SMK

CONSULTANTS

surveying – irrigation – environmental – planning

39 Frome Street
PO Box 774
Moree NSW 2400
Ph 02 6752 1021
Fax 02 6752 5070
admin@smk.com.au

www.smk.com.au

ATJs Earthworks – SPH Quarry

ENVIRONMENTAL IMPACT STATEMENT

ATJs Earthworks Pty Ltd

472 Eddy Park Lane, Gum Flat NSW 2360

March 2025

SMK

CONSULTANTS

surveying – irrigation – environmental – planning

ABN 63 061 919 003

DOCUMENT CONTROL

Project Name	ATJs Earthworks - SPH Quarry
Proponent	ATJs Earthworks Pty Ltd
Project Reference	24-245
Report Number	24-245 – Environmental Impact Statement
Prepared for	ATJs Earthworks Pty Ltd 472 Eddy Park Lane Gum Flat NSW 2360 Contact: Glen Hough E: office@atjsearthworks.com.au Ph: 0427 065 272
Prepared by	SMK Consultants 39 Frome Street Moree, NSW 2400
Contact	Peter Taylor ptaylor@smk.com.au 02 6752 1021

Author	
	Steve Cheal
Name	Steve Cheal B Nat.Res. (Hon) BE Resources (Hon)
Position	Environment Consultant
Company	SMK Consultants

Reviewed By	
	Peter Taylor
Name	Peter Taylor BSc. MEIANZ CIAg LAA
Position	Director
Company	SMK Consultants

Revision History			
Version Number	Date	Authority	Details
0	December 2024	Peter Taylor	Draft
1	January 2025	Peter Taylor	Final Issue
	March 2025	Peter Taylor	Minor Amendments

Certificate

Environmental Planning and Assessment Act, 1979

Submission of an Environmental Impact Statement (EIS)

Prepared under the *Environmental Planning and Assessment Act 1979* and meeting the requirements for Sections 190-192 inclusive of Part 8 of the *Environmental Planning and Assessment Regulation 2021*.

This Environmental Impact Statement has been prepared by SMK CONSULTANTS PTY LTD to accompany a Development Application made in respect of the development described as follows:

Development:	**90,000 tonne/year gravel quarry**
Applicant:	**ATJs Earthworks Pty Ltd**
Address:	472 Eddy Park Lane, Gum Flat NSW 2360
Land to be developed:	Lot 106 in Deposited Plan 656030.

Environmental Impact Statement:

The contents of this Statement, as required by Sections 190-192 inclusive of Part 8 of the *Environmental Planning and Assessment Regulation 2021*, are set out on the following pages.

Certificate: I certify that I have prepared the contents of this Statement and, to the best of my knowledge:

- □ It has been prepared in accordance with Part 8 of the *Environmental Planning and Assessment Regulation 2021*;
- □ It contains all available information that is relevant to the environmental assessment of the development to which the statement relates and
- □ The information contained in this Statement is neither false nor misleading.

Signature: Peter Taylor **Date: January 2025**

Peter Taylor B.Sc. MEIANZ CIAg LAA
Director
SMK Consultants

Executive Summary

This development proposal has been prepared by SMK Consultants on behalf of ATJs Earthworks Pty Ltd ("the Applicant") to support the extraction of up to 90,000 tonne/year of gravel from an existing quarry at 472 Eddy Park Lane, Gum Flat.

Applicant:	**ATJs Earthworks Pty Ltd** 472 Eddy Park Lane Gum Flat NSW 2360
Owner:	**Glen and Sonya Hough** 472 Eddy Park Lane Gum Flat NSW 2360
Land involved:	**Lot 106 in Deposited Plan 656030.**
Local Government Authority:	Inverell Shire Council
Zoning:	RU1 Primary Production under the Inverell Local Environmental Plan 2012
Development Type:	Designated and Integrated Development
Development Description:	Extraction of gravel material from an existing quarry site.
Capital Investment Value:	$15,000

Approvals and Licences

The following approvals are required for operation of the proposed quarry site at 472 Eddy Park Lane, Gum Flat:

- Development Approval for Regional Development – Extractive Industry from the Northern Regional Planning Panel (NRPP) under the *State Environmental Planning Policy (Planning Systems) 2021.*
- Environmental Protection Licence from the NSW Environment Protection Authority issued under the *Protection of the Environment Operations Act 1997.*

Overview of the Proposed Development

The proposed development is for an existing gravel quarry that has operated for over 50 years at 472 Eddy Park Lane, Gum Flat. No existing approvals have been issued for the quarry. It commenced operation prior to requiring approvals. The proponent is now seeking approval for an extraction limit of up to 90,000 tonne/year.

Current and proposed key operations on site include:

- Winning and stockpiling gravel material from the quarry pit;
- Loading of material onto trucks;
- Transporting of materials off site;
- Maintenance, servicing and refuelling of equipment on site;
- Irrigation disposal of water captured in controlled drainage areas.

The quarry is well developed and fully operational. The quarry site has been cleared through previous grazing and quarrying activities. No additional land disturbance or vegetation clearing is included in the proposed development. No new infrastructure or significant change to current operations is proposed. No onsite processing or blasting is required for the gravel material available at this quarry.

An estimated 1.5 million tonnes of gravel material remains available within the current footprint of the quarry. Based on forecast extraction rates which are dependent upon demand and production limitation, the lifetime of the quarry is estimated to be between 20 to 30 years.

Site rehabilitation has commenced and is proposed to progressively continue throughout the remaining operation and closure of the quarry (section 2.10 and Appendix H).

Site Overview

The existing quarry is approximately 10.8 ha in area and is located within a 38.5 ha grazing property. The quarry is surrounded by agricultural land, including areas of native woodland, approximately 10 km west of Inverell in north west New South Wales. Several residences are located in the vicinity of the quarry and the village of Gum Flat is 500 m south west of the quarry.

The quarry site is zoned as RU1 Primary Production under the *Inverell Local Environmental Plan 2012*. The proposed land use (extractive industry) is permissible with consent within this zone.

Consultation

Consultation with a range of government agencies and community stakeholders was undertaken to inform stakeholders of the proposed development and to allow any issues of concern to be raised at an early stage of the planning process and incorporated into the EIS.

Land and Water resources

The proposed development would change the topography of the site; however the site has limited agricultural production and has a long term history of use as a quarry, this is not considered to result in a significant impact on available land resources in the local area.

The Project will have minimal impact on adjacent existing agricultural activities, with the proposed development expected to coexist with the surrounding agricultural land uses in the locality.

The proposed development is not expected to impact on any of the NSW Aquifer Interference Policy minimal impact considerations. The quarry is completely below ground and therefore all rainfall and runoff within the quarry is captured. During extended wet weather periods, the quarry will require dewatering to retain access to the gravel material. This water will be pumped to a settlement pond, allowing settling of suspended solids and then applied as irrigation water onto a designated improved pasture area. This area will then be used for mainly cattle grazing. This water will be contained within the property. As the floor of the quarry is generally permeable, water collected in the quarry is likely to contribute to local groundwater aquifers.

Biodiversity

The existing quarry site has been previously cleared and no clearing of vegetation or habitat removal is proposed as part of the development. The quarry site is surrounded by areas of native woodland and cleared agricultural land containing habitat for several endangered species and ecological communities. The proposed development is expected to have negligible impact upon biodiversity of the surrounding area. Progressive rehabilitation of the site including revegetation with endemic native species is underway and propose for the quarry site.

Noise

While some nearby sensitive receptors are only a short distance from the quarry boundary, noise from machinery operations within the quarry are predicted to be within Project Noise Trigger Levels (PNTL) for industrial development in accord with the NSW Noise Policy for Industry 2017 (NPI). Quarry operations will be limited to 7am to 5 pm Monday to Friday.
Noise generated by heavy vehicles will exceed these levels, however heavy vehicle movements will be short term and infrequent with typically 3 – 12 loads per day and similar to normal heavy vehicles traffic noise on local roads.

Air Quality

The quarry resource available on this site is described as weathered granite. The granite is won by excavators, dozers and front end loaders. No crushing or sieving is required. The granite has little or no dust content as it contains minimal fines. Stockpiled gravel is loaded directly into trucks for removal from site.

The only form of dust on this site relates to minor dust generated by truck movements. Where required, this is managed by road watering. The water collected within the quarry from rainfall runoff is utilise for this purpose. This process assists with dewatering of the quarry.

TABLE OF CONTENTS

1 Introduction

SMK Consultants have been engaged by ATJs Earthworks Pty Ltd to prepare this Environmental Impact Statement (EIS). This EIS is to accompany a Development Application to the Inverell Shire Council seeking formal approval for the existing quarry operation. The quarry operation precedes current planning and approval instruments as it has been utilised as a quarry for approximately 50-years.

An EIS is required as the development is designated development as it proposes to extract more than 30,000 m^3 of material, as prescribed in Schedule 3 of the *Environmental Planning and Assessment Regulation 2021* (EP&A Regulation).

A Development Application pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) will be lodged with Inverell Shire Council, who will assess the development. The application is classified as 'Regional Development' and will be determined by the relevant Northern Regional Planning Panel under the *State Environmental Planning Policy (Planning Systems) 2021.*

The development is also classified as 'Integrated Development' pursuant to Section 4.46 of the EP&A Act, as approvals from other government agencies are required, specifically the NSW Environment Protection Authority (EPA). As a 'land-based extractive activity' that involves the extraction, processing, or storage of more than 30,000 tonnes per year of extractive materials, the proposal is classified as a 'Scheduled Activity'. An Environment Protection Licence would be required as stated under the *Protection of the Environment Operations Act 1997* (POEO Act) for the operation of the proposed development.

This EIS addresses the environmental assessment requirements of the Secretary of the Department of Planning and Environment (the SEARs) dated 09 July 2024. This EIS focuses on the key assessment requirements specified by the SEARs and proposed mitigation measures where possible to reduce potential environmental impacts. It is supported by specialist technical reports.

1.1 Background

"ATJs Earthworks - SPH Quarry" is a granite gravel quarry supplying gravel for construction and infrastructure projects throughout the New England and North West region.

The quarry has been operating on the current site for more than 50 years. Operations have continued to date on a historical use basis.

The applicant is a family-owned and operated civil earthworks company that has been serving the northwest region of New South Wales since 2012, supplying gravel for civil and construction works as well as operating a civil construction business for construction of roads and other civil works. Clients include the Inverell Shire Council and adjoining Councils. The applicant has operated the quarry for the past 12 years and owned the quarry for the past seven years.

The current operation extracts granite gravel material from the quarry pit and transports this material by road to civil and construction projects across the region.

1.2 Authors

The persons involved in the preparation of this Environmental Impact Statement and its appendices are:

- **Steve Cheal** B. Nat.Res. (Hons), B.E. (Hons).
- **Peter Taylor** B.Sc. MEIANZ CIAg

1.3 Objectives

The objective of the proposed development is to continue the current operation of the existing quarry with approval for an extraction rate of up to 90,000 tonnes per year.

The ongoing operation of the quarry with approved extraction rates will enable the Applicant to meet market demand for gravel across the region and infrequent larger civil construction projects and ongoing smaller domestic projects.

The proposed development aims to meet best practice environmental performance by:

- Managing quarry operations to minimise impacts on the surrounding sensitive receptors, biodiversity, water, soil and heritage values;
- Developing and implementing environmental management procedures that monitoring, review and improve performance.

1.4 Applicant Details

Table 1: Applicant Details

Organisation	**ATJs Earthworks Pty Ltd**
Site Name	ATJs Earthworks - SPH Quarry
Postal Address	472 Eddy Park Lane
	Gum Flat NSW 2390
ABN/ACN	72607979706
Phone Number	0427 065 272
Contact Name	Glen Hough
Email	office@atjsearthworks.com.au

1.5 Property Location

The existing quarry lies within a 38.5 ha rural property described as Lot 106 in Deposited Plan 656030. The property is primarily used for grazing, includes a residence and is bordered by rural farmland and patches of native woodland. Eddy Park Lane runs along the eastern boundary of the property (Figure 1).

The property is within the Local Government Area (LGA) of the Inverell Shire Council. It lies approximately 10 km west of the town of Inverell, which has a population of 9,651 as of the 2021 census. The quarry site is approximately 500 m north east of the village of Gum Flat (Figure 2).

Figure 1: ATJs Earthworks - SPH Quarry Locality Plan

Figure 2: ATJs Earthworks - SPH Quarry and surrounding landscape features

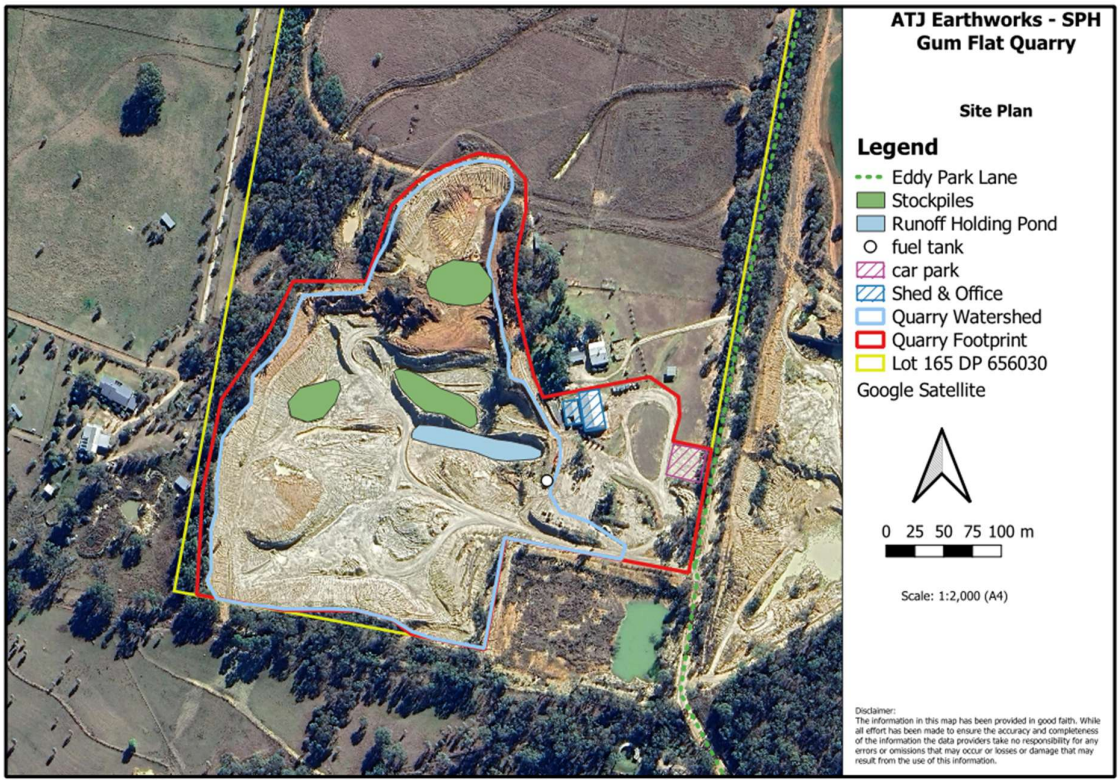
1.6 Project Site

The ATJs Earthworks - SPH Quarry site covers an area of approximately 10.8 ha. The quarry site is well-developed, with existing site office, workshop, worker amenities, drainage system, sediment pond, fuel storage / refuelling facility, and internal haul roads. The quarry also has existing plant, machinery and vehicles (Figure 3).

No new works or construction activities are proposed. The proposal does not involve altering the development footprint of ATJs Earthworks - SPH Quarry from the current area. Future material extracted will be obtained from within the existing footprint.

The quarry site is zoned as RU1 Primary Production under the *Inverell Local Environmental Plan 2012*. The proposed land use (extractive industry) is permissible with consent within this zone.

Figure 3: ATJs Earthworks - SPH Quarry Site Plan



A larger version of the site plan is presented in appendix A.

1.7 Surrounding Land Uses

The ATJs Earthworks - SPH Quarry is located within the Nandewar bioregion. The property and surrounding land is mostly cleared for agricultural production. The dominant surrounding land use is grazing, with occasional cropping .

Towns and villages within Inverell Shire largely rely upon the surrounding rural community for the bulk of their income. The main industry in the Inverell Shire is agriculture and some industry. Additional key industries include health care and social assistance, retail, education and training, accommodation and food services and construction.

A small number of quarries currently exist within the region. There is a small quarry directly adjacent to Gum Flat quarry, with the next the closest approximately 10 km to the east.

2 Proposed Development

2.1 Quarry operations

Current and proposed key operations on site are:

- Winning and stockpiling gravel material from the quarry pit;
- Loading of material onto trucks;
- Transporting of materials off site;
- Maintenance, servicing and refuelling of equipment on site.

Extraction operations consist of winning and loading gravel from the existing pit. The gravel is a suitable product for use, as extracted. The gravel is extracted using a bull dozer and/or excavator and is loaded onto trucks using a front-end loader or excavator. No onsite processing is proposed. No blasting is required. The granite material in its natural form can be used on construction sites without any processing.

Operations on site also involve a suite of environmental protection measures, which will be outlined in an Operational Environmental Management Plan (OEMP) and adhered to on site. The OEMP will outline management and mitigation measures for:

- Air quality;
- Chemicals ;
- Flora and fauna;
- Noise/vibration;
- Groundwater;
- Surface water and soil;
- Complaints register and response;
- Pollution incident response;
- Waste management.

Upon approval of proposed development, the management plans that describe current quarry operations will be updated and combined into an OEMP incorporating identified areas of improvement to site operations and any approval conditions to ensure ongoing environmental protection for the quarry site and surrounds.

2.2 Resource Characteristics

The available resource at the quarry site is weathered granite. Exploration methods to date have consisted of test pits which have revealed a consistent weathered granite gravel through the vertical profile of the quarry site.

Petrographic analysis of the resource material describes it as: decomposed granite; mainly medium grained; moderately to heavily weathered; coarsely porphyritic; and having approximately 8-9% clay content.

The remaining accessible resource material in the quarry is estimated to be approximately 1.5 million tonnes, based on the extraction area (10 ha) by the estimated extraction depth of 10 m below current quarry level and a resource density of 1.5 tonnes/m^3.

Overburden consists of weathered granite with minor quantities of reddish brown clays. The clay overburden has been used to form the embankment surrounding much of the quarry pit. This embankment is more significant on the western side as it has been used to form a noise barrier to deflect noise that may travel to an adjoining residence.

The quarry is a below natural surface operation. Over the past 50 years, the site has been excavated to a depth of approximately 10m deep at the deepest point. Continued operations will include excavation of the shallower sections of the quarry within the existing footprint but no expansion outside of the edge of the existing site. Once the shallower material is excavated, ongoing operations will involve excavation of the floor to deepen the site.

Based on preliminary excavations, the same weathered granite is available for an extended depth below the current floor level of the quarry.

2.3 Forecast Operational Life

The forecast average extraction rate is 50,000 tonnes per year, capped at a maximum of 90,000 tonnes per year. At this rate the estimated maximum operational life of the quarry is 30 years, based on the estimated quantities of remaining resource and an assumption that no impediments to extraction are encountered such as intersecting groundwater or bedrock.

The proposed development will not increase average annual extraction rates above current levels. Approval is sought to ratify the existing use and allow extraction levels to meet customer demand. The proposed development does not propose any significant change to current gravel extraction operations. The daily extraction rate varies to meet customer requirements.
The limit of excavation for this quarry will be dictated by two factors, mainly:

- If the quarry floor intersects the groundwater table, operations are to cease when there is a minimum of 1 m of resource remaining over the top of the aquifer with the aim of preventing disturbance or potential issues for the local aquifer;

- If the quarry encounters other forms of bedrock material which is not suitable for supply as aggregate to be used for road or other civil works production, operations will cease when the available weather granite material or similar material is removed.

2.4 Operating Hours

Noting that staff may be present and some non-noise generating activities may occur outside of the hours listed in Table 2, the current and proposed operating hours for noise generating operations of the quarry are listed below:

Table 2: Operating hours for noise generating quarry operations

Activity	Hours of Operation	
	Current	Proposed
• Transport (empty trucks in / loaded trucks out) • Quarry pit operations	7.00 am to 3.30 pm Monday to Friday	7:00 am to 5:00 pm Monday to Friday
• Light vehicle traffic	7.00 am to 5:00 pm 7 days a week.	7:00 am to 5:00 pm 7 days a week.
• Maintenance and servicing of plant and equipment	As required	As required
• Emergency*	As required	As required

*Emergency refers to supplying materials under emergency conditions as awarded by the authorities.

The majority of maintenance activity occurs in the workshop which adjoins the owner's residence. This workshop consists of a large shed to enable all trucks to be parked under cover. The workshop has a concrete floor and is enclosed on three sides. The eastern side of the workshop is open to allow trucks and equipment to enter.

2.5 Previous operations

The quarry has progressively expanded over the 50+ years of operation to date. Over this time the following points should be noted:

- The quarry has expanded over 50 years, including vegetation clearing and overburden stockpiling, to the current 10.8 ha quarry footprint;
- Up until the last 12 months there have been no complaints or known environmental incidents occurring from quarry operations;
- In the last 12 months some complaints have been made regarding alleged offsite discharge of runoff water from the quarry which was investigated by Inverell Shire Council and the Natural Resources Access Regulator (NRAR) with an outcome from NRAR that the quarry is not impacting local aquifers;
- No noise or dust complaints have been made to the proponent regarding quarry operations;

- Revegetation of previously disturbed areas has successfully commenced.

2.6 Quarry Access and Traffic

ATJs Earthworks - SPH Quarry is accessible via Eddy Park Lane, which is an all-weather gravel road, except for of extreme flood events where flooded culverts make the lane impassable.

Under normal circumstances, one or more truck and dog trailers are used to haul gravel material from the quarry to the customer. A typical return trip takes between 1 to 3 hrs to load at the quarry, travel to the site, unload and return to the quarry.

Truck and dog combination trailers are used and typically carry 32- 36 tonnes of material per load.

2.6.1 Traffic Volumes

The frequency and number of daily loads will depend upon several factors such as distance to site, daily demand for material required at site and the timeframe for delivery. The number of truck and dog combination trips to and from the site typically varies between 3 and 12 loads per day. The loading capacity of the quarry limits the number of such loads to a maximum of 25 per day, or 900 tonnes/day of material, assuming multiple trucks.

On rare occasions, site activity may approach maximum loads for large demands. The requirement for more intensive operations would be intermittent and short term, requiring more trucks operating simultaneously.

Light traffic to the quarry site consists of staff and occasionally contractors, typically between 5 to 10 vehicle movements/day to and from the site. No increase in light vehicle traffic is anticipated for the proposed development.

2.6.2 Transportation Routes

The quarry operation has constructed various internal access roads within the quarry to access differing parts of the resource for different projects. One main access road has been constructed from the quarry floor to the workshop area and property exit. This access road has been constructed at a suitable grade to allow loaded trucks to drive out of the below ground section of quarry in a safe manner without excess requirements for revving and overloading the engine capacity of the trucks.

Once the trucks reach the surface level, they depart the site via internal roads leading to the front gate of the property which is on Eddy Park Lane.

All internal quarry access ramps, roads and loading areas are unsealed. Access to and from the quarry is via Eddy Park Lane, which is an unsealed all-weather gravel road. Vehicles transporting material from the quarry can travel either north on Eddy Park Lane to the Gwydir Highway or south to Copeton Dam Road. Speed limits are restricted on site to ensure internal traffic safety. Loads are covered to minimise dust generation.

SMK Consultants conducted a safety audit of the two haul route options available, which concluded that the route via Copeton Dam Road is the preferred method of site access. Copeton Dam Road is a 7m to 8m wide bitumen sealed road which is maintained by Council. No specific areas of traffic conflict or traffic safety were noted on this road.

Copeton Dam Road provides a shorter and more direct route to projects in Inverell. As this road is sealed, localised impacts on residences along this haul route from issues such as dust, will be limited.

Eddy Park Lane is a gravel road servicing farms between Copeton Dam Road and the Gwydir Highway. The Lane includes some narrow causeways and sharp bends. Accessing the Gwydir Highway via Eddy Park Lane may require minor upgrades of Eddy Park Lane road surface and speed restrictions at two right angle bends. The Lane is an approved route for the truck and dog combinations and is maintained by Council.

The haul route choice is mainly based on the destination of the quarry material. If all trucks used Copeton Dam Road, this would add a significant travel distance for loads being delivered to work sites along the Gwydir Highway. The route via Eddy Park Lane is 4.7 km long. Travelling to this same point on the Gwydir Highway via Copeton Dam Road involves a 16.5 km trip.

2.7 Employment

The operation currently employs 5 permanent staff. All staff operate the machines for loading, a capable of servicing the equipment and drive the trucks. The proposal will not result in any additional full-time staff as it does not involve any changes to the operation or increases in extraction rates.

The quarry employs a range of specialist consultants for emissions monitoring and quarry management. This will continue as these are engaged from outside of the region as independent consultants. ATJs Earthworks also engage a range of service providers including electricians, diesel mechanics, fabricators and geotechnical specialists. Most of these are sourced from the Inverell district.

2.8 Services and Utilities

Quarry operation does not require a water supply, except for dust suppression, if needed. Water for dust suppression is sourced from the quarry runoff holding pond. Dust suppression may be required during excessively dry periods when road dust can be generated from truck movements. Plant and equipment owned by the applicant includes a water truck.

The quarry workshop has access to single phase power. Mobile phone service is available onsite and is the primary form of telecommunications.

2.8.1 Toilet facilities

Toilet facilities for the quarry are provided in the workshop, with waste transferred to the septic system of the existing 3 bedroom residence on the property, located approximately 30 metres from the quarry workshop. The residence has an 'Envirosafe' septic waste treatment system and has adequate capacity for the combined demand of quarry staff (5 persons) and residence (4 persons). The system is well maintained and functioning properly.

2.8.2 Fuel and chemicals

Up to 15,000 Litres of diesel fuel is stored on site in a containerised fuel tank. All machinery retained on the site is parked and refuelled adjacent to the existing workshop. Refuelling occurs via enclosed pump and pipe systems. This avoids the risk of fuel spills.

The containerised fuel tank is self-bunded. This tank is fully enclosed and secure.

No chemicals are stored onsite other than minor quantities of oils, grease and lubricants in the workshop for vehicle maintenance. These chemicals are stored and used in recessed well areas of the workshop's concrete floor to contain any spills. Any spillage is cleaned up and removed from the property as waste.

2.9 Capital Investment

The proposed development requires minor additional investment in infrastructure in addition to preparation of the EIS. The site is well established, with all required machinery and infrastructure onsite and no new quarry plant is required. All machinery present on site is portable and could be moved away once the quarry is closed.

A review of the existing operation identified that the above ground area around the workshop forms part of the operations. As this site will be subject to obtaining an Environment Protection Licence to be administered by NSW EPA, pre-lodgement advice from NSW EPA has indicated that the workshop area and area of natural surface adjoining

the workshop area will need to be contained with a controlled drainage area. The purpose of this is to manage the runoff from this area. The proposed development is therefore to include a containment area and sediment holding pond as part of additional works to ensure that the quarry operation can capture and control the runoff from this area.

Construction of this above ground controlled drainage area would be undertaken by the applicant who has the machinery to undertake this work. The estimated cost of this work which includes construction of suitable internal drains and a sediment pond is in the order of $15,000.

Allowing for this additional infrastructure and preparing the application, the estimated cost is in the order of $38,500 (plus GST).

2.10 Site Rehabilitation

Following completion of quarrying, areas that are no longer in use would be landscaped and progressively rehabilitated. The workshop would be retained as a workshop facility for ongoing maintenance of machinery retained by the applicant.

A concept rehabilitation plan is provided in Appendix H.

Objectives for site rehabilitation are:

- The site will be able to support future land use as close as practical to Class 4 or 5 agricultural land use;
- A stable final landform with a functional drainage system and minimal erosion;
- Establishment of healthy native vegetation that promotes soil stability and provides habitat for native species.

Rehabilitation would generally include:

- Removal of all structures, equipment and other materials from within the quarry area;
- Earthworks and landscaping to shape the land to maximum 3:1 batter slopes with a minimum 0.5% grade to allow free drainage, including terracing where appropriate;
- Site drainage directed to a proposed small sediment basin/dam on the north west edge of the quarry area for settlement. (The quarry is below ground and therefore once the site shuts down, it will contain all internal runoff. This runoff is expected to seep through the weathered granite and recharge local groundwater aquifers);
- Erosion and sedimentation control would remain in place until the site is appropriately reinstated and revegetated;

- Optimised use of stockpiled overburden as a substrate for establishing final landform and revegetation, including a diversion bank around the site to prevent local surface runoff from entering the quarry;
- Revegetation with an appropriate mix of local native species including appropriate soil preparation, sowing/planting techniques, tree guards and watering. Biomass, mulch or fertilizer may be applied, as required. All plantings include Agriform tablets (slow release fertilizer) to increase growth rate and viability for first 12 months;
- Revegetation at a rate that is appropriate for the climate, rainfall and climatic conditions;
- Weed and pest control;
- Fencing;
- Retention of some access tracks for ongoing site management.

The rehabilitation area has been divided into 6 zones to coordinate progressive rehabilitation (Appendix H). Rehabilitation has commenced in all zones. Rehabilitation works have included reshaping of land to stable batters including some terracing, reapplication of overburden material and revegetation with a mix of local and other native species including:

- *Eucalyptus sideroxylon*
- *Eucalyptus melliodora*
- *Eucalyptus microcorys*
- *Eucalyptus caesia*
- *Eucalyptus crebra*
- *Eucalyptus albens*
- *Grevillea sp.*
- *Dianella Cerulean*
- *Eucalyptus moluccana*
- *Eucalyptus sideroxylon*
- *Eucalyptus scoparia*
- *Eucalyptus saligna*
- *Eucalyptus citriodora*
- *Pao labillardieri*
- *Acacia melanoxylon*
- *Hardenbergia violecea purpurea*

3 Consultation

The planning and design of the Proposal has been informed by various stakeholders. The following subsections provide an overview of the consultation undertaken and the methods used to seek input and to inform stakeholders about the Proposal, including the processes to identify issues for consideration within the EIS.

3.1 Government Agencies

3.1.1 Secretary's Environmental Assessment Requirements

A request for the Secretary's Environmental Assessment Requirements (SEARs) was lodged with the Department of Planning and Environment (DPE) on the 14th June 2024. SEARs were partially supplied on 9th July 2024. Appendix B summarises the SEARS for the EIS and lists the section in which SEARS are considered.

3.1.2 Other NSW Government agency requirements

The assessment requirements from all relevant government organisations were requested as part of the SEARs and are also summarised in Appendix B, along with copies of correspondence received from each organisation.

Inverell Shire Council

Inverell Shre Council indicated that it was satisfied that the Draft SEARs adequately address the required environmental considerations for the project.

NSW Department of Planning, Housing and Infrastructure – Crown Lands

Crown Lands has reviewed the proposal. No Crown land is contained within the project footprint and Crown Lands have made no environmental assessment recommendations for the proposal, but have recommended that the applicant contact Crown Lands to initiate the processes required to authorise the use of and/or access to roads.

NSW Department of Primary Industries and Regional Development – Agriculture (DPI Ag)

DPI Ag have requested the following issue be considered, with appropriate mitigation measures outlined:

- Detail the potential impacts from the proposed extractive industry on agricultural land and agricultural land uses on the site and in the locality. Demonstrate that all significant impacts on current and potential agricultural developments and resources can be reasonably avoided or adequately mitigated;
- A Land Use Conflict Risk Assessment (LUCRA) should be undertaken detailing any risk mitigation measures to be implemented;
- Include a biosecurity (pests, weeds, and disease) risk assessment outlining the likely plant, animal, and community risks. The relevant weed or pest animals for a region

are addressed in the regional plans or strategies issued by NSW Local Lands Services. 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;

- Rehabilitation - outline the monitoring and mitigation measures to be adopted for rehabilitation remedial actions.

Department of Regional NSW – Fisheries (Fisheries)

Fisheries have indicated there is no key fish habitat in the proposed development and they do not have any input to the SEARs.

NSW Environment Protection Authority (EPA)

EPA have requested that the EIS provides the following information:

- Processing – details on what, if any, processing is needed on the quarried material;
- Noise and vibration (refer to Section 5.9):
    - proximity to sensitive receptors and impacts of any sources associated with the project, including construction and operational noise.
    - An assessment of both construction and operational noise for the proposed development (including private haul roads).
    - An assessment of vibration from all activities on the site.
    - An assessment of noise on public roads generated by the proposed development.
- Air (refer to Section 5.7):
    - An assessment of dust generation and management of potential impacts on adjacent landscape and/or nearby residences, communities, and other sensitive receptors (such as schools).
    - an air quality impact assessment (AQIA).
    - details of emission control techniques/practices that will be employed at the site and identify how these will meet POEO Act requirements;
- Water and Soils (refer to Sections 5.3, 5.10, 5.14 and Appendix J):
    - A water balance, water management systems, and the implementation of adequate erosion and sediment controls to control runoff from the quarry and processing area.
    - A description of how stormwater will be managed in all phases of the project, including how stormwater and runoff will be managed to minimise pollution.
    - A description of any water quality monitoring programs to be carried out at the project site.
- Waste, Chemicals and Hazardous Materials (refer to Section 5.16):
    - Identify, characterise and classify all waste.

  - An assessment of all aspects of waste generation, management and disposal associated with the proposed development.
  - Demonstration of compliance with all regulatory requirements outlines in the POEO Act and associated regulations.
  - Demonstration that appropriate spill containment will be provided for storage, filling and loading of all fuels and other chemicals to be used onsite, in accord with Australian Standards.
- Any other environmental impacts in accord with Section 45 of the POEO Act.

NSW Department of Regional NSW – Mining, Exploration and Geoscience (MEG)
MEG has no additional requirements to the proposed development.

NSW Department of Climate Change, Energy, the Environment and Water – Biodiversity Conservation and Science (BCS)
BCS has requested that the EIS include:

- A full and clear description of the proposed development, including any environmental impact mitigation measures.
- Potential environmental impacts of the proposed development including:
  a. Acid Sulfate Soils, Flooding, Coastal Processes and Associated Hazards,
  b. threatened species and ecological communities occurring in the locality
  c. the extent of any EECs or CEECs across the project site, in accordance with the BCS North East Branch Principles
- Potential impacts to Aboriginal cultural heritage (refer to Section 5.13);
- Potential impacts on biodiversity values (refer to Section 5.12 & Appendix E and F) including:
  a. Assessment against Biodiversity Offsets Scheme thresholds;
  b. Native vegetation clearing;
  c. An ecological assessment, including a field survey.
- Potential impacts to land reserved or acquired under the National Parks and Wildlife Act 1974 (refer to Section 4.4.4);
- Flooding and floodplain management (refer to Section 5.14.2);
- Historic heritage (refer to Section 5.13.1); and
- Cumulative impacts, including construction and operational impacts (refer to Section 5.20).

NSW Department of Climate Change, Energy, the Environment and Water – Heritage
Heritage NSW supports the assessment requirements in relation to Aboriginal cultural heritage and did not add any further requirements at this stage.

NSW Department of Climate Change, Energy, the Environment and Water – Water (DCCEEW Water)

DCCEEW Water has recommended the EIS include:

- Assessment of impacts on surface water sources, watercourses and riparian land, and measures proposed to reduce and mitigate these impacts;
- Consideration of legislation, policies and guidelines for controlled activities on waterfront land;
- Consideration into any required controlled activity approvals.

DCCEEW Water has also recommended seeking SEARs advice from Water NSW.

NSW Rural Fire Service (RFS)

RFS identified that the subject land is partially mapped bushfire prone land and specified that the EIS shall include a bushfire report that identifies bushfire risk and recommends mitigation measures to reduce those risks.

Transport for NSW (TfNSW)

TfNSW requested that a Traffic Impact Assessment (TIA) be prepared for the proposed development (refer to section 5.15 & Appendix G) and inclusions as listed in Appendix B.

Water Matters

Water related issues assessed in this EIS include:

- Access to surface and groundwater resources (refer to Sections 5.10, 5.11 & Appendix J (water balance)):
    - Annual volumes of surface water and groundwater to be taken from each water source (including via inflow and seepage) as defined by the relevant water sharing plan;
    - Assessment of volumetric water licencing requirements;
    - Assessment for the impact and approvals required for taking and/or storing water;
    - Identification of adequate and secure water supply for the life of the project; and
    - A detailed and consolidated water balance.
- Impact on surface and groundwater resources (refer to Sections 5.10, 5.11):
    - Assessment of impacts on:
        - Surface and groundwater sources (quantity and quality);
        - Related infrastructure;
        - Adjacent licensed water users;
        - Basic landholder rights;
        - Watercourses;

        - Riparian land; and
        - Groundwater dependent ecosystems.
    - Full details of all surface water and groundwater modelling;
    - Proposed surface water and groundwater monitoring activities and methodologies; and
    - Management and disposal of produced or incidental water.
- Flooding (refer to Section 5.14.2):
    - Assessment is required for any earthwork, embankment or levee which is reasonably likely to affect the flow of water to or from a river or lake.

3.1.3 Consultation with Government Agencies

A range of discussions occurred with the Inverell Shire Council to identify and address any potential local issues of concern.

3.2 Community Consultation

The proponent has previously conducted informal community consultation for the quarry operation to date, which has included verbal contact with neighbours to inform them of quarry operations and provide opportunity for feedback and complaints. This informal consultation has been ongoing and has included all aspects of site operations such as vehicle movements, noise impacts, dust generation, water and runoff.

3.2.1 Formal Consultation Process

A formal consultation process was implemented for the proposed development both to inform nearby landholders and the local community of the project, and to provide an opportunity for feedback of comments, suggestions and concerns. This process included correspondence by mail to all residences within 1 km of the quarry site which included:

- A letter informing of the proposed development and an invitation to provide feedback on the proposed development;
- A copy of the Project Summary;
- Contact details should residents have any questions or wish to discuss any details of the proposed development.

3.2.2 Formal Consultation Results

Results of the formal consultation process are summarised in Table 3.

Table 3: Formal Consultation Process Results

Feedback Medium	Date Received	Summarised Feedback Points
Phone call	24/08/2024	• Main concern expressed was that the proposal will include approval to blast. Resident was assured that this was not the case. • Resident mentioned that they had experienced dust on windy days. • Resident indicated that they did not hear any noise between 0630 - 0700hrs and this was not a concern.
Email	10/09/2024	• Resident expressed no issues with the proposed development. They were grateful for the quarry providing local employment. • No complaints about dust "when choosing to live on an unsealed road". • Only concern is potential for blasting near a small village.
Letter (emailed)	25/09/2024	• Concerns about quarry expansion over recent years, contrary to s4.66 of the Environment Planning and Assessment Act 1979 (EP&A Act) • Claim that recent quarry expansion has caused an increase in noise, dust and offsite water flow impacting property values and quality of life. • Concern expressed about proposed increase in extraction rates above existing rates. • Concern about possible expansion of quarry operating hours outside of 7:00am to 3:30pm and subsequent impact upon residence. Objection expressed to starting before 7:00 am. Expressed no objection with working to 5:00 pm. • Concern expressed regarding potential historical groundwater contamination from adjacent Gum Flat garbage tip site and the potential release of this to surrounding soil by an aquifer breach caused by the quarry. • Expressed need for consideration of adjacent quarry in the EIS. • Noise from quarry machinery, including "jack hammers and pile drivers" heard from within neighbouring house. • Concern that the quarry footprint is only clear of native vegetation because of quarry expansion over the last 10 years. • States that the surrounding vegetation is critically endangered ecological community (CEEC) White Box Yellow Box Blakely's Red Gum grassy woodland and derived native grassland. Concern that the proposed quarry expansion will have a detrimental impact on this CEEC. • Concern expressed regarding the potential impact of the proposal due to dust, noise and truck movements upon threatened species likely to be present in the area. • Concern expressed that revegetation should include endemic CEEC species present in the area. • Claim that large flows of water have historically and recently been discharged from the quarry site in 2021, 2022 and 2023 and ended up in local waterways (Gum Flat Creek and Myall Creek). • Claim that water has been pumped from the quarry to a dam on the SW corner of the property which has leaked/overflowed, causing neighbouring property access track to be continuously wet. • Concern expressed regarding ongoing disposal of water from the quarry. • Concern raised regarding potential aquifer breach of the quarry and any subsequent depletion of water table and the impact of this upon nearby bores, neighbouring land use and nearby vegetation. • Concern raised regarding dust generation from the existing quarry operations (e.g. cannot leave house windows open during the day) and impacts on health, rainwater and local ecological communities

Feedback Medium	Date Received	Summarised Feedback Points
		• Concern raised about dust generation along Eddy Park Lane and impact upon wildlife. • Concern raised regarding reduction in amenity and property values to nearby residences greater than 1 km from the quarry (Eddy Park Lane and Copeton Dam Rd) potentially impacted by existing, and proposed increase in traffic due to dust, noise and risk of injury/death from vehicle collisions. • Concern raised about increase in traffic generated and subsequent impact upon road users and road condition of Eddy Park Lane and Copeton Dam Rd. • Concern raised that Inverell Shire Council may have a perceived, or actual, conflict of interest in assessing the proposed development.

3.2.3 Proposed Future Consultation

An Operational Environmental Management Plan (OEMP) will be prepared for the quarry and include a range of management measures for the quarry to minimise adverse impacts of operations to surrounding landholders. The OEMP will be reviewed on a regular basis to ensure the document remains current and reflects industry best practice standards as well as local community values. The OEMP will include:

a) A consultation procedure and complaints response procedure;
b) A procedure for responding to any monitoring data that identifies exceedances or offsite impacts above acceptable levels;
c) An incident response management plan as required under an Environment Protection Licence.

4 Statutory Considerations

4.1 Permissibility

The proposed development is considered Designated and Integrated Development under Part 4 of the EP&A Act 1979.

The proposed development is considered a 'Designated Development' as described in Section 26(2), Part 1 of Schedule 3 of the EP&A Regulation 2021 for 'Extractive Industries', as the proposed development:

- *disturbs or will disturb a total surface area of more than 2 ha of land;*
- *seeks to extract more than 30,000 m^3 of material per year.*

As the development proposes to also extract more than 30,000 tonnes of material per year, it is also classified as a 'Scheduled Activity' under section 19, Schedule 1 of the POEO Act and requires an Environment Protection Licence (EPL). The quarry is not currently licenced.

As approvals from other government agencies are required (i.e. an EPL), the proposed development is also classified as 'Integrated Development', as described in Section 4.46 of the EP&A Act.

The proposed development is considered compatible with the objectives of the site's RU1 – Primary Production zoning, and is a permissible land use, with development consent, under the provisions of the *Inverell Local Environmental Plan 2012* (LEP). A Development Application under Part 4 of the EP&A Act will be lodged with the Inverell Shire Council.

Do any policy statements from Federal or State Governments have relevance?

The Federal and State Government policies relevant to this proposal are discussed in detail within this report. The main policies applicable to this application are State Environmental Planning Policies (SEPPs).

Are there any relevant planning studies or strategies?

No.

Is there any management plan, planning guidelines or advisory document that is relevant?

No.

4.2 Approvals and Licences

The following formal approvals are sought for the ATJs Earthworks - SPH Quarry:

- A Development Approval for Regional Development – Extractive Industry from the Northern Regional Planning Panel (JRPP) under the *State Environmental Planning Policy (Planning Systems) 2021.*
- An Environmental Protection Licence issued under the POEO Act.

4.3 Commonwealth Legislation

4.3.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) provides a legislative framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places, as defined in the EPBC Act as Matters of National Environmental Significance (MNES). The MNES currently listed in the EPBC Act are:

1. World heritage properties;
2. National heritage places;
3. Wetlands of international importance (often called 'Ramsar' wetlands after the international treaty under which such wetlands are listed);
4. Nationally threatened species and ecological communities;
5. Migratory species;
6. Commonwealth marine areas;
7. the Great Barrier Reef Marine Park;
8. Nuclear actions (including uranium mining);
9. A water resource, in relation to coal seam gas development and large coal mining development.

The potential impacts of the proposed development upon MNES have been considered as part of an Assessment of Significance, conducted in accordance with EPBC Act assessment requirements. The results of this assessment are attached as Appendix E. The proposed development will not have, and is not likely to have, a significant impact on MNES or on the environment of Commonwealth land. Approval for the Project under the EPBC Act is not required. Refer to Section 7.5 and Appendix E for further details.

4.4 NSW legislation and planning matters

4.4.1 Environmental Planning and Assessment Act 1979

The EP&A Act provides the framework for NSW planning legislation, including Local Environmental Plans (LEPs) that specify planning controls for specific parcels of land. The Act also provides for State Environmental Planning Policies (SEPPs) and Regional Environmental Plans (REPs). Applicable SEPPs are discussed below.

Development consent is required for the proposal, pursuant to Part 4 of the EP&A Act. The proposal is classified as Regional Development and will be determined by the Joint Regional Planning Panel (JRPP) under the provisions of the *State Environmental Planning Policy (Planning Systems) 2021*. The provision within the policy applicable to the proposed development is:

Development for the purposes of—
(a) extractive industries, which meet the requirements for designated development under Schedule 3 to the Environmental Planning and Assessment Regulation 2021.

This EIS has been prepared in accordance with the requirements of the EP&A Act. It provides an environmental impact assessment and details of how the quarry will be developed and operated to protect the environment, the community and provide for ecologically sustainable development.

4.4.2 Environmental Planning and Assessment Amendment (Siding Spring Observatory) Regulation 2016

The aim of the *Environmental Planning and Assessment Amendment (Siding Spring Observatory) Regulation 2016* is to ensure that development in the vicinity of the Siding Spring Observatory does not impact the effectiveness of the observatory, upon which the Dark Sky Region in NSW is centred.

Clause 92 of the *Environmental Planning and Assessment Amendment (Siding Spring Observatory) Regulation 2016,* under the EP&A Act*,* requires consent authorities to take into consideration the Dark Sky Planning Guideline when determining a development application for regional development, State significant development or designated development on land within 200 km of the observatory.

The proposal is located approximately 250 km northeast of the Siding Spring Observatory. It therefore does not require consideration of the Dark Sky Planning Guideline.

4.4.3 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) came into effect in August 2017 and replaced the *Threatened Species Conservation Act 1995*. The objective of the BC Act is to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development. The BC Act specifies requirements in relation to the listing of threatened species, biodiversity impact assessment, offsetting, related offences and the Biodiversity Assessment Method (BAM) for assessing the biodiversity values on land and the

impacts of activities on them. The BAM applies a standard approach to biodiversity assessment.

The BC Act also outlines the Biodiversity Offset Scheme (BOS). Development that is subject to the BOS includes development needing consent under Part 4 of the EP&A Act (excluding complying development), activities under Part 5 of the EP&A Act, State significant development and State significant infrastructure.

Where a development or an activity is, "likely to significantly affect threatened species", a Biodiversity Development Assessment Report (BDAR) must be prepared and consent authorities are required to consider the likely impact of the proposed development on biodiversity values before granting approval.

A development or an activity is "likely to significantly affect threatened species" (section 7.2 of the BC Act) and therefore requires a BDAR if:

- The BOS Threshold for clearing of native vegetation is exceeded;
- The development or activity is carried out in a declared Area of Outstanding Biodiversity Value (AOBV); or
- It is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test in section 7.3 of the BC Act.

The quarry site is not mapped on the biodiversity values map data base prepared by NSW DCCEEW (Figure 4) and is not located near an Area of Outstanding Biodiversity Value (AOBV).

The quarry site has some existing native vegetation within it and is also neighbouring existing native vegetation. The quarry site was assessed using the online BOS Entry Tool, which is used to determine the area threshold. According to BOS, the area clearing threshold for the quarry would be 0.5 ha clearing of native vegetation, based on the property lot size. No clearing is proposed under this development application. This proposal does not exceed the BOS threshold.

The third parameter to be assessed under the BC Act is a 'test of significance' for all development proposals that do not exceed the BOS Threshold. The required test of significance, outlined in Section 7.3 of the BC Act, is included as Appendix F. The Test of Significance concluded that the proposed development is not likely to significantly affect any threatened species, their habitats or ecological communities, and that further assessment under the BAM and the preparation of a BDAR is not required.

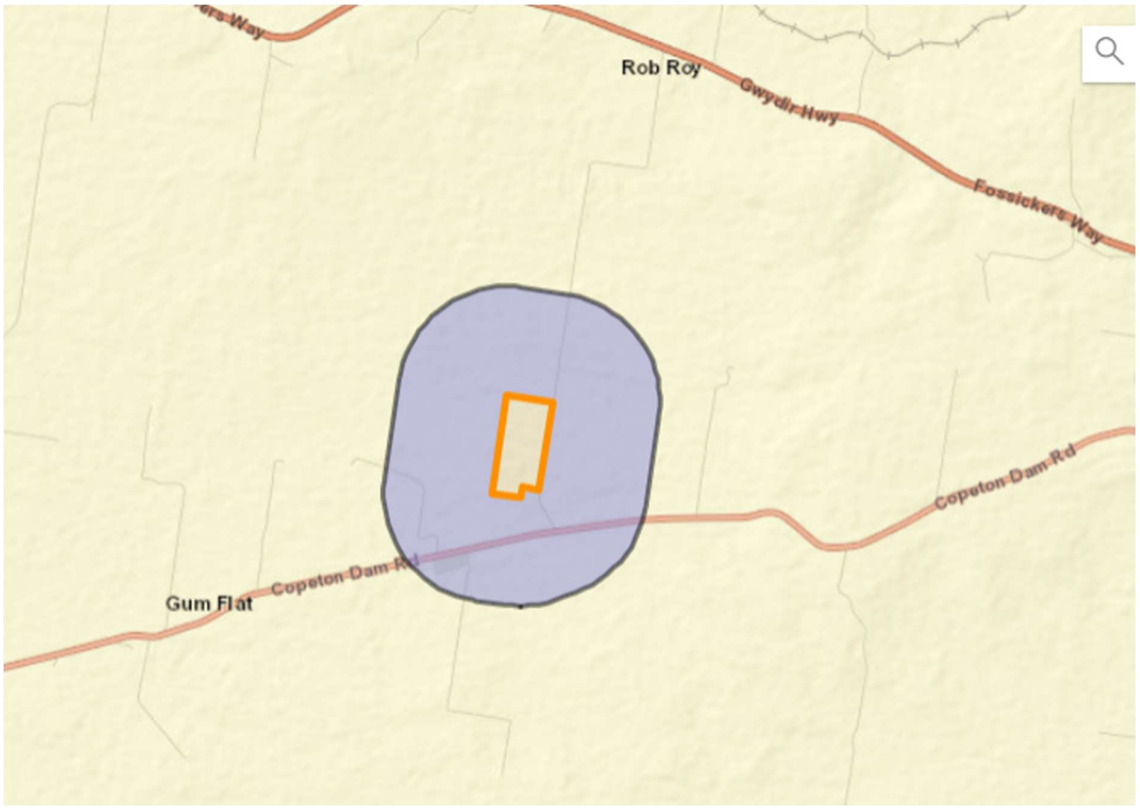
Figure 4: Biodiversity Values Map for ATJs Earthworks - SPH Quarry

4.4.4 National Parks and Wildlife Act 1974

The proposal has been prepared in consideration of the requirements of this Act. The subject site is located approximately 15 km from Barayamal National Park to the east of Inverell and 17 km from the Gwydir River State Conservation Area to the southwest. The development is not predicted to have any adverse impacts upon either of these areas.

The quarry site has been operating since 1975, and no Aboriginal artefacts or significant sites have been recorded for the quarry site (Figure 5). The probability of the proposed activities encountering any Aboriginal objects is low, as no land is proposed to be disturbed (all disturbance of vegetation and soil has previously occurred and proposed extractive operations are all at least 5 m below natural surface.)

Figure 5: AHIMS search for Lot 106 DP 656030 with a 1km buffer



It is considered that the proposal is unlikely to pose a risk to any potential Aboriginal heritage values which may be present within the locality.

In the event that items of indigenous cultural significance are uncovered during the course of quarry operations, an Unanticipated Finds Protocol will be implemented. These considerations protect the objectives of the Act.

4.4.5 The Heritage Act 1977

The *Heritage Act 1977* provides for the protection of the State's natural, built, marine and moveable heritage. The Act establishes the Heritage Council of NSW which maintains the State Heritage Register and Inventory.

No heritage items recorded on the Register or the Inventory are located on the subject land.

4.4.6 Rural Fires Act 1997

The Lot on which the quarry is located is not identified as bushfire prone land.

The development has been designed to comply with the NSW Rural Fire Service (RFS) guideline "Planning for Bush Fire Protection" (RFS 2019). The development does not involve

the erection of any buildings or dwellings. The quarry area is free of vegetation and other readily flammable materials. A 10m firebreak will be maintained around any structures present onsite. All weather roads will provide access for fire-fighting and the firebreak will provide access around the quarry. Water available for quarrying activities will provide an adequate supply for fire-fighting purposes. Overall, the potential fire risk posed by the development is minimal. The development is therefore considered compliant with the *Rural Fires Act 1997*.

4.4.7 Protection of the Environment Operations Act 1997

An Environmental Protection Licence issued under Section 48 the *Protection of the Environment Operations Act 1997* (POEO Act) is required for any development or activity listed in Schedule 1 of the Act. Subclause 19 of Schedule 1 lists 'land-based extractive activities' involving the extraction, processing or storage of more than 30,000 tonnes per year of extractive materials as a scheduled activity.

Section 45 provides details of matters to be taken into consideration in licensing functions. It requires that the appropriate regulatory authority consider the pollution likely to be caused by the proposed development, the likely impact of that pollution on the environment, and the practical measures that would be taken to mitigate that pollution.

Potential sources of pollution caused by quarry operations at ATJs Earthworks - Gum Flat Quarry are listed below in conjunction with the corresponding sections in this EIS which detail the potential adverse impacts of the proposal on the environment and the mitigation measures proposed to mitigate those impacts:

- Water pollution – Section 5.10, Appendix J
- Dust emissions – Section 5.7
- Noise pollution – Section 5.9, Appendix C
- Waste and hazardous materials – Section 5.16
- Environmental harm with associated adverse impacts on threatened species – Section 5.12, Appendix E, Appendix F

The forecast annual extraction for the ATJs Earthworks - SPH Quarry will be above 30,000 tonnes and therefore the quarry will require an Environment Protection Licence. This Licence can be applied for once development consent is issued.

4.4.8 Water Management Act 2000

The object of the *Water Management Act 2000* is the sustainable and integrated management of the State's water sources for the benefit of both present and future generations by applying the principles of ecologically sustainable development to protect,

enhance and restore water sources and their associated ecosystems, ecological processes, biological diversity and their water quality.

The objectives of this Act were considered throughout the planning and design phases of this development. Quarries normally require a secure and reliable water supply to operate. Except for periodic dust suppression, the ATJs Earthworks - SPH Quarry does not require water supply for operation. Water for dust suppression will be sourced from the internal runoff retention pond.

The current quarry operation drains all stormwater runoff internally to sediment and retention ponds located in the lowest part of the quarry floor. There is no risk of runoff or discharge from the quarry that may cause adverse environmental impacts.

Water balance considerations for the site are examined in section 5.10. On occasions of extended wet weather where water captured in the quarry starts to impact operations, management will partly dewater the quarry. Dewatering will aim to recycle this water for crop production once suspended solids have been settled out.

The quarry is part of a larger rural landholding, and the quarry sediment and retention ponds can be applied as irrigation water to dedicated irrigation bays within the property for pasture production. The irrigation proposal involves establishment of a turkey nest type dam that can be used to store water that is pumped from the internal ponds in the quarry. This turkey nest storage will not be able to capture any local runoff. Irrigation bays will be constructed with contour banks, drains, diversion banks, sediment traps and retaining ponds to manage the irrigation area and control runoff.

Legislation, policies and guidelines have been considered in regard to whether or not a controlled activity approval is required under the Water Management Act 2000. The quarry site is not within 40 m of waterfront land and no works are proposed on waterfront land or within a water course. A control activity approval under the is therefore not required.

4.4.9 Work Health and Safety (Mines and Petroleum Sites) Act 2013

The object of the *Work Health and Safety (Mines and Petroleum Sites) Act 2013* is to ensure that the quarry is operated safely. The site operates under a Work Health and Safety program in accordance with the principles of this Act.

4.5 State Environmental Planning Policies and Development Codes

Tables 4 and 5 present a summary and comment on current State Environmental Planning Policies (SEPPs) and identifies their relevance to the proposed development. Policies not considered relevant have not been referred to in any additional detail in this report.

Table 4: State Environmental Planning Policies

State Environmental Planning Policy (SEPP)	Relevance
SEPP (Biodiversity and Conservation) 2021	Review provided below
SEPP (Resilience and Hazards) 2021	Review provided below
SEPP (Transport and Infrastructure) 2021	Review provided below
SEPP (Resources and Energy) 2021	Review provided below
SEPP (Primary Production) 2021	Review provided below
SEPP (Planning Systems) 2021	Review provided below
SEPP (Industry and Employment) 2021	Not Relevant

4.5.1 SEPP (Resilience and Hazards 2021) – Chapter 4

The objective of this policy is to provide a State-wide planning approach for the remediation of contaminated land. Where it is proposed to rezone the land or to carry out a development that would change the use of the land, a consent authority must consider whether the land is contaminated and if it is, whether the land is suitable for the proposed development in its present state or whether remediation is required. Even where no change of use is proposed a consent authority must consider whether the land is suitable for the proposed development if the land has been used for a purpose listed in Table 1 of Appendix 1 in Contaminated Land Planning Guidelines (NSW Government, 2018 (Draft)).

A visual inspection of the land did not reveal any signs of chemical contamination. No refuse or waste has been disposed on the site intentionally or indiscriminately. No contamination is present. Site inspections and investigations of prior land use indicate that it is unlikely that contamination is present within this quarry that would render the land unsuitable for use as a quarry.

4.5.2 SEPP (Resilience and Hazards 2021) – Chapter 3

Chapter 3 of the SEPP (Resilience and Hazards) 2021 covers potentially hazardous and offensive development. It aims to ensure that a consent authority has sufficient information to assess whether a development is hazardous or offensive and to impose conditions to reduce or minimise any adverse impact.

A gravel quarry (extractive industry) is not listed as a potentially hazardous or offensive industry under this SEPP (Hazardous and Offensive Development Application Guidelines: Applying SEPP 33).

No dangerous goods are stored onsite. Diesel fuel stored onsite is not classified as a Class 3 flammable liquid, but as a C1 combustible liquid and is stored in an appropriate self-bunded container that meets the safe storage requirements of AS1940-2017.

The proposed development is not considered to be a potentially hazardous or offensive industry under this SEPP.

4.5.3 SEPP (Resources and Energy 2021)

This SEPP recognises the importance of mining, petroleum production and extractive industries to the NSW region and aims to provide for the proper management and the orderly development of land containing minerals, petroleum products and extractive materials. The SEPP aims to establish appropriate planning controls to encourage ecologically sustainable development through the environmental assessment and sustainable management of these resources.

Part 2.3 Development applications of the SEPP provides a number of matters that a consent authority must consider before determining a development application. These matters are similar to, but are in different terms to, the relevant matters contained in the Inverell Local Environment Plan and are considered in the body of this report.

Clause 2.19 requires that Council must consider the compatibility of development proposals on land in the vicinity of existing mines etc. or of land containing mineral or extractive resources. This provision is to ensure that these resources are not sterilised by incompatible development on surrounding land and is a matter for Council to consider. The quarry footprint is already fully established and does not impact upon existing or potential extractive industries.

Clause 2.20 requires the consent authority to ensure that the development is undertaken in an environmentally responsible manner to avoid or minimise:

- Impacts on significant water resources;
- Impacts on threatened species and biodiversity; and
- Greenhouse gas emissions.

The only greenhouse gas emissions are from machinery operation. Other matters are addressed in this report.

Clause 2.21 requires that the consent authority consider whether the proposed resource recovery is efficient. Modern equipment and best practice management principles are used in the operation of the quarry to ensure that resource recovery is efficient and economically viable.

Clause 2.21 (1) requires the consent authority to consider whether a consent should contain conditions to:

- Require some or all of the material to be transported by means other than by public road;
- Require the preparation and implementation of a code of conduct relating to the transport of materials on public roads.

Clause 2.21 (2) requires the consent authority to provide a copy of the development application to each roads authority for the roads used and the Roads and Maritime Service (TfNSW) within seven (7) days of receipt. This is a matter for Council. It is noted that the impact of the development upon the public road network has been considered and that a Traffic Impact Assessment is included in Appendix G.

Clause 2.21 (3) provides that the consent authority must not determine the development application until it has taken into consideration any submission received from the roads authorities and the Roads and Maritime Service (TfNSW) within 21 days after the Authority was provided with a copy of the application, and provide each of them with a copy of the determination. This is a matter for Council.

Clause 2.23 requires that the consent authority must consider whether or not the consent should be issued subject to conditions requiring rehabilitation of the land affected by the development. This is a matter for Council. The proposed development includes a rehabilitation plan (Appendix H) which is being progressively implemented.

4.5.4 SEPP (Transport and Infrastructure) 2021

The SEPP (Transport and Infrastructure) 2021 provides a consistent planning regime for infrastructure and the provision of services and public works across NSW, along with providing for consultation with relevant public authorities during the assessment process.

The proposed development is not identified in Schedule 3 of this SEPP as traffic generating development to be referred to Transport for NSW as the proposal is defined as 'any other purpose' and will not generate 200 or more motor vehicle movements per hour.

No works are proposed or considered necessary on adjoining road reserve. The existing quarry access is well established and allows for safe movement of vehicles to and from the quarry without adversely impacting the safety, efficiency or ongoing operation of Eddy Park Lane.

4.5.5 SEPP (Primary Production) 2021

This SEPP aims to support the orderly, environmentally sustainable and economic use and development of land for primary production and development. It also facilitates the future recognition and protection of State significant agricultural lands.

The use of land for Extractive Industry is supported within zone RU1 Primary Production within the *Inverell Local Environmental Plan 2012*. The proposed development will not impact upon State significant agricultural land or high value agricultural land. The proposed development does not include the erection of any buildings or dwellings, or subdivision of land. The quarry operates in such a way as to minimise land use conflicts in the area. The Rehabilitation Plan (Appendix H) for the quarry intends to rehabilitate the development footprint as close as reasonably possible to its natural state, thus returning it to a favourable condition for agricultural grazing over time as revegetation takes place.

4.5.6 SEPP (Biodiversity and Conservation) 2021 – Chapter 3 Koala Habitat Protection 2020

The SEPP (Biodiversity and Conservation) 2021 commenced on March 1, 2022, to replace SEPP(Koala Habitat Protection) 2020.

It is noted that the Koala Habitat Protection 2020 only applies to 'development' under Part 4 of the EP&A Act, specifically excluding Part 5 'activities' (which are also excluded from assessment under the Biodiversity Assessment Method).

The SEPP provides the following definitions:

- **Core Koala Habitat** means an area of land with a resident population of koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population.
- **Potential Koala Habitat** means areas of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component.

4.5.6.1 Habitat Definition and Feed Tree Species

The new SEPP no longer defines potential koala habitat. The definition of core koala habitat has been updated to allow areas with demonstrated koala presence in highly suitable habitat to be recognised, without the requirements of the previous definition which were difficult to meet. Core koala habitat will now be defined as:

a) An area of land where koalas are present; or
b) An area of land:
    i. Which has been assessed by a suitably qualified and experienced person in accordance with the Guideline as being highly suitable koala habitat; and
    ii. Where koalas have been recorded as being present in the previous 18 years.

The list of feed tree species has also been updated, increasing the number of species from 10 to 123 species. These 123 species were categorised into 9 distinct regions (Koala Management Areas), according to what trees koalas prefer to use in each area.

4.5.6.2 Mapping

Two new maps have been in introduced and are available for viewing:

a) **The Koala Development Application Map** – this identifies areas that have highly suitable koala habitat and are likely to be occupied by koalas. On land where there is no approved Koala Plan of Management, the map will be used to identify land where Council needs to consider the development application requirements in the Guideline.
b) **The Site Investigation area of Koala Plans of Management Map** – This identifies land that council are to focus their survey efforts on, particularly when identifying core koala habitat.

4.5.6.3 Development Assessment

Land within the Inverell Shire is listed under Schedule 2 of the SEPP for both the Northwest Slopes and Northern Tablelands Koala Management Areas. The SPH Gum Flat Quarry is located within the Northwest Slopes Koala Management Area and therefore assessment under this SEPP is required.

A list of Koala feed tree species for the Northwest Slopes Koala Management Area is provided in Schedule 1 of the SEPP. Listed species present in the vicinity of the SPH Gum Flat Quarry include White Box and River Red Gum.

A list of Koala use tree species for the Northwest Slopes Koala Management Area is provided in Schedule 3 of the SEPP. Listed species present in the vicinity of the SPH Gum Flat Quarry include Rough Barked Apple, White Cypress pine, White Box, River Red Gum and Yellow Box.

The NSW government Bionet Atlas online mapping tool was searched to determine the assessment of koala habitat value within the quarry footprint and its vicinity. Figure 6 presents the koala sightings in the vicinity of the SPH Gum Flat Quarry. Table 5 presents Koala Sighting details.

Figure 6: Koala sighting records in the vicinity of the SPH Quarry (NSW Bionet Atlas)

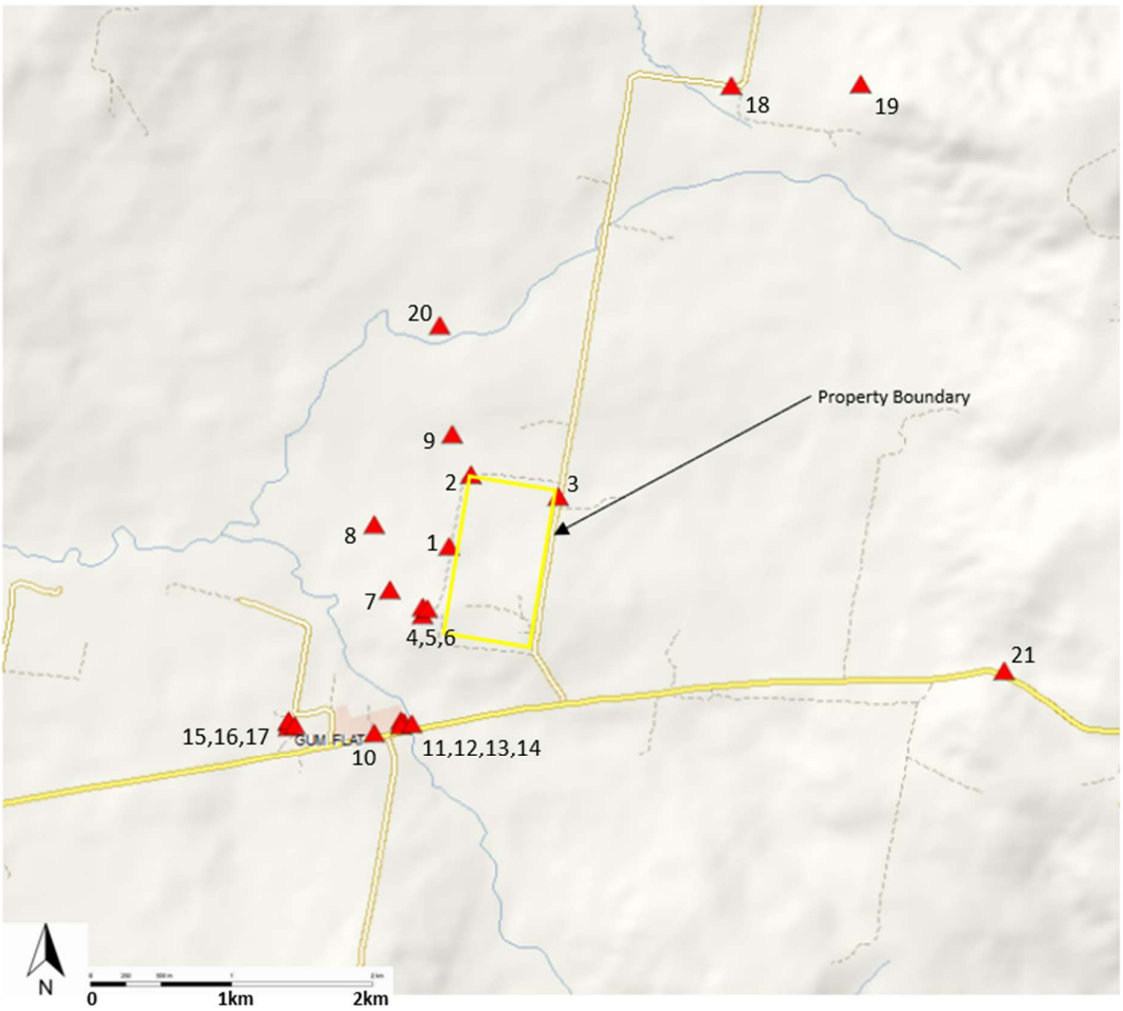


Table 5: Koala Sighting Details in the vicinity of the SPH Quarry

Koala Sighting	Observed Date	Location Description	Latitude	Longitude
1	22/05/2019	"Kingston" 384 Eddy Park Lane, Gum Flat	-29.77043	150.98710
2	28/10/2019	"Kingston" 384 Eddy Park Lane, Gum Flat	-29.76693	150.98815
3	25/09/2023	Eddy Park Lane, Gum Flat	-29.76799	150.99243
4	23/01/2021	"Kingston" 384 Eddy Park Lane, Gum Flat	-29.77379	150.98578
5	22/09/2022	"Kingston" 384 Eddy Park Lane, Gum Flat	-29.77343	150.98581
6	22/10/2024	"Kingston" 384 Eddy Park Lane, Gum Flat	-29.77347	150.98607
7	08/03/2024	"Kingston" 384 Eddy Park Lane, Gum Flat	-29.77257	150.98419
8	16/08/2022	"Kingston" 384 Eddy Park Lane, Gum Flat	-29.76937	150.98347
9	15/10/2018	"Kingston" 384 Eddy Park Lane, Gum Flat	-29.76498	150.98726
10	23/09/2019	Gum Flat Village	-29.77960	150.98347
11	30/12/2019	Copeton Dam Rd, Gum Flat	-29.77910	150.98532
12	11/12/2019	Copeton Dam Rd, Gum Flat	-29.77925	150.98478
13	11/12/2019	Copeton Dam Rd, Gum Flat	-29.77900	150.98478

Koala Sighting	Observed Date	Location Description	Latitude	Longitude
14	1/11/2019	Copeton Dam Rd, Gum Flat	-29.77907	150.98489
15	10/9/2021	Gum Flat Primary School, 958 Copeton Dam Rd, Gum Flat	-29.77930	150.97927
16	06/09/2024	Gum Flat Primary School, 958 Copeton Dam Rd, Gum Flat	-29.77920	150.97958
17	23/09/2019	Gum Flat Primary School, 958 Copeton Dam Rd, Gum Flat	-29.77905	150.97927
18	25/09/2023	Eddy Park Lane, Gum Flat	-29.74789	151.00087
19	16/11/2016	111 Eddy Park Lane, Gum Flat	-29.74783	151.00724
20	29/10/2020	"Kingston" 384 Eddy Park Lane, Gum Flat	-29.75964	150.98663
21	29/10/2016	Copeton Dam Rd, Gum Flat	-29.776529	151.01418

Recorded sightings show koalas have been present in woodlands in the vicinity of the subject property. There are no records of koalas observed within the quarry as there are no trees within the active quarry area. The nearest koala sightings are on the western boundary of the subject property where a tree line corridor has been retained and provides connectivity to surrounding woodland, mainly along Copeton Dam Road.

Most records have been taken within the last 5 years, with observation notes verifying several instances of koala families and koalas with joeys, indicating a healthy and reproducing koala population in the vicinity.

During the site inspections, no evidence of koala habitation such as scats, tracks or claw marks were found at the quarry site or in adjacent woodland. No core koala habitat was identified within the quarry footprint. Potential koala habitat exists on and around the margins/boundary of the existing quarry.

Koalas tend to move at night and sleep during the day in a range of trees. The quarry work will be undertaken during the day and, therefore, limited if any direct contact would occur if a Koala were present. If a Koala is sighted during the work, a suitable buffer and clear zone should be established to ensure the Koala is not disturbed.

The quarry has been in operation for 50-years or more. The local Koala population would have experienced the operations during this time. As there are Koala sightings in trees adjoining the quarry, this suggests that the quarry operation does not have a direct impact on local Koalas.

The proposed development will not have a significant impact on nearby Koala habitat and the proposal will not increase habitat fragmentation in the locality. On this basis, it is considered that the requirements of the SEPP do not need any further consideration.

Aerial imagery on the NSW Department of Planning, Industry and Environment online planning tool indicates that both of the Koala Habitat maps are outdated. The area within the subject site, which is included in the Koala Development Application Map, and much of the area within the site which is included in the Site Investigation Area for Koala Plans of Management, are cleared of vegetation.

The footprint of the existing quarry has been previously cleared and vegetation currently present within the subject site is limited to areas of revegetation undertaken as part of the quarry rehabilitation plan. This vegetation currently consists of immature trees, shrubs and groundcover. This is also currently isolated from larger areas of potential koala habitat in the local area.

Site inspections indicate that no Koala habitat are present within the subject site. If Koala were present in the area, it is likely that they would preferentially use nearby higher quality remnant vegetation, predominantly to the south of the quarry site. No clearing will take place as part of the proposal. On this basis, it is considered that the requirements of the SEPP do not need any further consideration.

4.6 Regional Plan

The New England North West Regional Plan applies to the Inverell local government area. The Plan presents objectives and planning goals aimed towards achieving a sustainable future for the region, maximising it's diverse climates, landscapes and resources.

The Plan outlines the following regionally focused goals:

- A strong and dynamic regional economy;
- A healthy environment with pristine waterways;
- Strong infrastructure and transport networks for a connected future;
- Deliver a variety of housing options.

The key priorities for the Inverell area that the proposed development supports include:

- *Continue to develop access and logistic infrastructure on appropriate sites to encourage new industry opportunities;*
- *Deliver a variety of housing options in Inverell to support the SAP and promote development that contributes to the unique character of and region.*

The proposed development will achieve this by meeting demand for gravel to the civil and construction industry across the region.

4.7 Development application and Licence requirements

4.7.1 Development Assessment

Under Part 4 of the EP&A Act, extractive industries require development consent under the relevant Local Environmental Plan (LEP). The subject land is located within the Inverell Shire and the *Inverell Local Environmental Plan 2012* is the appropriate planning instrument. The subject land is zoned as RU1 Primary Production. The proposed land use (extractive industry) is considered permissible with consent within this zone.

Under Schedule 3 of the EP&A Regulation, the following extractive industries (being industries that obtain extractive materials by methods including excavating, dredging, tunnelling or quarrying or that store, stockpile or process material by methods including washing, crushing, sawing or separating) are considered designated development:

a) That obtain or process for sale or reuse, more than 30,000 cubic metres of extractive material per year, or

b) That disturb or will disturb a total surface area of more than 2 hectares of land by:

i. clearing or excavating, or

ii. constructing dams, ponds, drains, roads or conveyors, or

iii. storing or depositing overburden, extractive material or tailings, or

c) That are located:

- *i. in or within 40 metres of a natural waterbody, wetland or an environmentally sensitive area, or*
- *ii. within 200 metres of a coastline, or*
- *iii. in an area of contaminated soil or acid sulphate soil, or*
- *iv. on land that slopes at more than 18 degrees to the horizontal, or*
- *v. if involving blasting, within 1,000 metres of a residential zone or within 500 metres of a dwelling not associated with the development, or*
- *vi. within 500 metres of the site of another extractive industry that has operated during the last 5 years.*

Given the existing quarry area exceeds 2 ha, it is considered a Designated Development. Part 4 of the EP&A Act outlines the assessment requirements for Designated Development.

4.7.2 Approvals required from NSW State Agencies and conditions that apply to the proposal

The following approvals are required:

1. Development Consent in accordance with the provisions of Part 4 of the EP&A Act. The proposal is classified as Regional Development and will be determined by the Regional Planning Panel (RPP) under the provisions of the *SEPP (Planning Systems) 2021.*
2. The quarry operation will require an environment protection licence issued under the POEO Act.

4.7.3 Consultation with relevant Utilities and Agencies

A request for the Secretary's Environmental Assessment Requirements (SEARs) was submitted to the NSW Department of Planning and Environment (DPE). DPE notified relevant government agencies requesting their environmental assessment requirements. A copy of the SEARs is included as Appendix B.

4.7.3.1 Inverell Shire Council

Inverell Shire Council requested that a pre-development application meeting be held between Council and the proponent to further discuss key points for consideration. Council have met the applicant on the property on several occasions to discuss the development and the application proposal.

4.7.3.2 Crown Lands

No Crown land is impacted by the proposal.

4.7.3.1 Environment Protection Authority

NSW EPA provided detailed requirements to be assessed as part of the EIS. These have been addressed within this EIS.

4.8 Local Planning Instruments

4.8.1 Inverell Local Environmental Plan 2012

The *Inverell Local Environmental Plan 2012* (LEP) is the current local government planning policy for the Inverell Shire. The framework of the LEP is derived from the EP&A Act. Gum Flat Quarry is located in Zone RU1 – Primary Production of the Inverell Shire.

The aims of the LEP are:

(aa) to protect and promote the use and development of land for arts and cultural activity, including music and other performance arts,
(a) to encourage sustainable economic growth and development,
(b) to protect and retain productive agricultural land,
(c) to protect, conserve and enhance natural assets,
(d) to protect built and cultural heritage assets,
(e) to provide opportunities for growth.

Comment

The proposed development is considered consistent with aims of the Local Environment Plan.

4.8.2 Land Use Definition

According to the LEP, a quarry is a land use involving "extractive industry" defined as "the winning or removal of extractive materials (otherwise than from a mine) by methods such as excavating, dredging, tunnelling or quarrying, including the storing, stockpiling or processing of extractive materials by methods such as recycling, washing, crushing, sawing or separating, but does not include turf farming."

Comment

The Gum Flat Quarry meets the definition of an extractive industry and is a permissible land use, with development consent, within the RU1 – Primary Production zone.

4.8.3 Zone RU1 – Primary Production

The LEP states that the objectives of the zone are:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base;

- To encourage diversity in primary industry enterprises and systems appropriate for the area;
- To minimise the fragmentation and alienation of resource lands;
- To minimise conflict between land uses within this zone and land uses within adjoining zones.

Comment

The protection of natural resources and places has been fully considered in the ongoing operation of the Gum Flat Quarry. The operation continues to undertake actions to minimise any potential impacts on, and conflicts with, surrounding land uses. The continued operation of the quarry will not contribute to fragmentation and alienation of land in the Zone. The proposal is not considered to conflict with adjoining land uses. The quarry contributes to appropriate diversity in primary industry enterprises in the area. The quarry is considered to be both compatible and consistent with the surrounding land uses and meets the objectives of the LEP for RU1 zoned land.

4.8.4 Heritage Conservation

Section 5.10 of the LEP deals with heritage items and heritage conservation areas which are listed in Schedule 5 of the LEP. The objectives of this section are:

a) To conserve the environmental heritage of Inverell;
b) To conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views;
c) To conserve archaeological sites;
d) To conserve Aboriginal objects and Aboriginal places of heritage significance.

Comment

The proposal is not in the vicinity of any heritage items in accordance with Council's Local Environmental Plan or under State or Federal legislation. A preliminary assessment of the site's archaeological heritage has been included in Section 5.11. The assessment concluded it was unlikely that items of archaeological heritage significance exist within the site. No sites of European heritage are impacted by the quarry.

4.8.5 Bushfire Hazard Reduction

Section 5.11 of the LEP deals with land that is considered bushfire prone and may require bushfire hazard reduction work. Bushfire hazard reduction work authorised by the *Rural Fires Act 1997* may be conducted on any land without development consent.

Bushfire hazard reduction work includes the following:

a) Design of access roads shall enable safe access and egress for residents attempting to leave the area at the same time that emergency service personnel are arriving to undertake firefighting operations;
b) An adequate supply of water is essential for firefighting purposes. In addition, gas and electricity should be located so as not to contribute to the risk of fire or impede the firefighting effort;
c) The type, location and ongoing maintenance of landscaping is considered a necessary BPM;
d) The establishment or maintenance of firebreak on land; and
e) The controlled application of appropriate fire regimes or other means for the reduction or modification of available fuels within a predetermined area to mitigate against the spread of a bushfire, but does not include construction of a track, trail or road.

Comment

The quarry site is not mapped as Bushfire Prone Land, nor is it mapped within a buffer zone for Bushfire Prone Land. Adjacent land to the south of the quarry is mapped as Category 1 Bushfire Prone Land.

The proposal does not involve the erection of any new buildings or dwellings. Apart from designated rehabilitation areas, the quarry site is generally clear of vegetation and other readily flammable materials.

A 10 m firebreak is maintained around structures present onsite (e.g. fixed or mobile plant equipment). All weather access roads provide operational access to permit evacuation and fire fighting in the event of a fire. The entry road is designed for trucks servicing the quarry and is more than adequate to allow access for a fire truck or fire tanker in the event where RFS or NSW Fire and Rescue need to enter the property.

4.8.6 Development Control Plan

The Inverell Shire Council Development Control Plan has a two sections relevant to the proposal:

- Commercial and Industrial Development;
- Parking and Traffic.

4.8.6.1 Commercial and Industrial Development

In relation to rural industries outside of Inverell's central business district, the Development Control Plan's intent is to adequately consider appropriate commercial and industrial developments outside of commercial and industrial zoned areas to ensure they are permissible and compatible with the current and future character of the surrounding area.

Comment

For the Gum Flat Quarry, no changes to the existing and current operations are proposed, other than the implementation of ongoing environmental management, rehabilitation activities and forecast fluctuation in vehicle traffic (see section 5.15) dependent on gravel extraction rates. The quarry has been in operation for more than 50-years. A similar quarry is located on adjoining land to the east of Eddy Park Lane. Quarrying operations have formed an historical land activity in the immediate area for an extended period and will continue to be part of the commercial development in the immediate area.

4.8.6.2 Parking and Traffic

The Plan's intent for industrial activities is that a development provides adequate, safe and well-designed on-site parking for all staff and visitors.

Comment

As part of Gum Flat Quarry's Safety Management System, adequate parking spaces for heavy vehicles, employees and visitors are well established on site. The employee/visitor parking zone is located on the eastern boundary as shown in Appendix A. Heavy vehicles are parked in the workshop shed.

4.8.7 Community Participation Plan

The Inverell Shire Council Community Participation Plan sets out how and when Council will engage with the community when undertaking its town planning functions under the EP&A Act. It applies to the entire Inverell Local Government Area. The Plan has been prepared in accordance with Section 2.6 and Schedule 1 of the EP&A Act 1979.

An effective community consultation program ensures a proposal has been fully explored and that community concerns are identified and considered. The Plan states that "written notice" of a Development Application will be sent to the persons who own adjoining land and/or neighbouring land when a Development Application has been received, where, in Council's opinion, the enjoyment of the adjoining land or neighbouring land may be affected by the development in relation to:

- The views to and the views from the adjoining land or neighbouring land;
- Overshadowing;
- Privacy;
- Noise;
- The visual quality of the development in relation to the streetscape;
- The location of the proposed development in relation to the neighbouring boundaries;

- The means of disposing of roof drainage water from the building and any potential adverse effect of drainage on adjoining sites;
- Whether any fuel burning equipment or mechanical devices are to be installed as part of the development;
- The relationship of the proposed development to existing development on adjoining land or neighbouring land;
- The amount of traffic likely to be generated by the development and the capacity of the site to handle the associated traffic
- movements; or
- The effect the development is likely to have on the future amenity of the neighbourhood.

Where in the opinion of Council, a development (including modification) is of a minor or inconsequential nature with minimal environmental impact, notification of a Development Application may not be required. It is Council's discretion to determine whether a development application is of a minor or inconsequential nature with minimal environmental impact, compared to the existing situation.

As the SPH Gum Flat Quarry is seeking development consent as an integrated development, this Plan nominates a minimum notification period, in accord with EP&A Regulation, of 28 days.

Comment

For the Gum Flat Quarry, no change to the existing and current operations is proposed, other than the implementation of ongoing environmental management, rehabilitation activities and forecast fluctuation in vehicle traffic (see section 5.15) dependent on gravel extraction rates.

4.9 Draft Planning Instruments

No draft planning instruments of relevance to this proposal were identified.

5 Environmental Impact Assessment

Items considered include matters set out under Part 5 of the EP&A Act. A summary of the major points of that consideration follows.

5.1 Meteorological and Climatic Data

Gum Flat is situated in north-west NSW. It is situated on gently sloping ground with the elevation approximately 700 m AHD. The climate is best described as temperate.

The following information is based on Bureau of Meteorology (BoM) information for Inverell Research Centre (Site: 56018), which is the closest recording station to the subject site that could provide comprehensive rainfall data. This weather station commenced recordings in 1949 and remains operational.

The Inverell Research Centre recording station is located approximately 9 km east of the proposed development site. Table 6 and Table 7 provide a summary of the average monthly and annual climate conditions.

Table 6: Rainfall Data – Inverell Research Centre BoM Site: 56018 (1949-Present)

Monthly Rainfall (mm)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Average	98.3	94.9	74.8	40.6	47.5	45.5	48.0	44.1	47.8	75.5	86.4	98.3	800
10th %ile	30.8	26.5	15.4	3.0	6.2	7.3	10.9	9.2	11.1	26.0	19.5	37.3	556
90th %ile	172.7	168.6	158.1	76.3	98.2	91.4	91.9	84.2	96.7	152.9	170.1	164.8	1065

Based on an annual average evaporation of approximately 1600 mm and an annual average rainfall of 800 mm, the site generally has a mean annual moisture deficit of 800 mm.

Table 7: Temperature Data – Inverell Research Centre BoM Site: 56018 (1949-Present)

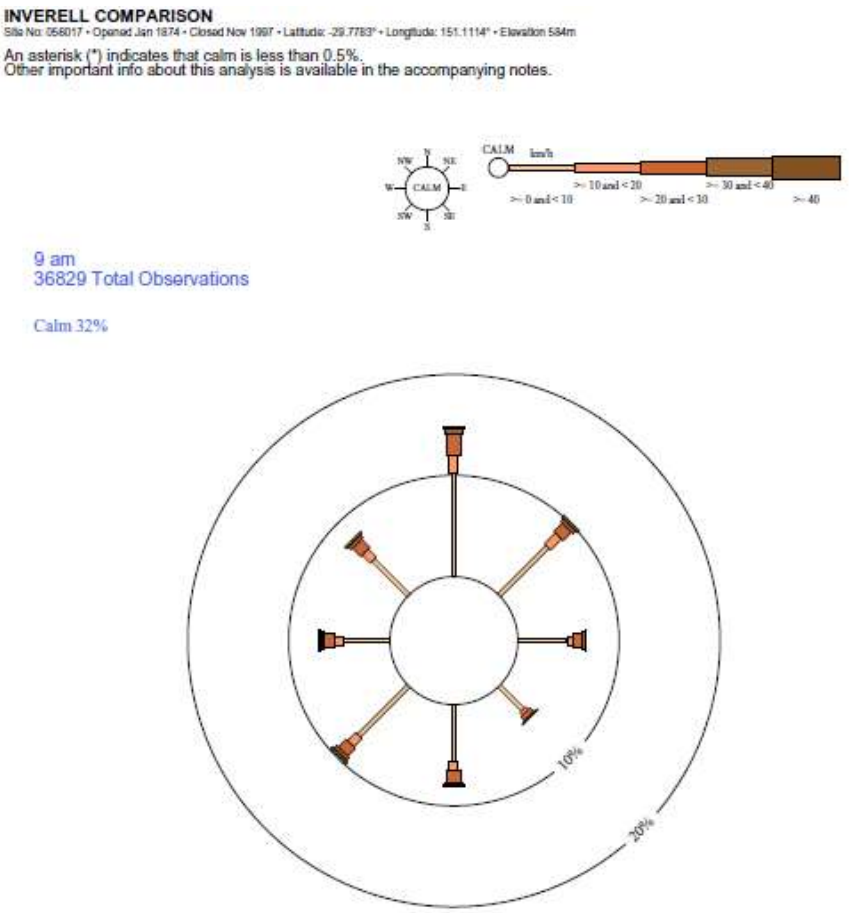
Monthly	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Av. Max Temp (°C)	29.7	29.0	27.2	23.6	19.1	15.8	15.3	16.9	20.1	23.4	26.0	28.5	22.9
Highest Temp (°C)	41.1	41.3	35.7	32.1	27.4	25.6	23.0	31.9	32.1	36.2	39.2	41.5	41.5
Av. Min Temp (°C)	16.6	16.4	14.6	11.1	7.4	4.9	3.7	4.4	7.1	10.4	12.9	15.1	10.4
Lowest Temp (°C)	6.5	6.2	3.4	-0.3	-3.5	-5.5	-5.0	-4.3	-2.0	-1.0	2.7	5.7	-5.5

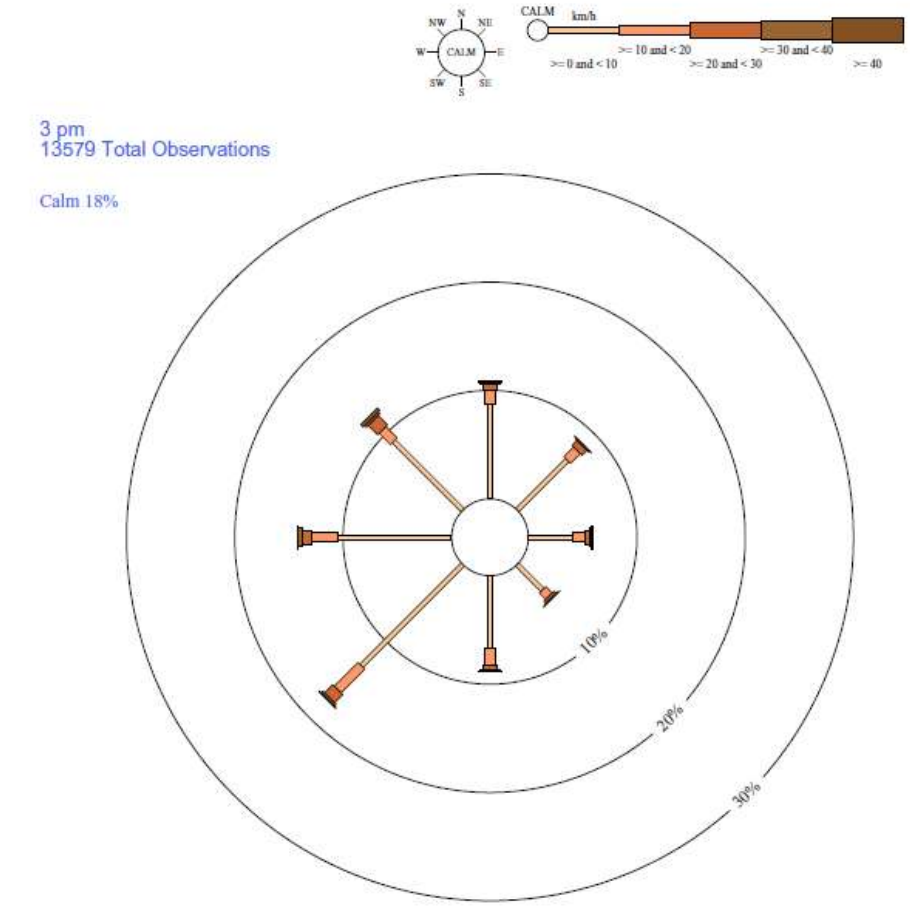
The long-term temperature figures show that the region experiences significant daily and seasonal temperature variations, with recorded temperatures ranging from 41.5°C to -5.5°C. Relative humidity is generally low.

The average wind speed and direction for the area varies according to the season and time of day. Wind data sourced from Inverell was examined to identify predominant wind directions in the locality. The 9am and 3pm wind roses depicting the average annual wind speed and direction are shown in the Figure 7.

The *New England North West Climate Change Snapshot* (2014) projections indicate a warmer climate will result in altered rainfall patterns and more intense bushfires, droughts and floods.

Figure 7: Wind Roses for Inverell (BoM Data 1874-1997)





5.2 Topography and Geology

ATJs Earthworks - SPH Quarry is located on the north west Slopes of NSW in the Inverell Basalts subregion of the Nandewar Bioregion.

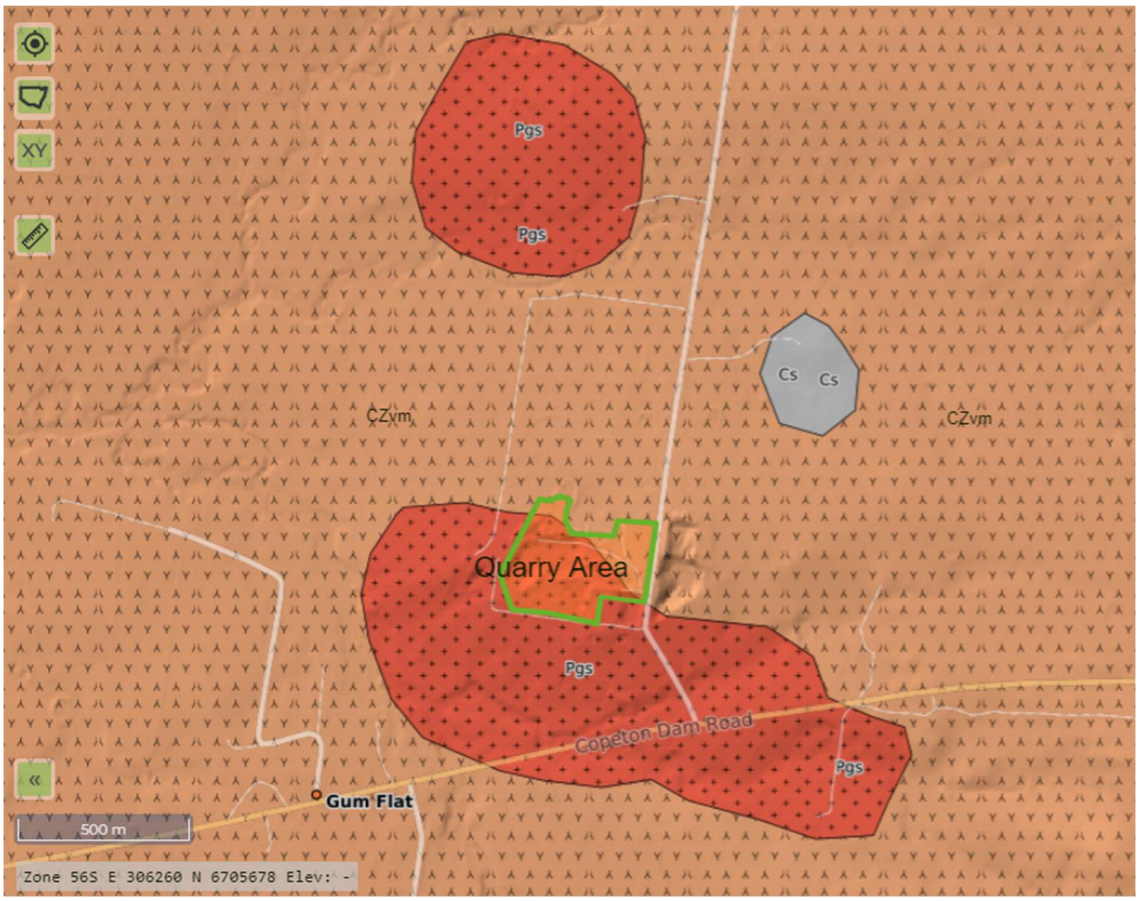
Prior to excavation the quarry site was slightly higher than surrounding land and relatively flat, with elevation across the site of approximately 710 m AHD. The existing quarry has an elevation ranging from 715 m to 700 m AHD.

Figure 8 shows the topography of the existing quarry footprint in the context of the surrounding landscape.

Figure 8: Topography of Gum Flat Quarry

Geological mapping of the region surrounding the subject site has been accessed using the NSW Department of Planning and Environment (Resources and Geoscience) online mapping tool. The online mapping tool presents a 1:1,500,000 scale geological map that has been compiled from numerous geological maps and regional geological synthesis datasets from the Geological Survey of NSW and Geoscience Australia. The map represents a simplified, generalised description of geological characteristics of New South Wales. From this, the geological formations present in the area of the quarry are outlined in Figure 9.
Mapping indicates the quarry is located on an outcrop of weathered New England Orogen granites, surrounded by Inverell Igneous Mafic Volcanics, characterised by basalt clay soils common in the Inverell area. Field investigations confirmed the geology of the area to be consistent with the desktop findings.

Figure 9: Geology of the locality around ATJs Earthworks - Gum Flat Quarry



Geology Legend:

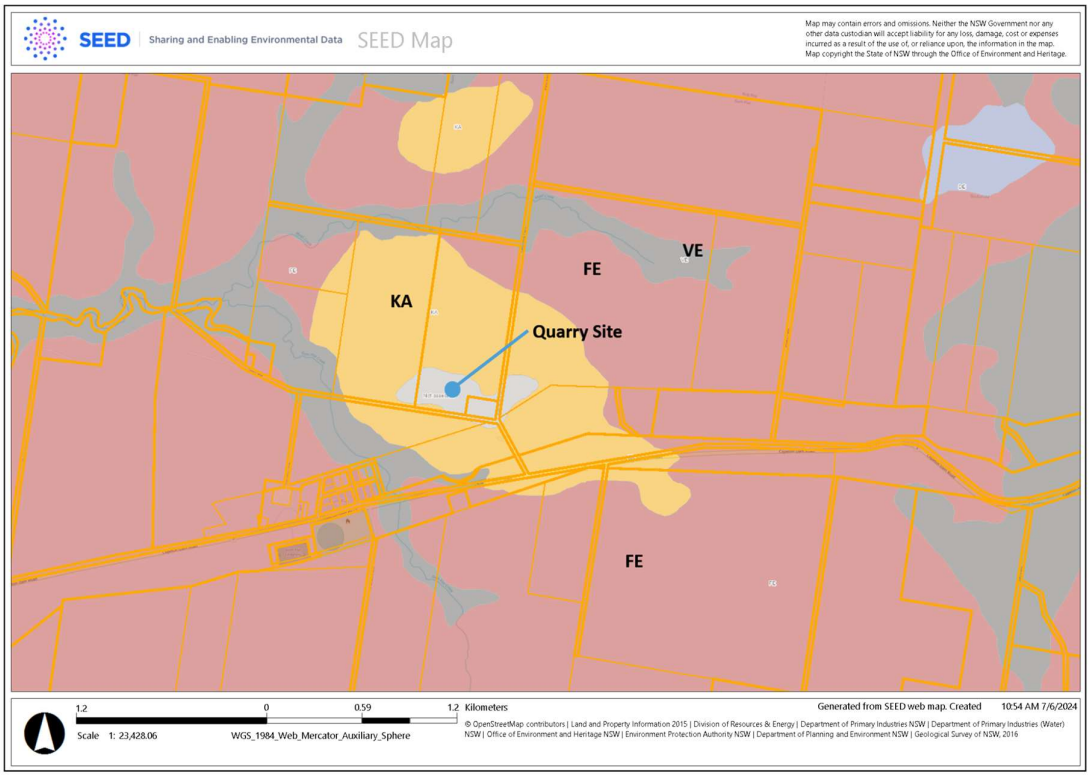
Key	Name	Age	Description
CZvm	Inverell volcanics - Igneous mafic	Cenozoic	Includes poorly dated basalt eruptions from widespread volcanic activity through the eastern part of NSW over the last 65 million years. Basalt lava flows are typical examples.
Pgs	New England Orogen granites	Permian	These granites are interpreted to form by melting of sedimentary rocks. Crystals within them include quartz, muscovite, red-brown biotite and commonly cordierite and/or garnet.
Cs	Sedimentary rocks	Carboniferous	A wide range of sedimentary rocks, including feldspar-rich sandstone, siltstone, mudstone and conglomerate units

5.3 Soils

5.3.1 Existing Environment

The Soil mapping indicates that typical soils surrounding ATJs Earthworks - Gum Flat Quarry are Chromosols and Sodosols (Figure 10).

Figure 10: Soil types in the vicinity of SPH Gum Flat Quarry (Source: NSW SEED Mapping)



Key: **KA**- Kandosols, **FE**- Ferrosols, **VE**- Vertosols

Kandosols

Kandosols are red, yellow and grey massive earths. They generally have a sandy to loamy-surface soil, grading to porous sandy-clay subsoils with low fertility and poor water-holding capacity. A wide range of crops can be grown on these soils where rainfall is higher or where irrigation is available. Kandosols often support sheep and cattle grazing on native pastures.

Ferrosols

Ferrosols are well-drained soils with red or yellow-brown colour and have clay-loam to clay textures. This soil type is usually associated with previous volcanic activity and is mainly located along the Great Dividing Range. These soils occur are often utilised for intensive crop production where rainfall permits.

Vertisols

Vertosols are cracking clay soils with characteristics including:

- brown, grey or black soils which crack open when dry
- they commonly form hummocky relief called gilgai
- very high-soil fertility—ability to supply plant nutrients
- large water-holding capacity.

5.3.2 Potential Impacts

5.3.2.1 Soil Erosion

The primary risk to soil due to quarry activities is erosion of disturbed areas that is not managed or controlled. The potential for soil erosion within the quarry is minimal as there is no soil within the quarry. Sediment eroded from the gravel resource is captured in the quarry.

No soil stripping is required for ongoing operations. The active footprint of the quarry has been cleared of vegetation and stripped of overburden. Any potential risks of soil erosion are contained and managed within the quarry by sediment and retention ponds. All existing site features, such as stockpiles and earthen bunds, and ongoing site activities are subject to ongoing management and active rehabilitation as quarrying activities move within the quarry boundary.

The area surrounding the quarry perimeters is maintained as grassed areas where possible. The overburden is allowed to grass up with native grasses. The area other than roads which surround the perimeter of the quarry is managed as a vegetative buffer and therefore the vegetation reduces the potential for erosion.

Internal roads between the site entry from Eddy Park Lane and the workshop area are maintained as gravelled roads. Areas between the roads are encouraged to support grass and are being naturally revegetated. Stormwater drainage from this above ground area is directed north onto farming land.

5.3.2.2 Salinity

The subject site does not have an existing salinity issues and the development proposal, as designed, will not increase the risk of salinity on the property.

5.3.2.3 Acid Sulphate Soils

Deposits of Acid Sulphate Soils (ASS) are commonly found less than five metres above sea level, particularly in low-lying coastal areas. Mangroves, salt marshes, floodplains, swamps, wetlands, estuaries, and brackish or tidal lakes are ideal areas for acid sulphate soil formation. There is no evidence of ASS present at the site.

5.3.3 Mitigation Measures

The proponent is conscious of the need to conserve all soil resources available onsite and to ensure that they are responsibly managed and are available for the rehabilitation of disturbed areas within the project site, whilst preventing erosion.

A Site Rehabilitation Plan has been prepared by the proponent which includes landscaping, soil stabilization, drainage management and revegetation. These measures are being implemented and will be maintained for the duration of the quarry's operation. These include:

- Where stockpiles are to be retained for periods in excess 6 months, the stockpiles are to be seeded with a cover crop of non-persistent pasture species;
- Implementing dust management measures to reduce dust production and subsequent aeolian erosion from site (as outlined in Section 5.7);
- Progressive rehabilitation where possible, including contouring, re-establishing topsoil and vegetation to minimise the area of exposed soil at any given time; and
- Ensuring that erosion and sediment control measures are only removed from the site once the area is successfully rehabilitated following the conclusion of quarry activities.

In most cases, water management controls duplicate as a means of soil erosion control. A range of water management and drainage controls present onsite are outlined in Section 6. The implementation of these controls directs all quarry runoff from disturbed areas to detention structures and a sediment pond within the quarry. This is below ground-level and the risk of uncontrolled offsite discharge of sediment laden water is minimal.

5.3.1 Assessment of Erosion Impacts

The proposal should not result in the pollution of land or waters, as best practice erosion and sediment control continue to be implemented as part of quarry operations. Achieving a high standard of erosion and sediment control and general site housekeeping will continue to be a priority throughout the lifetime of quarry operations.

5.4 Land Capability

5.4.1 Existing Environment

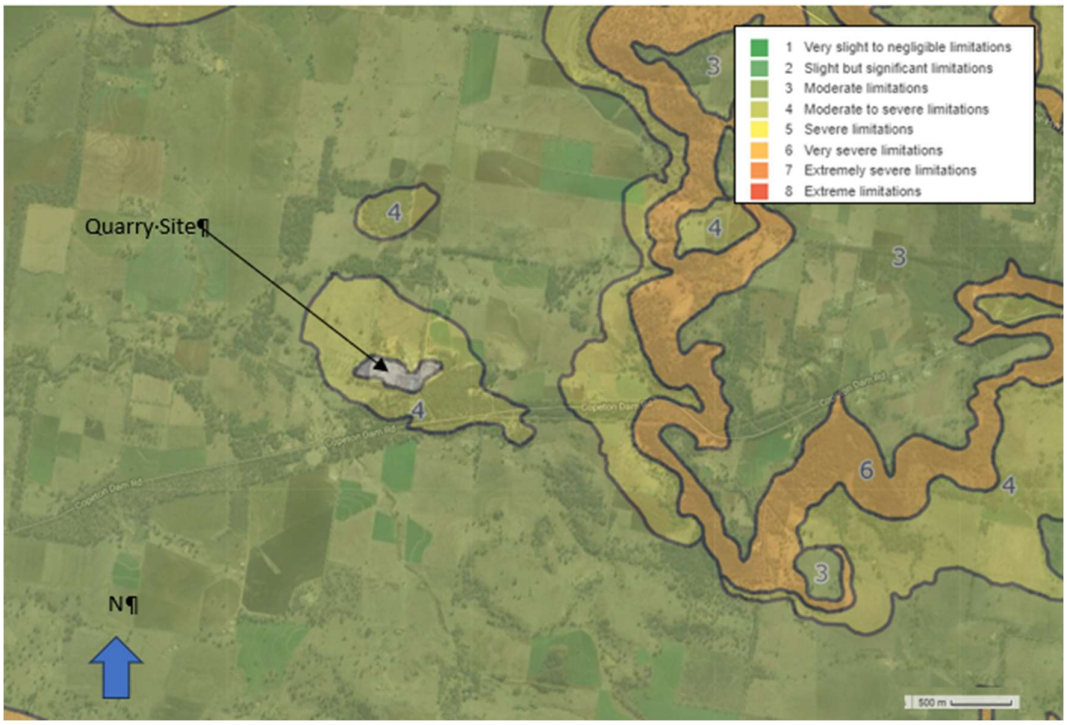
Land and soil capability assessment is based on the biophysical features of the land, including slope, wind hazard, soil pH, surface structural stability, salinity, rocky outcrops, water logging potential and existing erosion of a landform. Table 8 summarises the appropriate land use for each capability class.

Table 8: Land and Soil Capability Classes

Class	Most Intensive Use	Land Definition
Class 1	Regular cultivation including intensive crops	Suitable for a wide range of agriculture. It may be regularly cultivated. Very slight to negligible limitations.
Class 2	Regular cultivation	Suited to a wide range of horticulture in rotation with pastures. Several minor constraints may limit suitability for continuous cultivation. These include stony and shallow phases of soil and moderate erosion hazard.
Class 3	Regular cultivation, but must be consciously managed to prevent degradation	Suited to grazing, including the use of improved pastures. Cultivation is limited to cash or forage crops in rotation with pastures.
Class 4	Grazing, intermittent cultivation with specialised practices	Suitable for grazing, but not for cultivation. Pasture improvement relies on minimum tillages techniques. Productivity may be seasonally high but overall is low as a result of major environmental constraints.
Class 5	Grazing, very occasional cultivation for pasture establishment	Non-arable land suitable for grazing but not cultivation. Maintain or improve perennial pastures and preserve ground cover.
Class 6	Grazing only	Non-arable and often non-trafficable. Land suitable for grazing but not cultivation. Maintain or improve perennial pastures and preserve ground cover.
Class 7	Unsuitable for rural production	Includes steep (slope 33 to 50%) or extremely erodible, or saline or shallow soils. Generally unsuited to agriculture or at best suited only to light grazing.
Class 8	Unusable for any agricultural purpose	Extremely severe limitation includes precipitous slopes (>50%), areas with large proportion of rock outcrop and frequently inundated. Agricultural production is very low or zero as a result of severe constraints and as a results retirement form agriculture for conservation purposes may be the best option.

The NSW Soil and Land Information Database eSPADE, managed by NSW Department of Planning, Industry and Environment (DPIE), identifies the land surrounding the quarry site as having a land and soil capability ranking of Class 4 (Figure 12). The quarry site itself is not given a ranking in the database, reflecting the existing non-agricultural land use pre-dating the development of the database. The remaining farm land owned by the applicant has a soil capability ranking of Class 3. This is considered suitable for grazing, improved pasture and limited cultivation.

Figure 11: Land and Soil Capability Classes (eSPADE (DPIE))



Field inspection of the subject site and surrounding locality indicates that the land upon which the quarry footprint is located would be better classified as having land capability of 4 to 5, as a result of shallow infertile soils and very poor water holding capabilities within the quarry site.

5.4.2 Management Issues and Constraints

The required final land capability of the site following rehabilitation is influenced by both the original land capability of the site and the intended land use following quarry closure.

The original land capability of land surrounding the quarry footprint is mapped by DPIE as Class 4, yet is more accurately described as 5 due to the high drainage and shallow soils of the site. It is therefore considered that the site should be rehabilitated to a Land Capability Class of 5. The Rehabilitation Plan for the site (refer section 2.10 and Appendix H) aims to restore the landscape to a standard such that the site is suitable to return to limited agricultural use in line with this land capability class.

Factors which may affect returning the final landform to the desired land capability include:

- The reduced elevation of the final landform;
- Slope and associated erosive potential of the rehabilitated final landform;
- Ensuring safe and adequate drainage of the rehabilitated final landform.

5.4.3 Mitigation Measures

The rehabilitation objective of the proposed development is to return the existing quarry site to a land capability class of 5 such that the site is suitable for limited agricultural use .

Appendix H includes a rehabilitation plan with detail on the final landform based on the proposed final slopes and vegetation.

The following design features of the final landform are recommended to achieve the desired land capability objectives:

- The final batters of the extraction area would be safe, stable, non-eroding and non-polluting;
- Drainage of the final landform would be established at stable grade and to a defined location (i.e. storage) to prevent rilling and erosion caused by uncontrollable flow of surface water.

The proposed soil stripping, stockpiling and respreading measures and controls would also assist in maintaining the value of the soil for rehabilitation purposes and therefore maximise land capability. Soil replacement is planned:

- In the reverse order to stripping (i.e. subsoil replace first followed by topsoil last);
- To be applied with an alkaline (not acidifying) fertiliser to assist with any nitrogen or potassium deficiencies in the existing overburden.

The proposed management controls to be implemented would help the final landform to be established and allow for potential for future agricultural use while minimising erosion, pollution potential.

5.4.4 Assessment of Impacts

The implementation of the proposed soil management and rehabilitation methods are likely to result in a LSC Class 6 (or better) within the footprint of the existing quarry after rehabilitation is completed.

5.5 Land Use Conflict Risk Assessment

A Land Use Conflict Risk Assessment (LUCRA) (Appendix D) was undertaken to identify potential land use conflicts introduced by the proposed development.

The LUCRA is based on the "Living and Working in Rural Areas" Handbook (Learmonth et al. 2007). The NSW Department of Primary Industries and Regional Development has developed a guide based on this Handbook, which suggests four key steps be undertaken:

1. **Information Gathering** - The project details including site geophysical characteristics, the nature of the development proposed and the surrounding land uses are described;
2. **Risk Level Evaluation** - Each proposed activity is recorded, and the potential land use conflict level is assessed and assigned a risk level;
3. **Identification of Risk Mitigation Strategies** - Management strategies are identified for project activities to lower the risk of potential conflict. The higher the risk level, the more mitigation will be required;
4. **Record Results** - Key Issues, risk levels and recommended management strategies are recorded and summarised.

The LUCRA identifies mitigation measures for identified credible land use conflict risks as a result of the quarry activities on site.

5.5.1 Surrounding Land Uses

The area to the north, east and west of the quarry site is dominated by agricultural enterprises including grazing and limited/occasional cropping. Land to the south is dominated by woodland and the village of Gum Flat. Farm size is limited. Many of the adjoining farms run small enterprises assisted by off-farm incomes.

The adjoining property at 401 Eddy Park Lane has a quarry. The use of this quarry is intermittent and may not continue use. The resource available at this quarry is the same weathered granite.

The Village of Gum Flat is located approximately 675m to the southwest of the quarry and is located on Copeton Dam Road. The Village supports residential development, the Gum Flat Public School, a town hall and a sporting oval.

5.5.2 Sensitive Receptors

Sensitive receptors in the area include rural residences on surrounding agricultural properties, residences in the village of Gum Flat and the Gum Flat Primary School. The distances of each receptor from the quarry, as calculated from the closest edge of the quarry footprint, have been included in Table 9. The locations of sensitive receptors within a 1km radius of the quarry are mapped in Figure 12.

The closest township, Inverell, is located 10 km to the east and is not impacted by the quarry operation.

Figure 12: Nearby Sensitive Receptors

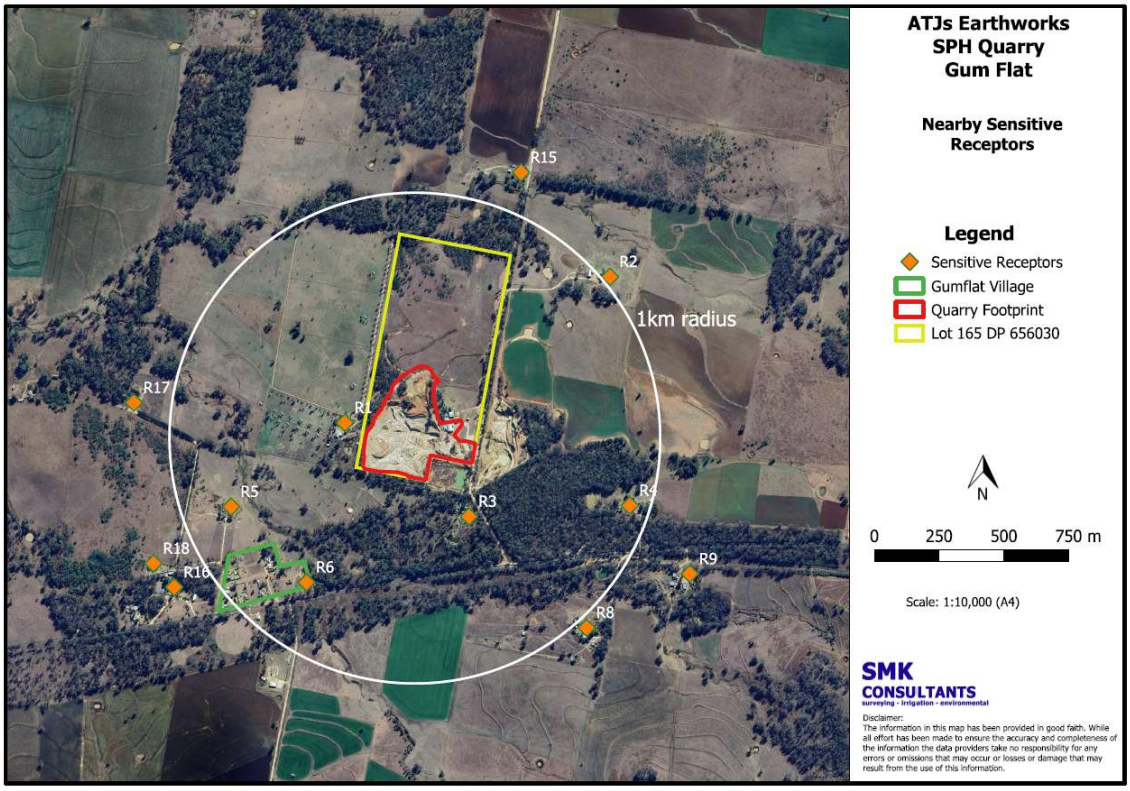


Table 9: Residences within 1 km of the Site

Closest Residences to ATJs Earthworks - SPH Quarry			
Receptor	**Address**	**Direction**	**Distance (m)**
R1	384 Eddy Park Lane, Gum Flat NSW 2360	West	80
R2	401 Eddy Park Lane, Gum Flat NSW 2360	North east	800
R3	492 Eddy Park Lane, Gum Flat NSW 2360	South east	220
R4	788 Copeton Dam Rd, Gum Flat NSW 2360	East	650
R5	18 Houghs Lane, Gum Flat NSW 2360	South west	570
R6	Gum Flat village (from closest residence)	South west	500
R8	793 Copeton Dam Road, Gum Flat NSW 2360	South east	800
R9	767 Copeton Dam Road, Gum Flat NSW 2360	South east	960
R15	356 Eddy Park Lane, Gum Flat NSW 2360	North	840
R16	Gum Flat primary School	South west	800
R17	114 Houghs Lane, Gum Flat NSW 2360	West	900
R18	35 Houghs Lane, Gum Flat NSW 2360	South west	900

5.5.1 Potential Impacts

The potential for land use conflicts as a result of the proposed development are identified in the LUCRA (Appendix D), and include reduced air quality (primarily dust generation), noise,

heavy vehicle traffic, potential groundwater impacts, offsite water discharge impacts and operating hours.

5.5.2 Management and Mitigation Measures

The recommended minimum buffer distances from sensitive receptors to extractive industries including quarries to limit potential adverse impacts are listed in Table 10. The actual likely adverse impacts on residences from an extractive industry will vary from site to site, depending on the nature and scale of activities undertaken at each site.

Table 10: Recommended Minimum Buffer Distances

Mining, Petroleum Production & Extractive Industries		
	Normal Operations (m)	**Blasting (m)**
Residential areas & urban development	500	1000
Rural dwellings	500	1000
Education facilities & pre-schools	500	1000
Rural tourist accommodation	500	1000
Watercourses & wetlands	SSD	SSD
Bores & wells	SSD	SSD
Potable water supply/catchment	SSD	SSD
Property boundary	SSD	SSD
Roads (public)	SSD	SSD

SSD: Site Specific Determination. Source: Department of Primary Industries (2007) Living and Working in Rural Areas Handbook

For the ATJs Gum Flat quarry, the minimum buffer distances for normal operations generally apply to nearby sensitive receptors. The quarry generally meets these buffer distances, with the exception of two residences located within the recommended minimum buffer distance. The closest residence (R1) is located approximately 80 m to the west of the top of the embankment surrounding the quarry site, while the other (R3) is located approximately 200 m from the south eastern edge of the quarry.

Air quality and noise impact assessments were carried out to determine the potential adverse impacts of the proposal on identified sensitive receptors. Air quality and noise impacts are considered in Sections 5.7 and Section 5.8 respectively. Additional noise assessment calculations are attached in Appendix C. The assessments identify a range of mitigation measures to minimise potential adverse impacts resulting from quarry operations.

The following existing management and mitigation measures will continue to be implemented throughout the project life in order to avoid and minimise impacts on surrounding land uses:

- The development as proposed would not divert any surface water runoff away from existing agricultural enterprises;
- Operations would be undertaken in a manner which minimises noise and dust emissions;
- Standard operating hours would continue;
- No blasting to occur;
- All machinery operating within the quarry to be fitted with appropriate mufflers to minimise noise emissions in accordance with manufacturers standards;
- Reversing alarms/beepers to consist of white sound emissions only (Squawker type alarms) to reduce the noise emissions when vehicles and plant a reversing within the quarry.

An OEMP will include mitigation measure to minimise the potential for impacts associated with quarry operations. This will form part of site induction procedures for employees who will need to adopt these mitigation measures during operations within the quarry.

The quarry has been operating for a period of 50-years. Its operations have become part of the landscape and therefore development in the surrounds since 1975, has been exposed to quarry noise from this site. When the quarry first commenced operations, no approvals were required. Quarrying has continued up until now without approval on the basis of an existing operation. However, the intentions of this application and site investigation includes ensuring that appropriate measures are adopted to allow the site to continue operations and meet relevant and current impact thresholds.

5.5.3 Assessment of Impacts

The development is considered permissible within the current zoning. It is noted that the development is an existing development, and that the Applicant has not received any direct complaints relating to quarry operations in the last 12 months. Complaints have been received by Council and more recently, NSW EPA.

The proposal does not comply with recommended minimum separation distances for two sensitive receptors; however, additional detailed assessments have shown that, providing the relevant proposed mitigation and management measures are implemented, the development will not introduce any new impacts to such an extent as to unacceptably reduce the amenity of rural residents.

Therefore, the proposed development is not considered to pose a significant risk of causing land use conflict within the locality.

5.6 Visual Amenity

5.6.1 Potential Impacts

Visible structures associated with ATJs Earthworks - SPH Quarry are primarily the overburden embankment surrounding most of the quarry site and the workshop.

The embankment has been constructed to provide a visual and sound barrier to residents on the property to the west. The property to the south has not raised issues of concern; however the quarry and related infrastructure is less visible from this southern property. The quarry has a low visibility from surrounding public roads, other than the workshop. The workshop is considered similar to other similar workshops in the area and is typical of standard farm infrastructure.

The larger embankment along the western boundary of the quarry site provides a barrier between the quarry site and an adjoining residence. This western embankment is approximately 5 m high and has batters of approximately 1V:3H. It is shielded by woodland in many areas and is becoming vegetated over time. The embankment has been built up to this height over time to provide a barrier between the quarry and the residence at 384 Eddy Park Lane. The barrier provides a visual block between the residence and the quarry operation. It also provides a sound barrier to deflect noise from the quarry from impacting the residence.

This residence was constructed between 2010 and 2013. The current residence eastern view is blocked by the bank. This blockage is undertaken on purpose to limit the visual impact of the quarry on this residence which was built some 35-years after the quarry commenced operations. The bank also limits the view of the workshop area. The potential visible impact that this residence could be exposed to is limited by the bank and retained woodland area around the south, west and northern sectors of the quarry.

The residence referred to as R3 has an area of woodland between the quarry boundary and the residence. Very limited views of the quarry are available from this receptor.

Only the quarry entrance is visible from Eddy Park Lane at the quarry is below ground.

5.6.2 Management and Mitigation Measures

The following measures are recommended to maintain the visual amenity of the development:

- Retention and protection of vegetation located between the overburden bank surrounding the quarry extraction zone, neighbouring sensitive receptors and Eddy Park Lane.

- Progressive rehabilitation and revegetation of the embankment and the quarry pit with appropriate species until project completion;
- Maintaining existing earth bank along western boundary to block the view of the adjoining residence toward the quarry site.

5.6.3 Assessment of Impacts

It is considered that no unreasonable adverse visual impacts have occurred or will occur as a result of the existing quarry. The adoption of recommended mitigation measures will ensure that existing visual impacts:

a) Are reduced over time as revegetation establishes around the quarry excavation;
b) Are not exacerbated by works above ground;
c) Will be eliminated following project completion through the implementation of full rehabilitation measures.

5.7 Air Quality

The quarry involves extraction of weathered granite. This is a relatively dust free quarry material as the fines content is extremely low. The gravel is extracted and removed from the site in its raw condition. No crushing or processing is required onsite. No dust is generated from the winning of the gravel material in its raw form.

The project does not involve any construction activities as infrastructure on the site is fully developed and operational.

Activity on this site is limited to winning and loading of the gravel and servicing of plant and equipment.

5.7.1 Potential Impacts

An assessment of the likely air quality impacts of the development has identified that potential impacts are limited to:

- Operation of front end loader, dozer or excavator within the extraction area;
- Wind erosion from stockpiled quarry materials; and
- Dust generated from haul truck movements along short unpaved internal roads.

NSW EPA sets out impact assessment criteria for ground level concentration of air pollutants in *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW, 2022*. The four pollutant types assessed in the ATJs Earthworks - SPH Quarry AQIA are shown in Table 11.

Table 11: NSW EPA Impact Assessment Criteria

Pollutant	Description	NSW EPA Criteria	Units	Averaging Time
TSP	Total suspended particulates	90	µg/m3	Annual
PM_{10}	Particulate materials with an aerodynamic diameter less than 10 µm	50	µg/m3	24 hours
		25	µg/m3	Annual
$PM_{2.5}$	Particulate materials with an aerodynamic diameter less than 2.5 µm	25	µg/m3	24 hours
		8	µg/m3	Annual
Deposited Dust	Dust is assessed as insoluble solids as defined by AS 380.10.1	2[1]	g/m^2/month	Annual
		4[2]		

[1] Maximum increase in deposited dust level

[2] Maximum total deposited dust level

Limited dust is generated from the winning of quarry material. Observation of loading activity under normal condition within the quarry indicated that minimal dust is generated from this process. Loading is done in a manor to retain the fines in the product. Without the fines, the product quality deteriorates.

The only significant potential source of dust is road dust. Internal roads are constructed of the weathered granite. Over time, some fines can be generated from the trucks as they roll this gravel and create surface fines. The internal roads can be repaved on a regular basis to cover this finer granite material to reduce dust generation from the trucks.

According to traffic forecasts, truck movements would involve between 3 and 12 truck movements per day. This will be variable as a result of delivery requirements for the gravel.

Based on predictions and no active management, the wheel dust generated from these trucks would have potential emission rates* of:

- 0.378 grams per second of Total suspended particles (TSP);
- 0.102 grams per second of PM10 dust particles; and
- 0.015 grams per second of PM2.5 dust particles.

*Source: Mining EET v3.1 page 16 equation for wheel dust from unpaved roads at industrial site (DSEWPC 2012)

5.7.2 Wind Patterns for Dust Dispersion

Wind roses have been prepared from weather information recorded at the Inverell Research Station. These provides 9am and 3pm average wind roses for the recorded data.

The 9am wind rose indicates winds dominated by northerlies, north eastern winds, east wind, southeast winds and south wind directions. These would potentially carry any emissions from the quarry site toward receptors to the south and west. There are no residences to the immediate south. The residence referred to as R1 to the west would be subject to any dust emissions during easterly winds.

The 3pm wind rose indicates that the afternoon wind pattern is generally reversed and dominated by westerly and southwestern winds. Receptor 2 located 800m northeast of the site receive dust during southwest and western wind directions.

There is a potential for road dust to be managed using available resources within the quarry site. The quarry maintains a collection area for internal runoff. This can supply water for a road watering program to eliminate vehicle dust. The following mitigation measures provide a management proposal to avoid dust emissions from the quarry operations.

5.7.3 Other Dust Sources

Development in the surrounding area includes cultivation and cropping. Activities such as cultivation generate dust. This generally occurs when cultivation is occurring but also during dry conditions where there is limited ground cover.

Eddy Park Lane is a gravel paved road. Use of this road creates dust. Houses along this road are subject to dust contamination on a regular basis as a result of normal vehicle movements along the Lane. Receptor 15 is a residence located adjacent to the Lane and therefore on occasions, is highly exposed to road dust.

5.7.4 Potential Dust Impacts

Dust impacts from this quarry can be confined to road dust that is potentially generated from the movement of trucks in and out of the quarry site. Haul routes within the quarry are controlled. During a haulage contract, the same gravel from the same stockpile is being moved. On this basis, if road dust is generated, this haul route can be watered and dust can be controlled. This is a relatively simple process where trucks follow the same route during haulage campaigns.

On this basis, detailed modelling was not undertaken as there is a single source of dust from this site.

5.7.5 Management and Mitigation Measures

Implementation of the following management measures to reduce any potential particulate impacts that may occur from haulage operations at ATJs Earthworks - SPH Quarry:

- Conduct all activities on the premises in a manner that will minimise the emission of dust;
- Apply water sprays (greater than 2L/m^2/h) to trafficable areas during haulage to eliminate air emissions associated with truck movements;

It is also recommended to implement a suite of dust control measures on site to limit particulate matter emissions as part of best practice management methods onsite. Table 12 outlines sources of dust from the quarry, and associated management measures.

Table 12: Dust Mitigation Measures to be Adopted at ATJs Earthworks - SPH Quarry

Potential Impact Site	Methods to Control Air Pollution
Roads	• Covered loads when transporting and watering of haul roads. • Grading of roads. • Well-defined haul routes to minimise areas of disturbance. • Speed limits (recommended 15km/h).
Wind Erosion of Exposed Materials and Stockpiles	• Minimising areas of disturbance. • Progressive rehabilitation.
Crushing, Screening and Handling	• Ensure dust covers in place. • Ensure water sprays are activated for dust management.
Loading and Handling Materials	• Keep front-end loader bucket low when handling and transporting materials.
Monitoring and Proactive Management	• Monitor meteorological conditions. • Cease activity on dry windy days. • In the event of increased dust production, increased dust suppression management measures, including by increasing watering rates, decreasing processing rates, slowing truck speeds; • Initiate Shut down procedures during periods of excessive dust generation or upon receipt of complaint and investigate and initiate additional controls.

The proposed OEMP for this site intends to include monitoring of dust emissions to quantify background dust levels and whether the quarry operation is contributing to this dust. The proposal will involve establishment of dust deposition gauges to measure total suspended dust levels. This will involve monthly sampling of dust collected in dust deposition gauges. The sampled dust will be analysed to mainly determine the total monthly insoluble dust levels. This will provide detail as per table 12 above for TSP. The duration of this dust monitoring will be subject to results. The minimum period of dust monitoring to be proposed will be 12-months.

5.8 Odour

The activities on this site involve quarrying raw gravel. The gravel is raw and not contaminated by organic matter. Nothing is mixed with the gravel material.

No sources of odour are present.

5.9 Noise and Vibration

General activity in the area surrounding the SPH Quarry is limited to normal agricultural activities, which include occasional heavy vehicle movements, cultivation and harvesting. Most of the land in the surrounding area is used for grazing. These activities produce very little noise. There are no other noise-generating activities in the area other than traffic noise from Copeton Dam Road.

The adjoining quarry is inactive and therefore not considered a noise generating activity.

The noise generating quarry activities for SPH Quarry are proposed between 7:00 am – 5:00 pm Monday to Friday, which falls within the daytime period specified in the Noise Policy for Industry (NSW, 2017).

The main noise generating activities within the quarry site are:

- Machinery operation, including excavating and loading undertaken in the pit area below natural surface level (front end loader, excavator or dozer) and loading by a front end loader;
- Heavy vehicle movements, including engine noise – loaded and unloaded to and from the quarry pit along the haul road the quarry entry on Eddy Park lane;
- Reverse warning devices

All of the above noises are considered as intermittent.

Local traffic noise is also generated by movement of heavy vehicles. Potential traffic routes utilise Eddy Park Lane to the east and Copeton Dam Road to the south. The proposed heavy vehicle route along Eddy Park Lane and then onto Copeton Dam Road passes one residence (R3, Figure 12) which fronts Eddy Park Lane.

Noise associated with quarrying falls under the Work Health and Safety (Mines and Petroleum Sites) Act 2013 No 54 and Work Health and Safety (Mines and Petroleum Sites) Regulation 2022. Management generally includes necessary hearing protection and conducting inductions and education for all site personnel.

Blasting and rock breaking are not required to win material and are not conducted at the quarry and are not part of the proposed development. Consequently vibration is also considered to be minimal or negligible. Noise levels emitted from this type of quarrying are generally less in comparison to most other extractive industries.

5.9.1 Noise Assessment

An assessment of all potential acoustic and vibration impacts on nearby sensitive receivers has been made in accordance with several guidelines including the NSW Noise Policy for Industry (2017) and the NSW Road Noise Policy (2011).

Three identified sensitive receptors have been considered when assessing operational impacts. The nearest of these, Receptor 1 (R1), is located approximately 85 m west of quarry boundary (Figure 12). Receptor 2 is located on Eddy Park Lane and is considered in the assessment of off-site transport noise impacts. The Gum Flat Primary School is also assessed for potential noise impacts upon the Gum Flat village, located approximately 500 m south west of the quarry site.

The NSW Noise Policy for Industry 2017 (NPI) presents a methodology for determining Project Noise Trigger Levels (PNTL) for industrial development. Ambient and background noise measurements are used to determine PNTL relevant to the proposed development. Table 13 provides the NPI minimum Rating Background Noise Levels (RBL) for each period of the day. The area is a quiet rural area with no other continuous noise sources and therefore these minimums have been adopted for the quarry assessment.

Table 13: Rating Background Noise Levels

Period	RBL dB(A)
Day	35
Evening	30
Night	30

Note: Day is defined as the period from 7am to 6pm (Monday to Saturday) and 8am to 6pm (Sundays and public holidays). Evening is defined as the period from 6pm to 10pm. Night is defined as the period from 10pm to 7am (Monday to Saturday), and 10pm to 8am (Sundays and public holidays).

The typical noise levels for equipment required for the proposed operations, presented in Table 14, have been obtained from:

- *AS 2436 – 2010, Guide to noise and vibration control on construction, demolition and maintenance sites.*
- *BS 5228-1, Code of practice for noise and vibration control on construction and open sites. Noise.*
- *DEFRA—Department for Environment Food and Rural Affairs (United Kingdom), Update of noise database for prediction of noise on construction and open sites-Phase 3: Noise measurement data for construction plant used on quarries, July 2006.*

Table 14: Typical Noise Levels of Construction Plant and Equipment

Plant Description	A-weighted sound power levels L_{wA} dB ref: 10^{-12} W		A-weighted sound pressure levels L_{pA} dB at 10m
	Typical Range	Typical (midpoint)	
Bulldozer	102-114	108	80
Excavator	97-117	107	79
Front end loader	110-115	113	85
Loader (wheeled)	99-111	105	77
Truck (>20 tonnes)	107	107	79
Truck (water cart)	106-108	107	79

The magnitude of off-site noise impacts associated with quarry operation will be dependent upon several factors including:

- The intensity and location of activities
- The type of equipment used
- Existing local noise sources
- Intervening terrain (landform and vegetation)
- The prevailing weather conditions

During any given period, the machinery items to be used at the site would operate at maximum sound power levels for only brief periods. At other times, the machinery may produce lower sound levels while carrying out activities not requiring full power. It is highly unlikely that all equipment would be operating at their maximum sound power levels at any one time. It is also not proposed that quarry excavation, loading and haulage occur outside of standard working hours. Accordingly, the predictions should be considered as conservative estimates.

Table 15 provides an analysis of both the intrusiveness and amenity noise levels for the purposes of establishing a PNTL for the proposed development. These levels are considered acceptable ambient noise levels that can be received by sensitive receptors while protecting environmental values, including health and well-being, outside a dwelling.

Table 15: Assessment of PNTL in adjacent receiving environment

Metric	Day dB(A)	Evening dB(A)	Night dB(A)
Rating Background Level	35	30	30
Project Intrusiveness Criteria	40	35	35
Recommended Amenity Level	50	45	40
Project Amenity Level	45	40	35
Project Trigger Noise Level	**40**	**35**	**35**

Noise impacts associated with the project were estimated using the distance attenuation relationship described in the following equation:

$$L_2 = L_1 - 20\text{Log}(d_1/d_2)$$

(source: Noise Guide for Local Government - epa.nsw.gov.au)

Where: d_1 = distance (m) between source and receiver
d_2 = distance (m) at which Sound Pressure (L_{pa}) measured
L_2 = sound pressure level at the distance d_1 from the source
L_1 = sound pressure level at distance d_2 from the source

Project Noise Trigger Levels (PNTL) were determined using ambient and background noise measurements from the site. PNTL were adopted based on the most stringent criteria and were conservatively set at 40 dB(A) (day); 40 dB(A) (evening); and 35 dB(A) night. Noise generation above these levels may potentially result in adverse noise impacts to nearby receptors.

The nearest residential receptor for potential noise impacts is located on the western boundary of the quarry and is identified as R1 (Figure 12), located 85 m west of the quarry boundary and typically 135 m from extractive operations. This is taken as the worst case for all surrounding residences. Apart from residences, the nearest sensitive land use is the Gum Flat Primary School, located in the village of Gum Flat, approximately 900 m south west of the quarry. Apart from other rural residences, there are no other sensitive land uses within the area.

The estimated noise received at residence R1 for a truck that reaches the top of the quarry at the workshop site for the brief period as it is leaving the quarry is calculated below. This relates to direct travel of noise and does not consider the noise mound between the quarry site and the receptor:

$$L_2 = 79 - 20 \log (402/10)$$
$$= 47 \text{ dB}$$

The presence of the noise mound on the western edge of the quarry would prevent any direct line of noise travel. The noise would be deflected and therefore reduced. Appendix C presents calculations to show the potential noise levels at R1 for noise generated within the quarry and noise generated at the workshop. The noise level adopted is for a truck at maximum noise emissions. This may occur on occasions but as the travel speed of trucks within the quarry is limited, the noise emissions from the trucks would be less.

The above calculations is considered a worst case event, but would last for only a brief period as the truck leaves the site.

This would occur during daytime hours and last for a period of less than 1 minute as the truck leaves the site. This does not allow for any deflection of noise from the sound barrier on the western side of the quarry which has been purposely built to deflect such direct travel of noise and therefore reduce the impact of noise emissions from the quarry when vehicles or machinery is working above ground level.

Estimated noise levels with consideration of all local conditions and attenuating factors are considered in the following section.

Potential receptors along Eddy Park Lane and Copeton Dam Road are considered for the assessment of off-site transport noise impacts.

5.9.2 Potential Impacts

5.9.2.1 Operational Noise

Noise level calculations for nearby receptors were conducted using the Sound Propagation level Calculator (*https://noisetools.net/barriercalculator*), based on ISO9613-2:2024. Assumptions for noise calculations are:

- The quarry pit is 10 m below natural surface;
- The estimated noise source has a sound power level of 105 dB
- The noise source is 50 m from the quarry boundary (worst case for propagation over the boundary embankment);
- The embankment around the quarry (West side) is 5 m above natural surface
- Noise source and receiver are both 1.5 m above ground;
- Receptor R1 is 85 m from the top of the gravel berm and 3m lower in elevation than natural surface at the quarry boundary (based on LIDAR survey);
- Gum Flat Primary School is 900 m from the top of the gravel berm and 15 m lower in elevation than natural surface at the quarry boundary (based on LIDAR survey).

Noise calculation results (Appendix C) predict the noise level of quarry operations upon Receptor R1 to be 37 dB for operations within the quarry pit during daytime hours (7am to 5pm). This result is 3 dB below the PNTL and it can be expected that no adverse impacts will be incurred by all nearby residences for proposed quarrying operations during working day hours from 7 am to 5 pm. This result is also just above the PNTL for evening and night periods; however, detectable noise can be expected if excavating, loading and haulage activities are conducted outside of these working day hours.

The estimated noise level received at the Gum Flat Primary School from quarry pit operations is 22 dB, which is well below the background noise level for the area and the management level for classrooms. This would be significantly below noise emissions from vehicles travelling along Copeton Dam Road.

Residual noise impacts are defined as the best achievable noise level from a development when the development noise emissions still exceed the PNTL following the implementation of noise mitigation measures. The NPI notes that the PNTL should not be considered a mandatory threshold, but rather a planning tool. The NPI also notes that the above approach is intended for new or substantially modified developments and should only be applied with caution to existing developments. As the proposed development is existing, the estimated noise impacts shown above are for indicative purposes only.

There are limited feasible and reasonable noise mitigation measures that could be adopted, in addition to those already implemented, that would result in lowering the emitted operational noise of the quarry.

5.9.2.2 Road Traffic Noise

Noise levels generated by traffic associated with quarry activities were assessed against relevant criteria determined in accordance with the NSW EPA's Road Noise Policy (RNP). The assessment focused on traffic impacts experienced by potential sensitive receptors along Eddy Park Lane and Copeton Dam Road, considered as local roads. The assessment criteria are set out in Table 16.

Table 16: Road Traffic Noise Assessment Criteria

Day (7am-10pm)	Night (10pm-7am)
$L_{Aeq,(15\ hour)}$ 55 dB(A) (external)	$L_{Aeq,\ (9hour)}$ 50 dB(A) (external)

The traffic movement from the haulage directly affects Residence R3, which is the closest sensitive receptor to the transport route from the quarry. Vehicles travelling along Eddy Park Road would generate noise for a period of 20 to 30-seconds only. Once past the residence, the noise would return to normal background levels. As residence R3 is a farm, background noise would potentially include farm equipment which would generate similar noise to a passing truck.

As there would be no continuous noise from quarry related traffic, the $L_{Aeq,(15\ hour)}$ criteria of 55 dB(A) would not be exceeded.

5.9.3 Management and Mitigation Measures

5.9.3.1 Operational Noise

The existing gravel berm surrounding the quarry pit acts as a barrier that effectively mitigates noise levels at nearby receptors from operations in the quarry pit. This will be maintained through the operational life of the quarry to ensure that the amenity of nearby receptors, in particular R1, is minimised.

Machinery and heavy vehicles form the major sources of noise from the quarry operation. Regular maintenance of all machinery is conducted to ensure good operating order. Periodic replacement of machinery to lower noise generating models is also practised. These practises form part of SPH Quarry's operational plan.

Noise from the standard reversing 'beepers', or pulsed tonal alarm, can lead to considerable annoyance in the surrounding community, even if noise levels are below PTNL thresholds. Reversing beepers on all quarry machinery and vehicles have been replaced with beepers that conform with the recommendations of "Review of alternatives to 'beeper' alarms for construction equipment" (NSW DECC 2009).

Noise levels at nearby receptors are predicted to be below the PTNL levels for the proposed daytime operating hours of the quarry. The quarry only operates during daytime periods and therefore noise emissions are considered compliant. To ensure that this continues, noise generating quarry operations such as heavy vehicle movements, gravel extraction and loading, will remain limited to daytime periods only (i.e. 7 am to 5 pm).

5.9.3.2 Road Traffic Noise Planning

Two primary haul routes are used by the quarry. The include Eddy Park Lane for deliveries of gravel to the north and west of the quarry and Copeton Dam Road for deliveries into Inverell or toward Copeton Dam. For approval purposes, the quarry operation will develop a traffic management plan as part of the OEMP. The traffic management plan will need to include as a minimum, the following parameters:

- Consultation with residents adjacent to haul routes;
- Vehicles to remain within or less than sign posted speed limits;
- A schedule to maintain and operate vehicles in accordance with manufacturer's standards for exhaust emissions;
- A haulage schedule to maximise periods of respite for residences adjoining the haul route;
- A monitoring plan to ensure plan adherence and a complaints-handling procedure.

Where possible, use larger vehicles to minimise the number of haulage trips as far as practicable.

5.9.4 Assessment of Impacts

5.9.4.1 Operational Noise

The assessment included noise calculations which indicate that offsite noise levels generated by the proposed operations are likely to be below the PTNL at all receivers, during proposed operation times, provided the existing mitigation measures remain implemented. An Operational Environmental Management Plan to be prepared for the quarry will include a community consultation procedure and a complaints procedure to enable a mechanism for noise issues to be raised and addressed if they should occur.

5.9.4.2 Road Traffic Noise

Road traffic noise will occur along Eddy Park Lane and Copeton Dam Road which are the main haul routes to and from the quarry. Road noise will be intermittent as the quarry will not generate any continuous traffic flow of trucks. This is considered acceptable in relation to traffic noise emission criteria.

At peak times, truck traffic will involve potentially three trucks per hour. Receptors along these routes are exposed to other local traffic which includes trucks and light vehicles. The quarry trucks have been operating for a period of up to 50-years and therefore should be considered as part of normal daily traffic. The quarry proposal does not involve any specific changes to this normal traffic.

5.9.4.3 Cumulative Impacts

A second quarry adjoins the eastern side of Eddy Park Lane. This quarry has historically supplied a similar gravel to the local area. This second quarry appears to be closed and does not appear to be operating as a commercial enterprise. This second quarry is also a below ground quarry and therefore operational noise is contained within the floor of the quarry. Noise emissions from this quarry would be similar to the ATJ Earthworks quarry in that noise emissions would be limited to periods when trucks or machinery are entering or leaving the quarry.

This intermittent noise would relate to traffic noise along both Eddy Park Lane and Copeton Dam Road. As no changes are occurring with the ATJ Earthworks quarry traffic movements, the risk of cumulative impacts from traffic noise increases are not present.

5.10 Surface Water

ATJs Earthworks - SPH Quarry is located within the Gwydir River Catchment. The subject site is not located on, or near, flood prone land. Gum Flat Creek is approximately 350m from the boundary of ATJs Earthworks - Gum Flat Quarry at its closest point.

Figure 13 shows the location of Gum Flat Quarry within the Gwydir Catchment area and Figure 14 shows the surface water network in the vicinity of Gum Flat Quarry.

Figure 13: Location of ATJs Earthworks - SPH Quarry Within the Gwydir Catchment

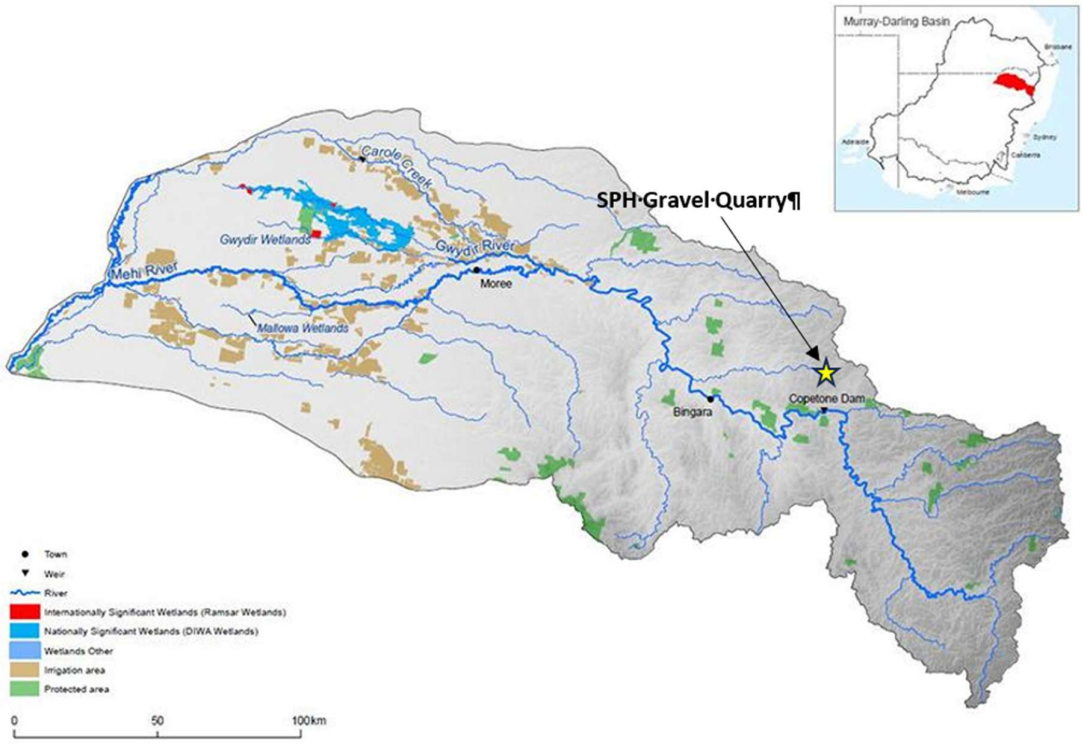
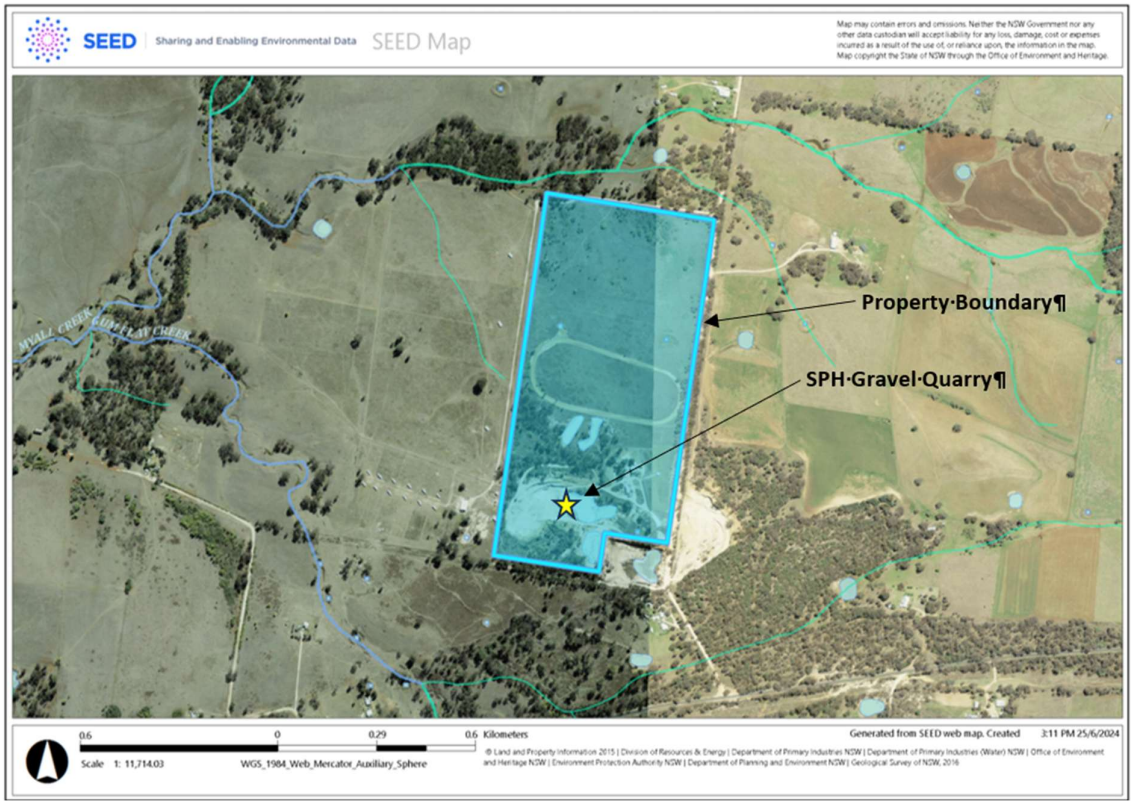


Figure 14: Surface Waters near ATJs Earthworks - Gum Flat Quarry from Hydro line spatial data



The below ground section of the quarry has no direct impact on local watercourses as it does not block or impede a marked watercourse. The area around the Workshop drains in a northwest direction. The above aerial image shows the location of local drainage lines. A drainage line commences to the northwest of the quarry area and runs across the adjoining property. The workshop area is in the upper catchment of this minor gully. This gully is now altered by contour bank although the contour banks appear to be breached.

Drainage from the workshop area is currently directed around the eastern side of the quarry and does not flow into the quarry. Surface runoff from the workshop area is dissipated across an open paddock to the immediate north of the quarry by a system of contour banks. This runoff may on occasion carry sediment generated from activities associated with the quarry site, such as truck movement or temporary storage of gravel near the workshop.

As part of the proposed development, this above ground area will be subject to controlled drainage and capture in a sediment holding pond. The following section provides design details.

5.10.1 Runoff Management

The site plan presented in Appendix A presents the current location of one internal pond within the quarry floor. Water accumulated in this pond can remain in the quarry or it can be pumped out of the quarry. The intent is that the pond location will be gradually changed so that only one or two ponded areas are present within the quarry floor. This will occur as the quarry extraction points change over time.

It is noted that the quarry floor is porous and there is no contamination from trucks or other equipment in the quarry. No refuelling occurs and if an incident such as a hydraulic line failure on a front-end loader, the spill is cleaned up. This ensures that the water accumulated in the pond floor does not become contaminated which would make it necessary to fully contain this water and remove it from the quarry for external disposal.

Water accumulated in these ponds can seep through the pond floor as the pond floors are not compacted and sealed off. The quarry floor has proven to be porous and is considered a recharge source for groundwater aquifers below this site. This water can continue to drain through the floor of the quarry and refill local aquifers. The local area is considered a recharge zone for local aquifers due to the presence of the rock outcrops and porous nature of the weathered granite which is common to the local region.

The option of pumping this water out of the quarry is available. The site plan presented in appendix A includes an area of the property which is marked out for potential irrigation. This covers an area of approximately 2 hectares to be established for spray irrigation and cropping. When the volume of water accumulated within the ponds inside the quarry starts to impact the quarry operation, this water will be pumped to a turkey nest dam to be located adjacent to a proposed sediment holding pond that captures runoff from the workshop catchment area. The water would then be pumped through a portable spray irrigation system onto the adjoining irrigation area and used for crop production. Use of the spray irrigation would avoid runoff and therefore minimise the requirement for capture of water from the irrigation area. The water pumped to this turkey nest dam would have settled in the pond in the pit and settled again in the turkey nest storage. Silt concentration in this water to be used for irrigation would therefore be minimal.

Section 5.10.2 presents a water balance for an internal holding pond. However, the storage of internal water relates to ensuring that there is access to the quarry material during wet periods and that the quarry material can be stockpiled or won from drier areas. Wet or saturated gravel has no value.

5.10.2 Stormwater Holding Pond

Stormwater runoff from within the quarry will contain sediment and is contained within the quarry via internal drainage into a stormwater holding pond. The stormwater holding pond allows for settling out of suspended solids after each runoff event. The pond should be capable of storing runoff from both a major storm event and an extended wet period so that pond overtopping events are limited to an acceptable frequency.

Two criteria have been used to determine the minimum volume of the stormwater holding pond:

Criteria 1: 1 in 20 year, 24-hour Design Storm event

Quarry Drainage Area	= 7,100m^2
Stormwater holding pond	= 3,600 m^2
Net Area	= 10,700 m^2

Runoff volume estimation is given by:

$V = ACi$

Where V = Volume (m^3)
A = Total Footprint (quarry + holding pond area) (m^2)
C = Run-off coefficient for drainage area
i = 1 in 20-year rainfall over 24-hour period (mm/hr)

A = 10,800 m^2
C = 0.60
i = 112 mm over 24 hours

V = 10,800 x 0.60 x 0.112
= 726 m^3
= 0.73 ML

Criteria 2: Annual water balance based on a 90th percentile rainfall year

This is required for a holding pond where wastewater is contained on site over an extended wet period. For this site, ATJ Earthworks are proposing to remove some of this internal water and use it for irrigation. The proposal involves construction of a turkey nest dam on Lot 106 DP656030 to store water pumped from within the quarry area and use this water for spray irrigation of pasture. This may provide an option for hay production or cattle grazing.

The proposed above ground storage will consist of a turkey nest type dam. This will ensure that it cannot capture general runoff such as a harvestable right dam.

Spray irrigation will be used to allow controlled water application. The application rate will be designed to minimise the risk of runoff. As the water will be settled both in the internal quarry settling area and the turkey nest, it is expected that the water used for irrigation will contain minimal silt. As there are no other sources of contamination within the quarry, no other contaminants such as elevated levels of nutrients or hydrocarbons are predicted to be contained in the irrigation water.

The irrigation area within the property will include contour drains which form sediment capture traps to minimise erosion, reduce drainage water velocity, maximise sediment settling and ensure no uncontrolled runoff.

An annual water balance requires an iterative calculation approach to determine the maximum effluent holding pond volume using monthly time-steps. The monthly runoff balance is the amount of runoff produced in that month that requires storage. A negative monthly balance indicates that the irrigation and evaporation rates are higher than the runoff for that month. The cumulative storage requirements consider the running balance of runoff already stored and the additional monthly inflow.

Monthly rainfall totals used for calculation of the 90-percentile wet year were taken from the BoM records for Inverell Site #056017 between the years of 1880 and 1996. Based on assessment of this rainfall data, 1903 is representative of a 90-percentile wet year. The evaporation rates were taken from published BoM data for Inverell. Other assumptions for the 90th percentile water balance were based on:

- Monthly rainfalls totals in the specific wet year;
- An assumed runoff coefficient for the quarry of 0.5;
- Rainfall falling in the pond was added to the total storage (runoff coefficient = 1);
- A seepage loss from the runoff holding pond (permeability of the in-situ quarry material) assumed to be 6.0 x 10^{-7}ms^{-1} (i.e. 50mm/day);

Runoff Holding Pond dimensions

The 90th percentile rainfall year generates a larger storage capacity than the 1 in 24-hour rainfall event, therefore the runoff holding pond requires a minimum capacity of 3.8 ML to contain runoff in a 90th percentile wet year. A pond of this volume will have a surface area of approximately 2,600 m^2 (65 x 40m), assuming a depth of 1.5m and 1:3 batters. The quarry should be managed to meet these requirements.

Irrigation of collected quarry runoff within the property

There is opportunity to irrigate storm water runoff from the quarry stormwater holding pond to a dedicated irrigation area within the property. The local climate records show that there is a rainfall deficit of 640mm in a 90th percentile wet year. The benefits of irrigating quarry wastewater are:

- The ability to maintain a safe storage capacity for future runoff (storm) events within the quarry stormwater holding pond;
- Reduced potential for any need for offsite discharges due to both one-off storm events and longer term wet periods;
- The establishment and maintenance of vegetation cover on soil conservation works (contour banks and drainage channels) to stabilise soil and minimise erosion.

The potential risks of this approach are minimal as:

- There are no contaminants in the collected water other than suspended solids from clay within the gravel. This is naturally occurring within all soils in the local area;
- An irrigation area is small scale (i.e. optimal area to maintain a water balance within the quarry is 2 ha);
- Any runoff from the dedicated irrigation area will be captured in existing contour banks and diverted to an existing harvestable right storage to which the property drains.

5.10.3 Workshop Catchment Management

As part of the required upgrades to this quarry operation, the catchment surrounding the workshop area is to be a controlled drainage area. This will involve capture of runoff from around the workshop and associated disturbed areas, and diversion of any clean upslope runoff around this catchment.

The creation of this controlled drainage area is recommended by NSW EPA. If NSW EPA issues an environment protection licence for this site, the bywash of the sediment pond created to settle the runoff from the workshop sediment pond will become a controlled and monitored discharge point.

Runoff captured in this sediment pond would be available for road watering and irrigation of the adjoining cropped area.

Catchment analysis for this pond is presented in appendix J. The storm event for this site generates a smaller pond size than a 90-percentile rainfall year. The calculations provided in appendix J for this sediment pond indicates a pond size of 0.4 megalitres. This allows for use of the water for irrigation as well as watering of roads. The calculation utilises an area of 2 Ha of irrigation which is also used for the holding pond within the quarry. However, as indicated

above, the water captured in the quarry can remain in the quarry and be utilised for road watering from inside the quarry if required. The sediment pond for the workshop area is above ground and would need to be kept with some capacity to capture storm events. Water captured in the workshop sediment pond would therefore have priority for use over any water captured within the quarry.

5.10.4 Potential Impacts

The quarry is internally drained so there is no risk of uncontrolled discharge to surface waters.

In the event of a wet period exceeding a 90th percentile wet year the quarry runoff holding pond may overflow to the quarry pit which would impact upon gravel extraction operations but pose no risk of overflow outside quarry extents.

Proposed development on the site is to include a controlled drainage area around the Workshop. This area is used for mechanical activities, parking of equipment and storage of minor amounts of gravel material. The proposed controlled drainage area will direct runoff to a sediment holding pond which has been designed for a 90th-percentile rainfall year allowing for use of this water for irrigation of 2 Ha or use of this water for road watering.

The sediment pond will allow settlement of any silt that washes off the bare ground around the workshop. The water will be settled in the pond before being used for irrigation or if it remains turbid, it can be used for road watering inside the controlled drainage area or within the quarry area.

The proposed system will limit the potential for offsite pollution from this workshop area to only severe wet years in excess of a 90-percentile wet year. If a discharge occurs, a water sample would be taken and the volume of discharge water would be estimated for reporting purposes.

5.10.5 Management and Mitigation Measures

The adoption and continued implementation of the following mitigation measures will reduce any impacts on surrounding surface waters:

- Maintain internal quarry drains and diversion banks to safely direct runoff within the quarry;
- Establish the workshop controlled drainage area and sediment pond;
- Maintain current contour banks and drainage channels across the property's irrigation area to capture any runoff water, including vegetation to stabilise drains and slow water velocity;

- Ensure that the storage and use of hazardous and dangerous materials occurs in accordance with relevant legislation, and ensuring spillages are contained so that surface water will not be contaminated with such chemicals;
- Minimise gradients of access tracks and maintain table drains to reduce internal site erosion;
- Capture sediment in erosion prone areas by placing hay bales, silt fences or other suitable control devices in drainage lines;
- When storing fuels, chemicals and other potentially environmentally hazardous substances:
    - Chemicals and fuels in containers of greater than 25 litres must be stored within a secondary containment system;
    - All waste will be stored in a suitable receptacles and removed from site as required;
    - All hazardous chemicals, corrosive substances, toxic substances, gases, dangerous goods, flammable and combustible liquids must be stored and handled in accordance with the relevant legislative requirements and Australian Standards including but not limited to the provisions of:
        - AS 1692-2006 – Steel tanks for flammable and combustible liquids;
        - AS 3780:2008 – The storage and handling of corrosive substances;
        - AS 1940:2004 – The storage and handling of flammable and combustible liquid;
        - AS 3833:2007 – Storage and handling of mixed classes of dangerous goods in packaged and intermediate bulk containers.
    - Bunding will be constructed of material which is impervious to the material that is to be stored in the bunded area;
    - Bunds will be kept in good condition (no cracks, gaps, leaks);
    - Stormwater captured within bunding is to be removed as soon as practicable and appropriately disposed of as contaminated water;
    - Empty hydrocarbon and chemical containers are to be stored closed, in place on a concrete hardstand or within a bunded area;
    - A collection sump or valve must be provided in the floor of the bunding to facilitate the removal of liquids;
    - Where vehicle access to the bunded area is required, access must be by way of a rollover bund;
    - Develop site-specific procedures for storing hazardous materials including details on:
        - Quantities of hazardous materials will be kept to a minimum, commensurate with their usage and shelf life.
        - Safety Data Sheets of stored hazardous materials will be readily accessible at the place of storage.

- Permanent and temporary containers that hold hazardous materials will be labelled with the relevant safety and risk phrases.
- The volume and types of hazardous materials stored will be known, current and documented.
- Hazardous materials that may degrade in storage and thus become more dangerous will be identified and managed.
- Storage and containment areas (including secondary containment) will be inspected for signs of loss or damage and any deficiencies will be addressed.
- Hazardous materials no longer in use will be identified and assessed to determine if they should be removed from site.
- Dangerous goods will not be held in transport storage areas for longer than five consecutive working days. Where they are required to be stored for longer periods, they will be moved to permanent hazardous materials storage areas.

- When refuelling:
  - Temporary bunding, drip trays or impermeable matting must be used to prevent spillage from any in field refuelling or maintenance of plant and equipment, or any other activity that could result in spillage of a chemical, fuel or lubricant to soil;
  - Refuelling of plant and vehicles must be conducted in designated areas away from sensitive receptors and at least 100 m away from watercourses, water holes, lakes or wetlands. All in field refuelling must include the use of a temporary bund to contain any spills;
  - Refuelling will utilise auto shut off valves;
  - Maintain appropriate spill kits and PPE at designated locations on site (e.g. refuelling locations, chemical storage facilities, mobile equipment);
  - Ensure employees are familiar with, and trained in the use of, proper spill clean-up procedures.
- Dewatering of Stormwater:
  - All water impacted by quarrying activities is to be captured within the internal runoff holding pond;
  - Water collected within the runoff holding pond, will be monitored prior to discharge if a pumping discharge occurs;
  - Water quality monitoring will be undertaken to determine if water is fit for discharge or reuse on site for dust suppression.
- Erosion and Sediment Control:
  - Site Management
    - Land-disturbing activities must be undertaken in such a manner that all quarry stormwater is captured within the quarry.

- Prevent, or at least minimise, environmental harm resulting from work-related soil erosion and sediment runoff.
- Ensure that use of land/properties adjacent to the development are not diminished as a result of the adopted ESC measures.

- Site Access
  - Site exit points must be appropriately managed to minimise the risk of sediment being tracked onto public roadways.
- Drainage Control
  - Collect all runoff from working areas in sediment ponds, designed to contain and control water in a 1 in 10-year storm event, to be designed and installed in accordance with DECC (2008) *Managing Urban Stormwater - Soils and Construction (Volume 2E).*
  - Wherever reasonable and practicable, any stormwater runoff from external areas must be diverted around or through disturbed areas in a manner that minimises soil erosion.
  - Within the internal drainage area discharging to the sediment pond, silt traps and sediment control devices will be implemented to slow the velocity of the water, ensuring no unnecessary erosion occurs and that the sediment basin remains efficient in settling out sediment.
- Sediment Control
  - Where practical, sediment traps should be installed and operated across the site that collect and retain sediment.
  - Where sediment basins and other sediment control devices pose a safety risk to workers these areas should be isolated (fenced) from commonly accessible areas to maintain site safety.
  - All reasonable and practicable measures must be taken to prevent the release of sediment from the site.
  - Suitable all-weather maintenance access should be provided to all sediment control devices.
  - Sediment control devices must be de-silted and made fully operational as soon as reasonable and practicable after a sediment-producing event, whether natural or artificial, if the device's sediment retention capacity falls below 75% of its retention capacity.
- Site Maintenance
  - All erosion and sediment control measures, including drainage control measures, must be maintained in proper working order at all times.

5.10.6 Assessment of Impacts on Surface Water

The implementation of the appropriate mitigation measures in accordance with the above recommendations and best practice management techniques will result in the quarry

operation having little to no impact upon the quality and quantity of surface water resources and are considered adequate to avoid potential offsite contamination.

The actions proposed within the quarry are separate to the allowance for a harvestable rights dam on the property. This harvestable rights dam is a legal right available to all landowners across NSW. For Lot 106 with a property area of 38.5 Ha, the maximum harvestable right capacity dam that can be built onsite is 2.89 megalitres in size. The Proponent has built this dam on Lot 106 but this is not part of the development subject to this application. The impact of this harvestable rights dam is considered acceptable under NSW Water legislation. As this harvestable right water has few restrictions on use, it can be used as source of water for irrigation or road watering as a backup for runoff captured in the quarry or workshop sediment pond.

5.11 Groundwater

The quarry is located at the top of an isolated porous weathered granite formation. This formation is located within the Inverell Basalt Groundwater Management Area (Figure 15). The primary aquifer occurring in the site vicinity is the 'Inverell Basalt Groundwater Source'. This is predominantly a fractured rock aquifer (Figure 16) and is covered by the NSW Murray Darling Basin Fractured Rock Groundwater Sources Water Sharing Plan 2020.

The quarry is located on a formation which is elevated above surrounding area and is inherently porous. It is not known what sort of connection exists between the formation on which the quarry is located and the surrounding Inverell Basalt Groundwater Source; however it reasonable to assume that this formation is more likely to contribute to groundwater recharge in the area and any percolation across the site will be a net contribution to surrounding groundwater resources. The floor of the quarry is permeable.

Visual inspection of the quarry pit indicates no evidence of groundwater present in the quarry, nor any intersection of the quarry excavations with the water table or shallow aquifers. There is no evidence of seepage or springs in the walls of the quarry. Surrounding bore logs indicate that while groundwater table depth varies across the area, it is generally below the proposed maximum invert of the quarry (Table 18). It is therefore reasonable to assume that the existing quarry pit is not contributing to reduced water table levels in surround areas. The quarry material is very well drained, and it can be reasonably assumed that water captured in the quarry will be contributing to local recharge of aquifers beneath the site.

Figure 15: Groundwater Management Areas in the Gwydir Catchment

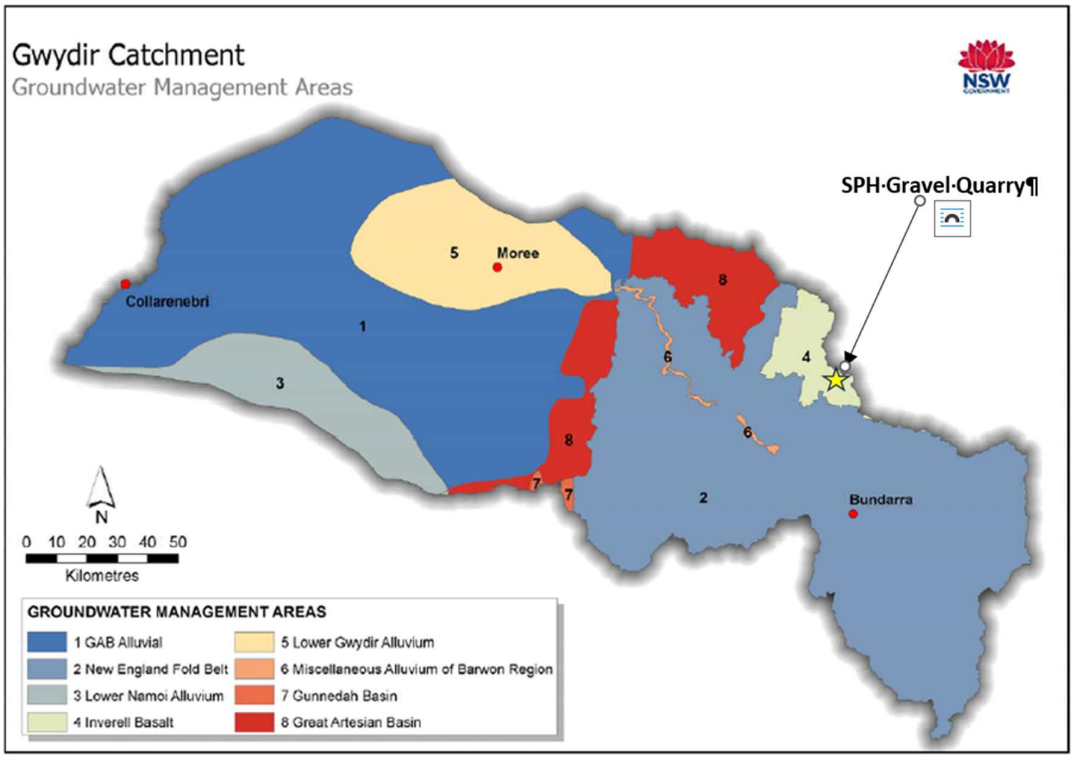
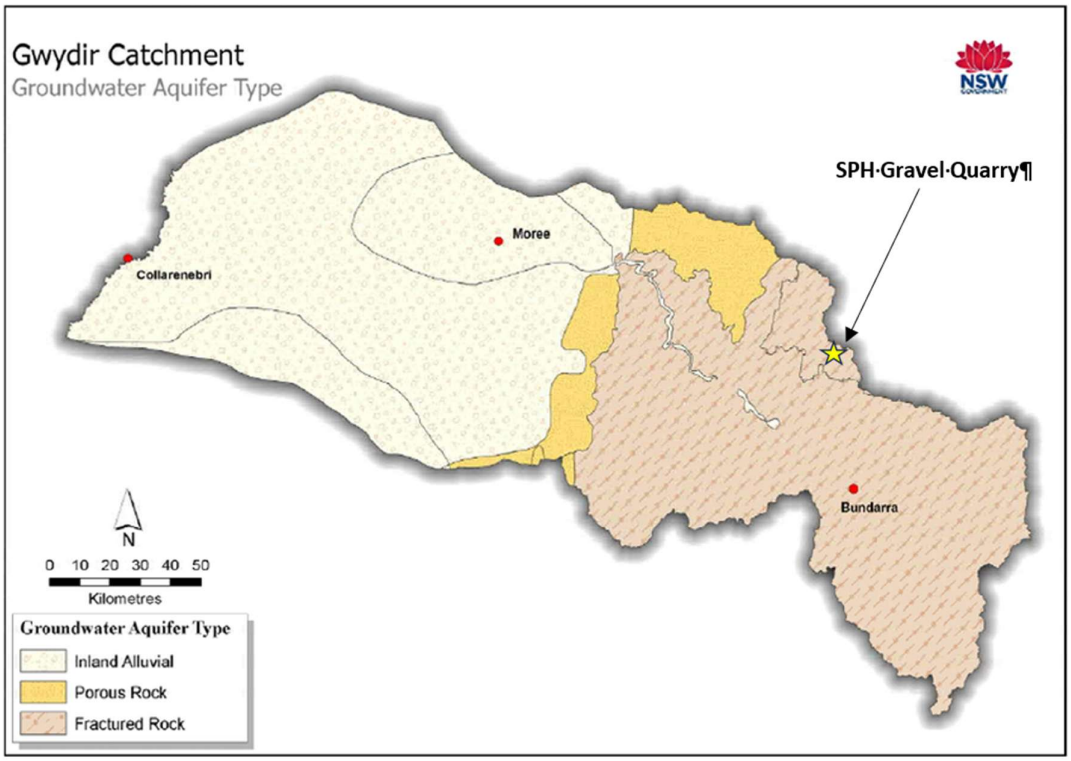


Figure 16: Groundwater Aquifers in the Gwydir Catchment



Water NSW's groundwater database indicates several groundwater bores have been drilled within 1 km of the Gum Flat Quarry. The locations of bores are presented in Figure 17 and bore log data is shown in Table 17. All these bores are predominantly low yielding stock and domestic bores. Only one presumably active stock and domestic bore is located on the boundary of the granite based geological formation that underlies the quarry site (GW901925 in Figure 18). One other bore (GW966059 in Figure 18) has been drilled in this formation, with records indicating no water yielded and the bore has been back-filled. All other bores in the vicinity are located in the surrounding Inverell basalt fractured rock formation (Figure 18). No active bores are located within the granite based geological formation which the quarry is extracting material from. Bore logs details relative to the Gum Flat Quarry are presented in Table 18.

Bore logs indicate that bores in the immediate area are located in geology typified by clay soil. Depth to bedrock varies significantly across the area, and is predominantly granite. Bore yields are typically below 1 L/s.

Figure 17: Locations of bores near ATJs Earthworks - Gum Flat Quarry (MinView)

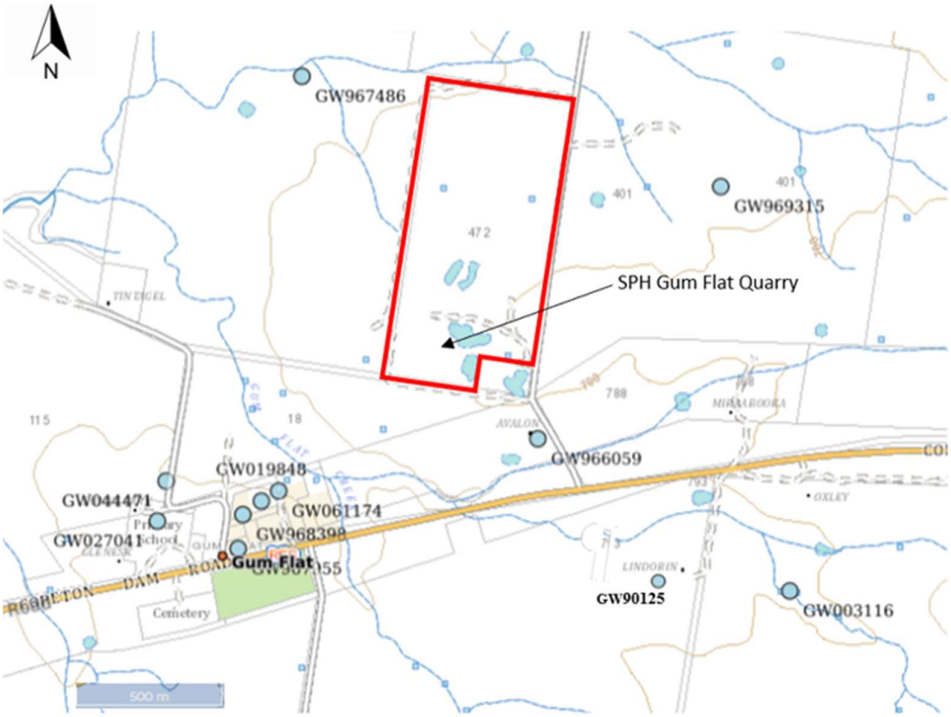


Figure 18: Locations of bores and local geology (MinView)

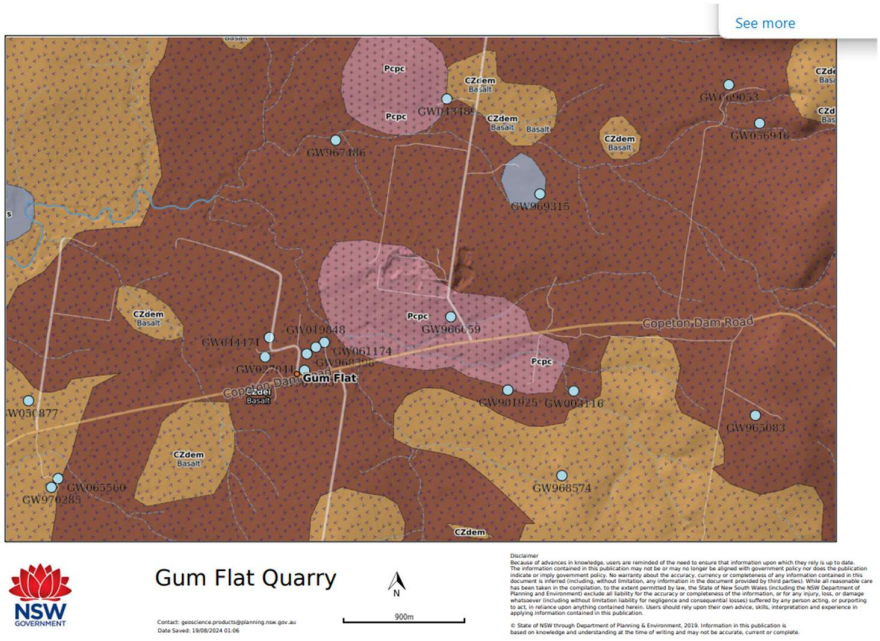


Table 17: : Bore Log Data in the vicinity of ATJs Earthworks - SPH Quarry

Bore ID	Depth of Bore (m)	Dominant Soil Type	Depth to Bedrock (m)	Bedrock Type	Standing Water level (m)	Yield (L/s)	Ground Level AHD (m)	Distance to Quarry (m)	Status
GW901925	22.6	clay	4.6	granite	4.0	0.25	695	870	Unknown
GW061174	45	clay	21.0	granite	7.0	1.26	680	530	Unknown
GW019848	24.3	clay sand	19.2	granite	9.1	0.63	682	600	Unknown
GW968398	29	clay	18.0	granite	8.0	0.13	683	670	Functioning
GW969315	18	granite	3.0	granite	4.0	0.40	697	840	Unknown
GW003116	36.6	clay	not reached	-	9.1	0.15	695	1200	Unknown
GW027041	32.3	sandy clay	25.9	granite	18.8	0.15	685	900	Unknown
GW044471	54.9	topsoil	not reached	-	24.4	0.08	681	820	Unknown
GW903284	26	clay	26	granite	7.0	0.15	678	420	Unknown
GW967955	29	clay	26	granite	-	nil			Abandoned
GW967486	59	clay	2	basalt	-	nil	675		Plugged
GW966059	57	topsoil	16	granite	-	nil	694		Plugged

- = no data

Table 18: : Standing Water Levels of nearby bores relative to SPH Quarry*

Bore ID	Distance to Quarry (m)	Ground level AHD (m)	SWL below ground (m)	SWL AHD (m)	SWL relative to Final Quarry base (m)
GW901925	870	695	4	691	11
GW061174	530	680.5	7	673.5	-6.5
GW019848	600	682	9.1	672.9	-7.1
GW968398	670	683	8	675	-5.0
GW969315	840	697	4	693	13
GW003116	1200	695	9.1	685.9	5.9
GW027041	900	685	18.8	666.2	-13.8
GW044471	820	681.5	24.4	657.1	-22.9
GW903284	420	678	7.0	671	-9.0

*Final maximum proposed depth of SPH Quarry is estimated to be 680 m AHD

5.11.1 Groundwater Dependent Ecosystems

Groundwater dependent ecosystems (GDEs) are defined as ecosystems which have their species composition and their natural ecological processes determined by groundwater (ARMCANZ & ANZECC, 1996). Searches of the Atlas of GDEs (BoM) identified no aquatic or terrestrial GDEs predicted to occur within the vicinity of the quarry (Figure 19 and Figure 20).

Figure 19: Aquatic Groundwater Dependent Ecosystems Near SPH Gum Flat Quarry

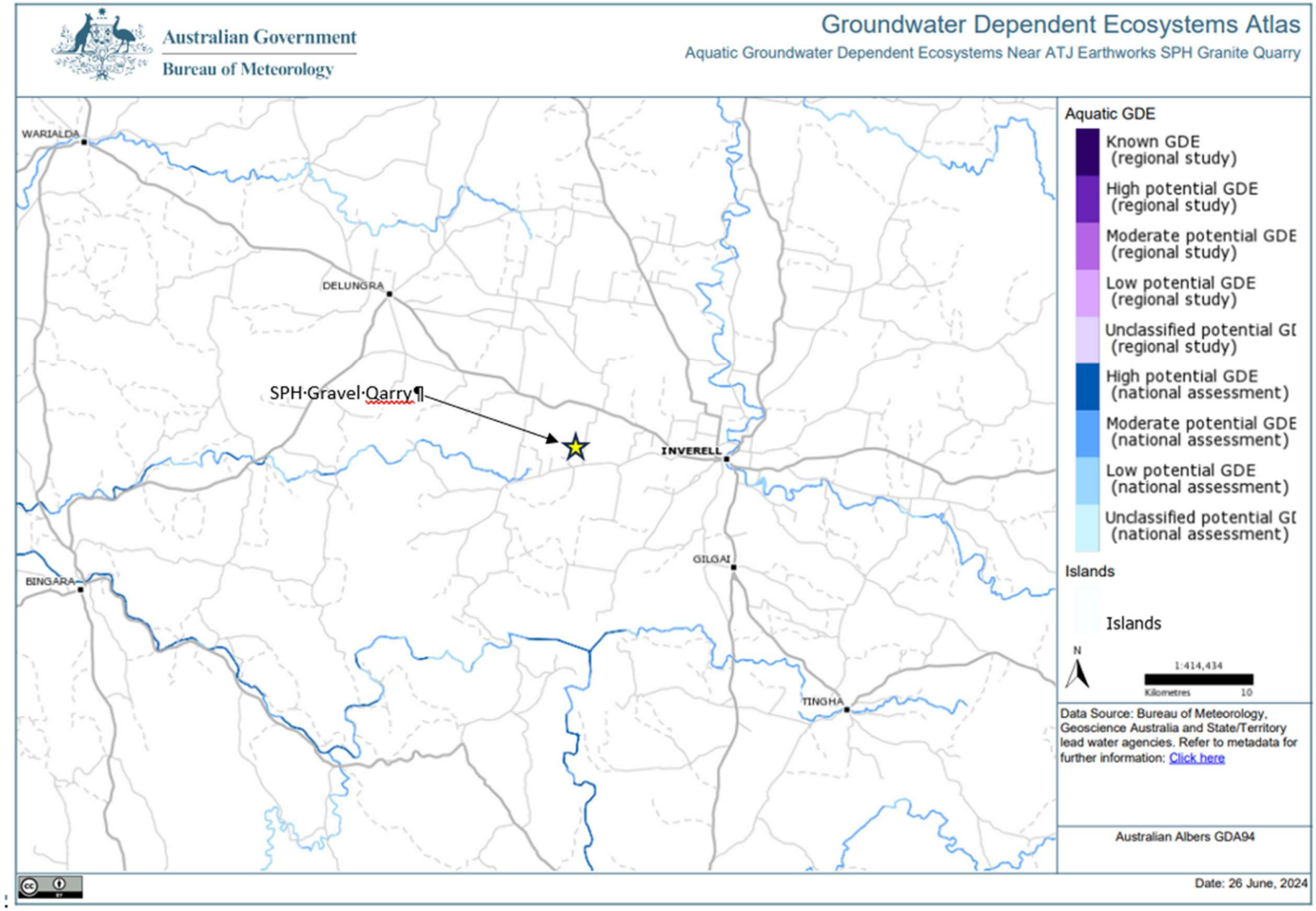
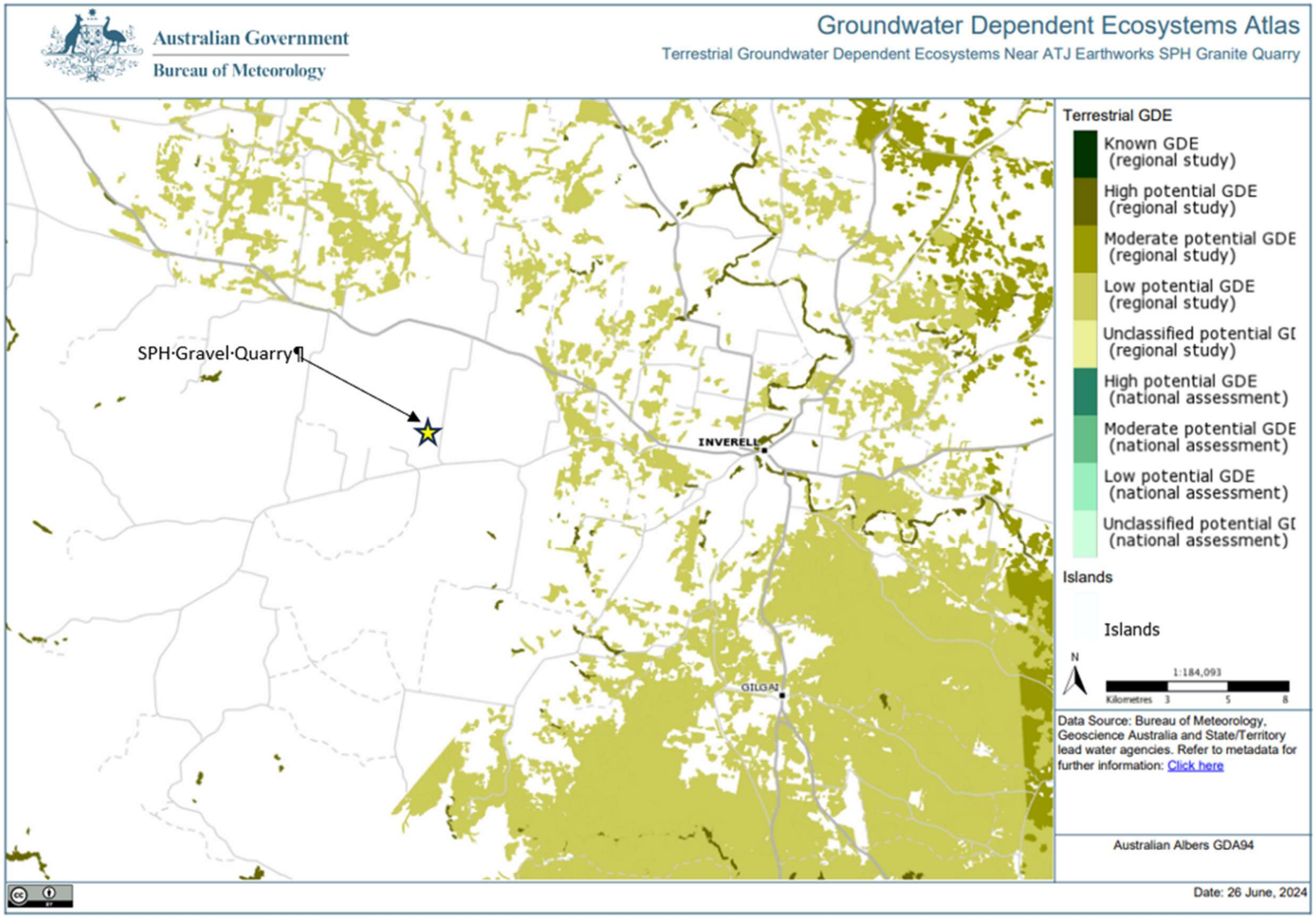


Figure 20: Terrestrial Groundwater Dependent Ecosystems Near SPH Gum Flat Quarry



5.11.2 Potential Impacts

No feedback from the formal community consultation was received indicating any reduction in bore standing water levels, any reduction in yields or any change in water quality.
The current invert level of the quarry is 690 m AHD. Assuming forecast extraction levels for the next 30 years, the potential final quarry invert will be approximately 680 m (i.e. 10 m below current invert and 20 m below natural surface level) before rehabilitation.

To date, the quarry has not impacted or intersected local aquifers.

Sichardt's equation is an empirical equation used to estimate the radius of influence of a well drawdown in an unconfined aquifer. It can be used to empirically estimate the impacts on the surrounding water table from open pit dewatering. The equation is:

$$R_o = 3000 \cdot s \cdot \sqrt{K}$$

where:

R_o = the radius of influence in meters
s = drawdown in meters
K = hydraulic conductivity in meters per second (m/s)

This equation empirically estimates how far the effects of pumping a well will extend in an unconfined, uniform aquifer. For a one dimensional steady state example, the quarry pit with near vertical walls can be taken to impact on the surrounding water table in a similar way to a well.

Assumptions for the Gum Flat Quarry are:

- Hydraulic conductivity is 5 x 10^{-6} m/s (this is considered a relative high rate for the ground material present – i.e. a conservative assumption);
- The surrounding aquifer is uniform, unconfined and has consistent hydraulic conductivity in all directions. Both these assumptions are conservative and are likely to overestimate impacts on the surrounding aquifer;
- Maximum pit depth is assumed to be 20m below the quarry natural surface and intersecting the groundwater table at 10m, giving a 10m drawdown. A pit depth of 20 m is based on the maximum forecast extraction (1.5M tonnes) over 30 years, for the current quarry area and depth.

$$R_o = 3000 \cdot 10 \cdot \sqrt{0.000005}$$
$$R_o = 67 \text{ m}$$

This equation forecasts the radius of influence of the quarry pit for maximum extraction over 30 years to be 67 m from the edge of the quarry pit. For the relative 'n' assumed depth of 25 m, the equation estimates the zone of influence of the quarry to be 101 m.

All active bores are at least 500 m from the quarry and are well outside the radius of influence (or drawdown zone) for the quarry pit, as estimated above.

This estimate assumes uniform conditions in terms of hydraulic conductivity and depth to bed rock, etc. Results of surrounding bore logs show that depth to bedrock is highly variable, standing water levels and yields from bores are also highly variable. Additionally, records indicate that groundwater flow, depth and availability are all highly variable and not uniform.

It is highly unlikely that the forecast gravel yield from the quarry will be realised before excavations reach groundwater and/or bedrock. If either the water table or bedrock is encountered, it will mean that the practical limit of gravel extraction from the quarry has been reached and further extraction will cease. The quarry will not extend into any local aquifer.

5.11.3 NSW Aquifer Interference Policy minimal impact considerations

The groundwater source in the vicinity of the proposed development is fractured rock and generally has total dissolved solids of less than 1,500 mg/L and yields of less than 5 L/s and is therefore categorised as a "less productive" groundwater source under the NSW Aquifer Interference Policy. This policy lists minimal impact considerations for which the proposed development has been assessed against. These are presented in Table 19.

Table 19: NSW Aquifer Interference Policy applicable minimal impact considerations

State Environmental Planning Policy (SEPP)	Comment
Water Table: 1. Less than or equal to 10% cumulative variation in the water table, allowing for typical climatic "post-water sharing plan" variations, 40m from any: (a) high priority groundwater dependent ecosystem; or (b) high priority culturally significant site; listed in the schedule of the relevant water sharing plan.	There are no high priority groundwater dependent ecosystems or high priority culturally significant sites listed or mapped in the vicinity of the proposed development.
A maximum of a 2m decline cumulatively at any water supply work.	No declines in water table levels at any water supply work has been reported, are known of or are expected, based on theoretical calculations.
2. If more than 10% cumulative variation in the water table, allowing for typical climatic "post water sharing plan" variations, 40m from any: (a) high priority groundwater dependent ecosystem; or	

State Environmental Planning Policy (SEPP)	Comment
(b) high priority culturally significant site; listed in the schedule of the relevant water sharing plan if appropriate studies demonstrate to the Minister's satisfaction that the variation will not prevent the long-term viability of the dependent ecosystem or significant site. If more than a 2m decline cumulatively at any water supply work then make good provisions should apply.	
Water Pressure: 1. A cumulative pressure head decline of not more than 40% of the "post-water sharing plan"(2) pressure head above the base of the water source to a maximum of a 2m decline, at any water supply work. 2. If the predicted pressure head decline is greater than requirement 1. above, then appropriate studies are required to demonstrate to the Minister's satisfaction that the decline will not prevent the long term viability of the affected water supply works unless make good provisions apply.	No declines in water pressure levels at any water supply work has been reported, are known of or are expected, based on theoretical calculations.
Water Quality: 1. (a) Any change in the groundwater quality should not lower the beneficial use category of the groundwater source beyond 40m from the activity; and (b) No increase of more than 1% per activity in long-term average salinity in a highly connected surface water source at the nearest point to the activity. Redesign of a highly connected surface water source that is defined as a "reliable water supply" is not an appropriate mitigation measure to meet considerations 1.(a) and 1.(b) above. (c) No mining activity to be below the natural ground surface within 200m laterally from the top of high bank or 100m vertically beneath (or the three dimensional extent of the alluvial material - whichever is the lesser distance) of a highly connected surface water source that is defined as a "reliable water supply". 2. If condition 1.(a) is not met then appropriate studies will need to demonstrate to the Minister's satisfaction that the change in groundwater quality will not prevent the long term viability of the dependent ecosystem, significant site or affected water supply works.	No change in water quality at any water supply work has been reported, are known of or are expected, based on theoretical calculations. The SPH is located more than 200m from nearby named waterways (Gum Flat Creek and Myall Creek). There are no defined "reliable water supplies" within the influence of the quarry.

State Environmental Planning Policy (SEPP)	Comment
If condition 1.(b) is not met then appropriate studies are required to demonstrate to the Minister's satisfaction that the River Condition Index category of the highly connected surface water source will not be reduced at the nearest point to the activity.	

The proposed development is not expected to exceed any of the NSW Aquifer Interference Policy minimal impact considerations. No feedback from the formal community consultation was received indicating any reduction in bore standing water levels, any reduction in yields or any change in water quality. Preliminary estimates indicate the quarry is unlikely to impact on any nearby groundwater bores.

5.11.4 Management and Mitigation Measures

The adoption and/or continued implementation of the following mitigation measures will reduce any impacts on surrounding ground water:

- Maintain internal quarry drains and diversion banks to safely direct runoff within the quarry;
- Monitor quarry pit for evidence of groundwater intersection;

5.11.5 Assessment of Impacts

This assessment indicates that the upon implementation of all proposed mitigation and management measures, the quarry is not likely to have an impact on local groundwater resources. There is no evidence that the quarry currently intercepts an aquifer or negatively impacts on the recharge of any aquifers, water quality or surrounding water table levels. The potential impacts of the proposed development upon groundwater aquifers are considered to be minimal.

5.12 Biodiversity

The SPH Quarry is located within the Nandewar IBRA region. Remnant vegetation in the study area comprises of native and improved pastures, along with remnant and isolated areas of woodland ecological communities.

The quarry site has been in operation for a period of 50-years. The quarry site has been historically cleared and there has little to no significant vegetation currently within the quarry, aside from an area where revegetation has commenced as part of rehabilitation.

No clearing of native vegetation or habitat alteration is proposed as part of the development and so it is unlikely to result in any impacts on biodiversity or movement of native fauna.

The quarry has native woodland communities along its southern and western borders as shown in Figure 21. There are some sparsely distributed shrubs and grass cover on the inactive areas of the quarry (mid-ground of Figure 21 and Figure 22). While much of this vegetation on the inactive area of the quarry is in poor condition, having low structure and function attributes, it contributes significantly to soil stability and protection, minimising both dust generation and erosion.

Figure 21: Vegetation on the southern and western boundaries of the ATJs Gum Flat quarry.

Figure 22: Quarry pit showing vegetation on inactive areas and no vegetation on active areas.

5.12.1Site History

The quarry site commenced clearing of the land in about 1973. This involved clearing of what is now the eastern sector of the quarry site.

By 1985, the clearing and quarry operation had extended to within 50m of the western boundary of the property. The quarry operation was relatively continuous. Additional clearing had occurred in the northern sector of the quarry site.

By 1989, the quarry had also expanded to the north and south, the workshop area had been developed and internal ponding of water had occurred.

By 1991, the quarry footprint extended to the southern boundary of the property and had mostly removed the woodland area on the northern side of the quarry.

By 2015, the quarry had expanded into the woodland along the southern boundary of the property.

(In august 2017, the Biodiversity Conservation Act 2016 began (BCA).

The complete footprint of the existing quarry was established by 2020 and no further clearing had been undertaken. Between the period 2015 to 2020, an area of approximately 0.5 hectares of vegetation that had been highly impacted and partially cleared over the previous period was cleared and included in the quarry footprint. This area is located along the southern boundary of the existing quarry site.

No additional clearing is to be undertaken. The areas at natural surface level surrounding the quarry and partially within the quarry footprint are now subject to rehabilitation. This rehabilitation includes the replanting of native flora and allowing these areas to regenerate. The rehabilitation includes weed control to improve the rate of rehabilitation of native species.

Development of the quarry site has included retention of a woodland buffer around the southern, western and northern sides of the quarry. The eastern side includes the workshop and residence as well as vehicle parking. Areas between roads and infrastructure are grassed but not replanted with native trees.

According to the Biodiversity Values Map and the Biodiversity Conservation Regulation Section 7.2, the area clearing threshold for the quarry site is 1 hectare (10,000 sq.m). The clearing undertaken since the introduction of the BCA in August 2017 has not been exceeded. Various legislative controls for clearing of native vegetation commenced in about 1990. These earlier legislative controls allowed clearing of up to 2 hectares per year. Based on the review of aerial images, the clearing undertaken for this quarry was permissible under previous historic clearing legislation.

5.12.2 Flora and Fauna

The vegetation communities and habitat surrounding the quarry are considered to be in fair to good condition and are reasonably well connected to larger areas of similar habitat. Vegetation on the southern and eastern boundaries of the quarry site is mapped as White Box Yellow Box Blakely's Red Gum Woodland; however it is more likely to be Blakely's Red Gum - Yellow Box grassy tall woodland, as it is mapped on the other side of the adjacent boundary fence.

There are no White Box present in this area or the vicinity of the quarry site. This is probably due to the very well drained granite based soil present. Overstorey in this area is dominated by Blakely's Redgum and Roughed Barked Apple, with occasional *Acacia implexa*, Apple box and Yellow box, and a groundlayer dominated (more than 50%) of Coolatai grass.

PCTs listed for the site in the mapping include:

- PCT 0 - Non-native for the cleared footprint of the quarry with no native vegetation;
- PCT 590 - White Box grassy woodland on the Inverell basalts mainly in the Nandewar Bioregion for the remnant woodland along the southern, western and northern side of the quarry as well as extensive remnant areas in the surrounding locality; and
- PCT 599 - Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Nandewar Bioregion along parts of Copeton Dam Road and properties to the north of Gum Flat Village.

Cleared farming and grazing land on the subject property and surrounding properties is mapped as PCT 0 – Non-native.

A test of significance was undertaken to determine the potential impact of the proposal on threatened or endangered species, populations and habitat communities. The test is presented as appendix F. The test includes plant community type (PCT) mapping based on the NSW Government SEED Portal and details of species that may be present or supported in the remnant vegetation within and around the quarry site.

According to the test, the proposal will have little to no impact on any threatened or endangered species and communities as no clearing of vegetation is required and the intended operation hours are limited. The remnant woodland that has been retained around the immediate quarry site will be preserved. No impact is predicted to occur for surrounding areas of habitat. However, these surrounding area of habitat on adjoining properties are on freehold land and therefore beyond the management abilities or influence of the proponent.

5.12.3 Potential Impacts

An 'Assessment of Significance' under the EPBC Act and a 'Test of Significance' under the BC Act have been conducted and are presented in Appendix E and Appendix F respectively. These assessments consider potential threatened species, populations and ecological communities which may be present within the locality of the development site and assess the potential impacts of the development upon these species.

The proposed development does not involve extension of the existing quarry footprint and will not result in any further vegetation clearing or disturbance. Flora and fauna in the study area will not be subject to any new types or extents of impacts over and above those of the current operation. The impacts of the proposed development upon biodiversity values was found to be minimal.

The quarry operation is now within its 50th year of activity on this site. The impact of mainly noise and gravel extractions can be considered as relatively continuous over this period. The impacts on local fauna populations would have been extended through a number of generations of species such as Koala who have a life span of between 10 and 15-years (Friends of Koala, 2025). For Koala, the habitat around the quarry has therefore supported between three and five generations.

The quarry footprint has reached a point where it will not expand in area. This is due to the operational requirements of the quarry as well as legislative controls, as well as the management approach to conservation of the remnant woodland and site rehabilitation.

The woodland within the quarry site may support threatened species but does not support White Box grassy woodland, will remain preserved. The rehabilitation plan will gradually improve the area of native vegetation around the quarry site and therefore improve the habitat.

The quarry site itself will remain as a large excavation and therefore rehabilitation options are limited. The rehabilitation proposed for the site will aim to restore the area as an open grassland and woodland but with the intent of allowing grazing of stock.

5.13 Heritage

5.13.1 Non-Aboriginal Heritage

A search of the NSW and Commonwealth heritage registers and *Inverell Local Environmental Plan 2012* revealed that no non-indigenous heritage items have been found or are recorded near the development site. Furthermore, a search for heritage sites using the EPBC Act Protected Matters Report found no World Heritage or National Heritage listed sites on the property or surrounding properties. A search of the NSW State Heritage Register found no heritage listed sites on the property or surrounding properties. The Inverell Shire Council Local Environmental Plan showed no heritage sites on the property or surrounding properties.

The footprint of the proposal consists of an active quarry, and it is therefore considered unlikely that heritage items will be impacted as part of the proposal.

5.13.2 Aboriginal Heritage

The proposed development is a well-established operating quarry. The site has been progressively cleared and quarried over the last 50 years. The site is heavily disturbed. The proposed development does not include disturbance to any new area or vegetation. All future areas of extraction are at least 5 m below natural surface level.

The surrounding area has been subject to historical clearing for grazing and agricultural production.

The following provides an Aboriginal Due Diligence Assessment to determine whether an ACHAR or further investigation such as a Permit to remove or relocate items of Aboriginal Heritage is required.

5.13.2.1 Aboriginal Due Diligence Assessment

In accordance with section 86 of the National Parks and Wildlife Act 1974 and the Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales 2010, the following provides a Due Diligence assessment of the quarry site and development proposal.

Aboriginal objects include:

- Physical objects, such as stone tools, Aboriginal-built fences and stockyards, scarred trees and the remains of camps;
- Material deposited on the land, such as middens;
- Ancestral remains of Aboriginal people.

The initial assessment involved a search of the NSW AHIMS register to identify whether any previous Archaeological surveys of the area found Aboriginal objects or sites. A search of the AHIMS register is presented in Appendix I.

The search reveals no recorded Aboriginal site within the property Lot 106 DP 656030. There are no recorded Aboriginal sites or places within a 1 km radius of the property.

The due diligence process then involved a ground assessment of landscape and visual inspection of the area surrounding the quarry site for artefacts or signs of Aboriginal presence. No Potential Archaeological Deposits (PADs) or sites or site complexes of archaeological sensitivity were observed during the site inspections within the quarry site. The quarry is an excavated site and therefore no natural surface is present within the footprint. The immediate buffer in the surrounding is highly disturbed with various stockpiles of overburden and windrows of material forming a noise mound.

No scar trees were present. No signs of Aboriginal artefacts such as stone chips were observed.

The site is not:

- Within 200 m of surface waters and therefore use of the area would have been historically limited to ranging for food, thus a potential for random dropped artefacts;
- Located on a ridge top, ridge line or headland, and therefore not a significant messaging or camping site;
- Located within 200m below or above a cliff face which would provide the potential for drawings;
- Within 20m of or in a cave, rock shelter, or a cave mouth that could have provided shelter.

The potential for finding sites of Aboriginal significance or cultural sites is limited for the quarry site as there has never been any relatively permanent source of water for extended camping at this site. No known or recorded history is available to indicate the presence of more permanent Aboriginal sites in this local area.

The footprint of the quarry is not to be altered as a result of this development proposal and therefore no new ground is to be disturbed as a result of the development being approved.

On this basis, it is reasonable to conclude that there are no known Aboriginal objects or a low probability of objects occurring in the area of the proposed activity.

However, as part of the ongoing development, employees and management must be made aware of their responsibilities in regard to Aboriginal sites and artefacts. In the event of discovery of an Aboriginal object or concern raised that an Aboriginal site is present, a standard process to be adopted on this site will involve an unanticipated finds protocol. This procedure is outlined below:

- *If any object is found suspected to be of Aboriginal origin, work in that location must cease;*
- *Notify NSW Heritage on 02 9873 8500;*
- *The site must be inspected by a person suitably experienced in identifying Aboriginal cultural material;*
- *Work may continue at a suitably distant location, not closer than 50m to the potential Aboriginal object;*
- *In the event that an object of Aboriginal origin is identified, appropriate action should be undertaken by the Proponent for the preservation of this site, or alternatively retain the services of an archaeologist to apply for an AHIP;*
- *If bones are uncovered, NSW Police should be immediately notified.*

5.14 Natural Hazards

5.14.1 Bushfire Hazard

5.14.1.1 Introduction

ATJs Earthworks - Gum Flat Quarry is located within the jurisdiction of the Northern Tablelands Bush Fire Management Committee (NTBFMC) and is covered by this Committee's Bush Fire Management Plan (BFMP).

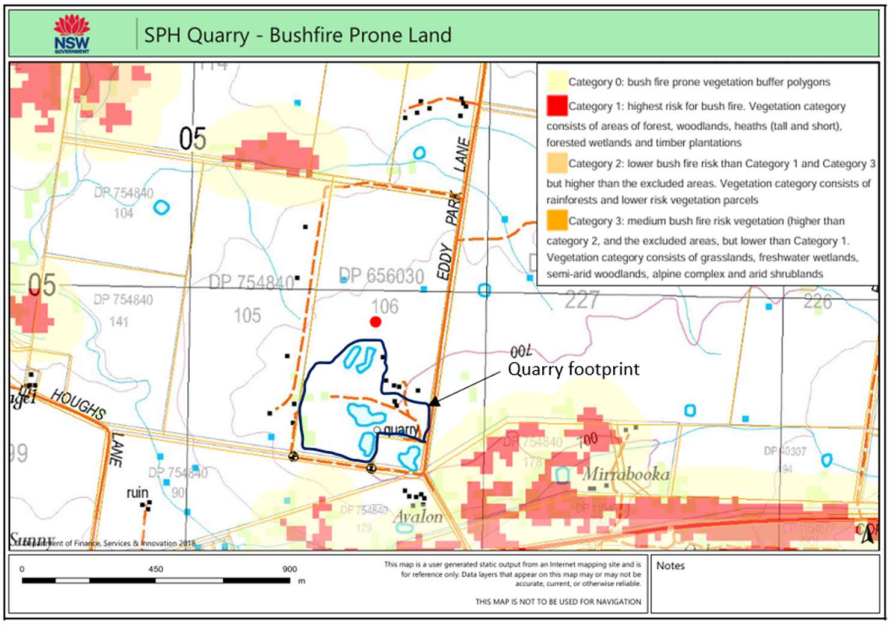
The bushfire season in the BFMP generally runs from August to March, yet drought conditions may mean that periods of fire danger may extend beyond this timeframe. The NTBFMC area has on average 170 bushfires a year, of which 5 on average can be considered to be major fires. The main sources of fire ignition include:

- Lightning strikes;
- Machinery;
- Escaped private burns.

5.14.1.2 Bushfire Prone Land Assessment

Bushfire Prone Land is land that has been identified by local council as capable of supporting a bushfire or being subject to bush fire attack. The NSW Rural Fire Service Planning Portal was used to determine that the Gum Flat Quarry property is located within a designated bushfire prone area. The parcel of land selected is not identified as bush fire prone; however it could still be affected by a bush fire. Mapping of bushfire prone land for the site is shown in Figure 23.

Figure 23: Bushfire Prone Land for the Gum Flat quarry site (NSW SEED Mapping tool)



5.14.1.3 RFS Bushfire Planning Objectives

Fire protection objectives considered with regards to the development site are outlined in the Rural Fire Service (RFS) guideline "Planning for Bush Fire Protection" (PBP) (RFS 2019).

The PBP states that in order for an industrial development to comply with the PBP, it must:

- Satisfy the aims and objectives outlined in Chapter 1 of the PBP;
- Consider any issues listed for the specific purpose;
- Propose an appropriate combination of Bushfire Protection Measures (BPM).

The proposal would be classed as 'mining (underground and open cut) and petroleum production' as per the industrial facility categories set out in the PBP.

Aims and Objectives of the PBP

The aims and objectives of PBP, as outlined in Chapter 1, are as listed and addressed below.

- **Afford occupants of any building adequate protection from exposure to a bushfire;**

The development does not propose any new dwelling or building. The development is not expected to offer protection for people from a passing fire front although a buffer of 10m will be observed between any structures present or erected onsite, and bushfire prone vegetation. Workers and employees are also not expected to defend the facility from fire and would be evacuated should a bushfire threaten the site.

This objective is satisfied.

- **Provide for a defendable space to be located around buildings;**

An Asset Protection Zone (APZ) of 10m will be maintained around all quarry related buildings which will act as defendable space for all buildings. Access to the quarry is by roads suitable for heavy vehicles. These roads can be used by fire services to attend to fire at the facility.

This objective is satisfied.

- **Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition;**

A minimum APZ of 10 m currently exists and will be maintained between all potential fire hazards and on site buildings. The quarry site is generally kept clear of vegetative growth and therefore the majority of the subject site will not support flammable materials. The primary flammable liquid stored onsite is diesel which is stored in a self-bunded containerised tank system adjacent to the workshop. This is surrounded by gravel and grass is maintained as a short lawn.

Activities which have potential to generate fire on site will be conducted with safe buffer distances from any surrounding buildings or potentially flammable materials. The majority of cutting or welding of materials occurs within the concrete floored workshop.

This objective is satisfied.

- **Ensure that safe operational access and egress for emergency service personnel and residents is available;**

As the quarry development provides for large truck movements, there is adequate access to proposed assets for firefighting operations.

This objective is satisfied.

- **Provide for ongoing management and maintenance of bushfire protection measures, including fuel loads in the Asset Protection Zone (APZ); and**

A minimum APZ of 10m will be observed between fire supporting vegetation adjacent to the quarry site and buildings and flammable materials associated with the quarry site. The majority of the site will remain free of vegetation. Sufficient heavy machinery is available on-site to manage buffer zones in a fuel-reduced condition.

This objective is satisfied.

- **Ensure that utility services are adequate to meet the needs of fire fighters (and others assisting is bushfire fighting).**

Utility services such as water supply exist in the form of a runoff holding pond within the quarry and a harvestable right dam on property. In addition, a water cart/truck equipped with a hose is available to assist in extinguishing any fire ignited and to ensure that there is sufficient water availability on site for firefighting. Rainwater tanks are available onsite which can be used a source of water for fire trucks.

This objective is satisfied.

5.14.1.4 Proposed Bushfire Protection Measures

The following safeguards and mitigation strategies will be implemented on site to minimise the bushfire hazard at Gum Flat Quarry:

- Incorporating firebreaks, including a perimeter road and embankment around the quarry site;
- Ensuring all buildings (including any temporary buildings) are set back at least 10m from any potential fuel sources (such as surrounding vegetation);

- Keeping the quarry site clear of potential fuel sources (such as vegetation), particularly in close proximity to quarry activities which may act as a source of ignition;
- Maintaining appropriate fire-fighting equipment at the site, ensuring fixed plant and mobile equipment are fitted with fire-fighting equipment including fire extinguishers;
- Checking the underside of vehicles periodically to ensure they are kept free of vegetation debris that could dry out and ignite;
- Storing flammable materials such as waste hydrocarbons away from ignition sources;
- Refuelling only to occur in cleared areas of the project site;
- Engines in all vehicles to be turned off during refuelling;
- No smoking policy to be enforced with only designated areas of the project site available for smoking; and
- Ensuring a water cart/truck is equipped with a hose to assist in extinguishing any fire ignited and that there is sufficient water availability on site for firefighting.

Bulk water requirements for the project will be sourced from water captured in the quarry runoff holding pond and a harvestable rights dam on the property. These water sources are also available for fire-fighting purposes. Smaller rainwater tanks have been installed to capture rainwater from the workshop and the residence.

5.14.1.5 Operational Access for Fire Fighting

The site access is via an unsealed all weather road which is suitable for heavy vehicles. The site is accessible from the east via Eddy Park Lane, with evacuation routes to both the north and south. The quarry is unlikely to be cut off in the event of a fire, ensuring practical access for firefighting purposes.

5.14.1.6 Emergency and Evacuation Planning

In the event of a fire, the site would be evacuated. Evacuation would occur via the site access road onto Eddy Park Lane. If this is blocked by a fire, sufficient clear area is available within the site as an evacuation area.

5.14.1.7 Assessment of Impacts

The proposed operations are unlikely to increase the number and type of ignition sources in the local area relative to existing conditions. Nevertheless, the proposed management and mitigation measures would ensure that an acceptable bushfire hazard is maintained within the quarry site.

5.14.2 Flood Hazard Areas

The quarry is not located in a flood prone area. Flooding is not considered to be a hazard for the proposed development.

5.14.3 Geological Instability

The land is not naturally subject to geological hazards such as volcanism, earthquake, or soil instability such as subsidence slip or mass movement. However, there is a potential that geological instability may be induced on the quarry site as part of quarry operations. This may lead to the occurrence of geological hazards on site.

To minimise the risk of geological hazards on site, the quarry adopts best management practices to ensure that safety standards are maintained on site. Quarry operations are guided by an overarching Mine Safety Management System, which identifies a series of site-specific Principle Hazards associated with the mine site and outlines a suite of management methods to minimise the risk of each hazard. The Operator implements the Mine Safety Management System.

In the event of approval, the Mine Safety Management System will be upgraded as required to reflect any changes in activities or processes on site. It is considered that implementation of a comprehensive and site-specific Mine Safety Management System is sufficient to minimise the risks posed by geological instability at the SPH Quarry.

5.15 Traffic

A Traffic Impact Assessment has been prepared in accordance with the RTA's Guide to Traffic Generating Developments (2002) and is attached to this report (Appendix G). The following summarises the assessments findings.

5.15.1 Quarry Access

Quarry is accessible via Eddy Park Lane. This is a gravel road, which is maintained by Inverell Shire Council. The road services the neighbouring farming community in addition to the adjacent quarry. The road is trafficable in all weather conditions apart from times of high stormwater runoff when causeways may become impassable. This is mainly an issue to the north of the quarry.

The access to Quarry from Eddy Park Lane is shown in Figure 24. The available sight distances along Eddy Park Lane (in excess of 150 metres to the east and west) are considered sufficient to provide for safe access to the quarry site.

Figure 24: Entrance to Quarry from Eddy Park Lane

The largest truck to use the access is a semi-trailer. The geometry of the entrance road exceeds the minimum standard for a rural access used as a turn-in speed of 15 km per hour. No traffic conflict has occurred at this intersection.

5.15.2 Existing and Proposed Traffic Levels

The current haulage route extends south along Eddy Park Lane for 400 m and onto Copeton Dam Road, and north along Eddy Park Lane to intersect the Gwydir Highway. Both roads lead to the Gwydir Highway.

Based on the maximum average annual extraction rate of 90,000 tonnes year, truck movements along Eddy Park Lane and other haul roads over the 10-hour working day will be an average of 10 truck two-way movements per day, or one truck in and out every hour. 90,000 tonnes per annum is considered more than the average extraction rate.

Based on the forecast average annual extraction of 50,000 tonnes, the Average Annual Daily Traffic (AADT) would be five one-way truck movements per day (or 10 trucks movements per day including return journeys). These estimates assume combination trailer units (rigid tipper truck and dog trailer) with a capacity of approximately 36 tonnes are utilised.

On occasions, truck movements may need to be more intensive to provide gravel for larger projects. The requirement for more intensive vehicle movements would be intermittent but may involve four trucks operating to and from the site in one day to move up 800 tonne in one day.

5.15.3 Potential Impacts

The development proposal will result in similar levels of heavy vehicle traffic on the local road networks. Heavy vehicle traffic generated by the SPH quarry is likely to make some contribution to wear and long term damage of public roads utilised as haulage routes, in particular Eddy Park Lane and Copeton Dam Road.

The SPH Quarry is located in a rural region where high traffic volumes and traffic congestion are not significant issues. The existing truck and light vehicle traffic generated by the quarry over the past 50-years has been part of the local traffic.

The site commences operations at 7am. This would involve arrival of potentially four light vehicles, loading of truck and departure of the trucks from the site over a 1-hour period. This would therefore involve movement of potentially 4-light vehicles to the site and 4-trucks from the site in this first hour. This is considered a minor volume of traffic.

Traffic generated by the proposal also has the potential to impact on road traffic noise and safety. Potential noise impacts have been discussed in section 5.9 and are not predicted to be significant.

5.15.4 Management and Mitigation Measures

To protect regional amenity values, transport activities associated with ATJs Earthworks - SPH Quarry will be limited to operating hours as specified in Section 2.4 of this EIS.

A truck drivers code of conduct is to be included in the OEMP. This will outline the responsibilities of truck drivers in relation to:

- Loading of trucks and cleaning of spilt gravel from trucks prior to departure from the quarry;
- Covering loads;
- Limiting speeds of vehicles to road conditions;
- Reducing speeds on particular sections of road such as where residences are close to Eddy Park Lane, for the purpose of minimising dust generation;
- Being courteous to other road users;
- Map and identify school bus schedules along haul roads to establish protocols to avoid conflict with school bus stops;

- Reporting incidences that need to be addressed by management and other drivers from ATJ Quarries.

The drivers code of conduct will be a standard part of driver inductions and where undertaken, tool box meetings for specific projects and work related activities.

5.15.5 Assessment of Impacts

The proposed development does not propose a change in traffic generation from the existing traffic generated by the quarry. Overall, the level of heavy traffic generated by the proposed development is not considered to pose a significant risk to the amenity, safety, or the local road network. Historically, the traffic generated from this quarry has not created road conflict issues.

5.16 Waste, Chemicals and Hazardous Materials

The only form of putrescible waste to be generated on this site will consist of waste from staff lunches and other meals. This would be removed from the site on a come clean – go clean basis.

Other material such as punctured tyres or waste from machinery maintenance would also be collected for disposal and/or recycling at an appropriate waste facility. This would include oil which can be recycled and machinery parts such as oil filters. These items including tyres have limited recycling options at present. They would be disposed of at the Inverell Landfill.

It is noted that a proposal for a tyre recycling facility is being developed in the Inverell Shire. This would provide a recycling option for used tyres from the quarry.

No bulk waste would be generated at the quarry and therefore the need for a skip bin or similar waste storage container is limited.

5.17 Biosecurity

The following provides a Biosecurity Risk Assessment and Management Plan, outlining the likely plant, animal and community risks associated with the proposed development and assesses the risk in accordance with AS/NZS 4360:2004 taking into consideration the likelihood and potential consequence(s) of the environmental impacts.

5.17.1 Defining Risk

Risk is the chance of something happening that will have an impact upon the objectives of a task, which in this case is the development and operation of the quarry without increasing

the biosecurity risk posed to plants, animals and the community. Risk is measured in terms of consequence and likelihood, which are then evaluated in a risk matrix.

5.17.2 Sources of Risk

The primary source of biosecurity risk associated relates to the stockpiling or transportation of contaminants on vehicles, people, equipment or materials onto and off the quarry site. The specific risks, as relevant to plants, animals and the community relate predominantly to the following:

- Introduction and spread of disease onto or from the quarry site which could affect plant, animal or human health;
- Introduction, propagation and spread of weed species by vectors including vehicles and personnel moving on and off the quarry site.

The quarry site does not involve the storage or cultivation of materials which could constitute potential food sources for pest animal species. The site does not offer suitable habitat for pest animal species and the risk of these species being present or increasing in number is negligible. Given this low risk a pest animal management strategy is not considered necessary.

Trucks deliver gravel to many sites. These sites may not have any significant management of weeds and therefore a minor potential is present for gravel trucks to return with weed seed. Such seed may be dropped at the quarry or washed off the trucks, thus introducing weeds to the quarry site. Site management currently includes weed management actions. These are relatively simple procedures of control of weeds by the use of soft herbicides.

Trucks and plant working on other sites are cleaned on a regular basis. This involves removal of mud and any vegetation from the trucks. The washdown water is collected onsite in a controlled area. This area adjoins the workshop and therefore is easily observed and managed if weeds are present.

5.17.3 Risk Assessment

The allocation of a consequence rating was based on the definitions contained in Table A. The likelihood or probability of each impact occurring was then rated according to the definitions contained within Table B.

Table A
Qualitative Consequence Rating

Level	Severity Level	Area of Consequence				
		Animal Health and Production	Plant Health and Production	Human Health, Safety & Well-being	Economic	Environmental
1	Insignificant	No loss.	No loss.	No injuries.	No economic loss.	No environmental impact.
2	Minor	Limited illness / injuries and / or deaths on single enterprise.	Limited damage / loss on single enterprise.	Minor injuries, no public health risk, short term well being impact.	Few businesses locally affected or single / few properties.	Minor / recoverable short-term isolated / localised environmental impact.
3	Moderate	Some illness / injuries / deaths on multiple properties across a locality.	Some damage / loss on single property – multiple paddocks.	Limited public health risk and / or injuries requiring medical and mental health treatment.	Widespread industry impact, multiple industries / properties per district.	Moderate, medium term, medium spread environmental impact.
4	Major	Considerable illness / injuries / deaths on multiple properties across a region.	Considerable damage / loss on multiple properties across a region.	Major public health risk and / or major injuries / well being impact.	High economic / trade risk to region and / or state.	Serious, long term widespread environmental impact.
5	Severe	Significant illness / injuries / deaths on multiple regions.	Considerable damage / loss across multiple regions.	Significant public health risk and / or human deaths / long lasting well being issues.	Major national economic implications.	Irreversible environmental impact.

Table B
Qualitative Likelihood Rating

Level	Descriptor	Description
A	Almost Certain	May occur several times over short period or continuously.
B	Likely	May occur monthly to several times a year.
C	Possible	Might occur once in a period of one to three years.
D	Unlikely	Could occur over time (every five to ten years).
E	Rare	May occur in exceptional circumstances.

A risk ranking (low, medium, high or very high) was assigned to each potential impact based on the matric presented in Table C.

Table C
Risk Rating Matrix

Likelihood		Consequences				
		1 Insignificant	2 Minor	3 Moderate	4 Major	5 Catastrophic
A	Almost Certain	M	M	H	X	X
B	Likely	L	M	H	H	X
C	Possible	L	L	M	H	H
D	Unlikely	N	L	M	M	H
E	Rare	N	N	L	M	H

The five risk rankings are defined as follows.

Negligible (N): Acceptable risk.

Low (L): Ongoing monitoring. Manage by routine procedures, unlikely to need specific application of resources.

Medium (M): Active management. Manage by specific monitoring or response procedures, with management responsibility specified.

High (H): Intervention required. Urgent management attention needed, action plans and management responsibility specified.

Extreme (X): Urgent attention required. Immediate action needed, action plans and management responsibility specified.

For each of the sources of risk identified, Table 20 identifies specific risks associated with each of the risk sources and identifies the management measures proposed to eliminate or reduce these risks and assess the residual risk.

Table 20: Biosecurity Risk Ranking

Risk Source	Specific Risk	Risk Management Measures	Likelihood	Consequence	Residual Risk
Transport of contaminants on vehicles, people, equipment or materials onto and off the Quarry site.	Introduction of disease onto or from the Quarry site.	Implement "come clean – go clean" principles for all vehicles / personnel moving onto and off the Quarry site, including: - Changing / cleaning footwear - Maintaining personal hygiene. - Cleaning of vehicle and equipment.	E	3	L
	Introduction, propagation and spread of weed species.	Weed spraying will be undertaken where there are signs of weeds.	D	2	L

Risk Source	Specific Risk	Risk Management Measures	Likelihood	Consequence	Residual Risk
Dispersal of dust, organic matter or other particulate matter from stockpiles.	Transfer of weed species propagules onto and beyond the Quarry site.	Water would be used to suppress any dust / particulate matter dispersion.	D	2	L

5.17.4 Summary of Biosecurity Risk

On consideration of the sources of risk and proposed management and mitigation measures to be imposed by the Quarry management, the proposal presents a negligible to low risk of specific biosecurity related impacts on plants, animals and the community. These risks would be effectively managed by the proposed monitoring, management and contingency measures proposed. On the basis of this reduced risk level, it is not necessary for a biosecurity management plan to be prepared.

5.18 Land Contamination

The extraction of gravel from this site is not considered to have a risk of contaminating land within the quarry, land outside the quarry or nearby waterways. Machinery to be operated on the site will include a front end loader and occasionally an excavator. Trucks will enter and leave the site via graded roads.

A preliminary site investigation was undertaken as part of this investigation. The scope of this investigation involved the following steps:

- Desktop assessment of available information about the site;
- Review of historical aerial photographs of the property and surrounds;
- Onsite assessment of visible landscape to identify any potential contamination of historical activity on site;
- Risk assessment of the previous land use;

If contamination were to be found, the following process was to be undertaken:

- Sampling of soils to determine whether contamination is present;
- Analysis of samples by a NATA Laboratory, including screening for a range of relevant contaminants of concern from the previous land use;
- Review of results to compare standard threshold levels for analytes;
- Prepare a Preliminary Site Investigation Report to outline the investigation and whether site remediation is required to enable the landuse to occur.

If no contamination were to be found, this would be reported.

The review of aerial imagery and discussion with the landowner identified that the quarry had been established in the mid-1970's. Ongoing development of the site has resulted in expansion of the quarry footprint and development of the workshop area adjacent to the residence on the property. No other contaminating activities such as other industrial related works have occurred on the site.

Current management of the site involves all mechanical activities occurring in the workshop. This has a concrete floor which is cleaned on a regular basis. No contaminants such as spilt hydrocarbons were noted in the workshop. Hydrocarbons associated with workshop activities was contained in drums or other vessels to prevent spillage.

The primary source of contamination on this site is diesel storage and use of this diesel during refuelling of machinery and trucks. No evidence of spilt fuel was visible around the area of the fuel tank. No hydrocarbon contamination was present.

Surrounding landuse includes a quarry, rural residential activity and an old, remediated landfill. The adjoining quarry and surrounding rural residential areas cannot drain toward the proponent's quarry and therefore if contamination is present on these adjoining landuses, it cannot impact the quarry on Lot 106.

Advice from local land owners indicated that Lot 1 DP348458 which adjoins the southeast corner of Lot 106 (The quarry site) had been excavated and developed as a quarry. Quarrying appears to have ceased in the 1980's. Anecdotal evidence indicates that the site was temporarily used for storage of waste material or rubbish generated from Inverell town area. The following provides an aerial image from 1989. The image potentially shows some material stored in the original excavation.

Figure 25: 1989 Aerial image show gravel pit on Lot 1 DP348458 with foreign material.

Anecdotal evidence indicates that the site was remediated with all waste removed. Once this was completed, the site has been allowed to natural regenerate.

Based on available information, if waste material was stored in this gravel pit, it would not cause any surface contamination of the quarry subject to this application. This old quarry continues to capture surface runoff which remains in the deeper eastern end of the quarry. This is not considered a source of contamination for the quarry subject to this application.

Based on this site investigation, no contamination was identified. As a result, no soil sampling was undertaken. The site is considered suitable for ongoing use as a quarry activity.

5.19 Social and Economic Impacts

The social and economic impacts of this proposal will be minimal. Direct social impacts are considered to be limited to employees of the business and the owners in the event the business closes as this is a sole source of income for staff and management. Most employees are long-term and embedded in the business. Other social impacts would include the impact on adjoining residents and other landowners that have been or could be impacted by the quarry operation.

It is noted that the quarry has operated for a period of 50-years and could be considered as part of the original community development in this area. It had been established and operational prior to many of the more recent rural residential development of the area.

Economic impacts are limited to the increased trade of these raw materials for ATJs Earthworks, which will maintain or potentially increase the contribution of this business operation to the economic activity within the Inverell Shire. Any negative social or economic impacts from approval of the proposed development are considered to be limited to:

a) An increase in road maintenance on roads to and from the quarry generated by quarry traffic;
b) Any impact on the surrounding amenity as a result of intermittent noise and dust emissions.

Appropriate mitigation measures have been included in this proposal to react and correct such impacts if they occur. Once approval is obtained, it is expected that the site will operate under a formal operational environmental management plan which would be submitted and approved by Council or the relevant authority which would include NSW EPA. This document would provide threshold limits, management actions, operational procedures and monitoring procedures to ensure that the quarry is operated in an environmentally responsible manner.

5.20 Cumulative Impacts

The potential environmental impacts from the establishment, operation and rehabilitation of the proposed Quarry have been detailed in their relevant sections throughout this report.

Potential cumulative impacts are those which are generated by the combined impacts on the local environment as a consequence of the project, together with other developments of a similar nature (both existing and proposed). For the purposes of this EIS, the assessment of cumulative impacts considers the impacts of existing and proposed extractive industry development in the local area.

It is noted that two other quarries have been historically developed in the Gum Flat area. It is unclear whether these two quarries have approval or continue to operate. No specific detail is available to assist with determination of operational approvals for these adjoining quarries or management. Based on the fact that the quarry resource is similar to the resource at the ATJ quarry, the operations of these adjoining quarries would have similar impacts on the surrounding area. This would include may traffic impacts along Copeton Dam Road. The potential is present to have three or more trucks per hour carrying quarry material along Copeton Dam Road if all three quarries are operating at the same time. A traffic peak may occur at 7am when all three sites open.

If the quarries are not managed appropriately, there is a potential for dust emission impacts in the local region. As the weathered granite resource has a low dust emission level, cumulative increases in dust causing a reduction in local air quality is not predicted to occur. This prediction considers the background contribution of dust emissions from local farming land.

When considered in the context of the zoning and surrounding land uses, it is concluded that there will be minimal adverse cumulative impacts resulting from this proposal. Adjoining lots will be largely undisturbed by the quarrying operations and within little or no impact on current land use. The proposed operations are limited to regular business hours, ensuring the amenity of the area is not compromised.

The development is occurring on an area that has been historically used for gravel extraction. The existing quarry operation will continue in a similar format with no significant change in extraction volumes.

5.20.1 Summary of Mitigation Measures

The outcome of this Environmental Impact Statement is a list of recommendations to be adopted during the ongoing operation of the quarry. The proposed mitigation measures will be subject to regular updates once an approval is obtained, and the relevant Licence and

approvals are issued. It is noted that a number of these mitigation measures are currently implemented as part of the existing operation.

Table 21 provides a summary of the recommended mitigation measures for the establishment and operation of the proposed quarry.

Table 21: List of Proposed Mitigation Measures

Issue	Mitigation Measures
General	▪ Preparation of an Operational Environmental Management Plan (OEMP); ▪ Review and update, as required; ▪ Establish a complaints processing mechanism. ▪ Ensure that a timely response is issued to any community and stakeholder enquiries regarding noise, vibration and traffic impacts associated with the proposed quarry.
Visual Amenity	▪ Retain and protect vegetation located outside of the identified extraction zone; ▪ Rehabilitate and revegetate the site with appropriate species.
Air Quality / Dust Impacts	▪ Always cover loads when transporting material from the site; ▪ Implement appropriate vehicle speed restrictions (within the site) and on haul roads; ▪ Implement progressive revegetation and/or mulching to ensure soil stabilisation across the site; ▪ Minimise areas of disturbance; ▪ Keep front-end loader bucket low when handling and transporting materials; ▪ Regularly inspect and maintain all equipment to reduce potential for excessive emissions; ▪ In the event of increased dust production, increased dust suppression management measures, including by increasing watering rates, decreasing processing rates, and slowing truck speeds; ▪ Initiate Shut down procedures during periods of excessive dust generation or upon receipt of complaint and investigate and initiate additional controls.
Noise	▪ Implement control and mitigation measures recommended; ▪ Operating hours to be in accordance with any development consent conditions.

	▪ Regularly maintain all plant and equipment to ensure that they are correctly tuned and well maintained to meet manufacturers specifications. ▪ Where practical, operate machines at low speed or power and switch off when not in use. ▪ Regularly inspect all plant and equipment to ensure compliance with industry best practice regarding noise levels and carry out repairs or modifications where necessary. ▪ Machinery to be operated in accordance with the manufacturer's direction. ▪ Monitor noise levels as and when required. ▪ Conduct environmental noise awareness inductions for all contractor employees and subcontractors. ▪ Conduct ongoing on the job training for each specific job task. ▪ Undertake noise generating activities during standard and/or less sensitive hours, where possible. ▪ Consult with the community and advise of any expected short term increased traffic movements, times, and length of the proposed operation.
Water Quality	▪ Implement erosion and sediment control measures in accordance with the OEMP. ▪ Implement temporary erosion and sediment control structures such as straw bales and silt fences to minimise the potential for sediment laden runoff to enter watercourses. ▪ Collect runoff from working areas in sediment ponds. ▪ Progressively stabilise and revegetate disturbed areas. ▪ Regularly monitor and maintain all erosion, sedimentation and pollution control devices, particularly after any significant rainfall event, to ensure effective operation, especially until disturbed areas are stabilised and/or properly vegetated. ▪ Water quality of surface runoff leaving the site should be monitored by visual inspection to ensure that the water discharged is not overly sediment laden and sampled if sampling is imposed under the expected Environment Protection Licence. ▪ Define internal truck haulage routes to reduce the area requiring regular dust suppression demand (reduce water usage and dust impacts). ▪ Water levels in the sediment basins to be regularly monitored, and water use adjusted to suit the various levels.

	▪ In the event of a chemical or sediment escape from site it would be cleaned up to a state which is no less than its condition prior to discharge. ▪ Education of site personnel for the implementation of sediment and erosion control plans. ▪ Use drains and diversion banks to direct clean stormwater away from disturbed areas, working areas or stockpiles. ▪ Ensure storage of and use of hazardous materials (fuels) is in accordance with *National Code of Practice for the Storage and Handling of Workplace Dangerous Goods (2001).* ▪ Maintain table drains to dissipate flow of rainfall runoff along drain and road areas.
Rehabilitation	▪ Progressively rehabilitate the site in accordance with the Rehabilitation Plan and any development consent conditions. ▪ All site rehabilitation works shall be designed to ensure the maximum revegetation cover is achieved and shall be maintained to ensure optimum establishment and growth. ▪ All noxious weed species, environmental weeds and Weeds of National Significance are to be managed across the site (including during progressive rehabilitation) on a regular basis to prevent the need for a reactive weed management strategy. ▪ Soil containing high quantities of weed seeds and/or weed seed banks should be disposed of either at an appropriate waste management facility, or in an area separated from remnant vegetation communities. ▪ Only endemic topsoil will ensure the endemic soil seed banks are restored to the site increasing the potential for successful rehabilitation of pre-development vegetation. ▪ An assessment of potentially contaminated soils is to be carried out prior to the removal of any infrastructure from the site.
Biodiversity	▪ Progressive rehabilitation of the site in accordance with the Rehabilitation Plan, with revegetation utilising local species as much as practical. ▪ A protection zone should be established around areas of vegetation to be retained close to quarrying activities. ▪ The site should be maintained to reduce the fuel load adjacent to retained vegetation. ▪ Implement weed management to minimise risk of weed establishment and proliferation.

	▪ Control existing weeds that are present onsite and listed under the *Biosecurity Act 2015*. ▪ Ensure that machinery brought onto and off the site is free from propagules.

Cultural Heritage	▪ In the event that any Aboriginal artefacts, items or sites of cultural heritage are found during quarry operations, the following protocol will be implemented:
	  ▪ Work will cease in the immediate area until NSW Heritage are advised and the site/artefact/relic is assessed.
	  ▪ A requirement to immediately stop all works if human remains are found during the quarry operations to prevent any further impacts to the remains. The NSW Police, the NSW DCCEEW and the local Aboriginal Community will be notified.
	  ▪ Consultation will be carried out as appropriate in accordance with the following documents:
	  ▪ Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010;
	  ▪ The Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW 2010.
	▪ Ensure that project staff and contractors and their employees are advised of their legal responsibilities under the *National Parks and Wildlife Act 1974* and the *Heritage Act 1977.*

Hazards and Risks	▪ Ensure all activities are carried out in accordance with *NSW Work Health Safety Regulation 2011*. ▪ Appointed contractors would need to be appropriately accredited, and undertake their work in accordance with an accepted WH&S Management Plan. ▪ Ensure all staff, sub-contractors and visitors to the site are appropriately inducted and made aware of hazards and emergency hazard procedures. ▪ Ensure all fuels are correctly stored, isolated away from vegetation and combustible sources. ▪ Ensure the fire extinguishers are regularly maintained and located around buildings and mobile machinery. ▪ Ensure all trafficked areas, access tracks and road verges are cleared of vegetation build up. ▪ Incorporate fire breaks, including a perimeter road, around the quarry site. ▪ Ensure any buildings, including temporary buildings, are set back at least 10m from any potential fuel sources.

	▪ Checking the underside of vehicles periodically to ensure they are kept free of vegetation debris that could dry out and ignite. ▪ Ensure a water cart/truck is equipped with a hose to assist in extinguishing any fired ignited and that there is sufficient water availability onsite for firefighting. ▪ Review and update, if required, hazard and risk management and contingency measures in the OEMP.
Hazardous Materials	▪ Diesel (Class C1) and lubricating oils and greases (Class C2) will not be stored adjacent to any other hazardous materials.
Traffic and Transport	▪ Operating hours in accordance with the development consent conditions. ▪ Provide adequate traffic management, including temporary speed restrictions, precautionary signs, illuminated warning devices, manual traffic control and provision of temporary barriers and markers when necessary. ▪ Monitor traffic amounts and driver performance.
Greenhouse Gas	▪ Biodiesel for machinery and equipment will be used where possible. ▪ All machines will be regularly maintained in accordance with the manufacturer's specifications. ▪ Ongoing driver education will be carried out to minimise greenhouse gas emissions arising from undesirable driver performance. ▪ Use modern, well-maintained machinery and vehicles where practicably possible.
Waste Management	▪ Waste materials generated from staff lunches would be removed from the site on a come clean – go clean basis. ▪ Transport of waste material off-site, whether for reuse, recycling or disposal, would be conducted by a licensed waste contractor where required by legislation. ▪ Empty hydrocarbon and chemical containers will be stored with closures in place on a hardstand or within a bunded area. ▪ Waste will be covered during transportation unless the waste consists solely of waste tyres or scrap metal. ▪ The vehicle used to transport the waste must be maintained so as to avoid the waste spilling, leaking or otherwise escaping from the vehicle. ▪ Containers used to transport waste should be checked to ensure they are safely secured to the vehicle.

	▪ For higher risk wastes (i.e. trackable waste), engage an approved contractor to remove the waste to the required destination for disposal.
Machinery	▪ Machinery maintenance to be undertaken in bunded and covered workshop area

An OEMP will be prepared for the quarry and will form part of the standard approach required for the operation of the site in order to establish and monitor objectives of the operation. This will include provisions for review and update should the proposal be approved.

Relevant monitoring programs will be included in the OEMP relating to specific performance criteria, including the following aspects of the operation:

- Operation schedule and production;
- Noise emission criteria, mitigation measures and incident response procedures;
- Dust emission criteria, mitigation measures and incident response procedures;
- Water management (quality and quantity) measures and incident response procedures;
- Biosecurity management and incident response procedures;
- Complaints receival and mitigation actions; and
- Environmental compliance.

6 Justification for the Proposal

Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) requires a detailed justification of the proposal and suitability of the site for the proposed expansion of Gum Flat Quarry. Mineral resource extraction can benefit and affect communities in different ways during the mining lifecycle. The sustainable management of mineral resources must consider and balance varying impacts to produce sustainable economic, social and environmental outcomes. The following justification therefore considers the potential biophysical, economic and social impacts and compliance with the principles of ecologically sustainable development (ESD).

6.1 Biophysical Impacts

Gum Flat Quarry is an existing quarry that has been in operation for 50-years but has not been required to or obtained development consent to operate. This a common issue with old quarries in that they did not initially require any form of development consent nor have been pursued by relevant authorities to obtain approval unless environmental issues had been caused or social impacts had become significant.

This application includes continued operation of the quarry at current levels of operation with an allowance for occasional larger project that could be obtained by the proponent. As indicated throughout this EIS, ongoing quarry extractions will occur vertically and not horizontally. The footprint of the quarry perimeter will not be expanded.

The remnant woodland that has been retained around the site is not to be impacted by ongoing operations. This woodland will be kept and will form part of the overall site rehabilitation process by providing habitat. This habitat will be expanded as part of the rehabilitation proposed that has commenced prior to this application being prepared.

Based on this assessment, the potential Biophysical impacts of the quarry will not be increased as a result of the quarry obtaining formal approval.

6.2 Economic Impacts

This application does not include any new capital investment in the site other than the cost of preparing the application and development of an irrigation area. The irrigation area had been proposed and work had commenced on the capture of runoff for improvement of primary production on the surrounding farm operations undertaken by the Proponent prior to this application being prepared.

The site is not expanding and no new quarry works are proposed. The development will not lead to the hiring of more staff as the operation of the quarry is already an ongoing activity; however, approval of the development will enhance job security for current staff.

Approval of the development will permit the quarry to continue its contribution to supplying the demand for gravel material across the region and to contribute to competitive pricing and diversity of gravel supply across the region.

No negative economic impacts for the community have been identified.

The proposal is considered justifiable on economic grounds, as it will deliver economic benefits to the local region.

6.3 Environmental Impacts

This assessment has provided thorough consideration of the potential impacts of the proposed development upon environmental values within the region. It is considered that, in the event that:

- Mitigation measures outlined in Section 6 of this report are implemented;
- Site management is outlined and recorded with the guidance of an Environmental Management Plan implemented on site; and
- The site is rehabilitated in accordance with the Rehabilitation Plan (Appendix H);

The environmental impacts of the development will be minimal, acceptable and the local environment will be protected from adverse impacts as a result of the continued operation of the quarry.

6.4 Ecologically Sustainable Development

Ecologically Sustainable Development (ESD) is defined as:

> *"Using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased (DPM 1990)."*

ESD is integrated into NSW environmental legislation and government policy. Schedule 2 of the EPA Regulation lists four guiding principles to assist in achieving ESD. They are:

- *The precautionary principle:* If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;

- *Inter-generational equity:* the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations;
- *Conservation of biological diversity and ecological integrity:* conservation of biological diversity and ecological integrity should be a fundamental consideration;
- *Improved valuation and pricing of environmental resources:* environmental factors should be included in the valuation of assets and services, such as polluter pays, full life cycle costing, and utilising incentive structures / market mechanisms to meet environmental goals.

6.4.1 Precautionary Principle

Schedule 2 of the EPA Regulation notes that application of the precautionary principle in public and private decision making processes should be guided by:

i. Careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and
ii. An assessment of the risk-weighted consequences of various options.

Providing the Quarry is operated as described in this EIS, the development is able to continue operations as a sustainable activity. No substantial threats of serious or irreversible environmental harm were identified. In addition, environmental monitoring will be used to confirm that the Quarry is operating in an environmentally sustainable way. Once the available resource is extracted and/or the demand for material has ceased the extraction operations will be cease and the site rehabilitated.

6.4.2 Intergenerational Equity

It is not expected that the proposal will have any significant adverse environmental effects due to the suitability of the site and the proposed high standards of design, management and site rehabilitation. Hence the proposed quarry provides for 'intergenerational equity'. The resource that is being quarried on this site underlies and extensive part of the surrounding region. The quarry will not result in the over-extraction of this high quality gravel resource which is utilised extensively throughout the Inverell and Gwydir Shires as a primary source of gravel. Sufficient gravel is available in the region to supply several more generations.

6.4.3 Biological Diversity and Ecological Integrity

The site footprint currently consists of an operational quarry; therefore the proposal will not result in any further vegetation clearing or habitat modification. It is intended to rehabilitate the site to a condition that would be suitable for agriculture, which will constitute an

improvement on habitat values presently on site. Consequently, no loss of existing biological diversity in the locality is expected.

6.4.4 Valuation and Pricing of Environmental Resources

Protection of amenity and natural resources has been considered throughout the quarry planning phase. The environmental controls which are already in place, and which will continue to be implemented, add significant cost to the proposed development. The development has therefore been developed in accordance with the polluter pays principle, in that environmental management and mitigation measures associated with the development have been funded by the Proponent.

6.4.5 Analysis of Alternatives

There remains an ongoing demand for gravel material across the region. The proponent does not have an alternative site for this proposal. The proponent will therefore not develop an alternative site on this property if the proposed development is not approved. It is highly likely that any new potential gravel resource would be investigated on undeveloped site and would therefore likely have relatively significant environmental impact as a result of clearing and establishment of a new quarry site.

The advantage of the current site is that is fully developed and does not introduce new impacts.

6.4.6 Consequences of Not Carrying Out the Development

If an alternate local resource cannot be accessed, material would need to be imported from other quarries or from outside of the local area. This would involve either a loss of economic competition and less value for money to the community, or additional traffic on public roads, which would be avoided if the proposal were to continue operations.

The local area would also not benefit from current investment and employment associated with the existing Quarry development.

7 Conclusion

This report has been prepared on behalf of ATJs Earthworks ("the Applicant") to assess the quarry operations and potential impacts of an existing quarry development located at 473 Eddy Park Lane, Gum Flat, NSW 2350, formally described as Lot 106 in Deposited Plan 656030.

The development application seeks approval for extraction of up to a maximum annual tonnage of 90,000-tonnes. The Proponent indicates that an average annual extraction tonnage of 50,000-tonnes is predicted for an average operational year.

This investigation has identified that the development proposal is consistent with relevant environmental planning instruments and meets the planning intent for the zoning of the *Inverell Local Environmental Plan 2012*.

Additionally, as detailed within this report, it is noted that the development application:

- Is consistent with the relevant regulatory provisions;
- Satisfies the relevant requirements of the State Environmental Planning Policies;
- Is consistent with the provisions of the Regional Plan;
- Adequately addresses and can appropriately manage potential off-site impacts associated with the quarry operation, including potential for stormwater runoff, noise and dust emissions;
- The site has been in operation for 50-years;
- Operates with a range of management policies to meet their environmental responsibilities.

The land is well located in terms of haulage routes to provide quarry material throughout the region. A suite of environmental mitigation measures has been presented to mitigate potential impacts to surrounding natural and built environments. Adoption of these mitigation measures forms part of the quarry's management protocols and procedures to ensure that it operates within acceptable thresholds and avoids unacceptable disturbance of local amenity and the environment.

Rehabilitation of the site has commenced and a proposal for complete rehabilitation is included with this application in the event that the quarry closes.

The development proposal is considered to meet current Extractive Industry Guidelines, statutory policy and best practice. The proposed development is capable of approval, subject to reasonable and relevant conditions of development.

8 References

Department of Environment and Conservation (DEC) (2005). *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*. DEC, Sydney, NSW.

Department of Environment and Conservation (DEC) (2006). *Technical Framework: Assessment and management of odour from stationary sources in NSW*. DEC, Sydney, NSW.

Department of Environment and Climate Change (DECC) (2008a). *Managing Urban Stormwater: Soils and Construction, Vol. 2C*. DECC, Sydney, NSW.

Department of Environment and Climate Change (DECC) (2008b). *Managing Urban Stormwater: Soils and Construction, Vol. 2E*. DECC, Sydney, NSW.

Department of Environment, Climate Change and Water (DECCW) (2010). *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*. DECCW, Sydney, NSW.

Department of Planning & Environment (DP&E) (2016). *Dark sky planning guideline: : protecting the observing conditions at Siding Spring*. Department of Planning and Environment, Sydney, NSW

Department of Planning & Infrastructure (DoP) (2011). *Hazardous and Offensive Development Application Guidelines: Applying SEPP 33*. State of New South Wales.

Department of Primary Industries – Water (DPI Water) (2016). *Dams in NSW Do you need a licence? March 2016*. (Fact Sheet available at: http://www.water.nsw.gov.au/__data/assets/pdf_file/0005/599117/Dams-in-nsw-do-you-need-a-licence.pdf)

Department of Urban Affairs and Planning (DUAP) (1996). *NSW EIS Guideline for Extractive Industries – Quarries.*

Environmental Protection Authority (EPA) (1999). *NSW Industrial Noise Policy*.

Environmental Protection Authority (EPA) (2014). *Waste Classification Guidelines Part 1: Classifying Waste*. EPA Document Ref: 2014/0796.

Environmental Protection Authority (EPA) (2014). *NSW Waste Avoidance and Resource Recovery Strategy 2014-21*. EPA Document Ref: 2014/0876.

Green D., Petrovic J., Moss P., Burrell M. (2011) *Water resource and management overview: Namoi Catchment*. NSW Department of Primary Industries, Sydney, NSW.

Landcom (2004). *Managing Urban Stormwater: Soils and Construction, Vol. 1* 2nd Edition. Landcom, Sydney, NSW.

Learmonth, R., Whitehead, R., Boyd, B., & Fletcher, S. (2007), Living and Working in Rural Areas. A handbook for managing land use conflict issues on the NSW Northwest slopes, Agricultural Landscapes.

Office of Environment and Heritage (OEH) (2012). *The land and soil capability assessment scheme – second approximation.* Sydney: Office of Environment and Heritage.

Rural Fire Service (RFS) (2006). *Planning for Bushfire Protection: A Guide for Councils, Planners, Fire Authorities and Developers*. Prepared by NSW Rural Fire Service in cooperation with the Department of Planning.

Appendix A: Site Plans

Appendix B: Secretary's Environmental Assessment Requirements

Requirement	Section
General Requirements The EIS must include:	
• an executive summary;	Page v
• a comprehensive description of the development, including:	
○ a detailed site description and history of any previous quarrying on the site, including a current survey plan;	Sections 1 & 1.5
○ identification of the resource, including the amount, type, composition;	Section 2.2
○ the layout of the proposed works and components (including any existing infrastructure that would be used for the development);	Appendix A
○ an assessment of the potential impacts of the development, as well as any cumulative impacts, including the measures that would be used to minimise, manage or offset these impacts;	Section 5
○ a detailed rehabilitation plan for the site;	Section 2.10 & Appendix H
○ any likely interactions between the development and any existing/approved developments and land uses in the area, paying particular attention to potential land use conflicts with nearby residential development;	Section 5.5
○ a list of any other approvals that must be obtained before the development may commence;	Section 4.2
○ the permissibility of the development, including identification of the land use zoning of the site;	Section 4.1
○ identification of sensitive receivers likely to be affected by the development using clear maps/plans, including key landform areas, such as conservation areas and waterways;	Section 5.5
• a conclusion justifying why the development should be approved, taking into consideration:	Section 6
○ alternatives;	
○ the suitability of the site;	
○ the biophysical, economic, and social impacts of the project, having regard to the principles of ecologically sustainable development; and	
○ whether the project is consistent with the objects of the Environmental Planning and Assessment Act 1979; and	Section 7
• a signed declaration from the author of the EIS, certifying that the information contained within the document is neither false nor misleading.	Page iv
Consultation In preparing the EIS for the development, you should consult with relevant local, State or Commonwealth Government authorities, infrastructure and service providers and any surrounding landowners and affected communities that may be impacted by the development. The EIS must describe the consultation that was carried out, identify the issues raised during this consultation, and explain how these issues have been addressed in the EIS.	Section 2
Key Issues	

Requirement	Section
The EIS must assess the potential impacts of the proposal at all stages of the development, including the establishment, operation and decommissioning of the development. The EIS must address the following specific issues:	

• **Noise** – including a quantitative assessment of potential:
  ○ construction and operational noise and off-site transport noise impacts of the development in accordance with the *Interim Construction Noise Guideline, NSW Noise Policy for Industry and NSW Road Noise Policy* respectively;
  ○ reasonable and feasible mitigation measures to minimise noise emissions; and
  ○ monitoring and management measures;
	Section 5.8 and Appendix C

• **Blasting & Vibration –**
  ○ proposed hours, frequency, methods and impacts; and
  ○ an assessment of the likely blasting and vibration impacts of the development, having regard to the relevant ANZECC guidelines and paying particular attention to impacts on people, buildings, livestock, infrastructure and significant natural features;
	Section 5.9 and Appendix C

• **Air –** including an assessment of the likely air quality impacts of the development in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*. The assessment is to give particular attention to potential dust impacts on any nearby private receivers due to construction activities, the operation of the facility;	Section 5.7

• **Water –** including:
  ○ a detailed site water balance and an assessment of any water licensing requirements or other approvals required under the Water Act 1912 and/or the Water Management Act 2000, including a description of the measures proposed to ensure the development can operate in accordance with the requirements of any relevant Water Sharing Plan or water resource embargo;
  ○ an assessment of potential impacts on the quality and quantity of existing surface and ground water resources, including a detailed assessment of proposed water discharge quantities and quality against receiving water quality and flow objectives; and
  ○ a detailed description of the proposed water management system, water monitoring program and other measures to mitigate surface and groundwater impacts;
	Section 5.9 and Appendix J

• **Biodiversity –** including: ○ accurate predictions of any vegetation clearing on site;	Section 5.12 & Appendix E, F

Requirement	Section
○ a detailed assessment of the potential biodiversity impacts of the development, paying particular attention to threatened species, populations and ecological communities and groundwater dependent ecosystems undertaken in accordance with Sections 7.2 and 7.7 of the *Biodiversity Conservation Act 2016*; and ○ a detailed description of the proposed measures to maintain or improve the biodiversity values of the site in the medium to long term, as relevant.	
• **Heritage –** including: ○ An Aboriginal Cultural Heritage Assessment Report (ACHAR), prepared in accordance with relevant policy and guidelines, identifying, describing and assessment any impacts to Aboriginal cultural heritage sites or values associated with the project. ○ The ACHAR must be prepared in accordance with the Guide to investigating, Assessing and reporting on Aboriginal Cultural heritage in NSW (OEH, 2011) and the Code of Practice for the Archaeological Investigation of Aboriginal Objects in SNW (DECCW, 2010), including results of thorough archaeological survey and test excavations (where required); ○ Include evidence of adequate and continuous consultation with Aboriginal stakeholders in determining and assessing impacts, developing and selecting options for avoidance of Aboriginal cultural heritage; and mitigation measures (including the final proposed measures), having regard to the Aboriginal Cultural heritage Consultation requirements for Proponents (DECCW, 2010);	Section 5.13
• **Traffic &Transport –** including: ○ accurate predictions of the road traffic generated by the construction and operation of the development, including a description of the types of vehicles likely to be used for transportation of quarry products; ○ an assessment of potential traffic impacts on the capacity, condition, safety and efficiency of the local and State road networks, detailing the nature of the traffic generated, transport routes, traffic volumes and potential impacts on local and regional roads; ○ a description of the measures that would be implemented to maintain and/or improve the capacity, efficiency and safety of the road network (particularly the proposed transport routes) over the life of the development; ○ evidence of any consultation with relevant roads authorities, regarding the establishment of agreed contributions towards road upgrades or maintenance; and ○ a description of access roads, specifically in relation to nearby Crown roads and fire trails;	Section 5.15 & Appendix G
• **Land Resources–** including an assessment of:	Sections 5.2, 5.3, 5.4

Requirement	Section
○ potential impacts on soils and land capability (including potential erosion and land contamination) and the proposed mitigation, management and remedial measures (as appropriate); and ○ an assessment of activities that could cause erosion or sedimentation issues, and the proposed measures to prevent or control these impacts;	
• **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;	Section 5.16
• **Hazards** – including an assessment of the likely risks to public safety, paying particular attention to potential bushfire risks and the transport, storage, handling and use of any hazardous or dangerous goods;	Sections 5.14 & 4.5.2
• **Visual** – including an assessment of the likely visual impacts of the development on private landowners in the vicinity of the development and key vantage points in the public domain, including with respect to any new landforms;	Section 5.6
• **Social & Economic –** an assessment of the likely social and economic impacts of the development;	Section 5.19
• **Rehabilitation –** including: ○ a detailed description of the proposed rehabilitation measures that would be undertaken throughout the development; ○ a detailed rehabilitation strategy, including justification for the proposed final landform and consideration of the objectives of any relevant strategic land use plans or policies; and ○ potential impacts on landforms(topography). Paying particular attention to the long-term geotechnical stability of any new landforms (such as overburden dumps, bunds etc.).	Section 2.10 & Appendix H
Environmental Planning Instruments The EIS must consider all relevant State Government environmental planning instruments, guidelines, policies, and plans. 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. During the preparation of the EIS you must also consult the Department's EIS Guideline – Extractive Industries – Quarries. This guideline is available at http://www.planning.nsw.gov.au/~/media/Files/DPE/Guidelines/extractive-industries-quarries- eis-guideline-1996-10.ashx . In addition, the EIS must assess the development against the *Inverell LEP 2012* and any relevant development control plans/strategies.	Section 4 Section 4.8

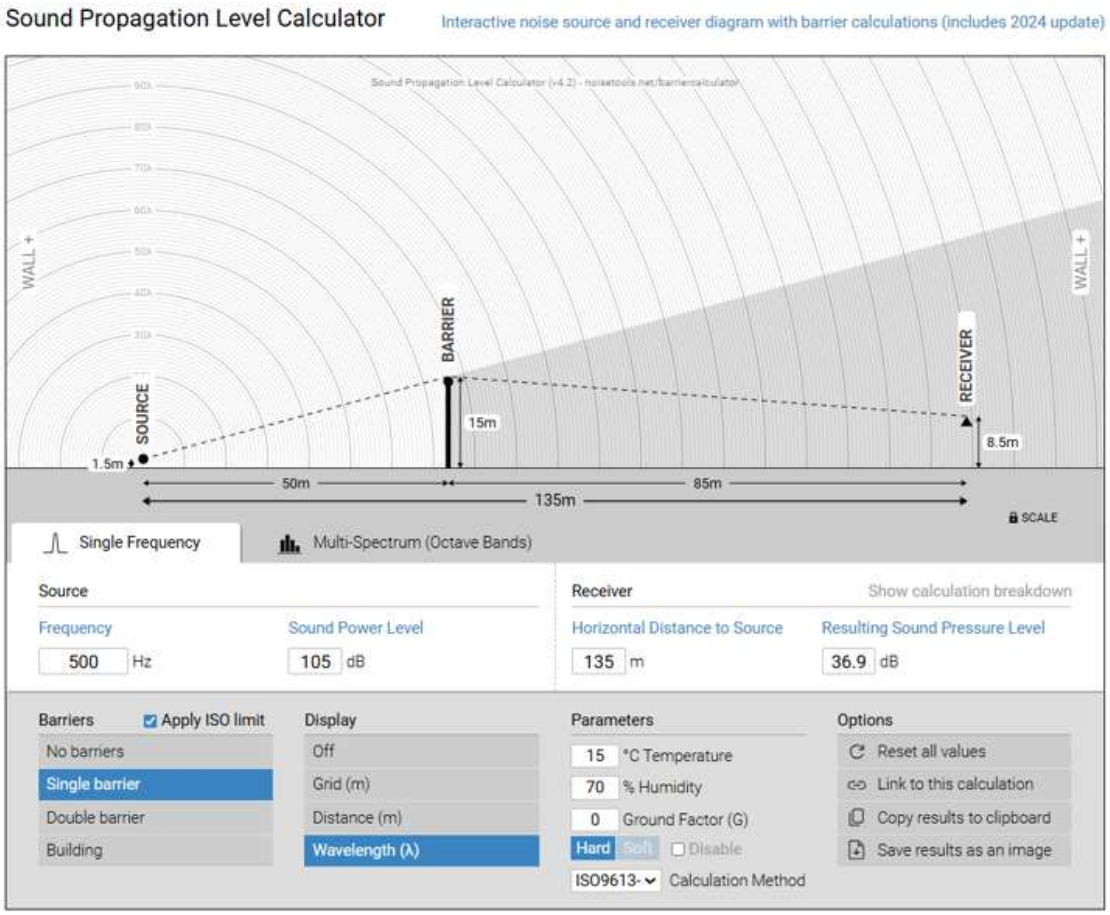
Appendix C: Noise Level Calculations

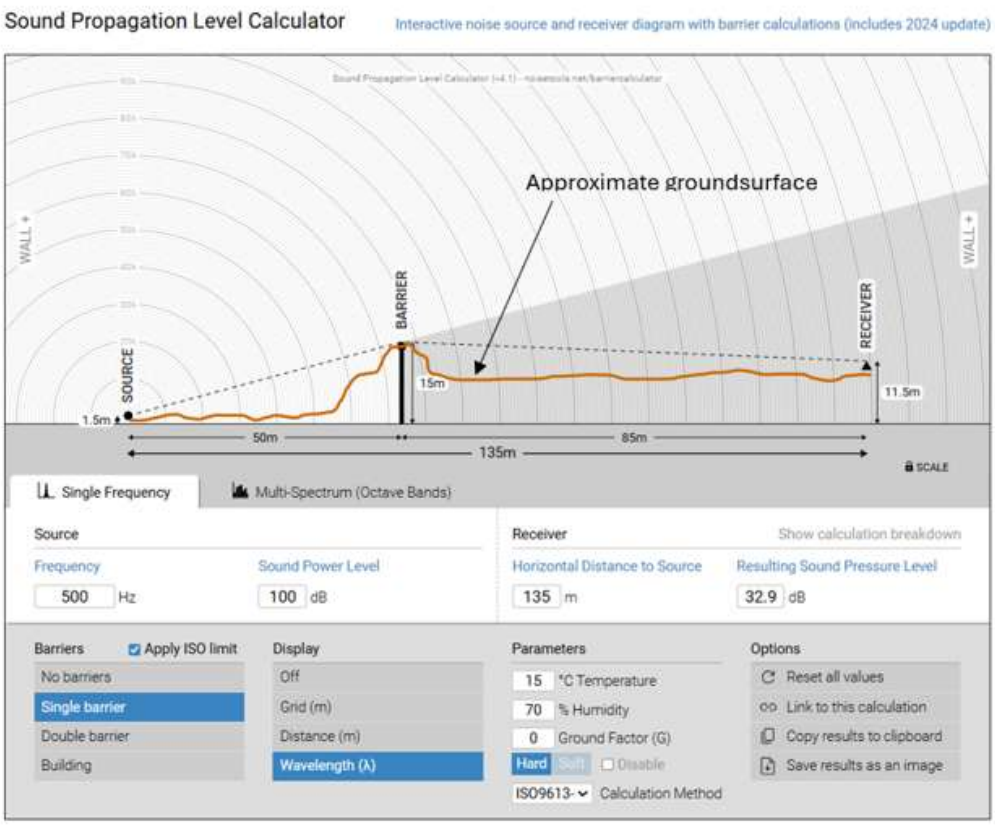
Calculated Sounds levels for Receptor R1 from SPH Quarry

Tool used: Sound Propagation and Acoustic Barrier Calculator - NoiseTools.net

Notes:

- Reference level of Calculator: 690 m AHD
- Source: machinery in quarry pit: 1.5m above pit surface. Pit surface is 10 m below natural surface (690m AHD)
- Barrier: 5 m gravel berm around quarry boundary (705m AHD) (natural surface level at quarry boundary is 700m AHD)
- Receiver: : Receptor R1 residence: 1.5m above natural surface (697m AHD) located 85 m west from top of gravel berm.



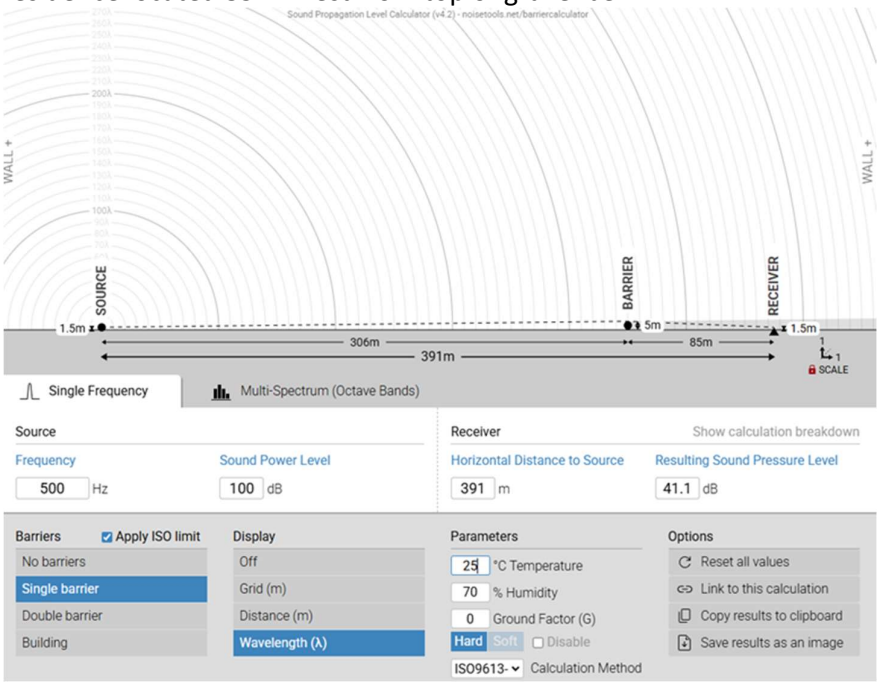


<u>Calculated Sounds levels for R1 from Haul Road trucks to & from SPH Gum Flat Quarry</u>

Source: Trucks on Haul road, at natural surface

Barrier: 5 m gravel berm around quarry boundary

Receiver: : R1 residence located 85 m west from top of gravel berm



Calculated Sounds levels for Gum Flat Primary School from SPH Quarry

Tool used: [Sound Propagation and Acoustic Barrier Calculator - NoiseTools.net]

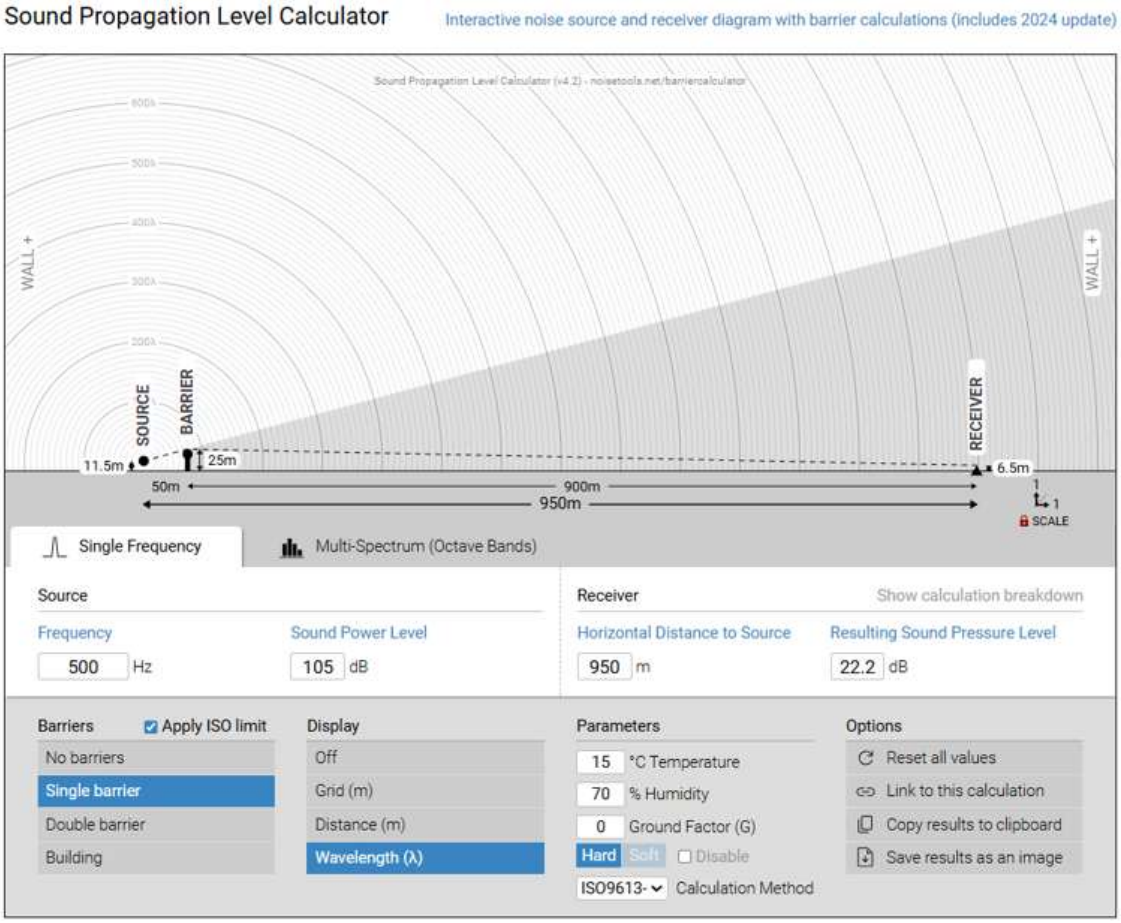
Notes:

- Reference level of Calculator: 680 m AHD
- Source: machinery in quarry pit: 1.5m above pit surface. Pit surface is 10 m below natural surface (690m AHD)
- Barrier: 5 m gravel berm around quarry boundary (705m AHD) (natural surface level at quarry boundary is 700m AHD)
- Receiver: Gum Flat Primary School at 1.5m above natural surface (685m AHD) located 900m southwest from top of gravel berm.

Source: machinery in quarry pit, 10 m below natural surface

Barrier: 5 m gravel berm around quarry boundary

Receiver: Gum Flat Primary School locate 900 m from top of gravel berm



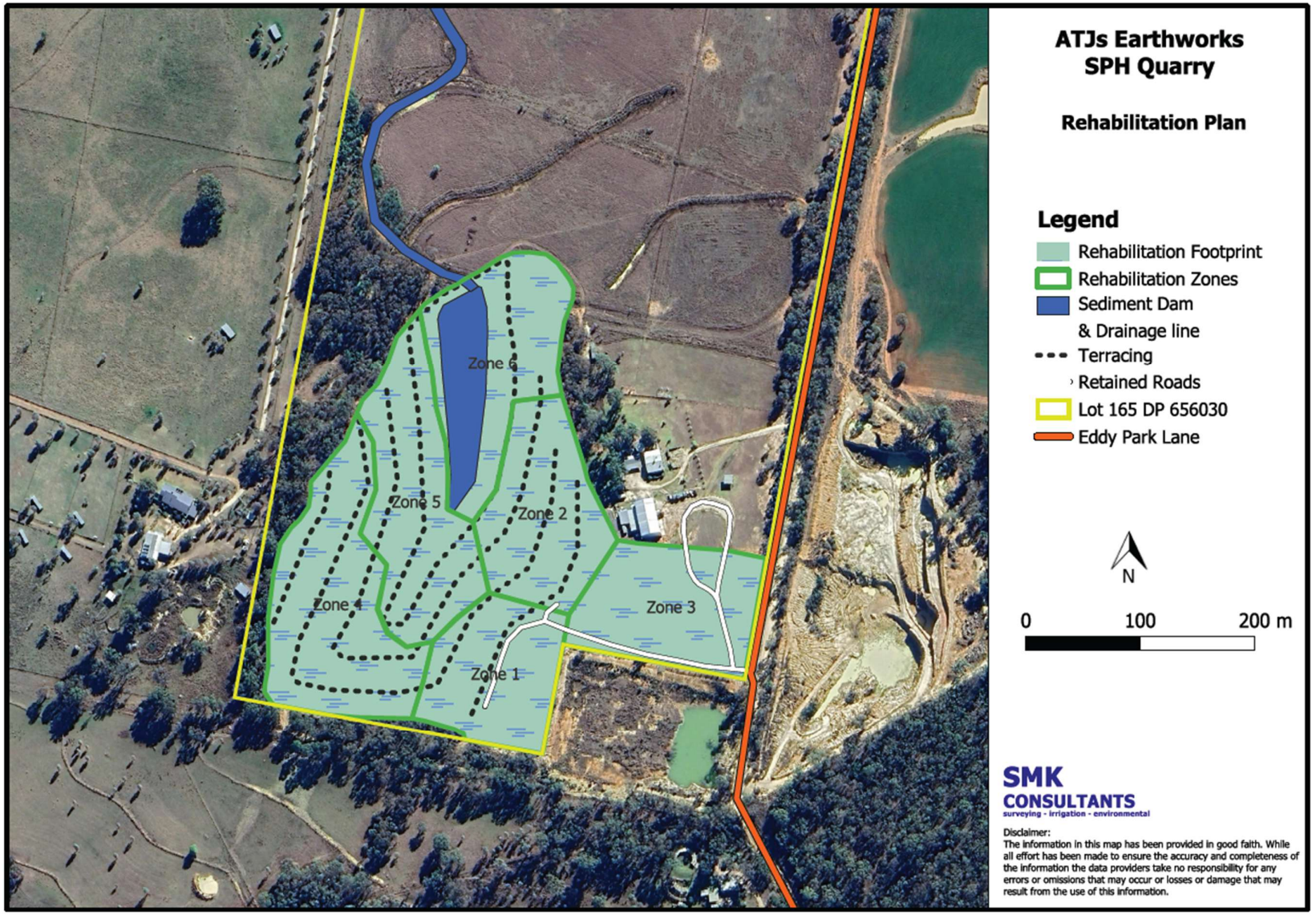
Appendix D: Land Use Conflict Risk Assessment

Appendix E: Matters of National Environmental Significance

Appendix F: Test of Significance

Appendix G: Traffic Impact Assessment

Appendix H: Rehabilitation Plan



Rehabilitation Plan Details

Rehabilitation Zones

Rehabilitation Zone	Area (ha)		Date	Revegetation Species
	Total	Landscaped & revegetated		
Zone 1	1.33	0.35	Nov 2022	*Eucalyptus sideroxylon, Eucalyptus moluccana, Eucalyptus melliodora, Eucalyptus microcorys, Acacia melanoxylon, Dianella cerulean, Hardenbergia violacea*
Zone 2	1.53	0.05	Nov 2022	*Eucalyptus sideroxylon, Eucalyptus melliodora, Dianella cerulean, Poa labillardieri*
Zone 3	1.54	0.05	2020-2024	*Eucalyptus Citriodora, Eucalyptus Scoparia, Pyrus calleryana*, Prunus nigra Sp.**
Zone 4	2.18	0.1	Nov 2024	*Eucalyptus Albens, Eucalyptus melliodora, Eucalyptus crebra, Angophora floribunda*
Zone 5	1.83	0.1	Nov 2024	*Eucalyptus Albens, Eucalyptus melliodora, Eucalyptus crebra, Angophora floribunda*
Zone 6	1.88	0.1	Sept 2024-	*Eucalyptus sideroxylon, Eucalyptus melliodora, Eucalyptus crebra*
Totals	**10.29**	**0.75**		

**Planted around permanent infrastructure*

Figure 1: Zone 1 Rehabilitation Nov 2024

Figure 2: Zone 1 Rehabilitation Nov 2024

Appendix I: AHIMS Search Results

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : Gum Flat
Client Service ID : 900437

SMK Consultants Pty Ltd - Moree
P O Box 774
Moree New South Wales 2400
Attention: Peter Taylor
Email: ptaylor@smk.com.au

Date: 13 June 2024

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 106, DP:DP656030, Section : - with a Buffer of 200 meters, conducted by Peter Taylor on 13 June 2024.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.

A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (https://www.legislation.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Heritage NSW upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Heritage NSW and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date. Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

Appendix J: Water Balance

The following table provides a detailed water balance and maximum pond sizing for the internal holding pond within the quarry floor.

SPH Gum Flat Quarry

Runoff Holding Pond Annual Water Balance - 90 percentile wet year

= input required

The 90 percentile wet year for the Bureau of Meteorology Data at Site #056017 - Inverell Comparison (for years 1880- 1996) is 1903

Month	Inverell Daily Pan Evaporation* (mm)	1903 Monthly Rain* (mm)	1903 Monthly Rain* (m)	Rainfall on Sump (m3)	Quarry Drainage Area Runoff (m3)	Total capture (m^3)	Av. Evap.* (m)	Evap. Loss (m3)	Net Volume# (m3)	Net water available for irrigation (m3)	Irrigation of 2 ha - Rainfall deficit	Net Storage Required (m^3)	
				a	b			c	a+b-c-d	0	Irrigation requirement over Area (m3)		
Jan	6.7	6.4	0.006	16	275	292	0.21	527	-4,181	0	4,026	0	
Feb	6.0	0.5	0.001	1	22	23	0.17	426	-4,349	0	3,350	0	
Mar	5.2	111.1	0.111	282	4,781	5,063	0.16	409	708	708	1,002	0	
Apr	3.8	31.9	0.032	81	1,373	1,454	0.11	289	-2,781	0	1,642	0	
May	2.7	87.6	0.088	222	3,770	3,992	0.08	212	-166	0	0	0	
Jun	2.0	46.3	0.046	117	1,992	2,110	0.06	152	-1,988	0	274	0	
Jul	2.0	129.6	0.130	329	5,577	5,906	0.06	157	1,803	1,803	0	1,803	
Aug	2.8	108.6	0.109	276	4,673	4,949	0.09	220	783	2,586	0	2,586	
Sep	3.9	116.8	0.117	296	5,026	5,322	0.12	297	1,080	3,666	4	3,662	
Oct	5.1	96.6	0.097	245	4,157	4,402	0.16	401	55	3,721	1,230	2,491	
Nov	6.0	95.3	0.095	242	4,101	4,343	0.18	457	-60	3,662	1,694	1,968	
Dec	6.6	132.7	0.133	337	5,710	6,047	0.20	519	1,582	5,244	1,438	3,806	
Total	53	963							-7,512.88		Max. Capacity Required	3,806	
												3.8	(ML)

Assumptions

Holding pond Area (m3) =	2,537	Quarry Drainage Area (QDA) (ha) =	8.860	**Areas**	
Quarry Drainage Area (m3) =	86,063	Quarry Drainage Area (QDA) (m^2) =	88,600		
Runoff Coefficient =	0.5	Holding pond Area (m^2) =	2,537		
Required Sump Volume (m^3) =	3,806	Quarry Drainage Area (TQA - Sump) (m2) =	86,063		
Average Sump Depth (m) =	1.5				
Sump Area for specified depth (m^2) =	2,537				

#Potential seepage losses from Drainage Sump (d):

granite gravel permeability =	6.00E-07
=	2.16E-03
=	0.05
=	1.555
=	**3,946**

*Source: Bureau of Meteorology

(b) Runoff = Controlled drainage area x rainfall x runoff coeff.

(d) Evap. Loss = Evaporation x Total Pond Area

Month	Daily Evap (mm)	Days	Monthly Evap (mm)	Rainfall deficit (mm)		Irrigation balance over Area (m3)	Irrigation requirement over Area (m3)	Irrigation Area (m^2)	Irrigation Area (ha)
Jan	6.70	31	208	201		4026	4026	20000	2
Feb	6.00	28	168	168		3350	3350		
Mar	5.20	31	161	50		1002	1002		
Apr	3.80	30	114	82		1642	1642		
May	2.70	31	84	-4		-78	0		
Jun	2.00	30	60	14		274	274		
Jul	2.00	31	62	-68		-1352	0		
Aug	2.80	31	87	-22		-436	0		
Sep	3.90	30	117	0		4	4		
Oct	5.10	31	158	62		1230	1230		
Nov	6.00	30	180	85		1694	1694		
Dec	6.60	31	205	72		1438	1438		
		Total	1603	640					

Holding Pond Dimensions with

Bottom (m)	
L	**87**
W	**29**
Alternate dimensions:	
Bottom (m)	
L	**65**
W	**40**
Total Area	**2,600**

The following table provides a detailed water balance for the sediment holding pond to be constructed for the Workshop catchment area.

SPH Gum Flat Quarry

Workshop Runoff Holding Pond Annual Water Balance - 90 percentile wet year

= input required

The 90 percentile wet year for the Bureau of Meteorology Data at Site #056017 - Inverell Comparison (for years 1880- 1996) is 1903

Month	Inverell Daily Pan Evaporation* (mm)	1903 Monthly Rain* (mm)	1903 Monthly Rain* (m)	Rainfall on Sump (m3)	Quarry Drainage Area Runoff (m3)	Total capture (m^3)	Av. Evap.* (m)	Evap. Loss (m3)	Net Volume# (m3)	Net water available for irrigation (m3)	Irrigation of 2 ha - Rainfall deficit	Net Storage Required (m^3)
				a	b			c	a+b-c-d	0	Irrigation requirement over Area (m3)	
Jan	6.7	6.4	0.006	2	28	30	0.21	53	-422	0	4,026	0
Feb	6.0	0.5	0.001	0	2	2	0.17	43	-439	0	3,350	0
Mar	5.2	111.1	0.111	28	488	517	0.16	41	77	77	1,002	0
Apr	3.8	31.9	0.032	8	140	148	0.11	29	-279	0	1,642	0
May	2.7	87.6	0.088	22	385	407	0.08	21	-12	0	0	0
Jun	2.0	46.3	0.046	12	203	215	0.06	15	-198	0	274	0
Jul	2.0	129.6	0.130	33	570	603	0.06	16	189	189	0	189
Aug	2.8	108.6	0.109	28	477	505	0.09	22	85	273	0	273
Sep	3.9	116.8	0.117	30	513	543	0.12	30	115	388	4	384
Oct	5.1	96.6	0.097	25	425	449	0.16	40	11	399	1,230	0
Nov	6.0	95.3	0.095	24	419	443	0.18	46	-1	398	1,694	0
Dec	6.6	132.7	0.133	34	583	617	0.20	52	167	565	1,438	0
Total	53	963							-707.68		Max. Capacity Required	384
												0.4 (ML)

Assumptions

Holding pond Area (m3) =	256	Quarry Drainage Area (QDA) (ha) =	0.905	**Areas**
Quarry Drainage Area (m3) =	8,789	Quarry Drainage Area (QDA) (m^2) =	9,045	
Runoff Coefficient =	0.5	Holding pond Area (m^2) =	256	
Required Sump Volume (m^3) =	384	Quarry Drainage Area (TQA - Sump) (m2) =	8,789	
Average Sump Depth (m) =	1.5			
Sump Area for specified depth (m^2) =	256			

#Potential seepage losses from Drainage Sump (d):

granite gravel permeability =	6.00E-07	m/s
=	2.16E-03	m/hr
=	0.05	m/day
=	1.555	m/mth
=	398	m^3/mth

*Source: Bureau of Meteorology

(b) Runoff = Controlled drainage area x rainfall x runoff coeff.

(d) Evap. Loss = Evaporation x Total Pond Area

Month	Daily Evap (mm)	Days	Monthly Evap (mm)	Rainfall deficit (mm)		Irrigation balance over Area (m3)	Irrigation requirement over Area (m3)	Irrigation Area (m^2)	Irrigation Area (ha)
Jan	6.70	31	208	201		4026	4026	20000	2
Feb	6.00	28	168	168		3350	3350		
Mar	5.20	31	161	50		1002	1002		
Apr	3.80	30	114	82		1642	1642		
May	2.70	31	84	-4		-78	0		
Jun	2.00	30	60	14		274	274		
Jul	2.00	31	62	-68		-1352	0		
Aug	2.80	31	87	-22		-436	0		
Sep	3.90	30	117	0		4	4		
Oct	5.10	31	158	62		1230	1230		
Nov	6.00	30	180	85		1694	1694		
Dec	6.60	31	205	72		1438	1438		
		Total	1603	640					

Holding Pond Dimensions with 3 to 1 L

Bottom (m)	
L	**28**
W	**9**
Alternate dimensions:	
Bottom (m)	
L	**20**
W	**15**
Total Area	**300**

Appendix K: Historic imagery

Historical Images Showing development of ATJ Earthworks Gum Flat Quarry

Dec 1973 image showing commencement of quarry operations.

March 1985 showing significant western expansion of quarry footprint.

Sept 1989 showing expansion of quarry footprint and deepening of quarry.

2003 Image showing quarry footprint.

2022 Showing extension of quarry to north

2023 Image showing current quarry footprint