mitigation measures	6.12.4
Biodiversity and Conservation Directorate 14/09/2021	The EIS must map the following features relevant to water and soils including: a) Rivers, streams, wetlands, estuaries (as described in s4.2 of the Biodiversity Assessment Method);	6.1.2
	b) Wetlands as described in s4.2 of the Biodiversity Assessment Method;	Not Present
	c) Groundwater;	6.13
	d) Groundwater dependent ecosystems; and	6.13.2.4, 6.13.6.8
	e) Proposed intake and discharge locations.	3.10
	The EIS must describe background conditions for any water resource likely to be affected.	3.10.3
	The EIS must assess the impacts on water quality, including:	6.12, 6.13
	a) The nature and degree of impact on receiving waters for both surface and groundwater; and	6.12.5, 6.13.6
	b) Identification of proposed monitoring of water quality.	6.12.3, 6.13.5

Table A2.2 (Cont'd)
Coverage of Issues Identified by Other Government Agencies for Consideration in the EIS

Agency / Organisation	Summary or Paraphrased Relevant Requirement	Relevant EIS Section(s)
WATER (Cont'd)		
Biodiversity and Conservation Directorate 14/09/2021 (Cont'd)	The EIS must assess the impact of the Monaro Rock Quarry on hydrology, including:	6.12, 6.13
	a) Water balance;	6.12.4
	b) Effects to downstream rivers, wetlands, estuaries, marine waters and floodplain areas;	6.12.5
	c) Effects to downstream water-dependent fauna and flora including groundwater dependent ecosystems;	6.13.6.8
	d) Impacts to natural processes and functions within rivers, wetlands, estuaries and floodplains that affect river system and landscape health;	6.12.5
	e) Changes to environmental water availability;	6.12.5.1
	f) Mitigating effects of proposed stormwater and wastewater management; and	6.12.3.6, 6.12.3.7
	g) Identification of proposed monitoring of hydrological attributes.	6.12.3, 6.13.5
DPIE Water & NRAR 06/09/2021	Identify an adequate and secure water supply for each water year of the entire life of the project.	3.10
	Annual volumes of surface water and groundwater proposed to be taken by the activity (including through inflow and seepage) from each surface and groundwater source as defined by the relevant Water Sharing Plan.	3.10
	An annual site water balance for the duration over which the activity proposes to impact the natural water cycle.	6.12.4
	The development of a thorough groundwater conceptual model with supporting cross section and extraction mining depth supported by field data.	6.13.4, Appendix L
	Assessment of impacts on surface and ground water sources (both quality and quantity), related infrastructure, adjacent licensed water users, basic landholder rights, watercourses, riparian land, and groundwater dependent ecosystems, and measures proposed to reduce and mitigate these impacts.	6.12, 6.13
	Proposed surface and groundwater monitoring activities and methodologies.	6.12.3, 6.13.5
	Details of a proposed water management plan.	6.12.3, 6.13.5
	Consideration of relevant legislation, policies and guidelines, including the NSW Aquifer Interference Policy (2012), the *Guidelines for Controlled Activities on Waterfront Land* (2018) and the relevant Water Sharing Plans	6.12, 6.13
NSW DPI Agriculture 09/09/2021	Detail the estimated water demand and water availability and the source of water and any sanitisation methods proposed.	3.10, 6.12.4
	Outline any impacts to water use for agriculture and measures to mitigate against these impacts.	6.12.5, 6.13.6
Queanbeyan-Palerang Regional Council 25/10/2021	Sediment and erosion control	6.12.4
	Source of water and expected usage for operational activities	3.10 and 6.12.5

Table A2.2 (Cont'd)
Coverage of Issues Identified by Other Government Agencies for Consideration in the EIS

Agency / Organisation	Summary or Paraphrased Relevant Requirement	Relevant EIS Section(s)
FLOODING		
Biodiversity and Conservation Directorate 14/09/2021	The EIS must map features relevant to flooding as described in the *Floodplain Development Manual 2005* (NSW Government 2005)	6.12.6.4
	The EIS must describe flood assessment and modelling undertaken in determining the design flood levels for events, including a minimum of the 1 in 10 year, 1 in 100 year flood levels and the probable maximum flood.	6.12.6.4
	The EIS must model and assess the effect of the Project on flood behaviour	6.12.6.4
BIODIVERSITY		
Biodiversity and Conservation Directorate 14/09/2021	Biodiversity impacts are to be assessed in accordance with the Biodiversity Assessment Method and documented in a Biodiversity Development Assessment Report (BDAR).	6.7, Appendix G
	The BDAR must document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the Biodiversity Assessment Method.	6.7, Appendix G
	The BDAR must include details of the measures proposed to address the offset obligation as follows;	6.7.4.4
	• The total number and classes of biodiversity credits required to be retired for the development/project;	6.7.4.4
	• The number and classes of like-for-like biodiversity credits proposed to be retired;	6.7.4.4
	• The number and classes of biodiversity credits proposed to be retired in accordance with the variation rules;	6.7.4.4
	• Any proposal to fund a biodiversity conservation action;	6.7.4.4
	• Any proposal to conduct ecological rehabilitation (if a mining project); and	N/A
	• Any proposal to make a payment to the Biodiversity Conservation Fund.	6.7.4.4
Mining, Exploration and Geoscience 14/09/2021	The proposed location of any biodiversity offset areas (both on and off site) or any supplementary biodiversity measures.	6.7.4.4
NSW DPI Agriculture 09/09/2021	Include a biosecurity (pests, weeds and disease) risk assessment outlining the likely plant, animal and community risks.	6.7.3.6, 6.7.4.3
	Include details of how the proposal will deal with identified biosecurity risks as well as contingency plans for any failures. Include monitoring and mitigation measures for weed and pest management.	6.7.4.3
Queanbeyan-Palerang Regional Council 25/10/2021	Biodiversity considerations and any requirement for offsets	

Table A2.2 (Cont'd)
Coverage of Issues Identified by Other Government Agencies for Consideration in the EIS

Agency / Organisation	Summary or Paraphrased Relevant Requirement	Relevant EIS Section(s)
HERITAGE		
Heritage NSW 13/09/2021	The EIS must identify and describe the Aboriginal cultural heritage values that exist across the whole area that will be affected by the development and document these in an Aboriginal Cultural Heritage Assessment Report (ACHAR).	6.8.2
	Consultation with Aboriginal people must be undertaken and documented in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW 2010).	6.8.2.3
	Impacts on Aboriginal cultural heritage values are to be assessed and documented in the ACHAR.	6.8.4, 6.8.7
	The assessment of Aboriginal cultural heritage values must include a surface survey undertaken by a qualified archaeologist.	6.8.3
	Outline procedures to be followed if Aboriginal objects are found at any stage of the life of the project to formulate appropriate measures to manage unforeseen impacts.	6.8.6
	Outline procedures to be followed in the event Aboriginal burials or skeletal material is uncovered during construction to formulate appropriate measures to manage the impacts to this material.	6.8.6
PLANNING		
NSW EPA 13/09/2021	Demonstrate that the planning process and any subsequent development incorporates objectives and mechanisms for achieving ESD.	7 and Appendix 6
	Consideration of alternatives and justification for theproposal.	2.7
APPROVALS		
NSW EPA 13/09/2021	Identify all approvals and licences required under environment protection legislation	3.1.2
REHABILITATION		
NSW EPA 13/09/2021	Outline considerations of site maintenance, and proposed plans for the final condition of the site.	3.16.2, 3.16.3, 3.16.4
NSW DPI Agriculture 09/09/2021	Describe the final proposed land use and land form.	3.16.3, 3.16.4
	Detail the proposed rehabilitation and decommissioning/closure measures to achieve this land use including the expected timeline for the rehabilitation program.	3.16
	Outline the monitoring and mitigation measures to be adopted for rehabilitation remedial actions.	3.16.6
Queanbeyan-Palerang Regional Council 25/10/2021	Details of progressive remediation of the site	

Table A2.2 (Cont'd)
Coverage of Issues Identified by Other Government Agencies for Consideration in the EIS

Agency / Organisation	Summary or Paraphrased Relevant Requirement	Relevant EIS Section(s)
HUMAN HEALTH		
NSW EPA 13/09/2021	A human health risk assessment undertaken in accordance with *Environmental Health Risk Assessment: Guidelines for assessing human health risks from environmental hazards* (enHealth) and must include: • the inhalation of criteria pollutants and exposure from all pathways; and	6.4 6.4.7
	• a demonstration of how the waste to energy facility would be operated in accordance with best practice measures to manage air emissions with consideration of the *Environment Protection Authority's NSW Energy from Waste Policy Statement*.	Not relevant to this Project – considered an error
SOIL AND LAND CAPABILITY		
NSW EPA 13/09/2021	Provide any details (in addition to those provided in the location description) that are needed to describe the existing situation in terms of soil types and properties and soil contamination.	6.11.6
	Identify any likely impacts such as:	6.11.6
	a) disturbing any existing contaminated soil;	6.11.6
	b) contamination of soil by operation of the activity;	6.11.6
	c) subsidence or instability;	6.11.6
	d) soil erosion; or	6.11.6
	e) disturbing acid sulfate or potential acid sulfate soils.	6.11.6
	Describe and assess the effectiveness or adequacy of any soil management and mitigation measures	6.11.5
NSW DPI Agriculture 09/09/2021	Include a Land Use Conflict Risk Assessment (LUCRA) to identify potential land use conflict with sensitive receptors.	6.11.4
	Include a map, to scale, showing the quarry operational and infrastructure details including separation distances from sensitive receptors and surrounding agricultural land uses.	Figure 2.8 & 2.9
	Describe the soil, slope, land capability, agricultural productivity, land characteristics and the history of agricultural land uses on the proposed development site.	6.11
	Describe the current and historical agricultural land uses on surrounding land in the locality including the land capability and agricultural productivity of the surrounding land.	6.11.4
	Detail the potential impacts on agricultural land and agricultural land uses on the site and in the locality.	6.11.6
	Detail the location and areas of land to be temporarily removed from agricultural use, and those areas which are to be returned to agricultural use on completion of the development.	3.16.3, 3.16.4
	Consider possible cumulative impacts on surrounding agricultural enterprises and landholders.	6.11.6,
	Assess impacts on any agricultural support services, processing and value adding industries.	6.11.4
	Demonstrate that all significant impacts on current and potential agricultural developments and resources can be reasonably avoided or adequately mitigated.	6.11.5
	Detail the expected life span of the proposed development.	3.13

Table A2.2 (Cont'd)
Coverage of Issues Identified by Other Government Agencies for Consideration in the EIS

Agency / Organisation	Summary or Paraphrased Relevant Requirement	Relevant EIS Section(s)
VISIBILITY		
Queanbeyan-Palerang Regional Council 25/10/2021	Visual impacts on surrounding residential areas	6.6
HAZARDS		
NSW DPI Agriculture 09/09/2021	Detail contingency plans to enable the operation to deal with emergency situations.	6.14.2.4
	Detail Emergency Management procedures and responsibilities for responding to bushfire threats.	6.14.2.4
NSW Rural Fire Service 15/09/2021	The EIS must address: • the aim and objectives of Planning for Bush Fire Protection 2019;	6.14.2
	• identification of potential ignition sources during construction and operation of the development;	6.14.2.4
	• storage of fuels and other hazardous materials;	6.14.3
	• proposed bush fire protection measures for the development, including vegetation management and fire suppression capabilities;	6.14.2.4
	• operational access for firefighting appliance to the site; and	3.4.2, 3.8.1
	• emergency and evacuation planning.	6.14.2.4
Queanbeyan-Palerang Regional Council 25/10/2021	Operational requirement / constraints: • Bushfire risk	6.14
SOCIAL		
Queanbeyan-Palerang Regional Council 25/10/2021	Community Engagement • Social Impact Statement	6.16

Appendix 3

Analysis of Environmental Risk

(Total No. of pages including blank pages = 7)

A3.1 Introduction

The following presents an analysis of potential risks associated with the development of the Monaro Rock Quarry Project. The analysis considers the risks associated with the development as described in Section 3 of the EIS. Standard mitigation measures implemented in the quarrying industry are assumed to be implemented. These include actions such as the use of dust suppression on roads and product stockpiles and the use of a Driver's Code of Conduct for all product despatch. This analysis has been used to inform the approach to environmental assessment for the EIS.

Risk is the chance of something happening that will have an impact upon the objectives or the task which, in this case, is the environmentally responsible extraction operation within the Project Site for the Monaro Rock Quarry. Risk is measured in terms of consequence (severity) and likelihood (probability) of an event happening. The allocation of a qualitative consequence ranking of the potential impact(s) occurring for each risk source was based on the definitions outlined in **Table A3.1** whilst the qualitative likelihood or probability ranking for each risk source was defined in accordance with **Table A3.2**. The risk ranking was then established based upon the matrix presented in **Table A3.3**. These tables have been developed generally in accordance with Standards Australia "HB 203:2012 Managing environment-related risk".

Table A3.1
Qualitative Consequence Ratings

Level	Descriptor	Description
1	Catastrophic	The potential to cause regional environmental impact/ecosystem damage with impacts causing quarry or business closure, e.g. major off-site release of a contaminant with long-term detrimental effects.
2	Major	The potential to cause substantial regional/local environmental damage which could result in major financial loss and/or prosecution, e.g. off-site release of a contaminant resulting in local ecosystem damage.
3	Moderate	The potential to cause substantial temporary or minor long-term damage, e.g. a minor water or large hydrocarbon off-site release with outside clean-up assistance required. May potentially result in a legal non-compliance.
4	Minor	The potential for a temporary impact or minor damage. No legal breach but may be non-compliant with internal environmental target, e.g. minor hydrocarbon spill.
5	Insignificant	No detrimental effect, negligible environmental impact.

Table A3.2
Qualitative Likelihood Ranking

Level	Descriptor	Description
A	Almost Certain	Is expected to occur in most circumstances
B	Likely	Will probably occur in most circumstances
C	Possible	Could occur
D	Unlikely	Could occur but not expected
E	Rare	Occurs only in exceptional circumstances

Table A3.3
Risk Rankings

		Likelihood				
		A - Certain	B - Likely	C - Possible	D – Unlikely	E - Rare
Consequence	1 – Catastrophic	25	24	22	19	15
	2 – Major	23	21	18	14	10
	3 – Moderate	20	17	13	9	6
	4 – Minor	16	12	8	5	3
	5 – Insignificant	11	7	4	2	1

Low Medium High Extreme

Table A3.4 presents the identified risk sources associated with the Project and the potential consequences of the identified risk and the risk rankings assuming adoption of the proposed management and control measures identified within Section 6 of the EIS.

The implications of the impacts of the four risk rankings are defined as follows.

Low (L): Residual impacts are unlikely to have any noticeable impact on the local environment or stakeholders.

Medium (M): Residual impacts are unlikely to preclude the development of a project but could require minor amendments in order to proceed.

High (H): Residual impacts would require careful management to enable a project to proceed in the manner proposed.

Extreme (E): Residual impacts could preclude development of a project in the manner proposed – it could proceed with substantial amendments.

Table A3.4
Analysis of Environmental Risks

Page 1 of 5

Risk Source	Consequence / Hazard	Risk with Standard Control Measures	Proposed Control Measures EIS Section Ref.
AIR QUALITY			
Emissions of TSP / PM_{10} / $PM_{2.5}$ / deposited dust from extraction and processing operations.	Health and / or amenity impacts on occupants within surrounding privately-owned residences.	9 (D3)	6.2.6
Emissions of TSP / PM_{10} / $PM_{2.5}$ / deposited dust from transportation of extracted and/or processed rock within the extraction area.	Health and / or amenity impacts on occupants within surrounding privately-owned residences.	9 (D3)	
Generation of gaseous emissions and blasting fumes.	Health and / or amenity impacts on occupants within surrounding privately-owned residences.	9 (D3)	
Emissions of respirable crystalline silica from extraction and processing operations.	Health and / or amenity impacts on occupants within surrounding privately-owned residences.	14 (D2)	
Generation of odour from asphalt production operations.	Health and / or amenity impacts on occupants within surrounding privately-owned residences.	5 (D4)	

Table A3.4 (Cont'd)
Analysis of Environmental Risks

Risk Source	Consequence / Hazard	Risk with Standard Control Measures	Proposed Control Measures EIS Section Ref.
GREENHOUSE GAS			
Scope 1 – on-site generation of Greenhouse Gas (GHG) emissions.	Climate change impacts from the Project, locally, regionally, and worldwide.	7 (B5)	6.3.5
Scope 2 – off-site generation of GHG emissions.	Climate change impacts from the Project, locally, regionally, and worldwide.	7 (B5)	
Scope 3 – off-site impacts of GHG emissions.	Climate change impacts from the Project, locally, regionally, and worldwide.	7 (B5)	
NOISE			
Construction of site infrastructure (excluding the Quarry Access Road), amenity barriers, vegetation clearing and soil stripping.	Noise emissions potentially resulting in amenity impacts at surrounding privately-owned residences.	13 (C3)	6.5.5
Construction of the Quarry Access Road	Noise emissions potentially resulting in amenity impacts at surrounding privately-owned residences.	13 (C3)	
Drilling and extraction operations near the land surface.	Noise emissions potentially resulting in amenity impacts at surrounding privately-owned residences.	5 (D4)	
Drilling and extraction operations below the original land surface.	Noise emissions potentially resulting in amenity impacts at surrounding privately-owned residences.	3 (E4)	
Primary and secondary processing operations.	Noise emissions potentially resulting in amenity impacts at surrounding privately-owned residences.	9 (D3)	
Transportation of extracted and/or processed rock within the extraction area.	Noise emissions potentially resulting in amenity impacts at other surrounding privately-owned residences.	13 (C3)	6.5.5
Road transportation of Quarry products, concrete and asphalt.	Noise emissions potentially resulting in amenity impacts at surrounding privately-owned residences.	5 (D4)	
BLASTING			
Ground vibration and airblast from blasting.	Amenity impacts on surrounding privately owned residences.	5 (D4)	6.5.5.3
Ground vibration and airblast from blasting.	Damage to nearby privately owned residences, buildings infrastructure, or stock.	6 (E3)	
Rock propelled outside the designed blast envelope (i.e. flyrock).	Damage to nearby privately owned residences, buildings, infrastructure or stock.	10 (E2)	
	Injury or death.	10 (E2)	
BIODIVERSITY			
Clearing of native vegetation within the Project Area.	Significant impacts upon habitat for terrestrial fauna species, threatened or rare native vegetation or vegetation communities and biodiversity values.	16 (A4)	6.7.4

Low | Medium | High | Extreme

Table A3.4 (Cont'd)
Analysis of Environmental Risks

Risk Source	Consequence / Hazard	Risk with Standard Control Measures	Proposed Control Measures EIS Section Ref.
BIODIVERSITY (Cont'd)			
Clearing of native vegetation within the Project Area (Cont'd).	Injuries to native fauna during clearing / earthworks.	9 (D3)	
Extraction operations.	Indirect impacts to fauna communities due to noise / blasting etc.	16 (A4)	
Transportation of extracted and/or processed rock within the extraction area and using the Quarry Access Road.	Injury or death to wildlife crossing the internal haul road or Quarry Access Road.	9 (D3)	
Inappropriate maintenance/management of weeds and pest species.	Weeds and/or pests impede successful rehabilitation.	13 (C3)	
	Weeds and/or pests propagating from the Project Area impact the productivity of surrounding agricultural land or the biodiversity values of retained native vegetation communities.	5 (D4)	
ABORIGINAL CULTURAL HERITAGE			
Removal or destruction of identified Aboriginal sites and/or artefacts within the development area.	Loss of Aboriginal cultural heritage values and reduction of in situ archaeological record.	20 (A3)	6.8.6
Removal or destruction of identified Aboriginal sites and/or artefacts outside of the development area.	Loss of Aboriginal cultural heritage values and reduction of in situ archaeological record.	6 (E3)	
Removal or destruction of currently unidentified Aboriginal sites and/or artefacts.	Loss of Aboriginal cultural heritage values and reduction of in situ archaeological record.	9 (D3)	
HISTORIC HERITAGE			
Authorised removal of known locally significant historic heritage sites.	Damage to or loss of historic heritage items.	6 (E3)	6.9
VISIBILITY			
Construction of Project Site Infrastructure and amenity barriers.	Amenity impacts arising from minor change in content and composition of views from privately-owned residences.	11 (A5)	6.6.4
Views of extraction and processing operations.	Amenity impacts through the change in content and composition of views from privately-owned residences.	13 (C3)	
Views of transportation operations using the Quarry Access Road.	Amenity impacts through the change in content and composition of views from privately-owned residences.	12 (B4)	
SOIL AND LAND CAPABILITY			
Inappropriate soil management.	Inadequate soil available for rehabilitation purposes leading to less successful rehabilitation and increased rehabilitation costs and maintenance.	5 (D4)	6.11.5

Low | Medium | High | Extreme

Table A3.4 (Cont'd)
Analysis of Environmental Risks

Risk Source	Consequence / Hazard	Risk with Standard Control Measures	Proposed Control Measures EIS Section Ref.
SOIL AND LAND CAPABILITY (Cont'd)			
Inappropriate soil management (Cont'd).	Degradation of soil in stockpiles leading to less successful rehabilitation and increased rehabilitation costs and maintenance.	3 (E4)	
	Erosion and loss of materials from soil stockpiles.	5 (D4)	
Changes to land uses impacting soil and land resources.	Reduction of the land and soil capability class within the Project Area.	9 (D3)	
SURFACE WATER			
Topsoil and subsoil stripping.	Reduction in water quality in local watercourses within the Murrumbidgee Catchment.	5 (D4)	6.12.3
Capture of surface water from local catchments.	Reduction in flows in surrounding watercourses.	12 (B4)	
Spillage/release of diesel.	Water quality impacts, if not contained within the Project Area.	6 (E3)	
Impacts on flooding.	Flood impacts on surrounding residences and/or infrastructure as a result of the Project.	3 (E4)	
Climate change.	Increased intensity of rainfall events.	7 (B5)	
GROUNDWATER			
Interception of groundwater table by extraction operations.	Reduced groundwater levels and availability of groundwater for existing groundwater users.	20 (A3)	6.13.5
	Reduced baseflow contribution to local watercourses within the Murrumbidgee Catchment.	13 (C3)	
Reduced baseflow contribution to nearby groundwater dependent ecosystems.	Impacts to groundwater dependent ecosystems.	5 (D4)	6.13.5
Contamination of groundwater (e.g. diesel spillage).	Impacts to groundwater quality.	5 (D4)	
HAZARDS AND HAZARDOUS GOODS			
Fire initiated on site.	Off-site vegetation burnt and/or property or infrastructure damage or destruction.	14 (D2)	6.14.2.4
Fire initiated off site.	On-site vegetation burnt and/or equipment damage or destruction.	14 (D2)	6.14.2.4
Transportation of explosives,	Potential for accident on site or off site.	10 (E2)	6.11.3
On-site storage of explosives.	No explosives would be stored on site.	Not Applicable	6.11.3
On-site storage of flammable liquids (e.g. diesel, bitumen).	On-site vegetation and/or equipment damage or destruction.	14 (D2)	6.14.3

Table A3.4 (Cont'd)
Analysis of Environmental Risks

Risk Source	Consequence / Hazard	Risk with Standard Control Measures	Proposed Control Measures EIS Section Ref.
TRAFFIC AND TRANSPORT			
Operational traffic on the public road network.	Additional operational traffic results in increased safety risks for motorists.	13 (C3)	6.10.3
	Additional operational traffic results in increased travel time for motorists.	3 (E4)	6.10.3
	Deterioration of road condition and serviceability as a result of increased traffic.	3 (E4)	6.10.3
ECONOMIC			
Amenity impacts from extraction operations.	Localised impacts negatively affect property prices.	9 (D3)	6.15.4
	Restriction of business opportunities for surrounding rural landowners	9 (D3)	
SOCIAL			
Extraction operations.	Creation of noise, vibration, dust, traffic, and/or visual amenity impacts that reduce social amenity.	13 (C3)	6.14.3
	Anxiety created by changes within Project Area.	13 (C3)	

Low | Medium | High | Extreme

Appendix 4

QPRC Planning Agreement Correspondence

(Total No. of pages including blank pages = 2)

Council ref: 52.4.1

7 July 2025

Mr Nicholas Warren
Principal Environmental Consultant
RW Corkery & Co Pty Limited
PO Box 1796
CHATSWOOD NSW 2057

Email: admin@rwcorkery.com

Dear Mr Warren,

Re: Monaro Rock Quarry – Planning Agreement Offer

Thank you for your letter dated 17 June 2025 regarding the proposed Planning Agreement for the Monaro Rock Quarry project.

Queanbeyan-Palerang Regional Council acknowledges receipt of your offer to enter into a Planning Agreement under Section 7.4 of the Environmental Planning and Assessment Act 1979.

Council notes the proposal to make annual contributions to support local community-based initiatives in recognition of local impacts.

Following consideration of your correspondence and a recent Councillor Workshop briefing on the project, I advise that Council is now in a position to commence discussions for a Voluntary Planning Agreement.

We look forward to receiving a draft Planning Agreement and will work with your team to progress the matter in accordance with The Department of Planning Housing and Infrastructure's practice notes and relevant legislative requirements.

Should you have any questions or wish to arrange a meeting to discuss next steps, please do not hesitate to contact QPRC New Release Coordinator, Tim Reich, on Ph 02 6825 6327 or via email at tim.reich@qprc.nsw.gov.au.

Yours sincerely,

Rebecca Ryan
General Manager
Queanbeyan-Palerang Regional Council

Appendix 5

Record of Community Engagement

(Total No. of pages including blank pages = 13)

Proposed Monaro Rock Quarry Project

Community Feedback Form: April 2021

This form is intended to record feedback from the local community relating to the Monaro Rock Quarry Project. It would be appreciated if you could take the time to complete this form and post it to PO Box 239, BROOKLYN NSW 2083. Alternatively, you can return a copy of this form via email to nick@rwcorkery.com or request that a copy be emailed to you for completion on your computer and emailed in reply.

The formal assessment of the Project will be managed by the NSW Department of Planning, Industry and Environment. You will be able to make a formal submission on the application during the public exhibition period.

Information provided will be compiled with all other information gathered during the community consultation program and summarised in the Environmental Impact Statement without recording the individual sources of comments. Reference to any personal confidential information provided during the consultation would only be included in the EIS within the written permission of the relevant person(s) or representative(s), except when required by law.

Personal Information	
Name:	
Address:	
Mailing Address:*	
Contact (Phone):*	
Contact (Email):*	
Publish Personal Information in EIS (yes/no) **Written permission required**	
* Please note your preferred method of contact	

General Project Queries	
How long have you lived at this address?	_____ Years Owner ☐ Permanent Home ☐ Lessee ☐ Weekend Use Only ☐
Have you reviewed the information provided through the letterbox consultation and do you have any queries regarding the information provided?	
Are there any particular environmental issues that you would like more information about or would like to see assessed in the Environmental Impact Statement for the proposed Quarry?	
Are there any particular social or economic issues that you would like more information about or would like to see assessed in the Environmental Impact Statement for the proposed Quarry?	
How do you expect the development of the Quarry to affect you and/or your family and you day to day life?	

At the end of the Quarry's operational life, Monaro Rock Pty Ltd will rehabilitate the operational areas. Do you have any preference for land use upon closure?	
Are you aware of any other concerns in the community or matters that should be considered by Monaro Rock Pty Ltd in relation to the Quarry operation?	

Other Issues	
Do you have any additional issues or comments regarding the proposed Quarry operations?	

Further Contact	
Would you be interested in receiving further information about the Monaro Rock Quarry Project by email or mail?	☐ Yes ☐ Email ☐ No ☐ Mail
Would you be interested in receiving an emailed copy of the Environmental Impact Statement once it is placed on exhibition?	☐ Yes ☐ No

Further Comments

FACT SHEET – SILICA DUST AND SILICOSIS

A key community concern in relation to the Monaro Rock Quarry Project is the potential health risks associated with dust generated by the extraction and processing of hard rock material, and particularly the risk of developing silicosis.

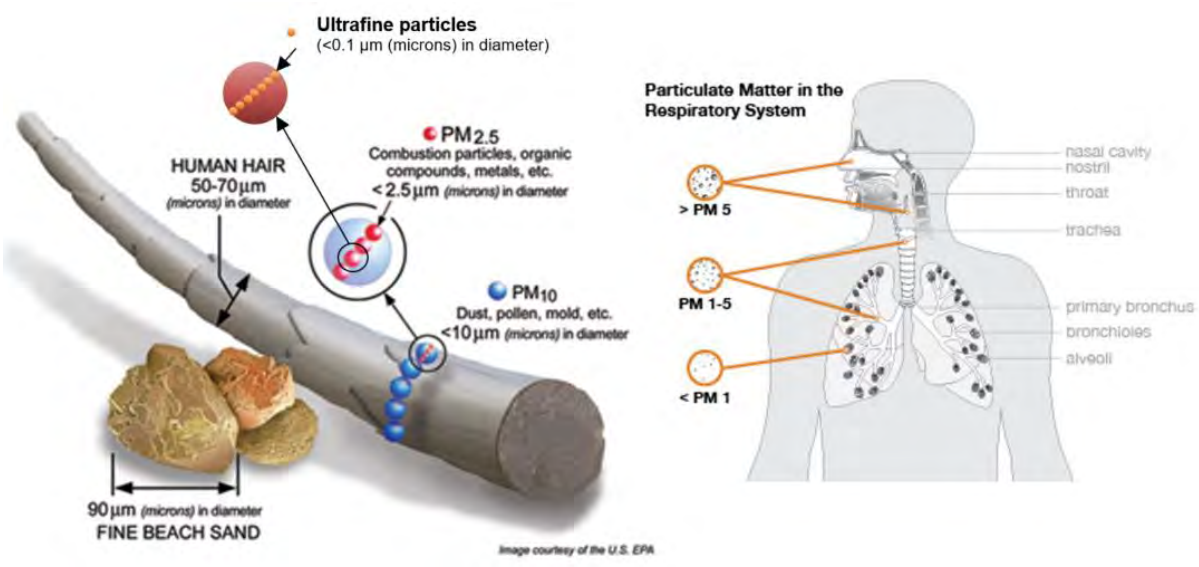
This fact sheet has been prepared by Monaro Rock to provide information about dust, silica and silicosis, and the key human health risk controls that will be implemented by Monaro Rock throughout the life of the project.

DUST AND SILICA?

Dust generated by mechanical processes used in quarrying such as the crushing and screening will disperse from the dust source as particulate matter. Particulate matter may have a range of morphological, chemical, physical and thermodynamic properties, with sizes that vary from less than 0.005 microns to greater than 100 microns. The size of the particulate matter depends on the activity. For example, very fine particles are generated by activities such as grinding or polishing, while the mechanical crushing and screening used during quarrying is more likely to generate particulate matter that is 10 µm or greater. Particulates are also generated from natural sources such as crustal dust (soil), pollen and moulds as well as other emission types such as wood smoke and diesel fumes.

Health risks associated with particulate matter depend on the size and characteristics of the material. Particulates that are 10 microns or less are considered to be respirable, that is, they have the potential to pass the body's natural defence mechanisms in the mouth, nose and upper respiratory tract and enter the lungs. The below image presents the various particulate matter sizes and penetration into the human lungs.

Silica is one of the most abundant minerals in the earth's crust and is found in stone, rock, sand, gravel, and clay, as well as products such as bricks, tiles, artificial stone benchtops and some plastics. When these materials are extracted or worked on, silica is released in dust and is known as respirable crystalline silica (RCS) or silica dust[1].



[1] Cancer Council (2021) *Silica Dust* https://www.cancer.org.au/cancer-information/causes-and-prevention/workplace-cancer/silica-dust [Accessed 08/04/2024]

The proposed quarry seeks to target an important deposit of rhyodacitic ignimbrite – a high-quality hard rock material valued for concrete production. A geological investigation recently undertaken as part of the environmental impact statement (EIS) for the project identified that the rhyodacitic ignimbrite contains crystalline silica in the form of quartz (SiO_2) at concentrations ranging from 30 to 40 per cent, which is typical of hard rock quarries of this kind. This means that the dust generated by the quarry may contain RCS.

WHAT IS SILICOSIS?

Respirable dust of any kind may be hazardous to human health, and repeated high levels of exposure can cause a variety of respiratory diseases. Exposure to RCS in dust can cause silicosis. Whether or not silicosis develops depends on factors such as how much RCS is in the dust, how much dust is inhaled and for how long.

Silicosis occurs when RCS is deposited in the lungs causing inflammation, resulting in a build-up of scar tissue and reduced lung capacity. Silicosis can be classed into three types.

- Chronic silicosis – caused by long-term exposure (10+ years) to low levels of RCS.
- Accelerated silicosis – caused by short-term exposure (1 – 10 years) to large amounts of RCS.
- Acute silicosis – a rare form of silicosis caused by exposure to very high concentrations of RCS over a very short period (less than 1 year).[2]

Links have also been made between exposure to RCS and other respiratory diseases such as chronic obstructive pulmonary disease (COPD) and lung cancer[3].

Environmental or community exposures to respirable crystalline silica are much lower than those encountered in the workplace and are, in most cases, not sufficiently high to cause occupational diseases such as silicosis (*CCAA, 2018*). SafeWork NSW and the NSW Resources Regulator regulate workplace health and safety legislation in NSW and the EPA regulates environmental pollution including air quality. Each of these Government agencies regulate the appropriate management of air quality for quarrying and other developments to ensure that relevant workplace standards are met and that surrounding residents are not placed at risk.

PROJECT ASSESSMENTS RELATING TO DUST

Monaro Rock is committed to minimising the impacts of the project on the community. We have engaged specialist consultants to prepare the following assessments relevant to silicosis risks for the project's EIS:

- An air quality impact assessment, including the development of a dust dispersion model to predict and assess potential dust impacts on the community.
- A human health risk assessment to assess the health risks associated with the air quality outcomes for the project.

[2] SafeWork NSW (2024) *Crystalline silica technical fact sheet* https://www.safework.nsw.gov.au/resource-library/hazardous-chemicals/crystalline-silica-technical-fact-sheet [Accessed 08/04/2024]

[3] Cement Concrete and Aggregates Australia (CCAA) (2018) *Workplace Health and Safety Guideline – Management of Respirable Crystalline Silica in Quarries* https://www.ccaa.com.au/CCAA/CCAA/Docs/Industry/Workplace_Health_and_Safety_Guideline_Management_of_Respirable_Crystalline_Silica_in_Quarries.aspx [Accessed 09/04/2024]

Outcomes of the specialist assessments will be communicated through the EIS and other consultation. Monaro Rock will continue to engage with the community and seek feedback as the project is developed.

SILICA DUST CONTROL MEASURES

Operating procedures will be specifically designed to minimise risks and impacts associated with RCS to workers and the community. A hierarchy of controls will be developed in consultation with specialist consultants and government agencies to ensure effective dust management in line with the NSW Work Health and Safety Regulation (2017).

SafeWork NSW (2024) recommends a range of dust management measures to minimise health and safety risks. All relevant measures will be implemented for this project. A summary of proposed dust mitigation measures is provided below. Additional measures may be recommended during the environmental impact assessment.

- Applying dust suppression to active surfaces using a water cart.
- Design controls on processing equipment such as enclosure of fixed crushing and screening equipment.
- Regular assessment of the level of personal exposure among workers performing high-risk tasks.
- Regular housekeeping in dusty work areas to prevent the accumulation of dust.
- Provision of suitable personal protective equipment (PPE), including training on how to correctly fit, use and ensure regular maintenance of respiratory protective equipment.

HOW DO I FIND OUT MORE?

Community members are encouraged to contact us with any project-related questions or ask to be included in ongoing consultation.

Enquiries may be sent directly to the project team via the Monaro Rock website (https://monarorock.com.au/) or to Nicholas Warren either by email at nick@rwcorkery.com or call 0437 635 975.

COMMUNITY NEWSLETTER

An update from Monaro Rock

May 2025

Since our community virtual event in June 2024, we have been reviewing and incorporating your feedback as we refine our project plans to ensure we meet health, safety and environmental criteria and consider community expectations.

We'd like to thank you for your comments and suggestions during these and previous discussions. We realise some of you have concerns about the project and we are committed to ensuring they are addressed wherever possible, and that you have an opportunity to speak with us directly.

We have received the results of many of the ongoing expert assessments that are helping us better understand any potential impacts this proposal might have on our community and environment, and how we can work to mitigate them.

We are finalising the Environmental Impact Statement and expect this to be submitted to the NSW Government in June 2025.

Project updates – environmental assessments

A comprehensive assessment of environmental, health, economic and social impacts associated with the proposed quarry is under way, and many individual assessments have been completed. Preliminary details of some of the major updates since the previous newsletter are summarised below.

- Biodiversity risks were assessed by Canberra-based ecologists Capital Ecology. The site was thoroughly surveyed for threatened native flora and fauna, and both direct and indirect impacts were considered.
- The Aboriginal Cultural Heritage Assessment has been completed, providing us with invaluable information regarding a culturally modified ring tree on site. The proposal has been adjusted to avoid disturbing or harming the artefact. The attached map shows the updated design.
- We recently completed a visual impact assessment from key vantage points around the Royalla area. This assessment will consider existing views and potential changes to the outlook from private properties and public land towards the quarry.
- Air quality, greenhouse gas emissions, noise and blasting impacts have all been assessed by qualified specialists.
- Groundwater and surface water impact reviews have been undertaken to inform us of any potential risks and how to mitigate them as effectively as possible. Mitigation measures and water management structures have been included in the design as a result.
- Broader human health, social and economic impact assessments are also being undertaken to consider risks and benefits to the community and region.

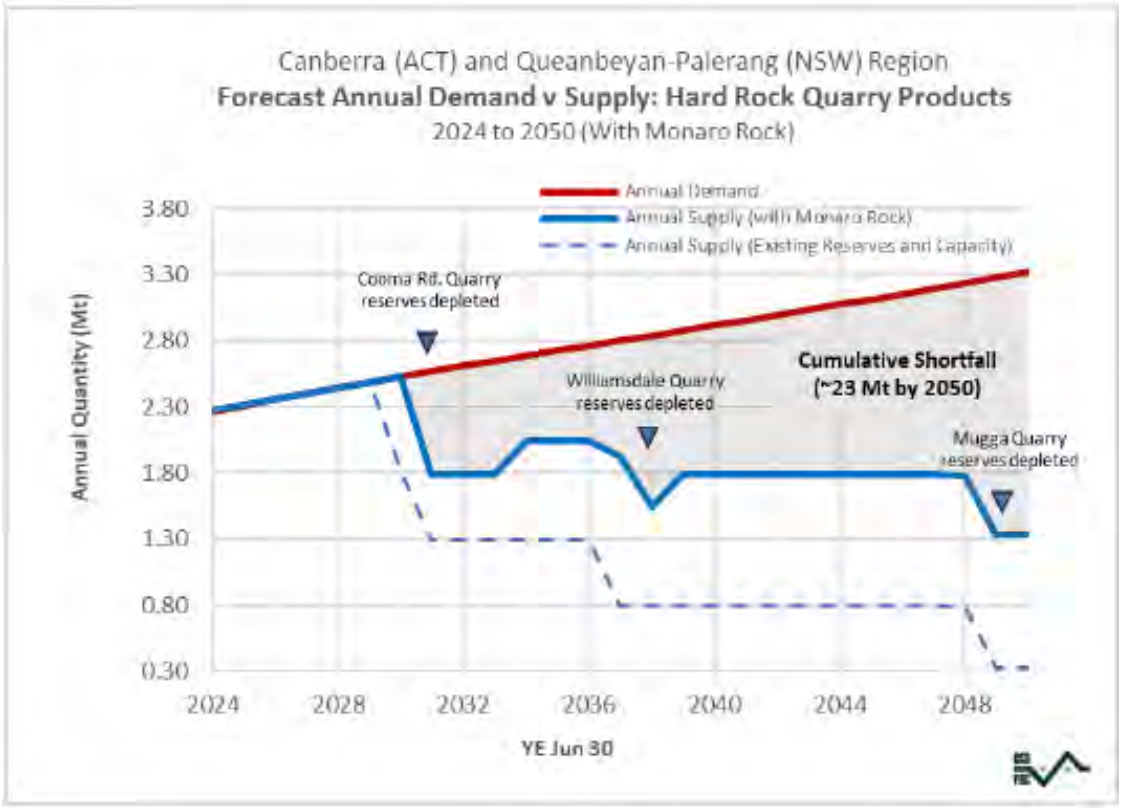
The outcomes of these assessments will be presented in a virtual meeting on Tuesday 3 June 2025. All of the reports will be included in the Environmental Impact Statement.

Need for the project

Members of the community have previously questioned whether there is sufficient demand for another quarry in the region. To answer this, we engaged Ecoroc Consulting Engineers to undertake a supply and demand analysis of the local market for construction materials. The following is a summary of the process and results.

- Demand was determined through a review of industry-based data on the need for construction materials per capita and the projected population growth in the ACT and Queanbeyan regions.
- Construction material supply was calculated from surrounding quarry operations using existing production rates, reserves and other limitations. Other sources such as recycled materials were also considered.
- Supply and demand were then analysed, with the outcomes presented in **Figure B.** The expected closure of the Cooma Road Quarry will lead to a supply shortfall which will be exacerbated by the future closure of other sources.
- Ecoroc determined that demand would exceed supply from existing hard rock quarry reserves from 2029, with a cumulative shortfall of resource of approximately 41Mt by 2050.
- Even assuming the approval and full capacity operation of Monaro Rock Quarry, the region would still face a resource shortfall of approximately 23Mt by 2050.
- As the Ecoroc assessment relies on market assumptions, a sensitivity analysis was also conducted. In every sensitivity scenario, a shortfall of resource was calculated.

In summary, there is steadily increasing demand for construction material in the ACT and Queanbeyan regions, and even with the assumed approval of the Monaro Rock Quarry, there is an anticipated shortfall over the period to 2050. The full report and a description of the methods used by Ecoroc will be included in the EIS.



Project updates – project design

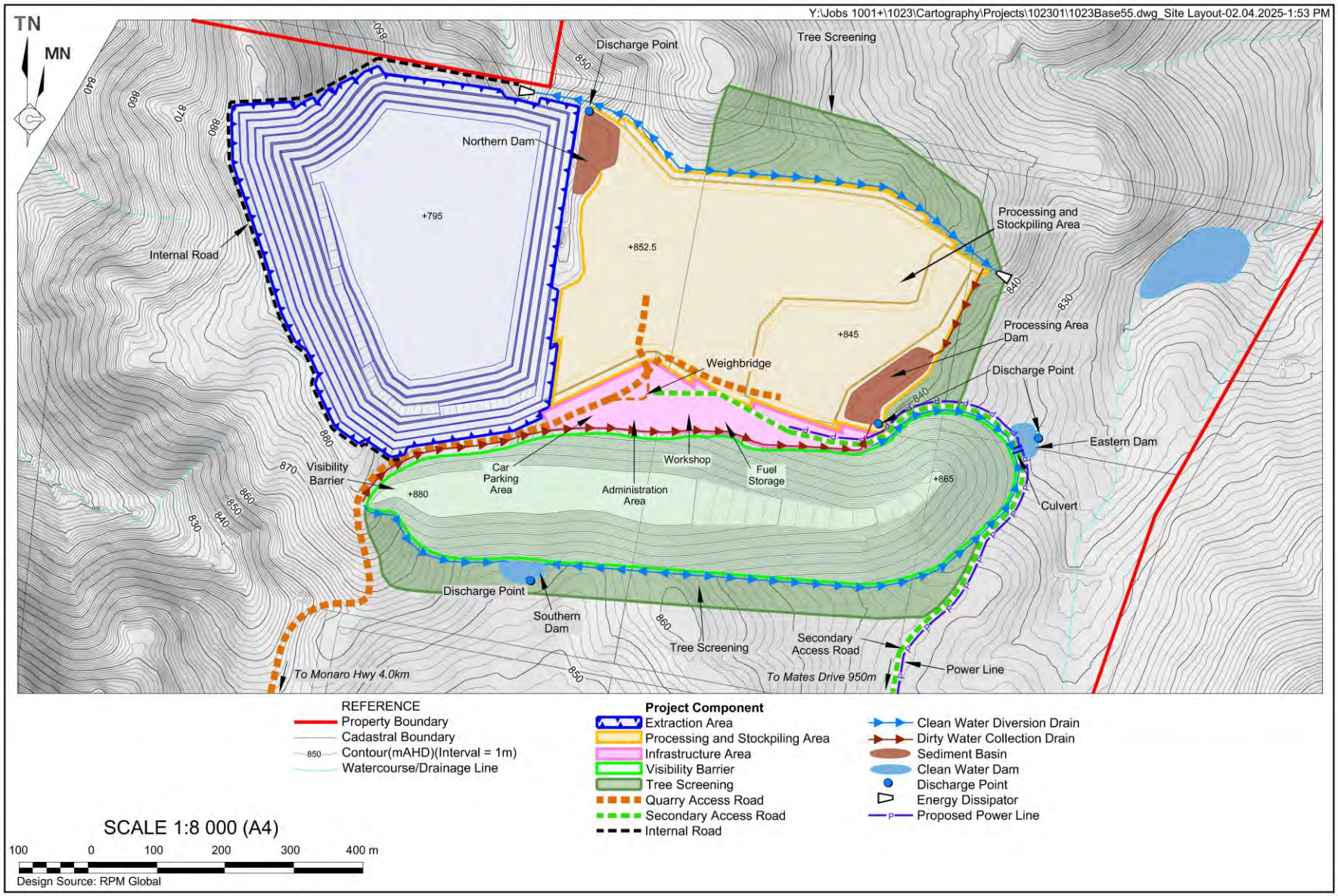
Some important amendments to the project design have occurred since the last community event. These are summarised below.

- The northwestern corner of the extraction area has been reduced in scale to avoid impacts to a culturally modified tree. Aboriginal stakeholders have indicated their preference that the tree not be removed and an exclusion area would be established.
- A groundwater bore has been added to provide water supply security for the project. The use of the bore is not expected to be required for normal operations but would ensure consistent supply for dust suppression during extremely dry periods. The use of the bore has been included in the Groundwater Assessment.
- Two clean water dams would be developed on the property to provide water for use as needed. Most of the existing small farm dams would be removed to accommodate these dams.

These updates will be discussed in more detail in the virtual meeting on Tuesday 3 June 2025.

Upcoming events

1. **Tuesday 3 June 2025**: Community members are invited to attend a virtual meeting in which more detailed information on the quarry design will be presented, with opportunities to ask questions. An invitation will be sent to registered email addresses in coming days. If you have not done so, please register your email address with us to receive a meeting invite and future updates. We encourage you to forward the invitation to others.
2. **June 2025**: It is expected that the Environmental Impact Statement will be placed on public exhibition at the end of June. Generally, the NSW Department of Planning, Housing and Infrastructure (DPHI) places applications and supporting documents on public exhibition for four weeks. We will notify those on our mailing list when this will occur. DPHI will separately distribute public notices, contact direct neighbours regarding the public exhibition, and host its own community consultation event to discuss the process of development assessment.


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TN
MN
Discharge Point
Tree Screening
Northern Dam
+795
+852.5
+845
Internal Road
Processing and Stockpiling Area
Processing Area Dam
Weighbridge
Discharge Point
Eastern Dam
Visibility Barrier
Car Parking Area
Workshop
Fuel Storage
Administration Area
+880
+865
Culvert
Discharge Point
Southern Dam
Tree Screening
Secondary Access Road
Power Line
To Monaro Hwy 4.0km
To Mates Drive 950m
REFERENCE
Property Boundary
Cadastral Boundary
850 Contour(mAHD)(Interval = 1m)
Watercourse/Drainage Line
Project Component
Extraction Area
Processing and Stockpiling Area
Infrastructure Area
Visibility Barrier
Tree Screening
Quarry Access Road
Secondary Access Road
Internal Road
Clean Water Diversion Drain
Dirty Water Collection Drain
Sediment Basin
Clean Water Dam
Discharge Point
Energy Dissipator
Proposed Power Line
SCALE 1:8 000 (A4)
100 0 100 200 300 400 m
Design Source: RPM Global



Indicative approval pathway

On this page we have provided a summary of the planning approval pathway for the project so you can see where we are up to in that process.

We welcome your feedback

R.W. Corkery & Co. will continue to manage the environmental impact assessment processes for the project.

Please contact our project representative Nick Warren on 0437 635 975 or nick@rwcorkery.com with your queries.

We have also commissioned Jane Seaborn of Landscape Research + Communications to undertake a Social Impact Assessment for the project.

Jane has been speaking to community members and we invite you to contact her directly on 0414 829 282 or jane@landscaperesearch.com.au.

Community updates

The Monaro Rock website at **www.monarorock.com.au** is where you will find fact sheets, FAQs and other project information, as well as a "contact us" link enabling you to get in touch with us directly.

If you have friends, neighbours, colleagues or others who may benefit from these updates please encourage them to visit the website and sign up to receive our newsletter.

Appendix 6

Summary of Environmental Management and Monitoring Measures

(Total No. of pages including blank pages = 13)

This Appendix has been compiled to record the full range of measures the Applicant would adopt when planning and operating the Project to mitigate any adverse effects on the environment.

The measures are presented in tabular form (**Table A6.1**) and record the respective objectives, actions and timing. Many of these measures would be reflected in the final conditions of consent. However, where they are not formalised, the Applicant would reflect the commitments in environmental management plans for the operation, thereby formalising them.

Table A6.1
Proposed Environmental Management and Monitoring Measures

Desired Outcome	Measure	Timing
1. Air Quality		
Minimise the emission of particulate materials from the Project Site	1.1 Prepare and implement an Air Quality Management System which outlines air quality management measures and responsibilities for the Project including monitoring requirements and a trigger action response plan.	Prior to the commencement of construction
	1.2 Include appropriate training and education regarding air quality related impacts for all staff and an induction process.	Throughout the life of the Project
	1.3 Include details regarding vehicle speed limits and other dust controls in employee site inductions and toolbox meeting, as required.	
	1.4 Minimise area of disturbance during project staging.	
	1.5 Implement a real-time particulate monitoring program that includes trigger alarms for reactive management of particulate matter levels.	
	1.6 Monitor meteorological conditions (including via automated alerts) to identify periods of adverse weather (little or no rainfall and wind speeds above 30km/h) and implement appropriate additional mitigation measures as required.	
	1.7 Undertake visual monitoring and reporting of visible dust emissions to site supervisors and implement measures to minimise or reduce observed dust emissions.	
	1.8 Apply water or, where needed, appropriate binding agents to unvegetated soil stockpiles and areas undergoing rehabilitation until such time as a suitable vegetative cover can be established.	
Reduce dust generated by resource extraction and processing activities	1.9 Utilise fabric filters on drill rigs.	Throughout the life of the Project
	1.10 Apply water or, where needed, appropriate chemical suppressants as a part of materials crushing and screening operations.	
	1.11 Ensure that all vehicles, plant and equipment used both at the Project Site and to transport materials to and from the Project Site are regularly maintained in accordance with manufacturer's requirements.	
	1.12 Minimise drop heights during loading and unloading of material and avoid tipping material down a tip face.	

Table A6.1 (Cont'd)
Proposed Environmental Management and Monitoring Measures

Desired Outcome	Measure	Timing
1. Air Quality (Cont'd)		
Reduce dust generated by vehicles and transportation activities	1.13 Limit on-site vehicle speeds to 50km/hr on unpaved road surfaces (excluding the Site Access Road) and 30km/hr on paved roads at the Project Site.	Throughout the life of the Project
	1.14 Utilise vegetation screening and 3m fencing along paved haulage routes.	
	1.15 Apply water or, where needed, appropriate chemical suppressants to paved and unsealed roads within the Project Site.	
	1.16 Limit load sizes to ensure material is not above the level of the truck sidewalls.	
	1.17 Cover all product truck loads with a tarpaulin which must be closed before using the Quarry Access Road.	
	1.18 Ensure that internal haul roads and the Quarry Access Road are maintained in good condition to facilitate efficient travel and transportation of materials.	
Reduce dust generated by ancillary operations	1.19 Utilise reverse pulse dust filters on materials storage silos.	Throughout the life of the Project
	1.20 Utilise dust shrouds during concrete blending.	
	1.21 Utilise an enclosure around loading point of concrete agitator trucks.	
Minimise odour impacts on nearby receptors	1.22 Apply standard odour mitigation for asphalt batching (e.g. directional venting, low-odour feedstock)	During asphalt plant commissioning and operation
2. Greenhouse Gas Emissions		
Minimise the emission of greenhouse gasses associated with the Project	2.1 Turn off all vehicles, plant and equipment when not in use.	Throughout the life of the Project
	2.2 The use of the most efficient vehicles and routes to minimise the number of trips required and minimise greenhouse gas (and particulate) emissions per tonne of material transported.	
	2.3 Ensure that all vehicles, plant and equipment are regularly serviced (including optimisation of tyre pressures) to ensure efficient operation.	
	2.4 Reduce gradients around the Project Site where feasible to reduce fuel consumption.	
	2.5 Consider the use of B5 fuel in plant and equipment (where practicable).	
	2.6 Consider solar power and green electricity procurement (where feasible).	
	2.7 Regularly maintain access road conditions to reduce fuel use.	

Table A6.1 (Cont'd)
Proposed Environmental Management and Monitoring Measures

Desired Outcome	Measure		Timing
3. Human Health			
Reduce the risk of health impacts to the local community.	3.1	Implement the air quality control measures presented in Section 1 of this table.	Throughout the life of the Project
Confirm assessment outcomes with regards exposure risks to Respirable Crystalline Silica	3.2	Subject initial air quality samples collected for the air quality monitoring program to laboratory analysis for Respirable Crystalline Silica concentration.	At the time of initial deposited dust sampling.
4. Noise			
Mitigate and minimise noise impacts from the Project on the surrounding residents	4.1	Implement a Noise Management System that guides noise management measures and responsibilities for the Project including monitoring requirements and a trigger action response plan.	Prior to commencement of noise-generating activities.
	4.2	Monitor noise-related impacts from the Project at least annually.	Annually during the Project Life
Minimise noise-related impacts during construction activities	4.3	Notify neighbours of construction activity progress, in particular when construction works along the Quarry Access Road and Secondary Access Road approach neighbouring properties.	During site establishment (approx. 6 months)
Mitigate noise-related impacts during operational activities	4.4	Construct a 3m fence / acoustic barrier along the sealed section of the Quarry Access Road.	Throughout the life of the Project
	4.5	Use tree screening on other sections of the Quarry Access Road to reduce noise propagation.	
	4.6	Strictly comply with the approved hours of operation.	
	4.7	Regularly service all on-site equipment to ensure sound power levels of each item remains at or below the default/or factory-set values.	
	4.8	Install frequency modulated reversing alarms to all mobile equipment.	
	4.9	Include appropriate training and education regarding noise related impacts for all staff and an induction process.	
	4.10	Include details regarding noise management in employee site inductions and toolbox meeting, as required.	
	4.11	Ensure that all truck drivers comply with the Applicant's Driver's Code of Conduct outlining procedures for reducing noise impacts during transportation in the vicinity of residences along the transportation route.	
	4.12	Maintain an open dialogue with the surrounding community to ensure any concerns over noise are addressed.	Prior to the commencement of construction and throughout the life of the Project.

Table A6.1 (Cont'd)
Proposed Environmental Management and Monitoring Measures

Desired Outcome	Measure		Timing
5. Blasting			
Manage and minimise blast-related impacts of the Project	5.1	Prepare and implement a Blast Management System that nominates the blasting clearance zone, blast monitoring practices and the blast notification protocols.	Prior to commencement of blasting activities.
	5.2	Ensure blasting occurs at most once per week (unless there is a misfire) and only during nominated blasting hours.	For each blasting event.
	5.3	Implement a blast notification protocol for all registered community members and other relevant organisations. Notification should occur at least 24hrs prior to any blasting event.	
	5.4	Consider the use of drone surveillance and audible sirens prior to blasting.	
	5.5	Complete a risk assessment process regarding blast clearances prior to the commencement of blasting operations.	
6. Visual Amenity			
Minimise the potential for adverse visual amenity impacts	6.1	Construct on-site infrastructure from non-reflective, neutral-coloured material.	Throughout construction operations
	6.2	Construct the Visibility Barrier to minimise the impact of visual amenity for southern residences.	
	6.3	Develop the upper benches of the extraction area with 5m faces where safe to do so, and with bench widths ranging from 5m to 10.	Throughout the life of the Project
	6.4	Progressively rehabilitate disturbed sections of the Project Site no longer required for the Project and re-vegetate disturbed areas.	
	6.5	Maintain vegetation on the Visibility Barrier and tree screening areas.	
	6.6	Install 3 m acoustic fence along sealed sections of Quarry Access Road.	During site establishment
	6.7	Plant vegetation near Location F (south of Enchanted Hill).	
	6.8	Plant vegetation along ACT section of Quarry Access Road.	
	6.9	Delay vegetation clearing until shortly before extraction begins in each stage.	Prior to each extraction stage
Minimise the risk of lighting impacts on neighbours	6.10	Minimise the use of night-time lighting to the extent practicable.	Throughout the life of the Project
	6.11	Ensure that night-time lighting is directed towards the active areas of operation only and away from residences to minimise lights shining directly towards the residence.	
Retain natural screening for as long as possible; reduce early visual exposure	6.12	Delay vegetation clearing until shortly before extraction begins in each stage.	Prior to each extraction stage

Table A6.1 (Cont'd)
Proposed Environmental Management and Monitoring Measures

Desired Outcome	Measure	Timing
7. Biodiversity		
Avoid and minimise impacts on flora, fauna and animal habitats	7.1 Prepare and implement a Biodiversity and Rehabilitation Management Plan that guides landscape and biodiversity management measures and outlines progressive rehabilitation processes. The plan would include responsibilities for management for the Project including monitoring requirements and a trigger action response plan.	Prior to the commencement of construction and throughout the life of the Project
	7.2 Training staff and conducting site briefings to communicate environmental features to be protected and measures to be implemented. Clearly delineate clearing areas in site inductions.	
	7.3 Install appropriate signage and/or barriers to delineate 'No Go Zones', 'Environmental Protection Area', and the limit of approved disturbance areas.	
	7.4 Hygiene protocols to prevent the spread of weeds and/or pathogens.	
	7.5 Stage clearing to minimise the extent of clearing at any one time, where possible.	
	7.6 Marking and protecting areas of retained vegetation and habitat during construction, including erecting temporary fencing to protect significant environmental features.	
	7.7 Develop a pre-clearing protocol which includes: – a pre-clearance survey must be conducted by a suitably qualified professional, experienced ecologist or wildlife handler; – a requirement to map relevant habitat features (e.g. hollow-bearing trees, nest trees) prior to and during clearing works; and – a requirement to ensure that a suitably qualified and trained fauna handler is present during hollow-bearing tree removal to rescue and relocate any displaced fauna.	
	7.8 Any clearing of habitat trees (e.g. hollow-bearing trees, nest trees) must occur outside of the breeding season of most of the locally occurring native fauna (i.e. August to December).	
	7.9 Any clearing or removal of key habitat features (e.g. hollow-bearing trees, fallen timber, surface rock) must be salvaged and relocated for rehabilitation.	
	7.10 Include tree screening areas, visibility barrier, progressive rehabilitation, and monitoring / management of surrounding areas as per the Biodiversity and Rehabilitation Management Plan.	
	7.11 Topsoil will be stripped and stockpiled separately for use in rehabilitation activities.	
	7.12 Conduct ecological monitoring annually from Year 1-5, then every 2 years thereafter (unless otherwise stipulated) in accordance with the Biodiversity and Rehabilitation Management Plan.	

Table A6.1 (Cont'd)
Proposed Environmental Management and Monitoring Measures

Desired Outcome	Measure	Timing
7. Biodiversity (Cont'd)		
Minimise the potential of vehicle strikes with threatened fauna	7.13 Communicate requirements for one site driving to all staff and contractors during training and inductions.	
	7.14 All site staff and contractors must adhere to a Driver's Code of Conduct.	
	7.15 Install and maintain appropriate signage.	
	7.16 Drivers are to adhere to speed limits within the Project Site.	
Minimise the impact to adjacent habitat due to edge effects, noise, dust or light spill	7.17 Implement the environmental safeguards as detailed in the relevant management plan for noise, dust and light.	Throughout the life of the Project
	7.18 No machinery will be left running outside of operational hours.	
	7.19 Lighting must meet Australian Standards with the light source shielded to face downwards.	
Minimise and avoid impact of weeds on the Quarry Site	7.20 Ensure that any weed infestations within the Project Site are identified and mapped an appropriate weed management is implemented as outlined in the Biodiversity Management Plan and the Rehabilitation Management Plan.	Throughout the life of the Project
	7.21 Implement a hygiene protocol to prevent the spread of weeds and/or pathogens.	
	7.22 Conduct annual weed monitoring, mapping and control within 200m of the disturbance footprint (where possible based on land ownership).	
	7.23 Consult with surrounding landholders regarding any weed control methods to be implemented.	
Minimise impact of and reduce pest animal populations	7.24 Implement a feral animal management program and outline this program in the Biodiversity and Rehabilitation Management Plan, to reduce and/or manage populations of feral animals at the Quarry Site including goats, rabbits, pigs, foxes and cats.	Throughout the life of the Project
	7.25 Conduct annual inspections for signs of feral animals within 200m of the disturbance footprint (where possible based on land ownership).	
	7.26 Conduct control programs informed by incidental sightings, adjacent land owners or any other reports, in consultation with surrounding landholders.	
	7.27 Implement environmental management measures to reduce availability of additional resource for pest fauna (e.g. management of waste).	
8. Aboriginal Heritage		
Appropriately manage Aboriginal objects within approved areas of disturbance	8.1 Prepare and implement a Heritage Management System that describes the procedures to be implemented for subsurface investigation of PAD sites, site salvage and documentation in consultation with RAPs and return to country or other protocols for the long-term management of artefacts as determined in consultation with the RAPs.	Prior to the commencement of construction
	8.2 Implement appropriate cultural heritage training for all site personnel, including in relation to identification and management of unanticipated finds.	Prior to the commencement of construction

Table A6.1 (Cont'd)
Proposed Environmental Management and Monitoring Measures

Desired Outcome	Measure	Timing
	8. Aboriginal Heritage (Cont'd)	
Appropriately manage unanticipated finds	8.3 Implement an unexpected finds protocol in the event that a previously unknown Aboriginal site is identified within the proposed areas of disturbance. – Cease all work in the vicinity of the site immediately. – Temporarily fence the site to prevent further disturbance. – Contact Heritage NSW, the RAPs and/or a qualified archaeologist to provide further advice or to assess the site. – Should the site be determined to be an Aboriginal object, ensure that the site location is registered with AHIMS and that a site card is submitted. – Avoid disturbing the site, if practicable. If not practicable ensure that all appropriate approvals are obtained prior to disturbance.	In the event an unanticipated Aboriginal object is identified
	8.4 Implement the following unexpected finds protocol in the event that a previously unknown Aboriginal site is identified outside of the proposed disturbance areas. – The site will be assessed by a qualified archaeologist and a RAP – The site will be considered for fencing depending on its proximity to the Limit of Disturbance – The site location will be registered with AHIMS, and a site card submitted.	
Appropriately manage suspected human remains	8.5 Implement the following protocol in the event that suspected human skeletal material is discovered within areas to be disturbed. – Follow Requirement 25 of the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* which outlines the protocol for unexpected finds of physical remains are suspected to be Aboriginal ancestral remains, including to: o Cease all work in the vicinity of the site immediately. o Temporarily fence the site with a minimum buffer of 10m, ensuring that no further disturbance occurs to the skeletal remains or associated artefacts. If skeletal remains have been removed from the ground, these should be stored in a dry location on site. o Contact the NSW Police and Heritage NSW to assist with identification of the burial. o If the skeletal material is determined to be ancient Aboriginal remains, Heritage NSW would send a Compliance and Regulation Officer to the scene and then issue an Advisory Letter setting out the required process from this point. o Ensure that the Aboriginal community (i.e. RAPs) are notified of the discovery.	In the event suspected human remains are identified

Table A6.1 (Cont'd)
Proposed Environmental Management and Monitoring Measures

Desired Outcome	Measure	Timing
8. Aboriginal Heritage (Cont'd)		
Appropriately manage suspected human remains (Cont'd)	– Ensure that the Aboriginal remains are recorded under the direct supervision of a specialist anthropologist or other suitably qualified person.	In the event suspected human remains are identified
	– Ensure that the location of the burial is registered as an Aboriginal site on the AHIMS database.	
	– Ensure that work within the cordoned off area is not recommenced until authorisation is received in writing from Heritage NSW.	
9. Traffic and Transportation		
Achieve safe and efficient road transport operations	9.1 Prepare and implement a Driver's Code of Conduct for transport-related activities, for all quarry-related drivers, addressing route compliance, safe driving behaviour, load covering, vehicle maintenance, and protocols during adverse weather.	Prior to the commencement of construction and transportation activities
	9.2 Develop and implement a Transport Management Plan for all construction and operational phases, including road movements, haulage protocols, and coordination with relevant authorities.	
	9.3 Design and construct the Monaro Highway / Quarry Access Road as presented in the EIS.	
	9.4 Undertake a Road Safety Audit of the proposed Monaro Highway / Quarry Access Road intersection prior to construction.	
	9.5 Limit the despatch of laden heavy vehicles to no more than 200 vehicles per day and 25 per hour. This includes the despatch of quarry products as well as the import of materials.	Throughout the life of the Project
	9.6 Limit the despatch of concrete agitators to no more than 50 agitators per day and 13 per hour.	
	9.7 Ensure all heavy vehicles use approved B-double routes and avoid non-designated roads.	
	9.8 Use Secondary Access Road only during initial construction phase and for light vehicles or emergency access thereafter.	
	9.9 Maintain safe intersection sight distances through vegetation trimming and design compliance with Austroads SISD standards.	
	9.10 Ensure that transport operations including the arrival and despatch of heavy vehicles occurs within the approval operating hours.	
10. Soil and Land Capability		
Maximise the volume and viability of stripped soil resources	10.1 Clearly mark areas for stripping and stockpiling.	Throughout the life of the Project
	10.2 Strip topsoil from all areas of disturbance and store in stockpiles on relatively flat areas (<10% slope) orientated parallel to the contours no more than 2m high.	

Table A6.1 (Cont'd)
Proposed Environmental Management and Monitoring Measures

Desired Outcome	Measure	Timing
10. Soil and Land Capability (Cont'd)		
Maximise the volume and viability of stripped soil resources (Cont'd)	10.3 Strip subsoil (where present) from areas of disturbance and store in stockpiles no more than 2m high.	Throughout the life of the Project
	10.4 Refrain from stripping or placing soil during wet conditions.	
	10.5 Ensure that the soil stockpile surfaces have a surface that is as 'rough' as possible, in a micro-scale, to assist in surface water runoff control and seed retention and germination.	
	10.6 Spread seed of a suitable cover crop on all soil stockpiles to facilitate early vegetation and apply water, if required.	
	10.7 Ensure that soil stockpiles are constructed with side slopes of 1:3 (V:H) or less and that the surface of all stockpiles achieves an effective 70% vegetation cover as soon as practicable. This would be achieved through the use of mulches, spray on polymer based products or other practices that would allow a vegetative cover to become established.	
	10.8 Signpost the soil stockpiles and limit operation of machinery on the stockpile to minimise compaction and further degradation of soil structure.	
Ensure soil resources are used appropriately for rehabilitation activities.	10.9 Rip or scarify all areas to be respread with topsoil to allow the respread material to be keyed into the underlying material.	During rehabilitation works
	10.10 Review soil characteristics prior to re-spreading and apply trace minerals or fertiliser as needed.	
11. Surface Water Resources		
Ensure surface water management objectives are being met.	11.1 Prepare and implement a Surface Water Management Plan that guides water management measures. The plan would include responsibilities for management for the Project including monitoring requirements and a trigger action response plan.	Prior to commencement of construction activities
	11.2 Prepare and implement an Erosion and Sediment Control Plan for progressive stages of development of the Project.	
	11.3 Undertake monthly water quality monitoring of water within sediment basins. Sample and test for pH, Total Suspended Solids (TSS), grease and oil, and electrical conductivity.	Throughout the life of the Project
	11.4 Maintain records of all water transferred within the Project Site including the volume of water discharged.	
	11.5 Maintain records of all external water imported to the site.	
	11.6 Ensure that dam capacity for the capture and use of clean runoff on-site complies with the Maximum Harvestable Rights Capacity of the land.	
Prevent pollution of surface waters	11.7 Manage sewage and effluent disposal through an approved water treatment system.	
	11.8 Store all hydrocarbon and chemical products in accordance with the manufacturer's specification and the relevant Australian Standard.	

Table A6.1 (Cont'd)
Proposed Environmental Management and Monitoring Measures

Desired Outcome	Measure	Timing
11. Surface Water Resources (Cont'd)		
Prevent pollution of surface waters (Cont'd)	11.9 Ensure visual inspections of water management infrastructure will be undertaken regularly and following significant a rainfall event of >15mm over a 24hr period.	Throughout the life of the Project
	11.10 Conduct maintenance on sediment basins within five days of a rain event and by transferring or discharging any water not required for onsite use. Discharge must achieve the nominated settling volume.	
Prevent pollution of surface waters (Cont'd)	11.11 Apply chemical coagulants and/or flocculants in any instance where detained surface water requires alteration to achieve the discharge limits required.	
	11.12 In any areas where active erosion of water management mitigation measures are observed, repairs shall be scheduled to re-instate full function and consideration given to installation of additional erosion mitigation as required.	
12. Groundwater		
Ensure that groundwater within the Quarry Site is monitored and impacts are minimised.	12.1 Prepare and implement a Groundwater Management Plan that guides groundwater management measures. The plan would include responsibilities for management for the Project as well as monitoring requirements and a trigger action response plan.	Prior to the commencement of construction
	12.2 Implement a groundwater monitoring program that includes private landholder bores GW402921 and GW40276 to enable for an assessment of impact for any make good agreement (subject to accessibility and suitability of the bores).	Throughout the life of the Project
	12.3 Meter groundwater production bores and develop a protocol to estimate groundwater inflow to the extraction area.	
	12.4 Implement appropriate make good provisions (e.g. replacement of impacted bores) in the event that existing groundwater bores are impacted beyond the relevant Aquifer Interference Policy Minimal Impact Considerations.	If required or 'in the event of unexpected impacts to groundwater levels and availability
Minimise the risk of impact to groundwater quality	12.5 Prepare and implement a Pollution Incident Response Management Plan, including associated protocols for communicating pollution incident to potentially affected parties, throughout the life of the Project.	Prior to the commencement of construction
	12.6 Ensure that all chemicals and hydrocarbons are stored in accordance with the manufacturer's specifications or the relevant Australian Standard to prevent contamination of groundwater.	Throughout the life of the Project
	12.7 Prepare and implement spill response procedures, including training and standard practices for hydrocarbon and chemical spill control, containment and clean up, in the event of accidental spills or leaks.	
All water used for the Project is licenced	12.8 Ensure that adequate water access licences and associated allocations are obtained for groundwater used.	Prior to the commencement of construction

Table A6.1 (Cont'd)
Proposed Environmental Management and Monitoring Measures

Desired Outcome	Measure	Timing
13. Hazards and Public Safety		
Ensure bush fire related risks are managed in accordance with relevant guidelines and risks are minimised to the greatest extent practicable	13.1 Prepare and implement *Emergency Management and Evacuation Management Plan*, to safely manage bushfire and other emergency impacts.	Throughout the life of the Project
	13.2 Conduct all refuelling within designated areas of the Project Site.	
	13.3 Ensure that all engines are turned off during refuelling.	
	13.4 Enforce a no smoking policy in designated areas of the Project Site.	
	13.5 Ensure that all site vehicles and mobile earthmoving equipment are equipped with fire extinguishers.	
	13.6 Clearly delineate the location of all fire extinguishers on all Project Site maps and include in personnel and contractor training and inductions.	
	13.7 Quarry Manager is to manage vegetation fuel load within the Project Site to ensure it is minimised as much as possible.	
	13.8 Ensure that a water cart is available to provide firefighting capabilities, if required.	
	13.9 Fully comply with the requirements of Rural Fire Service and other emergency services in the event of a fire emergency.	
Ensure that hazards and safety risks are minimised to the greatest extent practicable	13.10 Ensure that access to the Project Site is controlled and that adequate measures are in place to detect and manage unauthorised access.	
	13.11 Store hydrocarbons and hazardous materials in bunded, impervious areas undercover in accordance with the relevant Australian Standard, including *AS1940 – The Storage and Handling of Flammable and Combustible Liquids*.	
	13.12 Manage all hazardous materials in accordance with the requirements of the *Work Health and Safety Regulations 2017*.	
	13.13 Ensure that all transport operators are trained in the management of the material detailed within the Safety Data Sheet, including in the event of an unplanned spill.	
	13.14 Remove waste oils from the Project Site on a regular basis for disposal at an appropriately licenced location.	
	13.15 Ensure training is provided to selected site personnel in relation to specific firefighting tasks and procedures.	
	13.16 Undertake all hot works within cleared areas or under a Hot Works Permit system.	
14. Economic		
Maximise the economic benefits of the Project	14.1 Enter into a Planning Agreements with Queanbeyan-Palerang Shire Council to provide funding to local community-based activities that improve community interaction or amenity and natural resources such as water and biodiversity.	Within 12 months of commencement of quarrying operations.

Table A6.1 (Cont'd)
Proposed Environmental Management and Monitoring Measures

Desired Outcome	Measure	Timing
	15. Social	
Maximise positive social impacts and minimise the potential for adverse social impacts within the local and regional area	15.1 Establish a CCC in accordance with Government guidelines.	Pre-construction and ongoing
	15.2 Enter into a Planning Agreements with Queanbeyan-Palerang Shire Council to provide funding to local community-based activities that improve community interaction or amenity and natural resources such as water and biodiversity.	Within 12 months of commencement of quarrying operations.
Ensure transparent, responsive grievance management and build community trust.	15.3 Implement a formal complaint handling protocol, with logging, tracking, and annual reporting of response times and resolution outcomes.	Pre-construction and ongoing
	15.4 Appoint a nominated quarry representative with authority and resources to be the point of contact for the community and to address Project-related enquiries, concerns and grievances.	Pre-construction and ongoing
Foster durable trust, transparency, and adaptive management throughout the life of the Project	15.5 Develop and implement a strategy including CCC, annual public meetings, blast notifications, grievance mechanisms, and transparent reporting of social indicators.	Pre-construction and ongoing
	15.6 Define and implement a notification protocol for key messages, such as blast notifications and operational updates.	15.7 Operational phase
	15.8 Incorporate community feedback and social performance metrics into the Project's Annual Review. Publish results of key monitoring outcomes including noise, dust, traffic and amenity.	15.9 Annually
Minimise amenity impacts and reduce stress or fear associated with blasting events.	15.10 Notify residents via SMS/email at least 24 hours prior to blasting. Include timing, safety information, and expected impacts.	Operational phase
Minimise traffic-related safety and amenity impacts for local residents.	15.11 Implement and enforce a Drivers Code of Conduct for all quarry-related drivers, including speed limits, noise minimisation, and haul route restrictions. Monitor via weighbridge logs.	Operational phase
Protect residential amenity and ensure compliance with community expectations.	15.12 Adhere to operating hours, blast frequency limits and traffic levels.	Operational phase
Ensure accountability and continuous improvement in social impact management.	15.13 Monitor and report on social indicators including community feedback, engagement outcomes, and mitigation effectiveness.	Annually

Appendix 7

ACT City and Environment Directorate Correspondence regarding Intersection Configuration

(Total No. of pages including blank pages = 4)

From: Wyatt, Tim <Tim.Wyatt@act.gov.au>
Sent: Wednesday, 9 July 2025 2:12 PM
To: Nicholas Warren
Cc: Penny.Dalton@ttpp.net.au; Chelsea Corcoran; Riches, Dominic; TCCS_DC DevelopmentCoordination
Subject: RE: 1023 - Monaro Quarry Project - Presentation Doc

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OFFICIAL

Hi Nick,

The Development Coordination Branch of TCCS (now the City and Environment Directorate) has reviewed the submitted documentation and preliminary concept designs for the proposed access upgrade on the Monaro Highway, associated with the new quarry development. At this stage, we are generally supportive of the preferred intersection configuration and recommend that the project advance to the next phase of the development assessment process. This support is contingent upon addressing several further technical design and safety considerations outlined below in any subsequent documentation submitted. Please also note that the proposed off-site works will remain subject to a formal TCCS Design Review and Asset Acceptance process, which will occur once all other necessary development approvals have been obtained.

1. Freight Route and Preferred Access Option
DCB acknowledges that the Monaro Highway operates as a key freight corridor until its intersection with Isabella Drive, and the NHVR planner confirms that the Monaro Highway corridor along the ACT and through to NSW is an approved B-double route. The preferred option which proposes direct access via Monaro Highway, is considered beneficial for road safety and community impact, as it diverts heavy vehicle traffic away from residential areas and the proposed access would still be compatible with the overall strategic function of Monaro Highway as key regional road connection.

2. Traffic Impact Assessment (TIA)
The submitted TIA generally aligns with TCCS's recently updated TIA guidelines and addresses key requirements. Regarding the deceleration/acceleration lanes, under 4.73, 4.7.2 Intersection Geometry of the Monaro Rock Quarry Road Transport Assessment, it has been noted that the deceleration/acceleration lane lengths were derived based on Austroads AGRD04A required for cars. It would be beneficial for the proponent to elaborate more on the requirements for trucks, noting AGRD04A's guidance on acceleration lanes for trucks. This is noting that the quarry would have movements of trucks including semi-trailers and that the design vehicle for the turning templates include the 19m semi-trailer and the 25m B-double.

3. Pavement Design Standards
The following design standards and requirements will apply to the actual pavement design for the new intersection with Monaro Highway, including the associated upgrades to the approach and departure lanes:

- A design life of 40 years is required for arterial roads, in accordance with Engineering Assurance Note (EAN) 23.
- The design must comply with the Transport for NSW (TfNSW) Supplement to the Austroads Guide to Pavement Technology Part 2.
- The design must also align with the Austroads Guide to Pavement Technology Part 2, along with all other relevant Austroads pavement design guides.
- It is important to note that MIS 03 (Pavement Design) does not apply to highly trafficked arterial roads with a design traffic load exceeding 2 x 10^6 ESA. For such roads, MIS 03 refers to TRIS06, which in turn references the standards listed above.

We acknowledge the complexity of this layered approach to pavement design standards and plan to address it in the next upcoming update to the pavement standards and specifications later this year.

Please submit these details responding to the pavement design requirements as part of any future Design Review package.

4. Safety Considerations

Section 4.8 of the TIA addresses general road safety and community concerns, however DCB recommends that a formalised Road Safety Audit (RSA) be conducted on the preferred concept design prior to any Design Review submission to verify it's suitability; identyfing any other risks that would be anticipated with this design relative to site conditions, including vegetation, and terrain given traffic volumes and future truck movements. This RSA should also consider whether any speed management is warranted.

It is noted that whilst the proposed intersection design references compliance with Austroads guidelines and considers vehicle movements, it does not address the safety or any likely presence of vulnerable road users, such as pedestrians or longer distance cyclists. Even if crash data does not show a high incidence of pedestrian or cyclist involvement, the introduction of quarry trucks and increased traffic flow raises the potential for conflict points between vehicles and other users. The RSA should follow Austroads Part 6: Guide to Road Safety guidelines and pay particular attention to the effectiveness of the design for all users including connectivity to any existing pedestrian and cycling networks.

Thanks
Tim

Tim Wyatt | Senior Director Development Planning

Development Coordination Branch

Phone: 02 6205 4200 | Email: tim.wyatt@act.gov.au

City and Environment Directorate| ACT Government

480 Northbourne Avenue Dickson | GPO Box 158 Canberra ACT 2601 | www.transport.act.gov.au

I acknowledge the Traditional Custodians of the ACT, the Ngunnawal people and recognise any other people or families with connection to the lands of the ACT and region. I acknowledge and respect their continuing culture and the contribution they make to the life of our city and this region.

From: Nicholas Warren <nick@rwcorkery.com>
Sent: Tuesday, 17 June 2025 2:02 PM
To: Wyatt, Tim <Tim.Wyatt@act.gov.au>
Cc: Penny.Dalton@ttpp.net.au; Chelsea Corcoran <chelsea.corcoran@spiire.com.au>; Riches, Dominic <Dominic.Riches@act.gov.au>; TCCS_DC DevelopmentCoordination <TCCS.DCDevelopmentCoordination@act.gov.au>
Subject: 1023 - Monaro Quarry Project - Presentation Doc

Caution: This email originated from outside of the ACT Government. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Hi Tim,

As discussed just now, please see attached presentation on the Monaro Rock Quarry Project. I will leave you to circulate this to your team but have also included Dominic Riches on this email. I do not have contact details for Bryony.

Thanks again for your time and effort to arrange the meeting, I agree that it was very useful. As mentioned, please feel free to get in touch with me with further questions.

Regards,
Nick

Nick Warren

Principal Consultant

B.Sc., M. Bus., M. Env.Sc, TIQA, MIAP2, MEIANZ (CEnvP with REAP)

I do not work Wednesday afternoons

0437 635 975
nick@rwcorkery.com

www.rwcorkery.com

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