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Avoca Pit

STATEMENT OF ENVIRONMENTAL EFFECTS

Johnstone Concrete & Landscape Supplies Pty Ltd
173 Old Gunnedah Road, Narrabri NSW 2390

January 2021

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Prepared by: SMK Consultants
39 Frome Street, Moree, NSW 2400

January 2021

DOCUMENT CONTROL

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1	January 2021	Marie Duffy	Initial Issue to Council

EXECUTIVE SUMMARY

This development proposal has been prepared by SMK Consultants on behalf of Johnstone Concrete & Landscape Supplies Pty Ltd ("the Applicant") to support a development application to the Narrabri Shire Council for a quarry development to be known as the "Avoca Pit" at 2171 Maules Creek Road Tarriaro to extract up to 29,900 tonnes of gravel material per year.

Applicant: Johnstone Concrete & Landscape Supplies Pty Ltd
ABN: 43 151 205 882
173 Old Gunnedah Road
Narrabri, NSW 2390

Owner: Brock Ian Johnstone & Clint Lee Johnstone
C/O Johnstone Concrete & Landscape Supplies Pty Ltd
173 Old Gunnedah Road
Narrabri, NSW 2390

Land involved:

Lot Number	Deposited Plan
923	1046736

Local Government Authority: Narrabri Shire Council

Zoning: 'RU1' Primary Production under the *Narrabri Local Environmental Plan 2012*

Development Type: Local Development under the *Environmental Planning and Assessment Act 1979*

Development Description: 29,900 tonne / annum Gravel Quarry

Capital Investment Value: $25,000

Approvals and Licences

The following approvals are required to develop a quarry at the "Avoca Pit" to extract up to 29,900 tonne/year:

- Development Approval from the Narrabri Shire Council under the *Narrabri Local Environmental Plan 2012.*

The Proposed Development

Johnstone Concrete & Landscape Supplies Pty Ltd proposes to extract gravel and fill material from an existing farm quarry to supply quarry material to the local Narrabri region for infrastructure and construction projects.

The quarry has been historically utilised as a farm quarry and consists of variable material including clay, gravel, river rock and sand. The material is suitable for road base and inert fill. To date, it has not been subject to a development application and approval under the *Environmental Planning and Assessment Act 1979*. This application involves obtaining consent for the quarry to enable the extraction and sale of material outside of the farm gate.

The proposal is considered as Local Development under the *Environmental Planning and Assessment Act 1979.*

The proposed development is considered as permissible with the consent of the Narrabri Shire Council under the *Narrabri Local Environmental Plan 2012.*

This environmental assessment of the proposed development has determined that if appropriate safeguards and environmental management practises are adopted on the site, the quarry could be operated with minimal harm to the environment or the amenity of residents within the local area.

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1 Introduction

Johnstone Concrete & Landscape Supplies Pty Ltd have engaged SMK Consultants to prepare this Statement of Environmental Effects (SoEE). The report is to accompany a Development Application to the Narrabri Shire Council to seek Council consent to operate a Quarry Enterprise to extract up to 29,900 tonnes of quarry material per annum off the property of "Avoca" which is located at 2171 Maules Creek Road, Tarriaro in northern NSW.

A Development Application is required pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The appropriate determining authority is the Gwydir Shire Council. A SoEE is required in accordance with Section 4.15 of the EP&A Act. This report will include an assessment of the suitability of the site for the proposed development and the potential environmental impacts on both the natural and built environments, and social and economic impacts in the locality.

1.1 Authors

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

- **Hayley Bouliopoulos** B.Sc. Env, B.B.
- **Marie Duffy** B.Sc. M.Sc.

1.2 Development Site

The development site covers an area of 1.46 hectares on Lot 923 in Deposited Plan 1046736. The site is located on Maules Creek Road, approximately 31 kilometres south-east of the township of Narrabri within the Narrabri Shire local government area. The locality of the proposed development site is shown in Figure 1. The layout of the proposed development site is presented in the Figure 2 and included in Appendix 1.

Figure 1: Quarry Site Locality Plan

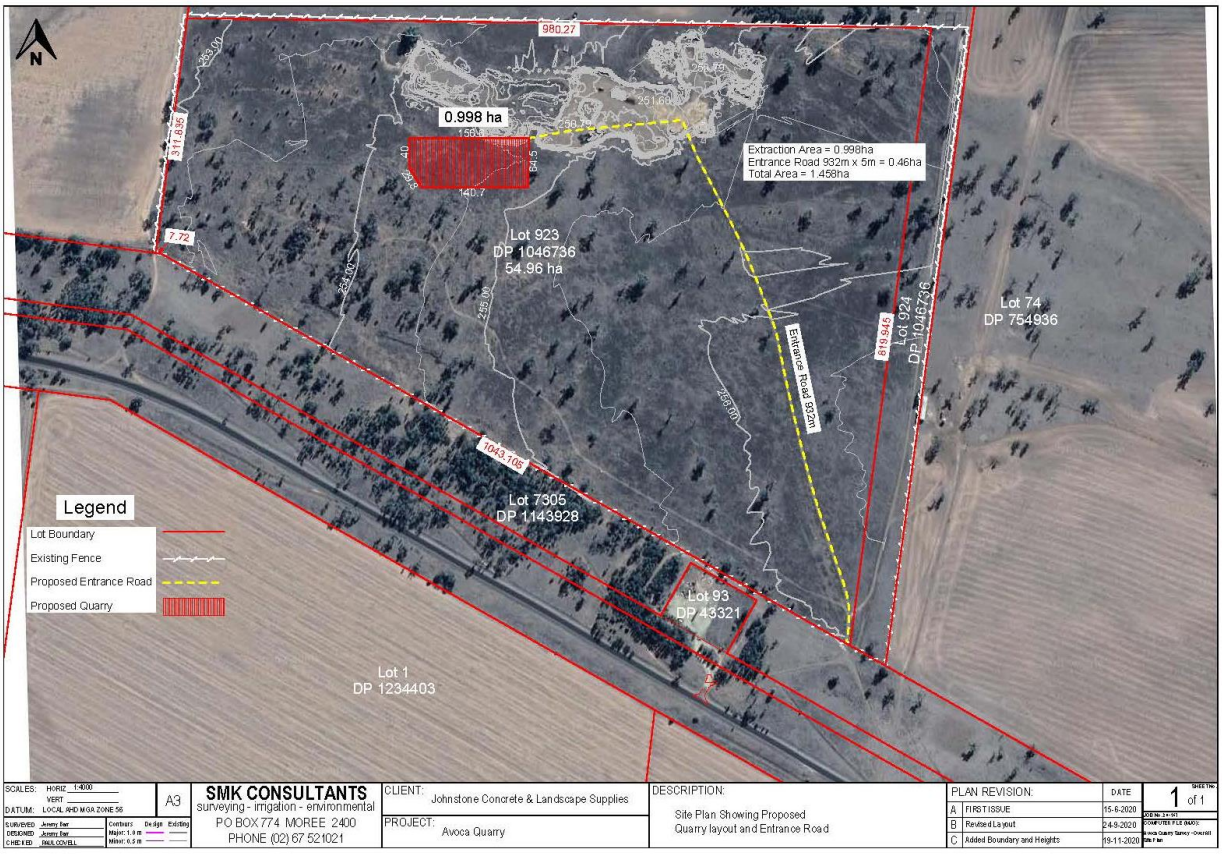


Figure 2: Site Plan showing Proposed Avoca Pit Extraction and Total Footprint

1.3 Proposed Development

The property has historically been used for grazing and cultivation. The quarry was originally developed for on-farm use. The quarry is currently abandoned, and the property is utilised for grazing of cattle. Local demand exists for fill material available from the quarry site.

This application seeks to obtain non-designated development approval for operation of the quarry site. The intended operations will remain under the 30,000 cubic metres per annum threshold and other provisions under Schedule 3 of the *Environmental Planning and Assessment Regulation 2000*, mainly:

"Extractive industries (being industries that obtain extractive materials by methods including excavating, dredging, tunnelling or quarrying or that store, stockpile or process extractive materials by methods including washing, crushing, sawing or separating)—

(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."

The intent of this development application is to obtain raw materials with an annual extraction limit of 29,900 tonnes / annum (i.e. approximately 17.9 cubic metres, based on a conversion rate of 1.68 tonnes per cubic metre). The footprint of the proposal is less than 2 Ha. The proposal is not within 40m of a waterbody or on the coast. The quarry is not located on contaminated or acid sulphate soils. No blasting is required for this type of gravel. No other quarries are located within 500m of this site. No approvals are in place for extraction of gravel from this site at present. Based on the above, the development is considered as non-designated.

Proposed operations will consist of winning and loading material from the proposed quarry pit by using an excavator, front-end loader and trucks. The material from the proposed Avoca Pit would be suitable for road or foundation subgrade material.

Normal hours of operation would be from 6 am to 6 pm Monday to Friday, and from 6 am to 1 pm on Saturdays. There will be no work at the site on Sundays or public holidays. Some work would occur outside of these hours. This work would consist of arrival of staff and general maintenance of equipment.

It is expected that the establishment and operation of the quarry will require up to two part-time staff, given the intermittent nature of the quarry operation. No additional staff will be employed in association with the Avoca Pit, and it is likely that existing staff hired by Johnstone Concrete & Quarries will work on-site on an as-required basis.

The quarry material would be extracted using an excavator. The dozer would stockpile the material onsite. No blasting is required as the material is considered soft rock. Processing onsite would be limited to screening of material; no crushing will take place on-site. Site operations would involve temporary establishment of portable equipment. On-site facilities would be limited to a portaloo. There will be no site office or lunchroom facilities.

An excavator and/or front-end loader would be used to load trucks. The trucks would then use an existing access road to leave the property and enter onto the Maules Creek Road for deliveries directly to project sites or to the Johnstone Concrete and Landscaping Supplies commercial premises along Old Gunnedah Road.

Machinery will be refuelled on-site. Fuel for all plant and machinery will be brought to the site in vehicle mounted fuel tanks on an as required basis. A service truck will be utilised for any on-site maintenance or servicing requirements. As an additional precautionary measure, bunded trays and spill kits (oil and water absorbents) will be available on-site during refuelling and maintenance of plant and equipment, or any other activity that could result in spillage of a chemical, fuel or lubricant to soil. Refuelling will be conducted in designated areas away from sensitive receptors and at least 100 m away from watercourses, water holes, lakes or wetlands. No fuel or other chemicals will be stored on-site.

No fuels, petroleum, hydrocarbon, oils, lubricants, gas products or combustible liquids will be stored on-site.

The quarry will be formed in two stages, with excavation works commencing on the westernmost end of the proposed footprint area. The quarry footprint drains towards the north-western corner of the footprint area, and a sediment pond would be constructed at this location as soon as practicable, following initial excavations. Phase 1 would involve the

excavation of approximately 0.5 Hectares, with the remaining 0.49 Hectares in the eastern section of the quarry footprint being excavated during Phase 2.

The site plan included in Appendix 1 presents an aerial image of the area showing the quarry site location and the surrounding land. The proposed quarry extraction footprint is 0.99 hectares. The total footprint including the extraction area and the existing access road is 1.46 hectares.

The following figures presents photographs of the existing quarry site and proposed footprint.

Figure 3: Photograph of existing quarry site

Figure 4: Photograph of proposed quarry footprint looking west

Figure 5: Photograph of proposed quarry footprint looking east

Quarry operations commenced more than 20 years ago during a period where quarry approvals for small commercial quarries or farm-use quarries were not required. The quarry operations have therefore continued to operate without formal approval.

At the cessation of the proposed quarry operations, spoil material and topsoil would be spread over the disturbed area and revegetated with grass as a pioneer species to encourage shrub and tree growth. The quarry is below ground and therefore the quarry floor would be shaped so as to form a shallow, localised depression which would collect local runoff and provide a stock watering point for the farm. The capacity of the quarry to store water would be limited to the available harvestable property right.

2 Infrastructure Requirements

2.1 Telecommunications and Electricity

No additional telecommunications or electricity connections will be required as a result of this proposal. Mobile phone coverage is available on the site. Equipment to be utilised on the site will be diesel powered.

2.2 Water Supply

On occasions, the quarry and haulage operations will create dust and therefore require some water for dust suppression. No other water supply is required for the operations.

The main potential source of dust would be traffic dust from trucks moving to and from the quarry site. Under circumstances where the dust is considered to impact adjoining landowners, the proponent would undertake selective road watering to avoid such impacts.

The primary water supply for road watering would be from water captured within the quarry site. This water can be legally extracted and used for road watering or many other purposes on a farm without a water use approval, as long as the water storage is beneath the on-farm harvestable rights threshold level. If required, additional water would be trucked into the site for dust suppression. This water would be obtained using existing groundwater entitlements.

2.3 Sewage from Onsite Amenities

A portaloo will be utilised as required for more intensive operations on the site to provide employees with these facilities whilst the quarry is operational. For this application, no permanent building or facility is to be erected on the properties.

2.4 Stormwater

All extractions will be below ground. Stormwater will be captured within the quarry site and therefore no silty water can flow from the active quarry pit.

Stockpiled material will generally be placed within the confines of the gravel quarry and therefore runoff from these stockpiles will be captured within the quarry. A sediment pond will be created within the quarry footprint to collect internal run-off.

The disturbed land around the quarry site will include bare ground for truck movements. The surrounds are generally maintained as grasses for grazing of stock. The runoff from the disturbed ground will generally dissipate in the vegetation and silt will settle in this vegetation.

Diversion banks will be installed up-slope of the proposed development to divert clean water away from the development. A sediment control plan has been prepared for the proposal and is included in Appendix 1.

2.5 Property Access

The quarry is accessible from the Maules Creek Road, using an existing property access that crosses Lot 7305 in Deposited Plan 1143928, a land parcel owned by Crown Lands. This is maintained by Local Land Services as part of the Travelling Stock Route. Pursuant to Section 75 of the *Local Land Services Act 2013*, the applicant is entitled to a right of way across this land parcel and no landowner consent is required, as the proposal does not entail construction or upgrade works within this Lot.

The existing access is a gravelled road with an existing single pipe culvert. Figures 6 – 8 below provide a view of the existing access and sight distances onto Maules Creek Road.

The available intersection sight distances are in excess of 500m. This is considered sufficient. Speed limits on the road are restricted to 100 km per hour.

Figure 6: Existing Access to Avoca Pit from Maules Creek Road

Figure 7: View from Existing Access looking East along Maules Creek Road

Figure 8: View from Existing Access looking West along Maules Creek Road

3 Policy and Legislation Assessment

3.1 Permissibility

The development is defined as an *extractive industry*. The proposed quarry is compatible with the objectives of the site's RU1– Primary Production zoning and permissible with development consent, under the provisions of the *Narrabri Local Environmental Plan 2012.*

The proposed quarry is considered as local development, as it does not trigger the requirements for designated development, under Schedule 3 of the *Environmental Planning and Assessment Regulation Act 2000*. Schedule 3 of the Regulation outlines the threshold between Local and Designated development. A review of these provisions is included within Table 1.

Table 1: Thresholds for Designated Development

Threshold to Exceed Local Development Classification	Comment
Must process greater than 30,000 cubic metres	Less than 30,000 cubic metres per year to be processed
Disturbs a surface area of more than 2 Ha	< 2 Ha to be disturbed
In or within 40 metres of a natural waterbody, wetland or an environmentally sensitive area, or	No creek or sensitive areas near the quarry sites.
Capital investment exceeds $20 million	Expected investment is less than $50,000
In an area of contaminated soil or acid sulphate soil	No contamination identified, no acid sulphate soils present
On land that slopes at more than 18 degrees to the horizontal	Slope is less than 2%
Involves blasting	No blasting
Within 500 metres of the site of another extractive industry that has operated during the last 5 years.	No approved quarry sites within 500m of the proposal

The proposed development does not exceed local development thresholds. The application can therefore be dealt with by Local Council without a requirement to forward the application to a Joint Regional Planning Panel for consideration.

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. Primary policies applicable to this application are State Environmental Planning Policies (SEPP).

Are there any relevant planning studies or strategies?

No.

Is there any management plan, planning guidelines or advisory document that is relevant?
No.

3.2 Commonwealth Legislation and Regulations

3.2.1 Environmental Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act) requires the approval of the Commonwealth Minister for the Environment for actions on Commonwealth land or those that may have a significant impact on matters of national environmental significance. The proposal was assessed in accordance with criteria specified in Matters of National Environmental Significance – Significant Impact guidelines 1.1 (DoE 2013). A copy of the assessment is presented in Appendix 4. The assessment concludes that the proposal does not have a significant impact on any Matters of National Environmental Significance. Hence, this proposal is consistent with the objectives of the EPBC Act.

3.3 State Legislation, Regulations and Policies

3.3.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* provides the framework for NSW Planning Legislation. Under this Act, local councils prepare 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 in Section 3.4.

This document has been prepared in accordance with the requirements of this Act. The following sections address the matters for consideration as outlined under Section 4.15 of the Act. This provides an assessment of how the development will comply with relevant legislation and policies, and how the proposal will be developed and managed to protect the built and natural environment.

3.3.2 Environmental Planning and Assessment Regulation 2000

The NSW *Environmental Planning and Assessment Regulation 2000* requires that certain documents must accompany a development application. This Statement of Environmental Effects and its attachments satisfy these requirements.

The proposed development is not considered designated development as the intended development does not involve the extraction of greater than 30,000 cubic metres of extractive material per year, does not disturb a total surface area of more than 2 hectares of land, and is not located within a pre-defined proximity of various sensitive areas.

3.3.3 Biodiversity Conservation Act 2016

The BC Act outlines requirements in relation to the listing of threatened species, biodiversity impact assessment, offsetting and related offences. The assessment of biodiversity values on land and the impacts of activities on those biodiversity values are to be carried out in accordance with the Biodiversity Assessment Method (BAM). The objective of the BAM is to adopt a standard approach that will result in no net loss of biodiversity in NSW.

The Act also outlined the Biodiversity Offset Scheme (BOS). Development that is subject to the BOS scheme 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 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.

Section 7.2. of the BC Act states that an activity is "likely to significantly affect threatened species" (and therefore whether a BDAR is required) is reached if:

- the test in section 7.3 of the BC Act identifies matters that may significantly impact threatened species, populations or endangered communities;
- the Biodiversity Offset Scheme (BOS) Threshold is exceeded; and
- the development is carried out in a declared area of outstanding biodiversity value.

The subject lot was assessed using the online Biodiversity Offsets Scheme Entry Tool, which determines whether any proposed clearing would be above or below the area thresholds or lies within an area mapped as having high biodiversity value. According to BOS, the area clearing threshold for the subject site is 1 hectare or more of native vegetation. Clearing is limited to the proposed quarry extraction footprint which is less than 1 hectare. The proposal therefore does not involve any clearing that would exceed the BOS Threshold. The site is not considered as containing high biodiversity value or native vegetation as per the available mapping. The proposed development site is not located within a declared area of outstanding biodiversity value.

Proponents are also required to carry out a 'test of significance' for all development proposals that do not exceed the Biodiversity Offset Scheme Threshold. The required test of significance (as outlined in Section 7.3 of the BC Act) is included in Appendix 3. It was determined that the proposal is not likely to significantly affect threatened species, and that further assessment under the BAM and the preparation of a BDAR is not required.

3.4 State Environmental Planning Policies

The following presents a summary and comment on current State Environmental Planning Policies and identifies their relevance to the proposed development. Policies that are not relevant have not been referred to in any additional detail in this report.

Table 2: State Environmental Planning Policies

SEPP No. & Codes	Title	Relevance
No. 1	Development Standards	Not Relevant
No. 19	Bushland in Urban Areas	Not Relevant
No. 21	Caravan Parks	Not Relevant
No. 33	Hazardous & Offensive Development	Refer to following section for review
No. 36	Manufactured Home Estates	Not Relevant
No. 47	Moore Park Showground	Not Relevant
No. 50	Canal Estate Development	Not Relevant
No. 55	Remediation of Land	Refer following section for review
No. 64	Advertising and Signage	Not Relevant
No. 65	Design & Quality Residential Flat Development	Not Relevant
No. 70	Affordable Housing (Revised Schemes)	Not Relevant
	Affordable Rental Housing 2009	Not Relevant
	Building Sustainability Index: BASIX 2004	Not Relevant
	Exempt and Complying Development Codes 2008	Not relevant
	Housing for Seniors or People with a Disability 2004	Not Relevant
	State Significant Precincts 2005	Not Relevant
	Infrastructure 2007	Refer following section for review
	Kosciuszko National Park – Alpine Resorts 2007	Not Relevant
	Mining, Petroleum Production and Extractive Industries 2007	Refer following section for review
	State and Regional Development 2011	Not Relevant
	Educational Establishments and Child Care Facilities 2017	Not Relevant
	State Environmental Planning Policy (Coastal Management) 2018	Not Relevant
	Primary Production and Rural Development 2019	Refer to following section for review

SEPP No. & Codes	Title	Relevance
	Koala Habitat Protection 2020	Refer to following section for review

3.4.1 State Environmental Planning Policy No. 33 – Hazardous and Offensive Development

This Policy provides for the control and proper consideration of development that is either hazardous or offensive, and without adequate mitigation measures, would pose a significant risk to, or have a significant impact on, the locality in relation to human health, life or property or the biophysical environment.

Hazardous Development

The hazardous substances and dangerous goods to be held or used on the proposed development site are required to be identified and classified in accordance with the risk screening method contained within the document entitled Applying SEPP 33 (Department of Planning, 2011). Hazardous materials are defined within guidelines for *Applying SEPP 33* as substances falling within the classification of the Australian Code for Transportation of Dangerous Goods by Road and Rail (Dangerous Goods Code).

The proposal would involve the use of diesel fuel, a Class 3 C1 combustible liquid, and small amounts of hydrocarbons including lubricating oils and combustible liquids. As the diesel fuel would not be stored on site and the lubricating oils and greases would not be stored adjacent to any other hazardous materials of the same class, SEPP 33 does not consider these to be potentially hazardous and does not require these to be considered further.

Similarly, no explosives would be utilised or stored on site. No other hazardous materials would be stored on the development site.

Therefore, based on the risk screening method of Applying SEPP 33, the proposal is not considered potentially hazardous under SEPP 33. As such, there is no requirement to undertake a Preliminary Hazard Analysis for the proposal.

Offensive Development

Offensive industries and potentially offensive industries are defined under Clause 4 of SEPP 33 as follows:

- *Offensive Industry: a development which, when all measures proposed to reduce or minimise its impact on the locality have been employed, would emit a polluting discharge in a manner which would have a significant adverse impact.*

- *Potentially Offensive Industry: a development which, if it were to operate without employing any measures to reduce or minimise its impact, would emit a polluting discharge in a manner which would have a significant adverse impact in the locality or on the existing or likely future development on other land.*

The proposal does not involve activities which would generate offensive odours or waste products. The proposal may generate noise and dust however this is not deemed as "offensive" as defined by this Policy. Further, the applicant proposes to implement the necessary controls to ensure no excessive dust or noise is experienced at locations surrounding the development site.

3.4.2 State Environmental Planning Policy No. 55 – Remediation of Land

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)).

The surrounding properties are cleared farming and grazing land adjoining other farming blocks. The specific quarry site has been previously used for gravel extraction for use within the property. There is no history of contaminating activity on the site.

A visual inspection of the land did not reveal any signs of chemical contamination such as chemically affected patches of vegetation, old drums or bare or discoloured areas. The visual inspection and the history of the land's past and its present use have led to the conclusion that it is unlikely for there to be contamination such as to render the land unsuitable for the present and proposed uses.

3.4.3 State Environmental Planning Policy – Infrastructure

The Infrastructure SEPP 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 does not trigger the provisions set out in Schedule 3 of the SEPP as traffic generating development that requires referral to the Roads and Maritime Services as the proposal is defined as 'any other purpose' and will not generate 200 or more motor vehicle movements per day.

3.4.4 State Environmental Planning Policy - Mining, Petroleum Production and Extractive Industries

The Mining, Petroleum Production and Extractive Industries 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.

Clause 12 of the SEPP provides a number of matters that a consent authority must consider before determining a development application. These matters are similar but are in different terms to the relevant matters in the *Narrabri Local Environment Plan 2012* and are considered in the body of this report.

Clause 13 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 proposed development involves a long-term plan to maintain access to a historically used gravel resource.

Clause 14 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.

These are matters for Council and are addressed below. A greenhouse gas assessment is provided in Section 4.9.1.

Clause 15 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, minimises waste and is economically viable. Section 4.6 demonstrates that waste produced on-site as a result of the quarry establishment and operation will be minimal.

Clause 16 (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 16 (2) recommends the consent authority to provide a copy of the development application to each road authority for the roads used and the Roads and Maritime Service within seven (7) days of receipt. This is a matter for Council.

Clause 16 (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 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 17 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 and rehabilitation is considered below. The project proposal includes a rehabilitation component.

3.4.5 State Environmental Planning Policy – Primary Production and Rural Development 2019

The Primary Production and Rural Development 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 property is not classified as Biophysical Strategic Agricultural Land (Figure 9).

The Shire supports the use of land for Extractive Industry within zone RU1 Primary Production under the *Narrabri Local Environmental Plan 2012*. This development does not include the erection of any buildings or dwellings, or subdivision of land. The proposed quarry operation will be undertaken in a way that minimises land use conflicts in the area.

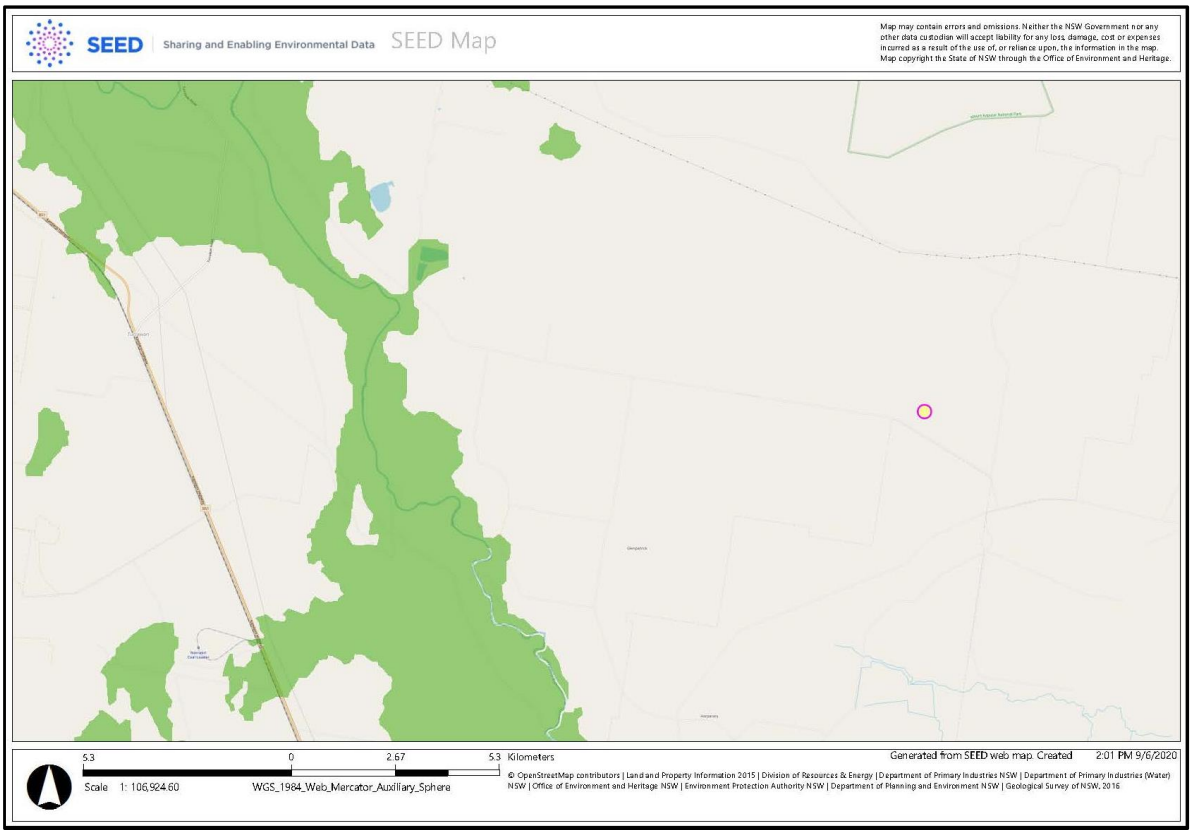


Figure 9: Biophysical Strategic Agricultural Land (Green) in relation to Property (Pink).

3.4.6 State Environmental Planning Policy (Koala Habitat Protection) 2020

The *State Environmental Planning Policy (Koala Habitat Protection) 2020* (KHP SEPP) commenced on 30 November 2020 to replace and repeal the *State Environmental Planning Policy (Koala Habitat protection) 2019*.

The Koala SEPP 2020 replicates the objectives and provisions of SEPP 44, which was in force from 1995 through to 2019.

The SEPP:

- Provides a framework for councils to prepare a strategic koala plan of management that would apply to the whole or part of a local government area.
- Applies to development applications on land over one hectare in a relevant LGA.
- Requires development applications to be consistent with a council strategic koala plan of management that applies to the land, or, if there is no strategic plan, sets out a two-step process to determine if the land is core koala habitat and if it is, produce an Individual Koala Plan of Management before council can grant consent to a development application.
- Exempts clearing of vegetation from the application of the SEPP if the purpose of the clearing is to maintain an Asset Protection Zone as part of rebuilding a dwelling destroyed or damaged by bushfire and allows the dwelling to be sited anywhere on the lot.

- Saves all Koala Plans of Management approved under SEPP 44 and 2019 Koala SEPP.

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.

Site Assessment

The Narrabri Shire is included in Schedule 1 of the KHP SEPP 2020 and the proposed development has an area of more than 1 Hectare, therefore an assessment of Koala Habitat is required, pursuant to Clause 7 of the SEPP. The assessment requires that the land is assessed for the presence of potential Koala habitat or core Koala Habitat.

The proposed development footprint does not include any mature trees, and does not contain any of the species listed in Schedule 2 of the Koala SEPP. However, adjacent vegetation present includes Bimble Box (*Eucalyptus populnea*), which is listed as a feed tree species in Schedule 2. A survey of these feed trees did not find any koalas nor any scats or scratch marks that would suggest that koalas utilise these trees. Furthermore, these trees are not within the proposed development footprint and will not be impacted by the proposed construction activities.

Figure 10 includes a map of all the recorded koala sightings within the Narrabri Shire. The red triangles indicate recorded sightings. There are no sightings within, or in close proximity to the proposed development site. The closest record is from a scat recorded in 2015 in the riparian area along Maules Creek, approximately 3 kilometres from the proposed development site. No recent or historical records (within 18 years) of a “resident population” exist for the project area.

Given that there is no evidence of a resident population of Koalas on-site, and that the tree species listed in Schedule 2 of the Koala SEPP are absent from the footprint of the proposed development, it was determined that no core or potential Koala habitat is present within the development footprint. In a broader context, if Koala were present in the area, it is likely that they would prefer higher quality remnant vegetation to the south-west of the subject site. There is minimal vegetation removal proposed as part of this development application, and no mature trees are located within the proposed clearing extent. It is therefore considered unlikely that the proposal would result in any adverse impacts on any local Koala population.

On this basis, it is considered that the requirements of the SEPP do not need any further consideration.

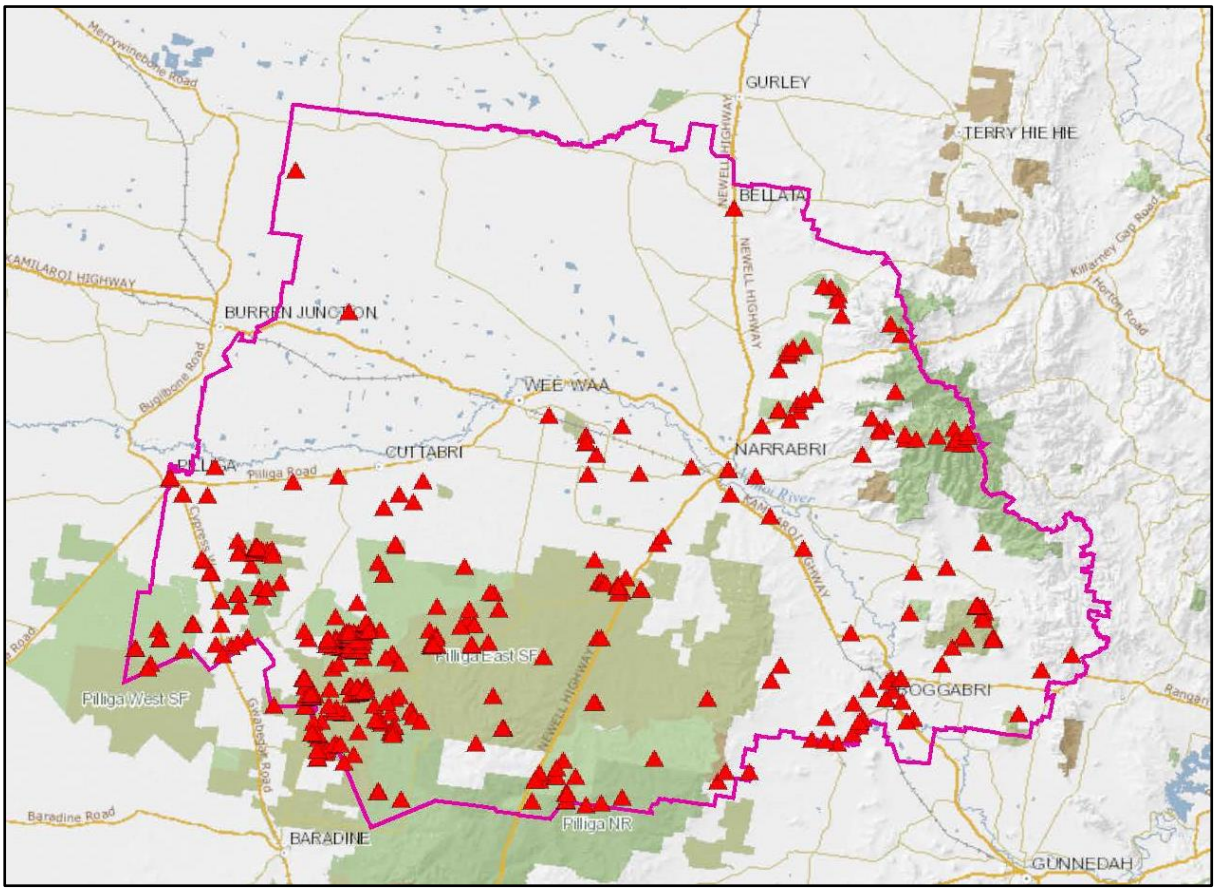


Figure 10: Koala Records within the Narrabri LGA

3.5 Regional Plan

3.5.1 New England North West Regional Plan 2036

The New England North West is one of the State's largest agricultural and food producers. To ensure that the region makes the most of our productive agricultural land and associated business opportunities, investment is required in infrastructure, including construction and manufacturing materials to provide the foundations for a strong and prosperous future.

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
- Attractive and thriving communities

The key priorities for the Narrabri area of relevance to this proposal include:

- Encourage diversification in agriculture, horticulture and agribusiness to grow these sectors and harness domestic and international opportunities.
- Continue to develop access and logistic infrastructure on appropriate sites to encourage new industry opportunities.

The proposed development will provide materials required for local construction activity to support rural development and infrastructure. The development is therefore considered to align with the key priorities for the Narrabri region.

3.6 Local Planning Instruments

3.6.1 Narrabri Local Environmental Plan 2012

The Narrabri Shire is a local government area located in the North West Slopes region of New South Wales, Australia. The *Narrabri Local Environmental Plan 2012* (NLEP) is the current local government planning policy for the Narrabri Shire. The framework of the NLEP is derived from the *Environmental Planning and Assessment Act 1979*. The proposed development site is located in Zone RU1 – Primary Production of the Narrabri Shire.

The aims of the NLEP are as follows:

a) to encourage the orderly management, development and conservation of resources by protecting, enhancing and conserving:
   i. land of significance for agricultural production, and
   ii. timber, minerals, soil, water and other natural resources, and
   iii. areas of high scenic or recreational value, and
   iv. native plants and animals including threatened species, populations and ecological communities, and their habitats, and
   v. places and buildings of heritage significance,
b) to provide a choice of living opportunities and types of settlements
c) to facilitate development for a range of business enterprise and employment opportunities,
d) to ensure that development is sensitive to both the economic and social needs of the community, including the provision of community facilities and land for public purposes.

The proposed development is considered consistent with aims of the Local Environment Plan. In particular, the proposal will facilitate economic growth within the region that requires a supply of gravel to facilitate development of a wide range of structures.

3.6.2 Land Use Definition

The proposed development is defined in the NLEP as an “extractive industry”. An extractive industry is further 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." Extractive industry is listed as permissible, with the consent of Council, for the land zone.

3.6.3 Land Use Zoning

The subject land is zoned as RU1 – Primary Production under the NLEP. The proposed development is permissible with consent from Council.

The objectives of the zones are:

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
  Comment: Material extracted from the quarry site will mainly be utilised to support local development. The majority of local development is related to primary production and therefore the quarry aligns with this objective.

- *To encourage diversity in primary industry enterprises and systems appropriate for the area.*
  Comment: The proposed quarry is an existing farm quarry in an area of land which has historically been used for agricultural purposes. The extraction of the material is an added primary resource and will result in increased economic activity for the area.

- *To minimise the fragmentation and alienation of resource lands.*
  Comment: The proposal will not alienate any existing cultivation or grazing country.

- *To minimise conflict between land uses within this zone and land uses within adjoining zones.*
  Comment: The quarry site is isolated from adjoining properties and therefore is not considered to have a direct physical impact on adjoining landuse. A quarry operation of the scale that is proposed is considered compatible with agriculture.

- *To allow for non-agricultural land uses that will not restrict the use of other land for agricultural purposes.*
  Comment: The proposal is for a quarry development that is considered a 'non-agricultural land use' on a small portion of the property. The remaining property area will continue to be utilised for agricultural purposes, including grazing. The proposed development is therefore not considered to restrict the use of other land for agricultural purposes.

The assessment of the proposed development has determined that the proposal generally conforms to the aims and objectives of the LEP & land use zone.

3.7 Development Contribution Plan

The '*Narrabri Shire Section 7.11 – Fixed Contributions Plan 2016*' is relevant to this proposal. This plan was developed to ensure the operation of traffic generating development does not adversely impact on local roads and allow Council to assess the demand for road maintenance, repair and reconstruction arising from traffic generating development. Section 7.11 (previously Section 94) of the *Environmental Planning and Assessment Act, 1979* enables Council to levy contributions from developers for the provision of public amenities and services required as a consequence of development.

The proposed development entails the operation of an "Extractive Industry". This is considered a traffic generating development under the Section 7.11 Fixed Contribution Plan. Under the provisions of the *Environmental Planning and Assessment Act, 1979,* Council may include a condition of consent that details the following:

- Require land to be dedicated free of cost;
- Require money to be contributed for works and facilities to be provided in the future;
- Require money to be contributed towards the cost of works in kind, in satisfaction of Section 7.11 requirements; or
- Require or accept a combination of any of the above.

It is expected that contribution payments may be required as a result of this proposal for works and maintenance as a traffic generating development. It is noted that in applying Section 7.11 contributions the Council must be fair and reasonable, and as such the contributions levied on development within the Narrabri Shire are limited to essential or baseline works.

The contribution rates for "Mines, extractive industries and other developments that result in increased numbers of laden heavy vehicles using Council's network" are outlined in Table 2 of the Plan. The contribution rates are:

- $0.31 per Equivalent Standard Axle (ESA) per km of haul road; or
- $0.053 per tonne of hauled material per km of haul road.

Details on proposed traffic are included in Section 4.15 of this report. The key haulage routes include:

- Maules Creek Road (SR19)
- Old Gunnedah Road (SR10)
- Harparary Road (SR11)
- Kamilaroi Highway (NR37)

However, exact project delivery locations and distances will vary.

3.7.1 Draft Environmental Planning Instruments

No draft environmental planning instruments apply to this proposal.

4 Environmental Considerations

Items considered include matters set out under Section 4.15 of the *Environmental Planning and Assessment Act 1979.* A summary of the major points of that consideration follows.

4.1 Land Use Conflict

The proposed development is consistent with the zoning for the lot as extractive industries are permitted on the land. The majority of the lot will continue to be used for agricultural purposes. The proposal is considered as compliant within the zoning under the LEP.

The closest neighbouring dwelling is a rural receptor located approximately 1.9 kilometres west-south-west from the proposed extraction site. The proposed quarry will not be visible from the dwelling due to the presence of existing vegetation in the south-west of the property and remnant vegetation located along Maules Creek Road. This vegetation will act as a visual barrier, whilst also providing a windbreak for potential noise and dust impacts. Given the available separation distance between the closest receptor and the development site, no land use conflict issues are predicted.

4.2 Land Contamination

Inspection of the quarry site did not identify any contamination. The site has been previously used for quarrying and therefore the material within the development site is considered as natural virgin material. A review of site history identifies that the site was grazed prior to construction of the quarry. No previous land use has been identified that would have a potential for contamination within the quarry areas.

A site assessment was undertaken to identify potential issues concerning contaminated land. The objective of this assessment was to 'gather sufficient information for the site to characterise any soil contamination issues that may present a risk to human and environmental health.' A search of the contaminated sites register was undertaken, and all the sites located within the Narrabri Local Government Area are listed within Table 4. The proposed site for the quarry is not identified as a contaminated site. Further, no potentially contaminating activities as listed in Appendix 1 of "Managing Land Contamination – Planning Guidelines" have been undertaken on the site. It is therefore considered that the site is not contaminated and is suitable for the proposed land use.

Table 3: Contaminated Sites List

Site Name	Address	Contamination Activity Type
Caltex Service Station	13 Doyle Street, Narrabri	Service Station
Lowes Petroleum (Former Mobil) Narrabri Depot	3 Old Gunnedah Road, Narrabri	Other Petroleum

Site Name	Address	Contamination Activity Type
Caltex Service Station	31-35 Cooma Road, Narrabri	Service Station
Caltex Narrabri Service Station	31 Dangar Street, Narrabri	Service Station
Caltex Service Station	12 Reid Street, Narrabri	Other Petroleum
Cargill Soapstock Disposal Site	Westport Road, Narrabri	Unclassified
Caltex Service Station	7-13 James Street, Narrabri	Service Station

4.3 Water Resources

On-site operational activities will be limited to the winning, crushing and transport of gravel and fill materials. The processing of materials will not require water as the material to be excavated is naturally moist, therefore water will only be required on an intermittent basis for dust suppression activities. The site is not expected to require a permanent source of water in order to operate.

A water balance is not deemed to be required given the minimal water requirements of the proposed development and the water supply available.

It is expected that a maximum of one water truck (equivalent to 23,000 L) per 1,000 tonne of extracted material would be required for dust suppression purposes. The proposed development would have an annual extraction limit of 29,900 tonnes of material per year. Therefore, the proposal would require approximately 0.69 ML of water per year during the operational phase.

When water is available in the on-site sediment pond, this water will be used as the primary water supply. Where there is no or insufficient water available in the sediment pond, it is intended to use an existing groundwater entitlement (WAL 12779) which is currently held by Mr. Brock Ian Johnstone, to provision the quarry. The licence has a total nominal volume of 72 ML and the bore taps the Upper Namoi Zone 5 Valley (Gin's Leap to Narrabri) Groundwater Source. Details of WAL 12779 are included as Appendix 6. The Water Access Licence was primarily purchased to secure a reliable water supply for quarries operated by the Applicant, with remaining water being sold or utilised for farming operations undertaken by the licence holder. The bore is located on Lot 1 in Deposited Plan 718917 on the Old Gunnedah Road on the southern outskirts of Narrabri. Water will be hauled from this location to the Avoca Quarry using a semi water truck with a capacity of 23,000L.

There are therefore ample water resources from existing entitlements to provision the quarry, which has minimal water requirements due to the nature of the raw material and the small-scale of the operation.

At the completion of the quarry activity, the total on-farm harvestable right will need to be determined. The quarry will be below ground and potentially hold water if local runoff is directed into the pits by diversion drains. If this occurs, the water storage capacity will need to be considered in relation to the maximum harvestable right on the farms. If the potential storage capacity exceeds the harvestable right volume, the quarry site would need to be encompassed by a diversion bank to prevent local runoff from being captured.

4.4 Flora and Fauna

4.4.1 Desktop Assessment

Initially, examination is required of the various threatened species databases to identify any known locations of threatened species, populations and ecological communities inside, or within close proximity to, the proposed impact area. This desktop assessment included searches of databases and a review of literature relevant to the site and local area, particularly:

- Office of Environment and Heritage (OEH) Atlas of NSW Wildlife database for records of threatened species and endangered ecological communities which have been recorded within a 10-kilometre radius (locality) of the subject site (accessed May 2020);
- Department of the Environment and Energy (DoEE) Protected Matters Search Tool for Matters of National Environmental Significance (MNES) listed under the EPBC Act within a 20 km radius from the site (accessed May 2020); and
- NSW Vegetation Information System (VIS) classification database (OEH, accessed May 2020).
- NSW Sharing and Enabling Environmental Data (SEED) portal (NSW Government, accessed June 2020).

Satellite imagery is also used to determine the presence and extent of broad habitat types for these species. Where it is determined the habitat of a species, population or community is not present, this species is culled from the list of potential occurrence. This list is further refined based on the habitat features identified during field surveys.

Figure 11 includes the modelled plant community types expected to occur within the area based on desktop information available on the SEED portal. The desktop assessment indicated that the property was likely to contain areas of native grassland and vegetation consistent with Plant Community Type (PCT) 101 “Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion”.

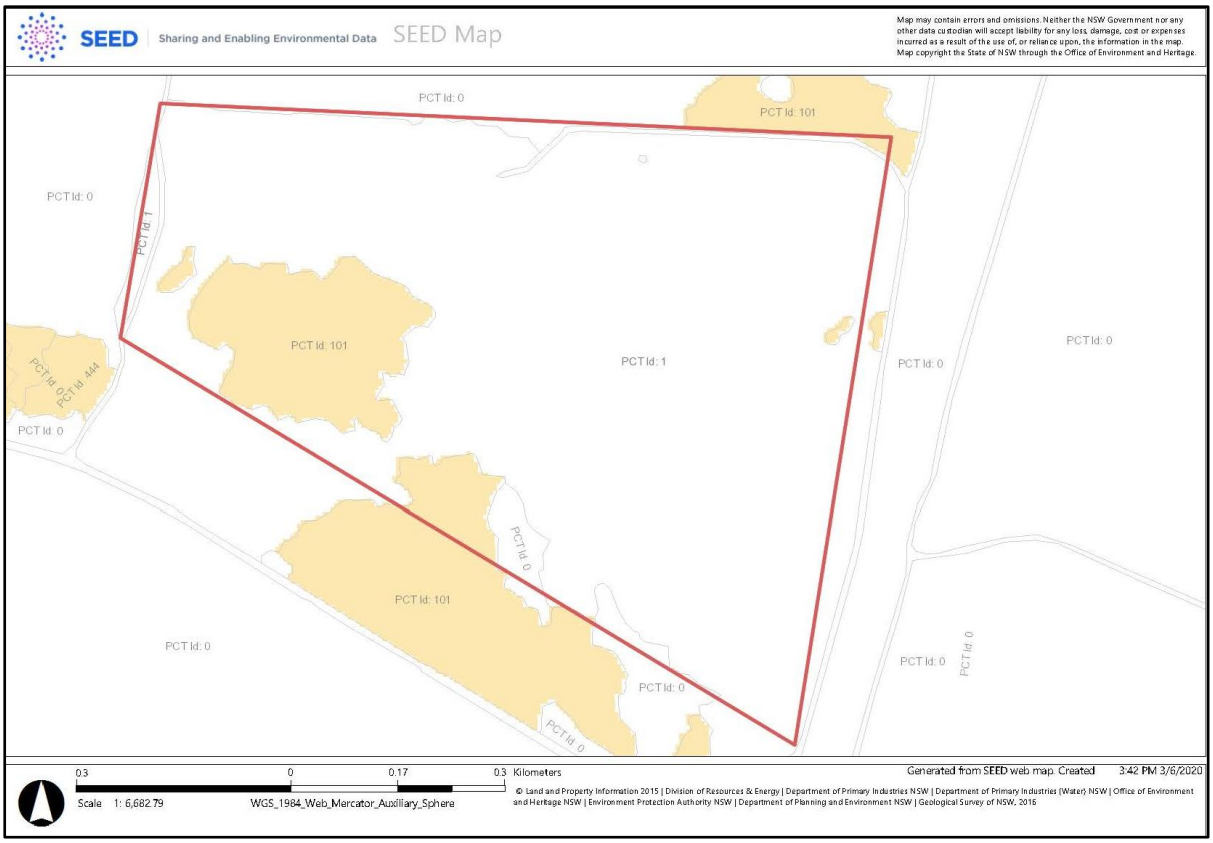


Figure 11: SEED Plant Community Types modelled for the area.

4.4.2 Site Inspection

SMK Consultants undertook a site inspection of the proposed development site and property on the 11th of June, 2020. The proposed quarry extraction footprint is located on an area of previously cleared and currently grazed grassland adjacent to the existing farm quarry site. The site had recently been subject to heavy rainfall and as such, despite the ongoing drought conditions, the site was dominated by dense grassland with a sparse shrub layer. Species identified onsite included a mixture of native and non-native species. Native species included Windmill Grass (*Chloris truncata*), Brown's Lovegrass (*Eragrostis brownii*), Galvanised Burr (*Sclerolaena birchii*), Western Rosewood (*Alectryon oleifolius*), and Fuzzweed (*Vittadinia cuneata*). Non-native and weed species present within the development site included Feathertop Rhodes Grass (*Chloris virgata*), Dandelion (*Asteraceae sp.*), Paddy Melon (*Cucumis myriocarpus*), Tiger Pear (*Opuntia aurantiaca*) and Common Prickly Pear (*Opuntia stricta*). It is noted that Common Prickly Pear and Tiger Pear are listed as Weeds of National Significance (WoNS).

The proposed development will involve clearing of the extraction footprint which consists of native grassland. Whilst the area has been subject to significant disturbance through its proximity to the existing farm quarry and ongoing grazing, the area still retains a number of native groundcover species at the time of the site inspection. The proposed extent of native

vegetation clearing is therefore 0.99 hectares. This is below the 1 hectare BOS threshold for the property.

The property includes an existing dirt access road which has been maintained as a cleared access to the existing farm quarry. This area has therefore not been included within the required clearing area. The proposed development area, including the extraction footprint and access road does not include any mature trees.

The surrounding area is similarly dominated by grassland, with a few mature paddock trees including Poplar Box (*Eucalyptus populnea*), Yellow Box (*Eucalyptus melliodora*) and Western Rosewood (*Alectryon oleifolius*). The area also included scattered immature White Cypress Pine (*Callitris glaucophylla*).

The vegetation within the south-western portion of the property (which is outside the proposed development footprint) was dominated by White Cypress Pine (*Callitris glaucophylla*), with occasional Silver-leaved Ironbark (*Eucalyptus melanophloia*) and Yellow Box (*Eucalyptus melliodora*). This area had a sparse shrub and groundcover layer. This area of the property is consistent with PCT 101 "Poplar Box - Yellow Box - Western Grey Box grassy woodland on cracking clay soils mainly in the Liverpool Plains, Brigalow Belt South Bioregion". This PCT is listed as being associated with the following threatened ecological communities:

- Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions;
- Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions; and
- White Box Yellow Box Blakely's Red Gum Woodland.

However, the area did not include the key species associated with any of the listed threatening ecological communities. It was therefore determined that there are no Endangered Ecological Communities (EEC) within or adjacent to the subject site. Nevertheless, this area will not be cleared or directly impacted by the development proposal.

Fauna species identified whilst onsite included Galah (*Eolophus roseicapilla*) and Australian Magpie (*Gymnorhina tibicen*).

A Test of Significance was undertaken in accordance with the *Biodiversity Conservation Act 2016* to determine the potential impact of the proposal on threatened or endangered species, populations and habitat communities. The assessment is presented in Appendix 3. This assessment concluded that the proposal would be unlikely to have a significant impact on any threatened or endangered species and communities, as only minor clearing of vegetation is

required and the intended operation hours would be limited by the intermittent nature of the work required.

4.5 Soil

4.5.1 Soil Type

The proposed Avoca Pit site consists of a brown to grey sandy clay vertosols (as shown in Figure 12) which are underlain by layers of gravel, river rock and sand. The quarry area is not considered to have existing salinity issues and the development proposal, as designed, will not increase the risk of salinity on the property. There are no acid sulphate soils present within the region.

Land slope on the property varies across the site but is essentially flat. Erosion is not considered a risk. However, given the nature of the proposed development, best practice drainage and sediment controls will be implemented on site. There is minimal physical alteration as result of this proposal and hence there is no chance of subsidence, slip or mass movement of the soil on site.

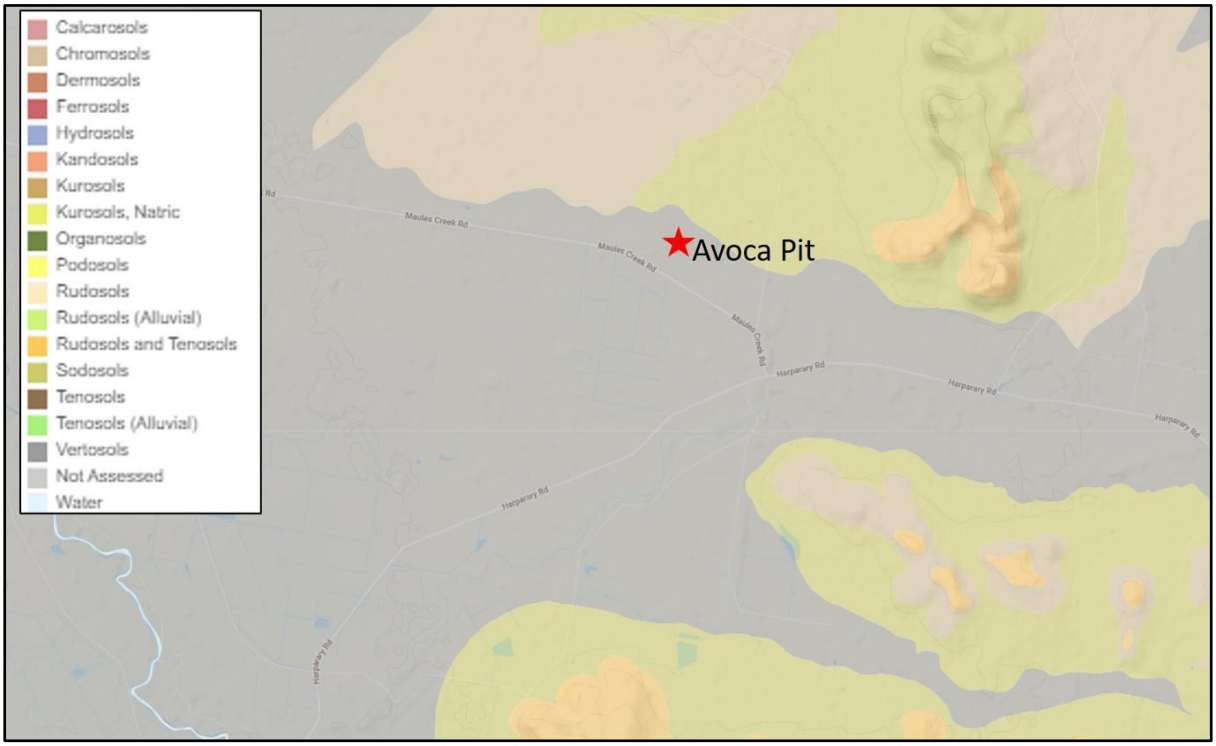


Figure 12: Australian Soil Classification for the Development Site (Source: eSPADE, 2020).

4.5.2 Land Capability

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 outcrop, water logging

potential and existing erosion of a landform. The following table summarises the appropriate land use for each capability class.

Table 4: 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 tillage 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 result retirement from agriculture for conservation purposes may be the best option.

The NSW Soil and Land Information Database eSPADE, managed by OEH, identifies the proposed quarry site within the Land and Soil Capability (LSC) Class 3 (as defined by OEH,

2012). The land capability class for the subject site and surrounding land are shown in Figure 13.

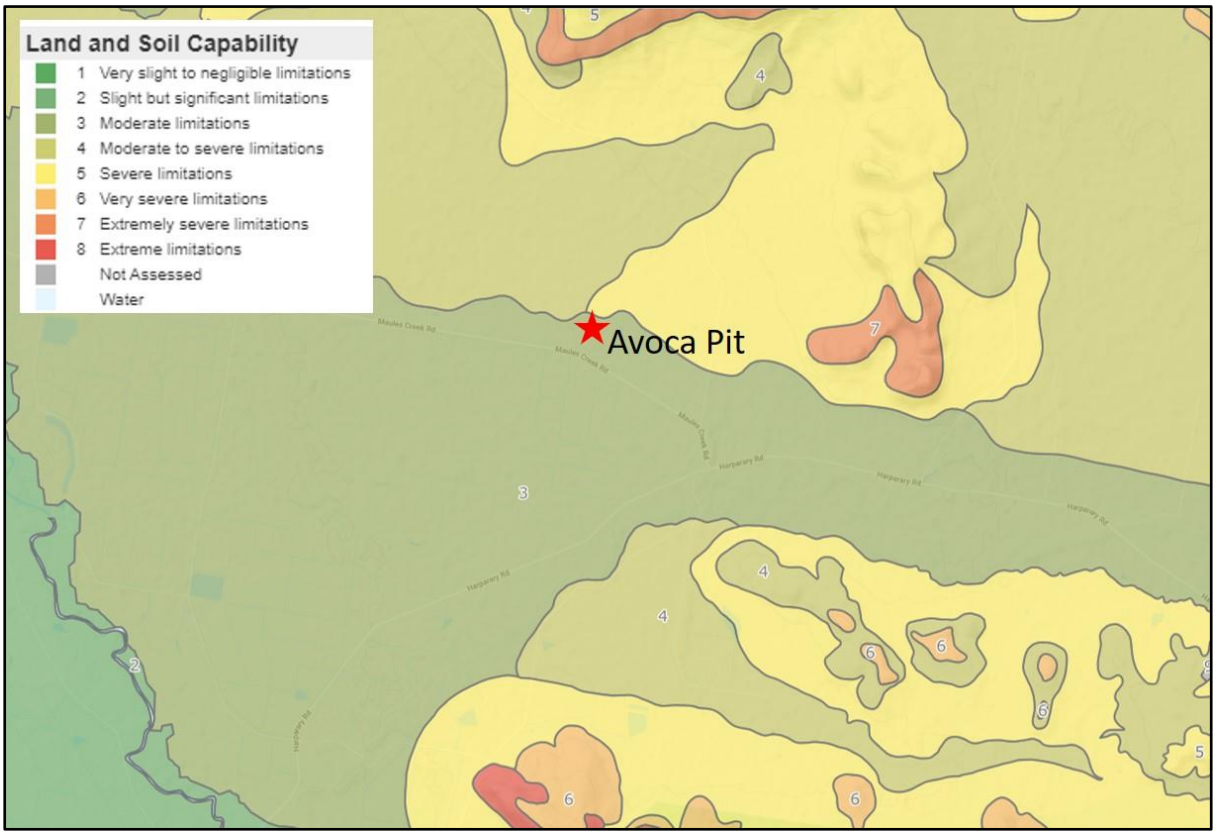


Figure 103: Land and Soil Capability Mapping for the Development Site (Source: eSPADE, 2020).

4.5.3 Erosion and Sediment Control

The applicant 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.

Erosion and sediment control plans have been prepared for the construction and operational phase of the proposal. These are included in full in Appendix 1 and list several soil erosion management measures to be implemented throughout the project duration, including:

- The establishment of a controlled drainage system and sediment pond, to ensure surface runoff containing high sediment loads is captured and retained within the impact footprint of the development;
- The installation of silt traps, fences or shakedowns until a diversion bank is established upslope of the quarry;
- Opening up the quarry footprint in stages, with no more than 0.5 Ha to be excavated at any one time;
- Ensuring that erosion and sediment control measures are checked regularly and maintained appropriately throughout the duration of the project.

The implementation of these controls would either divert “clean” water (via non-scouring drains/banks) around disturbed areas or direct runoff (“dirty” water) from disturbed areas to detention structures. A sedimentation pond will be established in the north-western section of the quarry footprint to reduce the external impact of the works. This shall be below ground-level and will minimise the risk of offsite discharge of sediment laden water.

4.6 Waste

The main form of waste to be generated on the 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 oil from an oil change would also be collected and removed to appropriate waste disposal facilities.

4.7 Natural Hazards

The land is not subject to geological hazard such as volcanism, earthquake, or soil instability such as subsidence slip or mass movement.

4.7.1 Bushfire

The proposed quarry site is not located on land classified as bushfire prone land (Figure 14). Given that this block is substantially cleared, has existing wide roads available to limit the spread of a bushfire, there will be no buildings or structures associated with this development and all components related to extractive operations will be portable, the proposal is considered to be consistent with the aims and objectives of ‘Planning for Bushfire Protection’ (NSW Rural Fire Service 2006). There are no additional bushfire protection measures recommended within this report. Whilst no specific bush fire prevention measures are required for the site, it is recommended that management ensure that grass is kept short and that any tree branches are kept out of the immediate area surrounding the proposed quarry site.

In the case of a local bushfire, operations would need to cease on the site until the matter was resolved and the fire was extinguished.

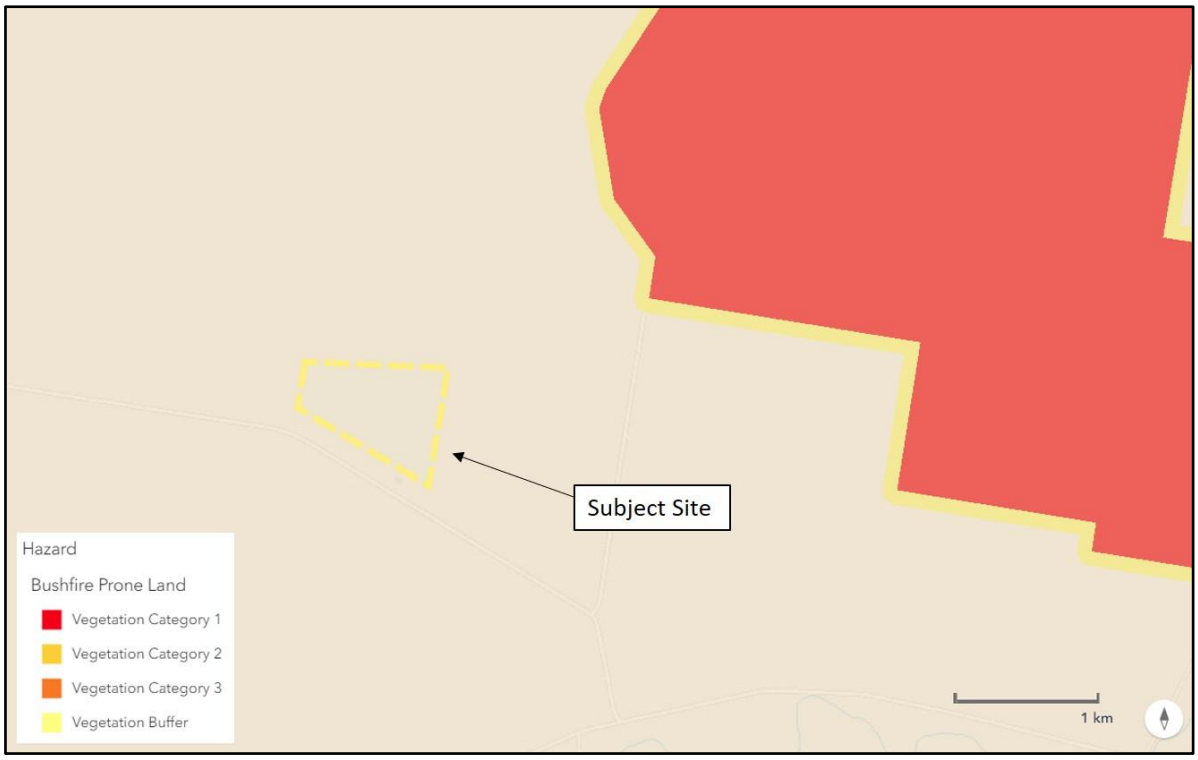


Figure 14: Site not located within Bushfire Prone Land

4.7.2 Flooding

The subject land is not within the identified flood planning areas as included in the Flood Planning Maps within the Narrabri LEP.

4.8 Cultural Heritage

4.8.1 Indigenous Heritage

The Aboriginal Heritage Information Management System (AHIMS) is a database operated by OEH and regulated under section 90Q of the *National Parks and Wildlife Act 1974*. AHIMS contains information and records related to registered Aboriginal archaeological sites (Aboriginal objects, as defined under the Act) and declared Aboriginal places (as defined under the Act) in NSW.

A search of the AHIMS database was conducted on the 4th of June 2020 to identify registered (known) Aboriginal sites or declared Aboriginal places within or in the vicinity of the subject area. The search lots included Lot 923 DP1046736 with a buffer of 1,000 metres. The search revealed zero (0) known aboriginal sites within or within close proximity to the proposed development site. A copy of this search report is attached as Appendix 2.

The quarry site was investigated on foot for Aboriginal heritage sites. No scar trees were identified amongst the older mature trees near the proposed development site. The site is not located close to water sources and therefore the potential presence of camp sites is

limited. The inspection of the site did not reveal the presence of random artefacts such as stone shards. The potential for the site to contain aboriginal heritage or artefacts is limited, given previous disturbance associated with clearing and agricultural grazing activities. However, the site will be subject to excavation which may disturb objects that are currently buried.

In the event that any object/s are encountered that are suspected to be of Aboriginal origin (including skeletal material), the unanticipated finds protocol in the Aboriginal Heritage Assessment will be followed:

- Stop work, protect item and inform supervisors/contractor, notify the Office of Environment and Heritage (OEH) as soon as practical and provide details of the object and its location (and if human remains also inform the Police).
- Work should not resume at the particular location unless authorised in writing by OEH.

In accordance with the *National Parks and Wildlife Act 1974,* Aboriginal objects include:

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

4.8.2 Non-Indigenous Heritage

No non-indigenous heritage items have been found near the development site, nor is development site listed under Schedule 5: Environmental Heritage; of the LEP.

4.9 Air Quality

Air pollution can result from increased dust and / or exhaust emissions from machinery used as part of the operation of the quarry. Dust from aggregates is a pollutant and can adversely affect amenity in the area. These emissions must be controlled so that there are no significant emissions from the plant.

The potential sources of dust at a quarry can include:

- Extracting of raw materials using machinery
- Loading of raw materials in trucks
- Road transport of quarry materials

The proposal will include the following management and mitigation measures to minimise the potential adverse impacts of dust, both on and offsite:

- Cover or dampen all stockpiled materials to ensure proper stabilisation.
- Vehicle speed restrictions within the subject site will be imposed.

- Regularly inspect and maintain all machinery to reduce potential for excessive emissions.
- During extreme conditions, such as very hot, dry, windy conditions, dust generating work should be suspended as necessary to prevent undue dust impacts.
- If road dust is creating a nuisance or safety issue, road watering is to be undertaken.

Implementation of the abovementioned control measures are considered sufficient to minimise dust emissions to ensure that there is no significant adverse impact on amenity as a result of the proposed development.

4.9.1 Greenhouse Gas Emissions

The National Greenhouse and Energy Reporting Act 2007 (NGER Act) established a single, national system for reporting greenhouse gas emissions, abatement actions, and energy consumption and production by corporations from 1 July 2008. The Act sets out thresholds which determine registration and reporting requirements for facilities and corporations. The current facility threshold is summarised below.

- 25 kt (25,000 t) or more of greenhouse gases (CO2-e) (scope 1 and scope 2 emissions);
- consumption of 100 TJ (100,000 GJ) or more of energy; or
- production of 100 TJ (100,000 GJ) or more of energy.

The likely Greenhouse Gas emissions generated during operations at the proposed Avoca Pit were calculated using the NGER Emission and Energy Threshold Calculator 2019-2020 in order to give an indication of potential greenhouse gas reporting requirements (full results included as Appendix 5). The results of the Calculator were as follows:

- Total Emissions = 54 t CO_2-e
- Total Energy Consumed = 772 GJ
- Total Energy Produced = 0 GJ

The quantities for both CO2 emissions and energy consumption and production are well below the thresholds, therefore registration is not required.

4.10 Visual Impacts

No significant visual impacts are foreseen regarding the development. The quarry site is considered sufficiently isolated from other residences or public view in order to limit the impact on the local ambience. Existing vegetation on the Lot and along Maules Creek road will shield the proposed development. The proposed access road and access from Maules Creek Road are existing and as such are not considered to create a new visual impact to local residents.

4.11 Noise Impacts

Activity in the surrounding area is limited to normal farm operations. The farming operations include occasional cultivation and harvesting activities, however much of the land has been retained for grazing. These activities produce very little noise. There are no other noise generating activities in the area other than traffic noise from the Maules Creek Road.

Excavation and loading activity would generally be undertaken below ground in the pit areas. The activity would be restricted to daytime according to the Noise Policy for Industry (NSW, 2017).

Major noise sources at quarry sites can include:

- Truck and engine noise
- Alarms
- Excavating, scraping, loading devices
- Reverse warning devices.

No blasting is required and therefore no other noise is potentially generated from the activity. All of the above noises are considered as intermittent.

The operational noise levels for typical equipment required for the proposed operations are presented in Table 5.

Table 5: Typical Sound Levels of Construction Plant and Equipment

Plant Description	A-weighted Sound Power Level SWL dB(A)	A-weighted Sound Pressure Levels SPL dB(A) at 10m
Excavator	107	76
Front end loader	109 (L_{MAX} 128)	78
Vibrating Screen/Stockpiler	111	80
Mobile Crusher	115	84
Truck & Dog	107	76
Truck (water cart)	107	76

Source: SWL's from Noise Impact Assessment for JCLS Narrabri (Advitech Environmental, 2020)

The magnitude of off-site noise impacts associated with operation would be dependent upon a number of factors:

- The intensity and location of activities;
- The type of equipment used;
- Existing local noise sources;

- Intervening terrain; and
- 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 stages. 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 and certain types of machinery would be present on the site during standard operating hours and not during the evening or night periods, where sound can be potentially increased as a result of various factors, including inversion layers. Accordingly, the predictions should be considered as conservative estimates.

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 4 provides the NPI minimum RBL for each period of the day, which were adopted for the site. The area is a quiet rural area with no other continuous noise sources.

Table 6: 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).

Table 7 provides an analysis of both the intrusiveness and amenity noise levels for the purposes of establishing a PNTL for the proposed development.

Table 7: 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**

These levels are considered acceptable ambient noise levels that can be received by sensitive receptors whilst being considered to protect environmental values, including health and well-being, for outside a dwelling.

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

Propagation calculations consider sound intensity losses due to hemispherical spreading, with additional losses such as atmospheric absorption, directivity, ground absorption and shielding ignored in the calculations.

Predicted Noise Levels at Receptors

Figure 15 illustrates the location of the proposed quarry site and the sensitive receivers within the area, namely rural residential dwellings (also detailed in Table 6).

Receptor 1 (R1) is the closest dwelling to the proposed extraction area and is 1,900 metres west-south-west of the Quarry site. At this distance, the loudest activity (mobile crusher) is predicted to occur when the machine is working actively without any noise barrier between the source and the residence. This would only occur when the machine is outside of the below ground quarry. The noise received at this residence can be calculated using the following equation which allows for attenuation of noise over the separation distance:

$$L_2 = 84 - 20 \log(1{,}900/10)$$
$$= 38.4 \text{ dB}$$

The predicted noise level at this closest residence will be in the order of 38.4 dB. This is considered as compliant (below the PNTL of 40 dB). All the nearby receivers are buffered from the proposed extraction area by existing vegetation including trees. It is not foreseen that a noise impact will arise for these dwellings as a consequence of this proposal.

Further, during normal quarry operations, the mobile crusher will be operating in the pit area which is below ground. The machine would be operating a depth of more than 2m below ground level and therefore the surrounds of the pit would deflect any direct noise between the machine and the closest receptor.

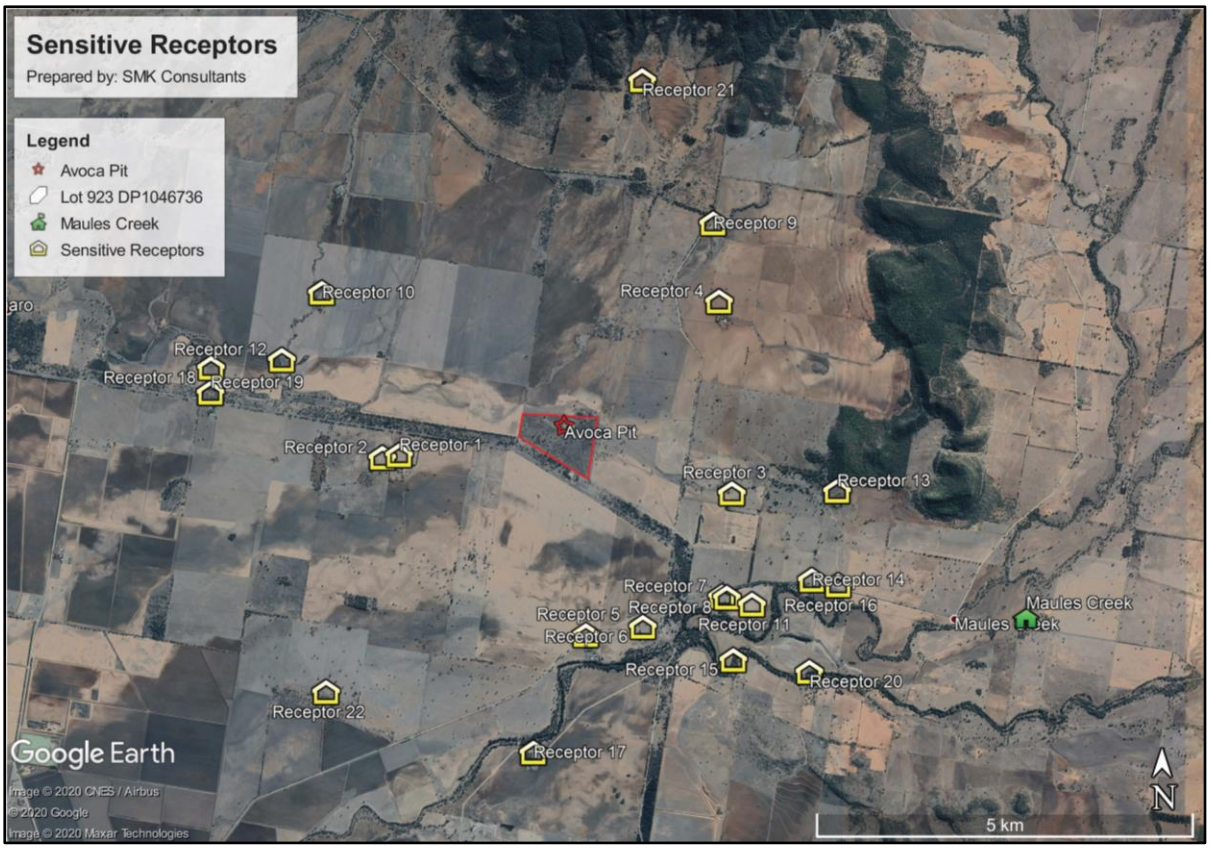


Figure 15: Sensitive receptors within 5 kilometres of the project site.

Table 6: Separation Distances from Sensitive Receptors

Receptor ID	Address	Receptor Type	Direction	Distance (km)
R1	2044 Maules Creek Road, Tarriaro	Rural Dwelling	WSW	1.9
R2	704 Yarrie Lake Road, Narrabri	Rural Dwelling	WSW	2.2
R3	64 Timor Mountain Road, Tarriaro	Rural Dwelling	ESE	2.3
R4	316 Timor Mountain Road, Tarriaro	Rural Dwelling	NE	2.4
R5	1622 Harparary Road, Harparary	Rural Dwelling	S	2.8
R6	1688 Harparary Road, Harparary	Rural Dwelling	SSE	2.8
R7	1814 Harparary Road, Maules Creek	Rural Dwelling	SE	3.0
R8	1824 Harparary Road, Maules Creek	Rural Dwelling	SE	3.1
R9	442 Timor Mountain Road, Tarriaro	Rural Dwelling	NE	3.3
R10	225 Bellview Road, Tarriaro	Rural Dwelling	WNW	3.3
R11	1878 Harparary Road, Maules Creek	Rural Dwelling	SE	3.4
R12	1851 Maules Creek Road, Tarriaro	Rural Dwelling	W	3.5
R13	1976 Harparary Road, Maules Creek	Rural Dwelling	E	3.6
R14	1928 Harparary Road, Maules Creek	Rural Dwelling	ESE	3.7
R15	95 Ellerslie Road, Maules Creek	Rural Dwelling	SE	3.8
R16	1976 Harparary Road, Maules Creek	Rural Dwelling	ESE	4.1
R17	1478 Therribri Road, Harparary	Rural Dwelling	S	4.3
R18	1701 Maules Creek Road, Tarriaro	Rural Dwelling	W	4.4

Receptor ID	Address	Receptor Type	Direction	Distance (km)
R19	1764 Maules Creek Road, Tarriaro	Rural Dwelling	W	4.4
R20	201 Ellerslie Road, Maules Creek	Rural Dwelling	SE	4.5
R21	1757 Wave Hill Road, Tarriaro	Rural Dwelling	N	4.5
R22	1199 Harparary Road, Harparary	Rural Dwelling	SW	4.6
Maules Creek	Maules Creek, NSW	Small Rural Town	SE	6.4

Note: Distances have been calculated based on the closest extraction area.

4.12 Services

No additional services such as phone or electricity will be required for this development.

4.13 Traffic

Maules Creek Road would provide the only access for traffic movements to and from the proposed quarry site. Traffic would include heavy vehicles for aggregate despatch, and light vehicles for employees.

Table 8 outlines the predicted average truck movements based on the following:

- 29,900 tonnes per year hauled from the site.
- Haulage vehicles will include truck and dog configurations with a 38-tonne haulage capacity per trip.
- Hours of operation for loading of trucks to haul materials are 6.00 am to 6.00 pm. However, given loading times it is assumed that trucks will only be operational for 11 hours/day.
- There will be 50 working weeks/ year.
- There will be 5.5 working days/week.
- Movement is one-way (i.e. a truck entering and leaving is considered two movements).

Table 8: Traffic Calculations

Traffic Calculations	
Tonnes Processed	29,900 tonnes / year
	598 tonnes / week
	109 tonnes / day
Trucks	787 trucks / year
	16 trucks / week
	3 trucks / day

Truck Movements – Truck to and from the quarry	1,574 trucks movements / year
	32 trucks movements / week
	6 trucks movements / day

Note: Numbers have been rounded up where applicable.

The proposed development may generate up to 6 truck movements a day (32 truck movements weekly). This equates to less than one truck per hour during standard operating hours. The use of B-doubles, or road train truck and dog combinations (3-trailers) could further reduce the number of truck movements as the weight per load would increase from 38 tonnes to 50 and 55 tonnes, respectively. The above table provides for the average predicted traffic movements. However, on occasions, site activity would need to more intensive to provide material on a demand basis.

The public roads proposed to be utilised as the key haulage route are all located within the Narrabri local government area. The haulage route will include traffic exiting the property on Maules Creek Road (SR19) and heading either east or west to deliver material directly to project locations. The following roads have therefore been considered in the assessment for the proposed haulage route:

- Maules Creek Road (SR19)
- Old Gunnedah Road (SR10)
- Harparary Road (SR11)
- Kamilaroi Highway

Maules Creek Road (SR19), Old Gunnedah Road (SR10) and the Kamilaroi Highway are all B-Double approved routes (over 50 tonnes). However, Harparary Road (SR11) is not currently classified as an approved B-Double approved route (over 50 tonnes). Therefore, the truck size is limited for eastern bound haulage of materials.

The following tables present the available traffic data for the above-mentioned roads.

Table 9: Traffic Data for Maules Creek Road (SR19) from Narrabri Shire Council

Road	Date of Observation	Average Daily Traffic (ADT)	Heavy Vehicles
Maules Creek Road (SR19)	2006	196.6	17 (8.60%)
	2006	110.6	11 (9.90%)
	2008	285.8	50 (17.50%)
	2008	184.5	25 (13.55%)
	2009-10	182.9	28 (15.31%)
	2011	314.8	64 (20.33%)
	2012-13	115.4	10 (8.67%)

Road	Date of Observation	Average Daily Traffic (ADT)	Heavy Vehicles
	2015-16	141.1	21 (14.88%)

The addition of 6-trucks per day would be equivalent to a 4.3% increase in the total ADT based on the most recent available data along Maules Creek Road (2015-2016). This is not considered as a significant impact that may cause a safety issue.

Table 10: Traffic Data for Old Gunnedah Road (SR10) from Narrabri Shire Council

Road	Date of Observation	Average Daily Traffic (ADT)	Heavy Vehicles
Old Gunnedah Road (SR10)	2000	1809.5	114 (6.30%)
	2005	1719.4	91 (5.29%)
	2005	898.6	61 (6.79%)
	2007	660.4	70 (10.60%)
	2007	623.1	85 (13.64%)
	2008	623.1	96 (15.40%)
	2008	985	98 (9.95%)

The addition of 10-trucks per day would be equivalent to a 0.61% increase in the total ADT based on the most recent available data along Old Gunnedah Road (2008). This is not considered as a significant impact that may cause a safety issue.

Table 11: Traffic Data for Harparary Road (SR11) from Narrabri Shire Council

Road	Date of Observation	Average Daily Traffic (ADT)	Heavy Vehicles
Harparary Road (SR11)	2005	71.7	7
	2005-06	68.3	9
	2006	55.3	6 (10.85%)
	2006	104.4	9 (8.62%)
	2008	43.3	5 (11.55%)
	2009	86.4	9 (10.42%)
	2010	58.6	11 (18.77%)
	2011	55.3	11 (19.89%)
	2014	127.2	30 (23.58%)
	2019	56.5	8 (14.16%)

The addition of 6-trucks per day would be equivalent to 10.6% increase in the total ADT based on the most recent available data along Old Gunnedah Road (2019). Whilst this would be

considered a significant increase, no safety issues are expected due to the overall low levels of traffic on this road.

Table 12: Traffic Data for the Kamilaroi Highway from RMS

Road	Date of Observation	Average Daily Traffic (ADT)	Heavy Vehicles
Kamilaroi Highway	Westbound (2006)	575	98 (17%)
	Westbound (2008)	651	159 (24%)
	Eastbound (2010)	986	N/A
	Eastbound (2011)	784	190 (24%)
	Westbound (2011)	769	172 (22%)

The addition of 6-trucks per day would be equivalent to a 0.39% increase in the total ADT based on the most recent available data along the Kamilaroi Highway (2011). This is not considered as a significant impact that may cause a safety issue.

The NSW Centre for Road Safety provides crash statistics for all reportable accidents that have occurred within the Narrabri Shire area from 2014-2018. Mapping of reportable accidents is presented in Figure 16. Figure 16 indicates that a low number of traffic incidents occur on rural roads in the vicinity of the development site. This is likely to be a result of low traffic density of these roads. By contrast, roads with higher traffic densities (such as the Kamilaroi Highway) experienced a greater number of collisions during this time period.

Between 2014 and 2018, there have been two (2) reportable incidents that have occurred on Maules Creek Road. One (1) incident in 2015 resulting in a moderate injury near the Maules Creek Road intersection with Old Gunnedah Road, and one (1) incident in 2018 resulting in a serious injury approximately 4.6 kilometres west of the proposed quarry access.

Between 2014 and 2018, there have been three (3) reportable incidents that have occurred on the Old Gunnedah Road outside the Narrabri town limits. One (1) incident in 2014 resulting in a moderate injury between the Pikes Lane intersection and the Maules Creek Road intersection, one (1) incident in 2018 resulting in a moderate injury approximately 800 metres west of the Pikes Lane intersection, and one (1) incident in 2018 resulting in a serious injury at the Old Gunnedah Road intersection with Kaputar Road. No other reportable incidents occurred on any rural roads in close proximity to the development site or along the proposed haulage route.

Given the low incidence of traffic incidents within the region, it is unlikely that any particular section of road in the vicinity of the proposed Quarry presents a traffic hazard.

The Kamilaroi Highway is expected to be utilised as a transport route for the proposed Quarry in supplying materials to some local infrastructure projects. A number of incidents occurred on this section of the Kamilaroi Highway from 2014 to 2018. Typically, these incidents occurred at different locations along the highway. Three (3) incidents resulting in death occurred on the straight stretch of road to the north of Baan Baa, however there does not appear to be an obvious link between these incidents. It appears that no particular locations along the highway present a significant hazard to road safety.

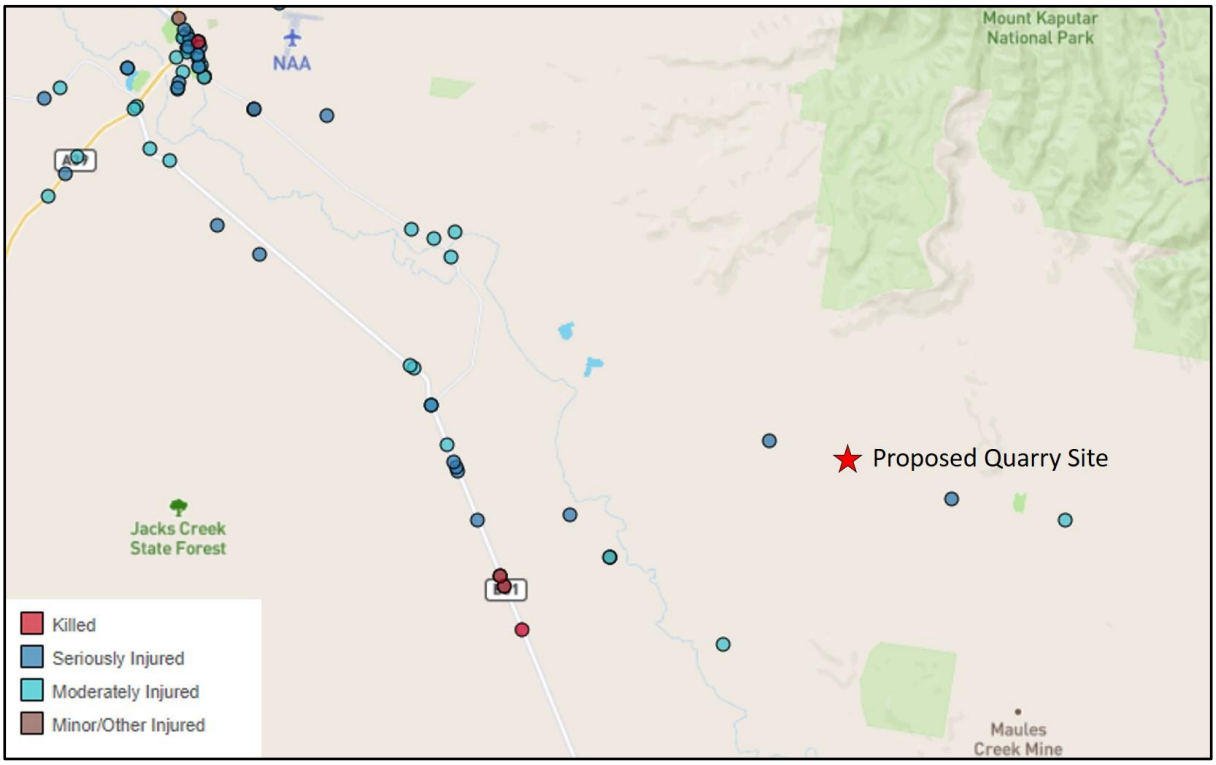


Figure 16: Reportable accidents in the locality (2014-2018)

The travel routes and localities for transport of material from the proposed quarry are yet to be determined. The type of fill material available on this site is suitable for local roads and infrastructure. If Council or other authorities purchase this gravel, the delivery location could be within a 30-kilometre radius of the proposed quarry which will include local Council roads.

The overall quantity of gravel to be extracted from the quarry is considered minor. The potential impact of up to 6-trucks per day is small.

4.13.1Access Suitability

The proposal includes utilising an existing access from Maules Creek Road to the property. The current state of the existing access is shown in Figure 17.

Figure 11: Existing Property Access to the proposed Avoca Pit
(Location: 218592m E; 6624724m S)

4.13.2 Safety and Efficiency of Access

The sign posted speed limit on Maules Creek Road is 100 km/h. Intersection performance is dependent upon adequate horizontal and vertical sight distance for all entering traffic (Department of Main Roads, Chapter 13, Road Planning and Design Manual Intersections at Grade, 2006). It is therefore necessary to undertake a check of the available sight distance to assess whether or not it can operate under safe parameters. The types of sight distance that must be provided in the design of all intersections include:

- Approach Sight Distance (ASD)
- Safe Intersection Sight Distance (SISD)
- Minimum Gap Sight Distance (MGSD)

Intersections should be designed to provide the more conservative value of SISD or MGSD for all vehicle movements that may be required to give way to other vehicles at the intersection. Details regarding how the sight distances are applied are provided in the following sections.

Approach Site Distances (ASD)

Provision of ASD for cars:

- The minimum level of sight distance which must be available on the minor road approaches to all intersections to ensure that drivers are aware of the presence of an intersection;
- For major road approaches where practical, drivers should see the pavement markings within the intersection and should be achieved where practicable. However, the provision of ASD on the major road may have implications (e.g. costs, impact on adjacent land and features) in which case Stopping Site Distance (SSD) is the minimum sight distance that should be achieved on the major road approaches to the intersection and within the intersection;

- Numerically equal to normal car SSD – which is defined as the distance travelled by a vehicle between the time the driver receives a stimulus signifying a need to stop, and the time at which the vehicle comes to rest; and
- Varying the SSD may include the object height used in its calculation. ASD is measured from a driver's eye height (1.1m) to 0.0m, which ensures that a driver is able to see any line marking and kerbing at the intersection whereas SSD is measured from 1.1m to 0.2m (a nominal object height).

Provision of ASD for trucks:
ASD for trucks should be provided at intersections to ensure that trucks approaching the intersection, at the 85th percentile operating speed of trucks, are able to stop safely. ASD for trucks on the intersection approaches should be measured from the truck driver eye height (2.4m) to the pavement level at the stop or holding line (0.0m).

Approach sight distance for trucks are numerically the same as the SSD values for trucks provided in the Austroads Document Guide to Road Design – Part 3: Geometric Design. ASD is applied as shown in Figure 18.

$$\text{ASD} = \frac{\text{R}_\text{T} \times \text{V}}{3.6} + \frac{V^2}{254 \times (d + [0.01 \times a])}$$

Where:

- ASD = Application Sight Distance
- R_T = Reaction Time (s) = 2.0s
- V = Operating (85%ile) speed (Km/h) = 40km/h
- d = Coefficient of deceleration = 0.22
- a = Longitudinal grade (% + uphill, - downhill) = 0.0%

$$\text{ASD} = \frac{2.0 \times 40}{3.6} + \frac{40^2}{254 \times (0.22 + [0.01 \times 0])}$$

$$\mathbf{ASD = 50.85m}$$

The required Approach Site Distance is therefore 50.85m. The available sight distance of the existing access road to Maules Creek Road is approximately 60m, which is considered satisfactory.

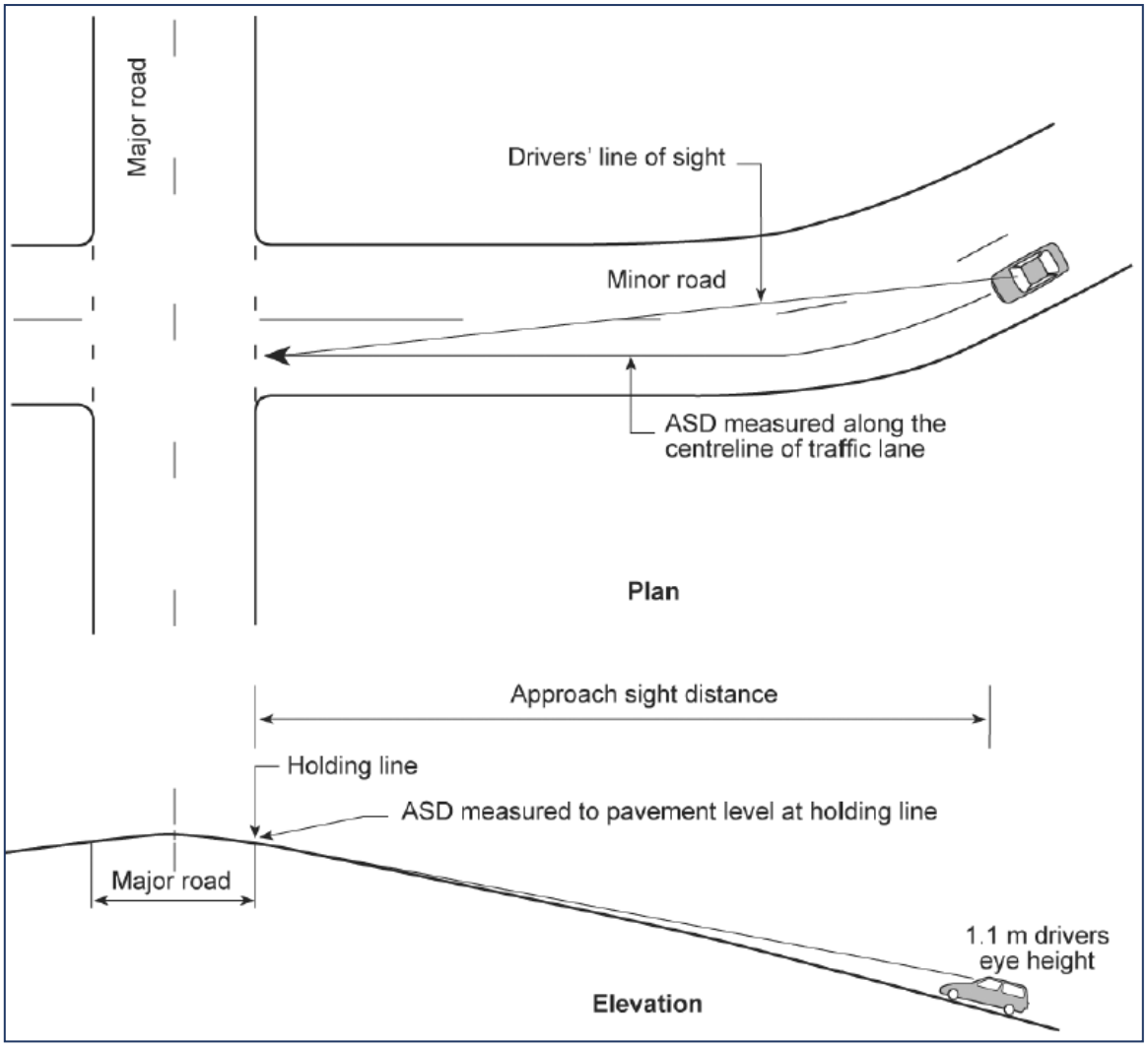


Figure 12: Application of ASD (Source Figure 3.1. AGRD04A/09).

Safe Intersection Sight Distance (SISD)

SISD refers to the distance required for the driver of a vehicle, on the non-terminating road, to observe a vehicle entering from a minor road, decelerate and stop prior to a point of collision. In this context, it is the minimum sight distance which should be provided on the major road of the intersection. SISD:

- Is viewed between two points to provide inter-visibility between drivers and vehicles on the major road and minor road approaches. It is measured from a driver eye height of 1.1 m above the road to points 1.25 m above the road which represents drivers seeing the upper part of cars. Figure 3.2 illustrates the longitudinal section for the two cases representing inter-visibility; one for drivers on the major road and the second for a driver waiting in the minor road for an opportunity to enter the major road;
- Assumes that the driver on the minor road is situated at a distance of 5.0 m (minimum of 3.0 m) from the lip of the channel or edge line projection of the major road. SISD allows for a 3 s observation time for a driver on the priority legs of the intersection to detect the problem ahead, (e.g. car from minor road stalling in through lane) plus the SSD;

- Provides sufficient distance for a vehicle to cross the non-terminating movement on two-lane two-way roads, or undertake two-stage crossings of dual carriageways, including those with design speeds of 80 km/h or more;
- Should also be provided for drivers of vehicles stored in the centre of the road when undertaking a crossing or right-turning movement;
- Enables approaching drivers to see an articulated vehicle, which has properly commenced a manoeuvre from a leg without priority, but its length creates an obstruction; and
- Is measured along the carriageway from the approaching vehicle to the conflict point, the line of sight having to be clear to a point 5.0 m (3.0 m minimum) back from the holding line or stop line on the side road.

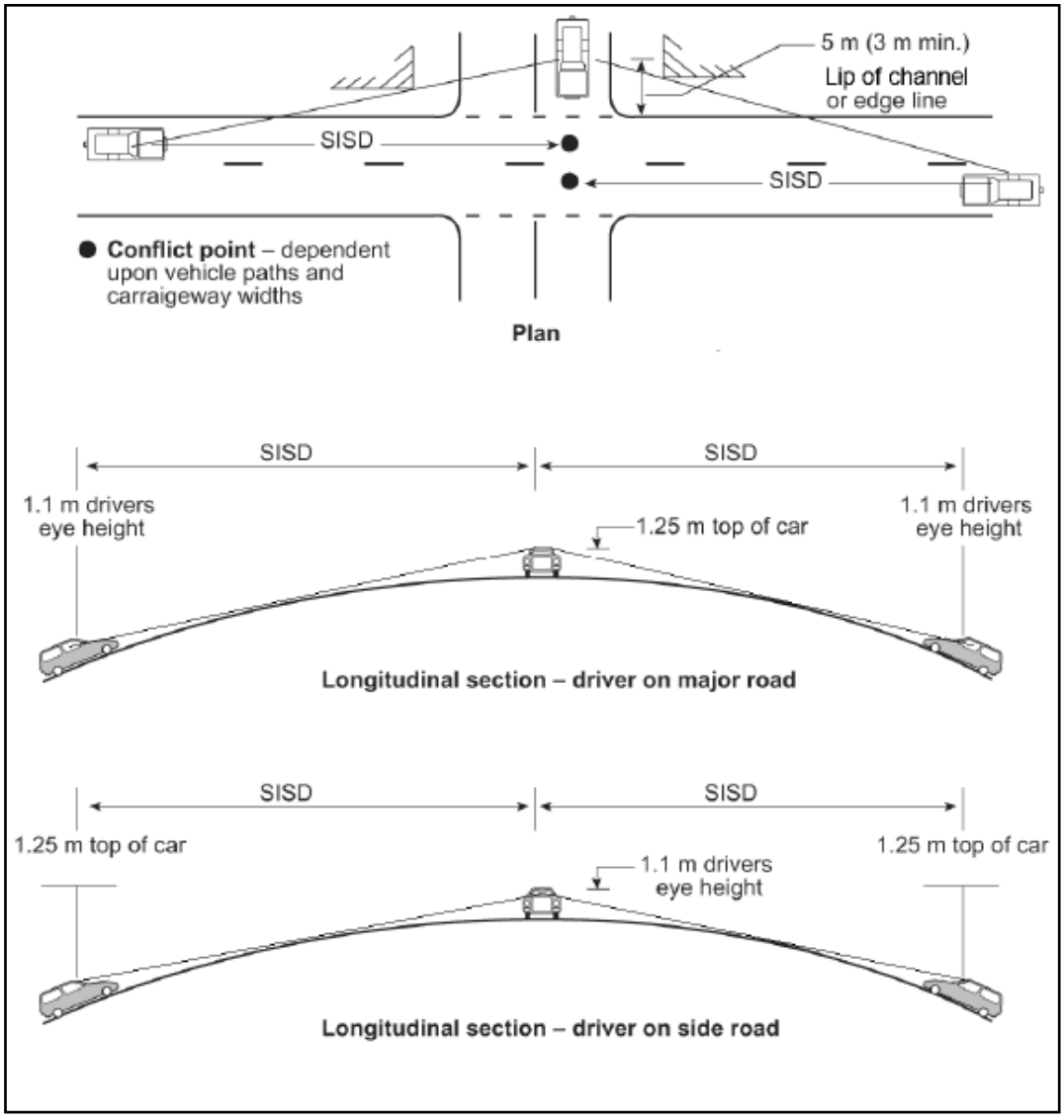


Figure 13: Application of SISD (Source Figure 3.1. AGRD04A/09)

The Safe Intersection Sight Distance (SISD) for the access intersection has been calculated as:

$$\text{SISD} = \frac{\text{D}_\text{T} \times \text{V}}{3.6} + \frac{V^2}{254 \times (d + [0.01 \times a])}$$

Where:

- SISD = Safe Intersection Sight Distance
- D_T = Decision Time (s) = Observation Time (s) + Reaction Time (s) = 5.0s
- V = Operating (85%ile) speed (Km/h) = 100km/h
- d = Coefficient of deceleration = 0.22
- a = Longitudinal grade (% + uphill, - downhill) = 0.0%

$$\text{SISD} = \frac{5.0 \times 100}{3.6} + \frac{100^2}{254 \times (0.22 + [0.01 \times 0])}$$

SISD = 317.84m

The required Safe Intersection Site Distance is therefore 317.84m. The available intersection sight distances turning left or right onto Maules Creek Road are in excess of 500m. There are no objects or vegetation obscuring the view (in either direction) of a truck parked 3-5m back from the intersection. The existing access road geometric design is deemed satisfactory in terms of Safe Intersection Sight Distance.

Figure 14: Available Sight Distance from Existing Access looking East along Maules Creek Road >500 metres.

Figure 15: Available Sight Distance from Existing Access looking West along Maules Creek Road >500 metres.

Minimum Gap Sight Distance (MGSD)

MDSD is based on distances corresponding to the critical acceptance gap that drivers are prepared to accept when undertaking a crossing or turning manoeuvre at intersections. More information on gap acceptance theory in relation to intersection capacity is provided in the *Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis.*

The MGSD required for the driver of an entering vehicle to see a vehicle in the conflicting streams in order to safely undertake a desired manoeuvre is dependent upon the:

- length of the gap being sought (critical acceptance gap time t_a) and;
- observation angle to approaching traffic.

As the intersection has been appropriately designed and constructed for heavy vehicles, including road trains, sighting angles will be well within these restrictions.

The critical acceptance gap time varies according to:

- the type of manoeuvre – left-turn/right-turn/crossing of traffic
- the width of carriageway – increased time required for greater widths
- whether the major road has a one-way or two-way traffic flow, requiring increased time required to look both ways.

The estimated values for MGSD, with t_a factors extracted from Table 3.5 of the *Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections*, are presented below in Table 13.

Table 13: Table of Minimum Gap Sight Distances (in metres) for various speeds

Critical gap acceptance time (t_a) (secs)	85th percentile speed of approaching vehicle (km/h)										
	10	20	30	40	50	60	70	80	90	100	110
4	11	22	33	44	55	67	78	89	100	111	122
5	14	28	42	55	69	83	97	111	125	139	153
6	17	33	50	67	83	100	117	133	150	167	183
7	19	39	58	78	97	117	136	155	175	194	214
8	22	44	67	89	111	133	155	178	200	222	244
9	25	50	75	100	125	150	175	200	225	250	275
10	28	56	83	111	139	167	194	222	250	278	305

Based on Table 14 the assessed values for MGSD (in metres) for the Maules Creek Road and existing Avoca Pit access road intersection have been calculated with a t_a of 10 seconds, to give the most conservative values of 278 metres for both left and right turns out (turning into traffic travelling at 100km/h). These values are both within the available sight distances and are therefore deemed satisfactory.

4.14 Site Rehabilitation

During the course of quarry operations, the site will be progressively rehabilitated as far as is practicable to minimise the extent of excavated and disturbed ground on the site at any given time. Progressive rehabilitation may either include temporary stabilisation of worked sections, or initiation of permanent rehabilitation procedures of completed quarry sections.

4.14.1 Final Land Use Objectives

The following objectives have been adopted to guide rehabilitation procedures for the site:

a) To rehabilitate the site for future agricultural use, and to a soil and land capability class of 3 (see Section 4.5.2 for current land capability);
b) To minimise the environmental impact of all site earthworks associated with the rehabilitation works;
c) To optimise the use of available overburden and topsoil as a substrate for vegetation; and
d) To achieve a stable and functional drainage system at the site under extreme rainfall events.

4.14.2 Final Land Form

The spoil material removed during the initial phase of the quarry establishment (i.e. soil stripping to expose underlying river gravel) shall be re-used during the post-closure rehabilitation works. It will not be possible to reproduce a flat landscape at this site. The final landform of the proposed quarry site will therefore consist of a localised, shallow depression. The intent is to create a small deeper section for water to accumulate, leaving the remaining area to support grass and regrowth of native tree species.

Once the level of the quarry floor has been raised to the extent that is possible, remaining extraction batters would be sloped to no steeper than 3 horizontal to 1 vertical, to allow the establishment of suitable vegetation without a high risk of erosion. Stockpiled topsoil and overburden would then be spread on the batters and quarry floor to provide suitable topsoil material to allow vegetation growth. Where appropriate, reseeding would be undertaken to provide a cover crop to stabilise the surface and allow natural and local pioneering species to establish on the site. Fencing should be erected to exclude domestic stock if required to limit disturbance of the revegetation process. Ultimately it is intended for this section of the site to be suitable for livestock grazing. Access roads will be left in situ to provide site accessibility.

4.14.3 Rehabilitation Procedures

Pre-Closure Rehabilitation Procedures

Soil stripping

Topsoil refers to the top surface layer of soil which is biologically active and of value in revegetation. Subsoil is less biologically active than topsoil yet is still of use in rehabilitation. Together, the topsoil and subsoil form the soil profile. Although the thickness and quantity of soil across the site is likely to be variable in places.

Topsoil and subsoil are to be stripped and stockpiled separately. The soil will be progressively stripped across the site to enable access to quarry resources below. Vehicular traffic will be kept to a minimum on the soils to be stripped to prevent compaction and degradation. The area of soil to be stripped at any one time will be minimised as far as is practicable, to minimise the risk of erosion.

Movement of topsoil that is too wet or too dry will significantly degrade the soil quality. Stripping of topsoil will therefore be planned and managed to avoid working in wet conditions to prevent higher levels of soil loss due to erosion. Where stripping topsoil is unavoidable in the above situations, any additional erosion and sediment control procedures required will be implemented.

Soil Stockpiling

Soil which contains high quantities of weeds and / or weed seed banks should be separated from soil stockpiles to be utilised for rehabilitation. This soil should not be utilised for rehabilitation, but instead should be disposed of either at an appropriate waste management facility, or in an area separated from remnant vegetation communities.

Topsoils are to be stockpiled separately to subsoils. Saline soils (if present) are to be stockpiled separately to non-saline soils, over an aggregate substance to allow leaching of salt concentrations over time.

Where possible, the length of time that soils are stockpiled, should be minimised as far as practicable. Where stockpiles are retained for periods in excess of 6 months, stockpiles will be fertilised and seeded with non-persistent pasture species to maintain soil structure, organic matter and microbial activity and to prevent erosion.

The primary risk to soil as a result of the proposed quarry operation is that of soil erosion. All reasonable and practicable measures will be undertaken to minimise erosion, and the environmental impacts of erosion, of soil stockpiles. These are as follows:

- Stockpiles would be constructed in accordance with Standard Drawing (SD) 4-1 of *Managing Urban Stormwater – Soils and Construction" V1* (Landcom, 2004) (the "Blue Book") and restricted to the nominated disturbance footprint;
- A coverage of 70% grass (or equivalent stabilisation) would be established over the stockpiles within 60 days (C-Factor of 0.05);
- Topsoil and subsoil stockpiles would be aligned generally parallel with the contour in low mounds not exceeding 2m and 3m in height, respectively;
- Stockpiles will be constructed with an angle of repose that is safe and that prevents scouring;
- The stockpiles would be isolated from runoff by the construction of diversion embankments; and
- Stockpiles to be contained within the established controlled drainage area to prevent sediment-laden run-off. Alternatively, sediment fencing would be positioned downslope of stockpiles until an adequate level of stabilisation is achieved. The installation and maintenance of these features would comply with the recommendations provided by SD 6-8 of the Blue Book.

Progressive Rehabilitation

During quarry operations, the site will be progressively rehabilitated as far as is practicable to minimise the extent of the disturbed quarry footprint at any given time. Progressive rehabilitation may either include immediate, temporary stabilisation of worked sections, or initiation of permanent rehabilitation procedures of completed quarry sections.

All noxious weed species, environmental weeds and Weeds of National Significance are to be managed across the site during quarry operations. Proactive weed management strategies during the course of quarry operations will minimise the need for a reactive weed management strategy following the closure and final rehabilitation of the quarry.

Post-closure Rehabilitation Procedures

Post-Closure Site Assessment

A site inspection by suitable qualified persons is to be undertaken as soon as practicable following the closure of quarry operations on site, to identify any potentially contaminated sites.

If the site assessment identifies potentially contaminated sites, the following steps will be undertaken:

- Detailed site assessment and testing to characterise the nature and extent of contamination; and
- Implementation of contamination remediation measures to isolate the impacts of and treat the contaminated site, such that the site is stable and does not pose a risk to human health or welfare, or to surrounding environmental values.

The site will be left free of contaminating materials, such as oils and fuels, to a standard that satisfies the NSW Contaminated Sites Guidelines for Agricultural land use.

Fencing

During the rehabilitation process, fencing should be set up to exclude domestic stock and minimise potential site disturbance during the revegetation process.

Soil Replacement and Preparation

Only endemic soil is to be utilised for site rehabilitation. Endemic soil is taken to mean soil that was stripped from the site at the commencement of quarry operations, or soil sourced adjacent to the quarry site as required following the closure of quarry operations (which may be required to smooth the final landform). The use of endemic soil improves the likelihood of rehabilitation success, as it consistent with natural soil characteristics on site, and enables utilisation and propagation of endemic seed banks within the soil.

Soil replacement should occur in reverse order to stripping, i.e. subsoil should be replaced prior to topsoil.

To minimise waste generation on site and to enhance drainage, remaining stockpiles of raw gravel should be mixed with subsoil (where appropriate) and spread evenly over the site.

An alkaline (non-acidifying) fertiliser should be added to respread soil to assist in any nutrient deficiencies as required.

Soil is to be applied across the quarry site in such a way that it provides:

- Suitable soil depth to enable vegetative growth (where appropriate); and
- Suitable topography such that the site is stable, with an absence of steep/unstable areas which are susceptible to erosion.

Erosion during the soil replacement and preparation phase will be minimised by the following measures:

- Undertaking revegetation as soon as is practicable following soil replacement;
- Where appropriate, undertaking progressive soil replacement and revegetation across the site, to minimise the creation of large areas of bare earth; and
- Ensuring that erosion control measures installed during the course of quarry operations (such as sediment fences) remain in place until the site is revegetated with a low risk of erosion.

Once soil replacement is completed, the area will be smoothed and contoured to allow for future agricultural use. This smoothing process would target all on-site batters, with the exception of access roads and ramps into the base of the quarry site. Remaining roads or ramps will be left in a trafficable state.

Revegetation

The site will be utilised for grazing following the conclusion of quarry operations. Replaced soil is to be seeded with a cover species during the course of revegetation works, to ensure stabilisation of the soil surface and protect the landscape from erosion, and to maintain the biota of the topsoil to preserve soil fertility. Replacement subsoil may be mixed (as appropriate) with gravel left over from quarry operations.

Watering and fertilisation of rehabilitation sites will be undertaken as required to ensure the success of revegetation activities on site.

The edges of the depression will be revegetated as appropriate with a mixture of native and introduced pasture species, with the potential to include local native trees and shrubs where appropriate. Placement of trees and shrubs is to be managed such that the storage site is easily accessible.

Monitoring

Once landscaping, soil replacement and revegetation activities are completed, the site shall be regularly monitored by means of site inspections to measure the success of rehabilitation strategies. In the event that initial revegetation practices are unsuccessful (i.e. plants die), the site will be re-seeded, regularly monitored, and managed as required through measures such as regular watering and application of fertiliser.

If actively eroding locations are identified, control measures may be implemented on site to stabilise the landscape. Measures may include an increased emphasis on fast revegetation of the eroding surface (e.g. by planting fast growing groundcover species such as grasses over problem areas, to complement existing revegetation efforts).

The revegetation process will be considered to have succeeded when:

- A self-sustaining vegetation community has been established
- The landform of the site is stable; and
- The site may be utilised safely for its intended post-rehabilitation purpose.

4.15 Social and Economic Impacts

The social and economic impacts of this proposal will be minimal. Economic impacts are limited to the applicant in regard to direct income from the quarry that has previously been restricted to on-farm use. Any negative social impacts from approval of the proposed development are considered to be limited to a minor increase in regular traffic to and from the quarry, in addition to intermittent noise emissions, mainly from trucks, during days of operation. The market for this quarry material is primarily as fill material for local development.

4.16 Cumulative Impacts

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. The adjoining lots will be largely undisturbed by the quarrying operation and will still be able to continue their current use as cultivation and grazing land. The gravel extraction proposal is not considered to be a significant scale of development and the operation of the site will be intermittent. The operations for the proposal would be restricted to regular business hours, so as to ensure the amenity of the area is not compromised.

Dwellings and other vulnerable receivers within the area are deemed to be at a sufficient distance from the proposed quarrying operations so as to not be affected by the proposal.

The development is occurring on a brownfield site that has been targeted for the purpose of gravel and fill extraction. It benefits from preferential siting on an area of land which has been historically cleared and subject to disturbance. This application intends to formalise the operation with an approval from Council.

5 Conclusion and Recommendations

The following points provide a summary of this investigation into the proposed development of a 29,900 tonne/annum quarry to be located within Lot 923 DP1046736.

The findings of this *Statement of Environmental Effects* include:

- The proposal is considered to comply with local planning guidelines and objectives of the *Narrabri Local Environmental Plan 2012;*
- The proposal is not considered to have any major additional environmental impact and provided appropriate mitigation measures are adopted, does not pose any significant conflict with the health or amenity of the surrounding populace;
- The proposal is not considered to pose any adverse effects to the social or economic fabric of the locality in the form of adverse impacts on neighbouring receivers; and
- The core elements in the surrounding natural habitat would remain undisturbed by the proposal and therefore the impact of flora and fauna is considered to be minimal. Minimal could be defined as similar to farming operations on the site.

Appendix 1 – Site Plans

SCALES: HORIZ 1:4000 VERT DATUM: LOCAL AHD MGA ZONE 56	A3	SMK CONSULTANTS surveying - irrigation - environmental PO BOX 774 MOREE 2400 PHONE (02) 67 521021	CLIENT: Johnstone Concrete & Landscape Supplies PROJECT: Avoca Quarry	DESCRIPTION: Site Plan Showing Proposed Quarry layout and Entrance Road	SHEET No. 1 of 1

SURVEYED Jeremy Barr
DESIGNED Jeremy Barr
CHECKED PAUL COVELL

Contours Design Existing
Major: 1.0 m
Minor: 0.5 m

PLAN REVISION:		DATE
A	FIRST ISSUE	15-6-2020
B	Revised Layout	24-9-2020
C	Added Boundary and Heights	19-11-2020

JOB No. 20-167
COMPUTER FILE (MJO): Avoca Quarry Survey - Over All Site Plan

Johnstone Concrete & Landscape Supplies

Avoca Quarry

Site Plan Showing Proposed Quarry

Legend

- Stage 1 - Extraction Area
- Stage 2 - Extraction Area
- Sediment Pond
- 0.998Ha Quarry boundary
- Access Road
- Drain Line
- Lidar Contours (1m)
- Lot Boundaries

N

0 100 200 300

Scale: 1:6,000 (A4)

Surveyed By: Tarrant Moss
Prepared By: Tarrant Moss
Date: 19/11/2020

SMK CONSULTANTS
surveying - irrigation - environmental

Johnstone Concrete & Landscape Supplies

Avoca Quarry

Site Plan Showing Proposed Quarry Layout

Legend

- Stage 1
- Stage 2
- Sediment Pond
- Stockpile Area
- Screening area
- Portaloo
- Drain Line
- Diversion Bank
- 0.998Ha Quarry boundary
- Contours
- Roads

Google Earth Image

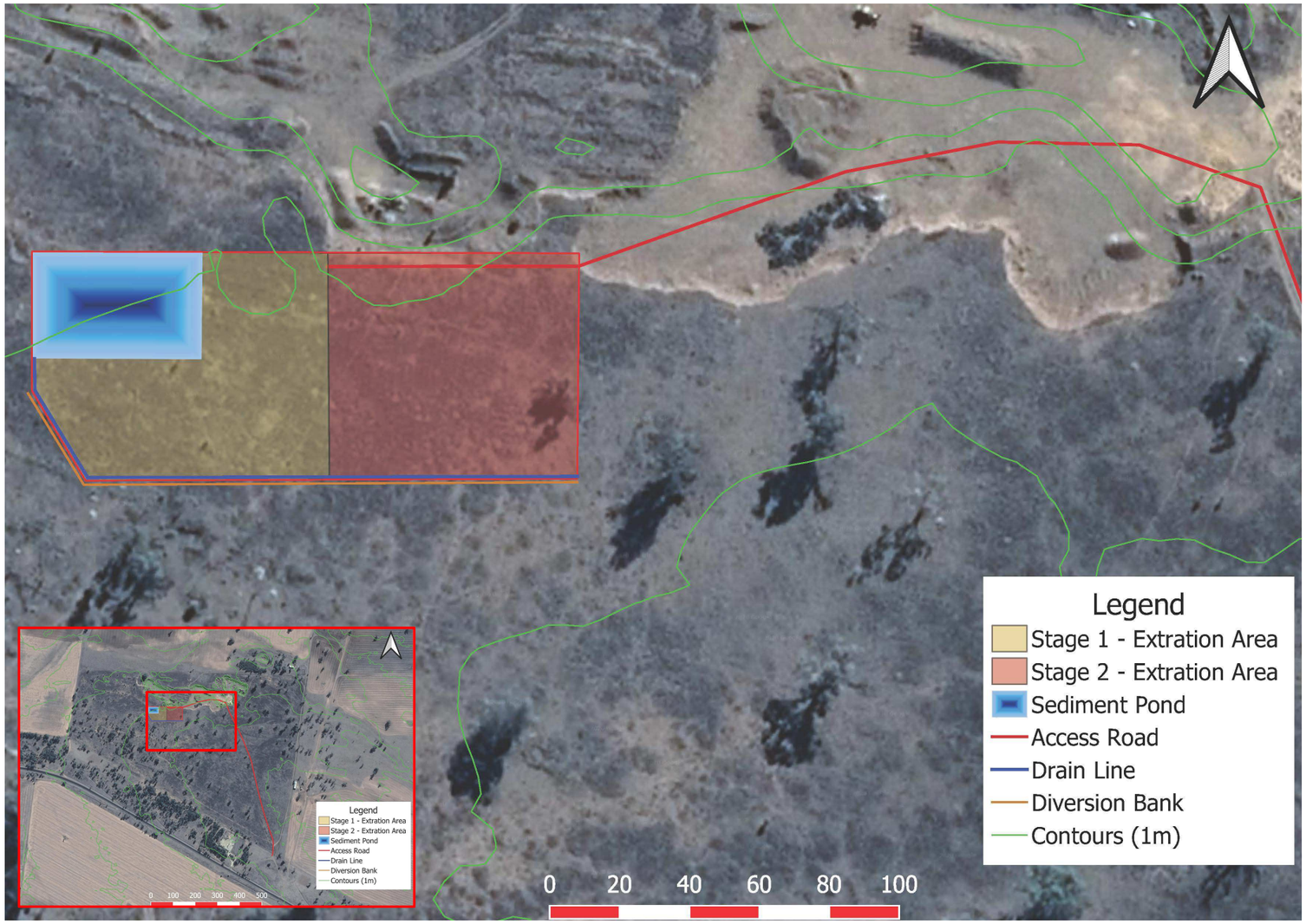
0 20 40 60

N

Scale: 1:1,500 (A4)

Surveyed By: Tarrant Moss
Prepared By: Tarrant Moss
Date: 19/11/2020

SMK CONSULTANTS
surveying - irrigation - environmental

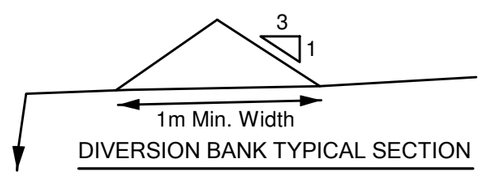


RUN-OFF CONTROL AND MITIGATION PARAMETERS
- CONSTRUCTION -

- The contractor is responsible for all erosion protection and sediment control during the contract.
- The contractor is to ensure all construction areas are to remain in a bare state for the minimum amount of time possible.
- During the time that these areas are left exposed, all efforts must be taken to ensure the subject area is not eroded
- Any topsoil that is to be stripped is to be placed in a designated top soil stockpile
- Any top soil stockpiles are to be placed on suitably higher ground and a silt fence is to be built surrounding the stockpile
- Stockpiles are to have one access only and are to be rehabilitated on construction completion
- Silt traps/fences should be constructed and used until a diversion bank is established on the upstream side of the quarry
- Silt traps/fences/shakedowns are to be checked weekly and after rain events
- Dust is to be minimised during construction with watering of the site when required
- Open no more than 0.5 ha of quarry at any one time.
- All sediment and erosion devices are to remain until all construction works are completed
- It is up to the contractor to manage sediment and erosion control to suit the varying stages of construction and make sure all placement of devices and management of devices is up to best practice guidelines.
- The quarry floor should slope towards the excavated faces to ensure any run-off drains towards the catch drain
- Any and all operations within the quarry should seek to abstain from going below the ground level of the existing pit so as to prevent any run-off within the quarry leaching into the groundwater that is present on site

Catch-Drains are designed to be open channels that collect runoff and desposit sediment to designed sediment controls. Diversion Banks are designed to redirect any run-off outside of the catchment that would otherwise enter the holding pond

CATCH-DRAIN TYPICAL SECTION



DIVERSION BANK TYPICAL SECTION

SEDIMENT POND USAGE DURING CONSTRUCTION

A monthly inspection shoud be undertaken for: the sediment holding pond, drains and diversion structures
The following information should be recorded during the inspection:

- General condition.
- Evidence of overflow and condition of downstream catchment.
- Captive Water colour, eg. highly turbid, brown, clear etc.
- Evidence of eroding surfaces.
- Evidence of sediment discharge.
- Approximate retained capacity.

During construction the required holding pond capacity will increase relative to the increase in the quarry catchment area. See figures listed under 'SEDIMENT BASIN DETAILS'. During construction; the holding pond capacity should at no point have a capacity below what is required.

SEDIMENT BASIN DETAILS:

Full Catchment (Including Road) = 1.458ha
Disturbed Catchment Area = 0.998Ha
Allowable Free-Board = 1m
Batter Ratio = 5:1
Required Capacity = 0.54ML*

EXTRA INFORMATION:

STAGE 1:
Catchment Area = 0.959ha
Disturbed Area = 0.499Ha
Allowable Free-Board = 1m
Required Capacity = 0.354ML*

STAGE 2:
Catchment Area = 1.458ha
Disturbed Area = 0.499Ha
Allowable Free-Board = 1m
Required Capacity = 0.537ML*

*Capacity is calculated from a 5-Day 90th-Percentile storm

	L (m)	W (m)	Area (m²)
Top	39.5	20.0	790.0
Bottom	29.5	10.0	295.0

Volume (ML)	0.543

NOTE: Holding Pond in diagram accounts for the extra area created by the 1m freeboard = 1485m²

SCALES: HORIZ 1:1000
VERT -
DATUM: LOCAL AHD MGA ZONE 56

A3

SURVEYED J.BARR
DESIGNED T.MOSS
CHECKED PAUL COVELL

Contours Design Existing
Major: 1.0 m
Minor: 0.2 m

SMK CONSULTANTS
surveying - irrigation - environmental
PO BOX 774 MOREE 2400
PHONE (02) 6752 1021

CLIENT: JOHNSTONE NARRABRI

PROJECT: AVOCA QUARRY

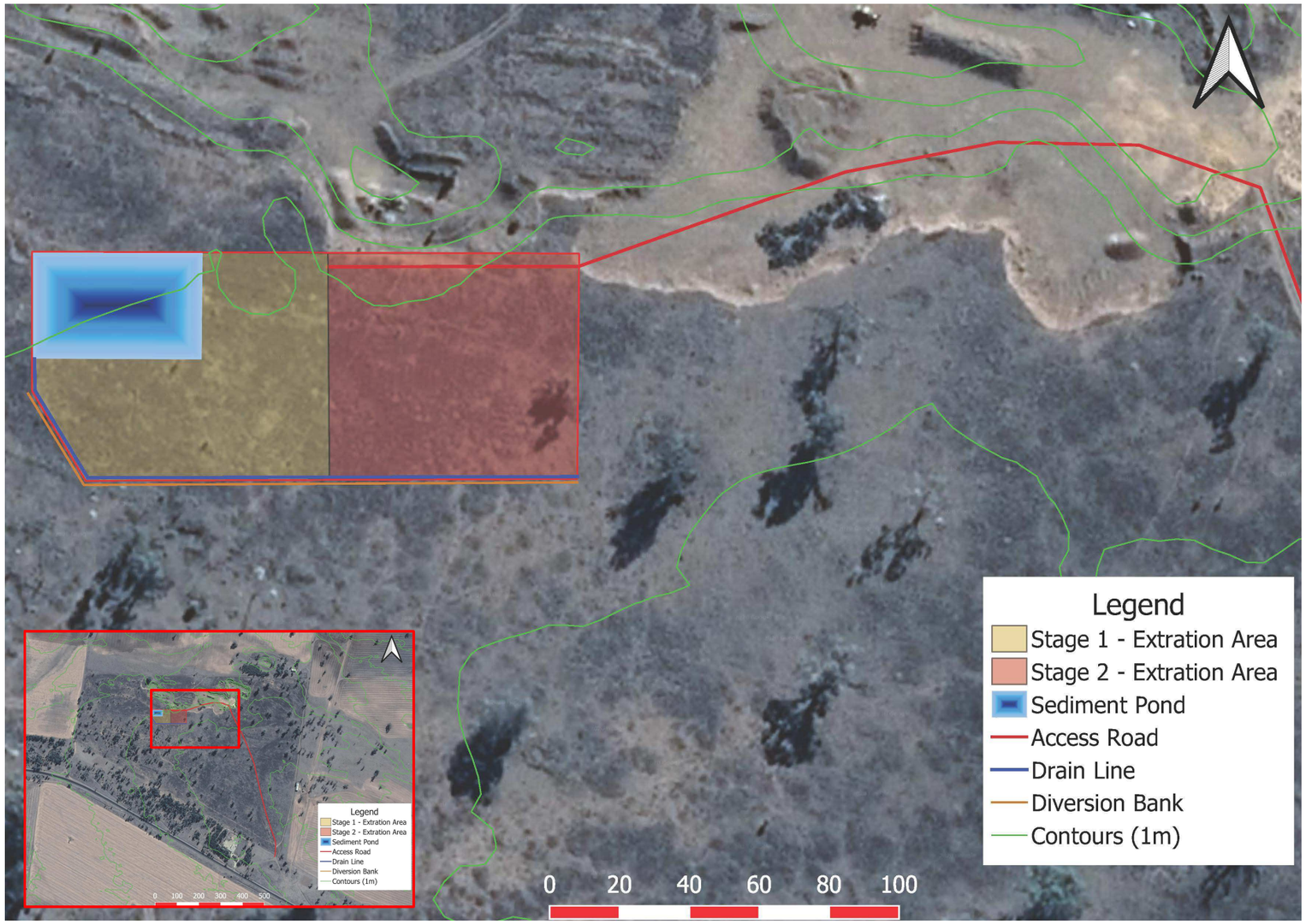
DESCRIPTION: LAYOUT PLAN FOR SOIL AND WATER MANAGEMENT DURING CONSTRUCTION

PLAN REVISION:		DATE
A	INITIAL DESIGN	30-06-2020
B	SECONDARY DESIGN	06-10-2020
C		

SHEET No. 1 of 1

JOB No.

COMPUTER FILE (MJO): Quarry Report Draft 2 - PLAN FOR CONSTRUCTION



RUN-OFF CONTROL AND MITIGATION PARAMETERS
- OPERATION -

. It is the contractor's responsibility to manage sediment and erosion control to suit the varying stages of opration and make sure all placement of devices and management of devices is up to best practice guidelines.
. Any topsoil that is to be stripped is to be placed in a designated top soil stockpile
. Any top soil stockpiles are to be placed on suitably higher ground and a silt fence is to be built surrounding the stockpile
. Stockpiles are to have one access only and are to be rehabilitated on operation completion
. The contractor is to ensure all operation areas are to remain in a bare state for the minimum amount of time possible.
. During the time that these areas are left exposed, all efforts must be taken to ensure the subject area is not eroded
. Water from the holding pond can continue to be used for dust suppression provided it is uncontaminated
. Dust is to be minimised during operation with watering of the site when required
. Silt traps/fences/shakedowns are to be checked weekly and after rain events and sediment is to be removed once it builds up to a height of 300mm from top of upslope side.
. The sediment ponds and drains should be inspected monthly, or following a significant rainfall event
. Each table drain should be inspected at least monthly, or following heavy rainfall with particular emphasis on the condition of land immediately down-slope of the discharge point. Any maintenance work should be completed within 7 days of the initial inspection
. The diversion bank upstream of the quarry should be inspected monthly or following a significant rainfall event and necessary repairs be conducted as soon as possible
. The quarry floor should slope towards the excavated faces to ensure any run-off drains towards the catch drain
. Any and all operations within the quarry should not go below the ground level of the existing pit so as to prevent any run-off within the quarry leaching into the groundwater that is present on site

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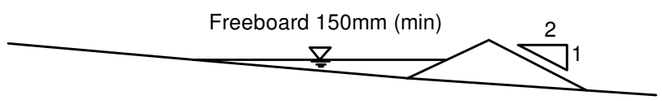
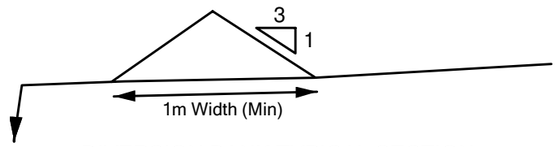


CATCH DRAIN TYPICAL SECTION



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- Evidence of sediment discharge.
- Approximate retained capacity.

SCALES: HORIZ 1:1000
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DATUM: LOCAL AHD MGA ZONE 56

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CLIENT: JOHNSTONE NARRABRI

PROJECT: AVOCA QUARRY

DESCRIPTION: LAYOUT PLAN FOR SOIL AND WATER MANAGEMENT DURING OPERATION

PLAN REVISION:		DATE
A	INTIAL DESIGN	30-06-2020
B	SECONDARY DESIGN	06-10-2020
C		

SHEET No. 1 of 1
PLAN SET: DESIGN
JOB No.
FILE: Quarry Report Draft 2 - PLAN FOR OPERATION

Appendix 2 – AHIMS Search Results

Office of Environment & Heritage
NSW GOVERNMENT

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : 20-167
Client Service ID : 510749

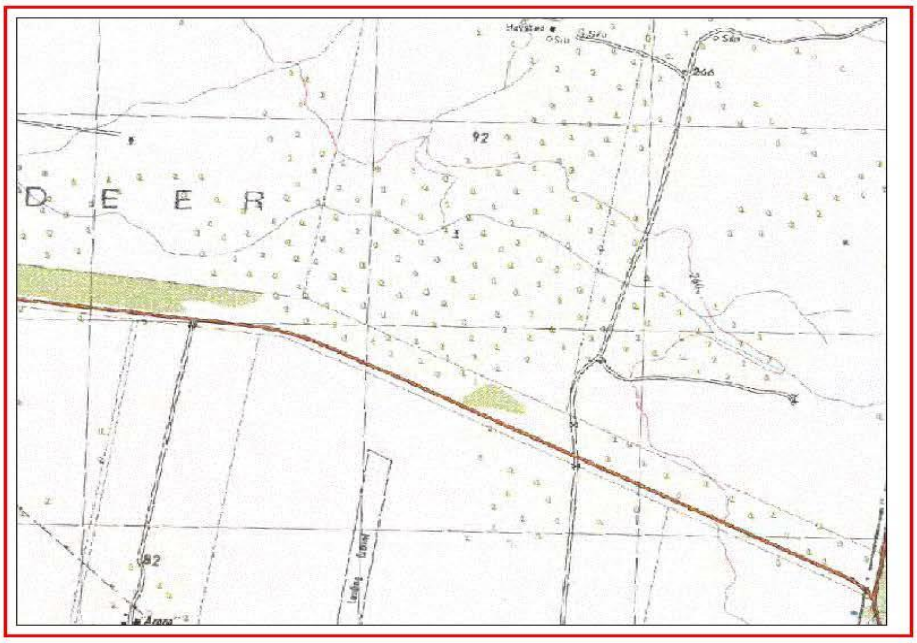
SMK Consultants Pty Ltd - Moree
P O Box 774
Moree New South Wales 2400
Attention: Hayley Greenham
Email: hayley@smk.com.au

Date: 04 June 2020

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 923, DP:DP1046736 with a Buffer of 1000 meters, conducted by Hayley Greenham on 04 June 2020.

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 the Office of the Environment and Heritage 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. *

Appendix 3 – Test of Significance – BC Act 2016

Endangered Ecological Communities (EEC's) and threatened species that have the potential to be impacted by the proposed works have been assessed under the guidelines of Section 7.3 of the Biodiversity Conservation Act (2016) and this is provided below in the form of a five-part test. The assessment has been conducted in accordance with the Threatened Species Test of Significance Guidelines (OEH 2018).

No EECs were identified in the subject site or study area during the site assessment.

Assessment of Potential Presence of Threatened Species

A search of the National Parks and Wildlife Atlas of NSW Wildlife (BioNet) identified species with recorded sightings within a 10km radius of the proposed development site. The search result for listed species is presented in Table 1 below.

Table 1: Listed in Bionet for within 10km of the site

Scientific Name	Common Name	Legal Status	Records
Stictonetta naevosa	Freckled Duck	BC Act: V	2
Circus assimilis	Spotted Harrier	BC Act: V	1
Falco subniger	Black Falcon	BC Act: V	1
Ninox connivens	Barking Owl	BC Act: V	2
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	BC Act: V	1
Chthonicola sagittata	Speckled Warbler	BC Act: V	1
Anthochaera phrygia	Regent Honeyeater	BC Act: E4A EPBC Act: CE	1
Pomatostomus temporalis temporalis	Grey-crowned babbler (eastern subspecies)	BC Act: V	5
Phascolarctos cinereus	Koala	BC Act: V EPBC Act: V	1
Nyctophilus corbeni	Corben's Long-eared Bat	BC Act: V EPBC Act: V	1
Cadellia pentastylis	Ooline	BC Act: V EPBC Act: V	9

The project site is located with the Liverpool Plains subregion of the Brigalow Belt South Bioregion. A broader search for species, populations and communities that may occur within the locality of the development site was therefore conducted through investigating known and predicted species' distributions within the Brigalow Belt South Bioregion (Liverpool Plains subregion). A copy of the search results for listed species is presented at the end of this report in Table 3.

Species were considered with regards to their known distribution and habitat requirements, to assess whether the subject site is likely to serve as suitable habitat, and subsequently whether/how the development is likely to impact upon the species.

The availability of habitat on site was assessed using a number of factors including:

- Structural and floral diversity;
- Occurrence and extent of habitat types in the general vicinity;
- Continuity with similar habitat adjacent to the site, or connection with similar habitat off site by way of corridors;
- Key habitat features such as tree hollows, water bodies, crevices and rocky areas;
- Degree of disturbance and degradation; and
- Topographic features such as aspect and slope.

This information was used to evaluate the site as potential habitat for each of the threatened species considered and assign each species with a rating based on their likelihood to occur within the subject site. The 'likelihood of occurrence' categories are detailed in Table 1. The habitat assessment is provided in Appendix A. Species assigned with a rating of 'Moderate' or higher and are considered potentially impacted by the proposed works have been considered further under relevant legislation within the assessment of significance provided below.

Table 1: Likelihood of Occurrence Criteria

Likelihood Rating	Criteria
Known	The species was recorded within the study area during site surveys.
High	It is likely that a species would inhabit or utilise habitat within the subject site. Criteria for this category may include: • Species recently and/or regularly recorded in contiguous or nearby habitat; • High quality habitat types or resources present within study area; • Species is known or likely to maintain a resident population surrounding the study area; and • Species is known or likely to visit during migration or seasonal availability of resources.
Moderate	Potential habitat for a species occurs within the subject site. Criteria for this category may include: • Species previously recorded in contiguous habitat albeit not recently (>10 years); • Poor quality, depauperate or modified habitat types and/or resources • present within study area; • Species has potential to utilise habitat during migration or seasonal availability of resources; and • Cryptic flora species with potential habitat available within the subject site that have not been seasonally targeted by surveys.

Likelihood Rating	Criteria
Low	It is unlikely that the species inhabits the area and would likely be considered a transient visitor if ever encountered. Criteria for this category may include: • The subject site or study area lacks specific habitat types or resources required by the species; • The subject site is beyond the current distribution of the species or is isolated from known populations; • Non-cryptic flora species that were found to be absent during targeted surveys; and • The subject site only contains common habitat which would not be considered important for the local survival of a threatened species.
Unlikely	The habitat within subject site and study area is unsuitable for the species.

Only species that have the potential to be present within the available habitat are listed in Table 2 and assessed in this test of significance.

Table 2: Listed Species to be Assessed under the Test of Significance

Scientific Name	Common Name	Legal Status	Records within IBRA Subregion
Circus assimilis	Spotted Harrier	BC Act: V, P	27
Falco subniger	Black Falcon	BC Act: V, P	15
Ninox connivens	Barking Owl	BC Act: V,P,3	42
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	BC Act: V, P	198
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	BC Act: V, P	317
Phascolarctos cinereus	Koala	BC Act: V EPBC Act: V	1486
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	BC Act: V,P	221
Chalinolobus picatus	Little Pied Bat	BC Act: V,P	6
Nyctophilus corbeni	Corben's Long-eared Bat	BC Act: V,P EPBC Act: V	48
Desmodium campylocaulon	Creeping Tick-trefoil	BC Act: E1	1
Swainsona murrayana	Slender Darling Pea	BC Act: V EPBC Act: V	2

[1]Number of BioNet Atlas records in selected area. Status Abbreviations: Vulnerable (V), Endangered (E), Protected (P), and Sensitivity Classes 2 and 3 (Sensitive Species Data Policy) (2,3).

Test of Significance - Assessment of Criteria and Discussion

The following is to be considered for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats:

a) **In the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

A viable local population of a threatened terrestrial flora or fauna species in this assessment is defined as a population that occurs within the study area and the connected habitat adjacent to the quarry sites.

Flora Species

Creeping Tick-trefoil, Slender Darling Pea

Potential habitat for the listed species is present on the site. Should the existing pit be extended, the development would involve the disturbance on a small scale of cleared, degraded vegetation (i.e. areas previously cleared of native vegetation and currently utilised for grazing). Large areas of similar disturbed habitat, and smaller areas of higher quality native vegetation, are present adjacent to the subject site. Should the above-mentioned species be present within the development footprint, they may be displaced in the short-term. However, given that adjoining vegetation retains the potential to support these species, it considered that the risk of a viable population being placed at risk of extinction is minimal.

Microchiropteran Bats

Yellow-bellied Sheath-tail Bat, Little Pied Bat, Corben's Long-eared Bat

All of these species may use the site for foraging and drinking water on occasion, however given the lack of optimal foraging habitat within the subject site and the areas of native woodland and riparian habitat in the locality, it is unlikely that the subject sites are regularly or heavily utilised by Little Pied Bat, Corben's Long-eared Bat or Yellow-bellied Sheathtail Bat. Additionally, there is no roosting and/or breeding habitat within the proposed development footprint. The risk to these bat species from the development is therefore limited to the loss of sub-optimal foraging habitat. It is therefore considered that no viable local population of any threatened species will be placed at risk of extinction as a result of the proposed development.

Birds of Prey

Spotted Harrier, Black Falcon, Barking Owl

These highly mobile species have relatively large home ranges (>200 Ha). It is therefore highly unlikely that the low-quality, modified vegetation within the subject site is an important

component of the home range of these species. These birds are highly dependent upon mature overstorey trees and/or hollow bearing trees for nesting and provision of hunting perches. They are also dependent upon the presence of prey species. The vegetation present at the subject site is degraded and consists of a quarry site, cleared woodland and cultivated paddocks and as such provides limited habitat for prey species. The development is therefore deemed not to pose a risk to viable local populations of the above-mentioned species.

Woodland Species

Brown Treecreeper, Grey-crowned Babbler

Habitat loss and/or degradation as a result of clearing, increased weed invasion, under-shrubbing and "tidying up", are all significant threats for these species. Woodland habitat will not be cleared or disturbed by the proposed development, thus the above-mentioned species are not at risk of any direct impact.

The risk to these woodland species is therefore limited to indirect impacts such as noise disturbance, and potential habitat modification resulting from the spread of weed species. It is recommended that weeds occurring at the site that are listed under the Biosecurity Act 2015 are treated prior to completion of works to prevent their spread to adjoining areas. Provided that these measures are implemented, secondary impacts are not considered significant and are unlikely to place a viable population at risk of extinction.

Arboreal Mammals

Koala

Koalas are largely or wholly tree-dependent and may utilise good-quality native woodland/forest habitat within the study area. Given the proximity of the subject site to these areas of suitable habitat, it is possible that Koalas transit through the subject site on occasion. However, given that adjoining vegetation has similar characteristics (structural and species diversity, disturbance), any short-term displacement or disturbance incurred would not result in a significant impact to these species. It is therefore considered that there is no risk of a viable population being placed at risk of extinction.

No population of listed threatened species was identified within the subject site and minimal indirect impacts are expected to occur off site. It is therefore considered that no viable local population of any threatened species will be placed at risk of extinction as a result of the proposed development. Additionally, as the site is surrounded by areas of similar and / or higher-quality native vegetation, local populations of fauna species will have the ability to access or preference these surrounding areas. Therefore, it is considered unlikely that any local population of threatened species within the study area will be placed at risk of extinction.

b) In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

(i) **is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**

(ii) **is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.**

The site does not support an endangered ecological community. The development proposal is therefore considered unlikely to impact on the extent of any of the listed endangered or critically endangered ecological communities.

c) In relation to the habitat of a threatened species, population or ecological community:

(i) **the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and**

The proposed development involves minimal clearing of native vegetation over a maximum extent of 0.99 hectares as required for the proposed extraction area. Whilst the total development footprint is 1.46 hectares, this area includes the existing access road which is not considered to contain native vegetation. Any additional impact on habitat is considered to be small scale when considered in the context of available area of similar and higher quality habitat that has been retained in the local region.

(ii) **whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and**

The proposed development is not predicted to cause or promote any additional fragmentation of species within the area. Species of fauna may disperse and breed in surrounding areas and remain within habitats that would support viable populations. Threatened flora species, whilst not identified in the area, may be displaced in the short-term, however, adjoining vegetation is considered suitable so that these species are not at risk of extinction or fragmentation.

(iii) **the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,**

The habitat within the proposed development footprint consists of significantly degraded, cleared vegetation with limited diversity. The area does not offer any critical habitat features, such as water bodies or tree hollows, which are of ecological significance in supporting

threatened species. The proposed development is therefore not considered to remove habitat essential for the survival of a threatened species within the area.

d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

The development proposal is not located in an area of outstanding biodiversity value.

e) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process:

A total of 34 key threatening processes are listed for the Brigalow Belt South Bioregion (Liverpool Plains IBRA Subregion) by the Bionet search of the region. The following Table 3 presents a list of these processes and comment. Based on the number identification in the list, the following discussion is presented to assess the process.

Table 3: Key Threatening Processes

Listing of Key Threatening Processes for Brigalow Belt South – Liverpool Plains IBRA Subregion	Comment
Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners (*Manorina melanocephala*)	No extensive woodland present
Alteration of habitat following subsidence due to longwall mining	Not applicable
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	Not applicable
Anthropogenic Climate Change	Scale of development would result in limited impact
Bushrock removal	Not applicable
Clearing of native vegetation	Site has been previously cleared
Competition and grazing by the feral European Rabbit, Oryctolagus cuniculus (L.)	Rabbits not a pest at this location
Competition and habitat degradation by Feral Goats, Capra hircus Linnaeus 1758	No goats present
Competition from feral honey bees, Apis mellifera L.	Any feral bees will be eradicated if present
Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners	Not applicable
Herbivory and environmental degradation caused by feral deer	No deer present
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	The site had evidence of burning from previous hazard reduction burning
Importation of Red Imported Fire Ants Solenopsis invicta Buren 1972	No fire ants present

Listing of Key Threatening Processes for Brigalow Belt South – Liverpool Plains IBRA Subregion	Comment
Infection by Psittacine Circoviral (beak and feather) Disease affecting endangered psittacine species and populations	Not applicable
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	Very limited frog habitat available
Infection of native plants by Phytophthora cinnamomi	Phytophthora not observed to be present
Introduction of the Large Earth Bumblebee Bombus terrestris (L.)	Not present
Invasion and establishment of exotic vines and scramblers	Not present
Invasion and establishment of Scotch Broom (Cytisus scoparius)	Not present
Invasion and establishment of the Cane Toad (Bufo marinus)	No suitable habitat available at present
Invasion of native plant communities by African Olive Olea europaea subsp. cuspidata (Wall. ex G. Don) Cif.	Not present
Invasion of native plant communities by Chrysanthemoides monilifera	Not present
Invasion of native plant communities by exotic perennial grasses	Discussed below.
Invasion of the Yellow Crazy Ant, Anoplolepis gracilipes (Fr. Smith) into NSW	Not present
Invasion, establishment and spread of Lantana (Lantana camara L. sens. Lat)	Not present
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	Not present
Loss of Hollow-bearing Trees	The site has been previously cleared. The development will not include the removal of any mature trees and will not involve the removal of any hollow-bearing trees.
Loss or degradation (or both) of sites used for hill-topping by butterflies	No hilltop sites present
Predation and hybridisation by Feral Dogs, Canis lupus familiaris	The development would not increase the presence or impact of Feral Dogs
Predation by Gambusia holbrooki Girard, 1859 (Plague Minnow or Mosquito Fish)	No watercourse within study area
Predation by the European Red Fox Vulpes Vulpes (Linnaeus, 1758)	The development would not increase the presence or impact of European Red Fox
Predation by the Feral Cat Felis catus (Linnaeus, 1758)	The development would not increase the presence or impact of Feral Cats
Predation, habitat degradation, competition and disease transmission by Feral Pigs, Sus scrofa Linnaeus 1758	The development would not increase the presence or impact of Feral Pigs
Removal of dead wood and dead trees	No remnant woodland supporting dead wood present.

Invasion of Native Plant Communities by Exotic Perennial Grasses

Invasion of Native plant communities by exotic perennial grasses is listed as a key threatening process. Exotic perennial grasses (e.g. Coolatai Grass) have the capacity to invade native plant communities, competing with an excluding native species (NSW Scientific Committee 2003). The invasion of these grasses also reduces the habitat value for many native fauna species.

Whilst not identified during the site inspection, patches of Coolatai Grass may be present within regrowth vegetation and paddocks within the subject site. The risk posed to native plant communities is the risk of this and other exotic perennial grasses spreading into areas with better quality native groundcover. The proposed development will involve the clearing of such vegetation, should the quarry be approved. Pathogen control protocols should be developed and implemented in accordance with the requirements of the *Biosecurity Act 2015*. Provided safeguards regarding weed management are implemented, the proposed works are unlikely to result in increased weed incursion. The proposed works are therefore considered unlikely to increase the impact of this key threatening process.

The above assessment was conducted under the provisions of the *Biodiversity Conservation Act 2016* (BC Act) and determined that the proposal would not have a significant impact on any listed threatened species their habitat and as such further assessment is not required.

Conclusion

The proposal was assessed using the Test of Significance in accordance with the BC Act which determined that given the low habitat value of the vegetation to be impacted within the quarry site as part of the proposal, the project is not likely to significantly affect threatened species, ecological communities, or their habitats.

This assessment has determined that the potential adverse impacts of the proposed development on threatened species, populations or communities is considered minimal and no further investigation in the form of a Species Impact Statement is required.

Appendix A: Bionet Threatened Species, Populations and Communities Search Results for Brigalow Belt South Bioregion (Liverpool Plains IBRA Subregion)

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
Reptilia					
Uvidicolus sphyrurus Border Thick-tailed Gecko	BC Act – V EPBC Act - V	Found only on the tablelands and slopes of northern NSW and southern Queensland, reaching south to Tamworth and west to Moree. Most common in the granite country of the New England Tablelands. Occurs at sites ranging from 500 to 1100 m elevation. Populations are mostly fragmented, with over 50 discrete sites currently known that are separated by at least 2 km. This species often occurs on steep rocky or scree slopes, especially granite. Recent records from basalt and metasediment slopes and flats indicate its habitat selection is broader than formerly thought and may have extended into areas that were cleared for agriculture. Favours forest and woodland areas with boulders, rock slabs, fallen timber and deep leaf litter. Occupied sites often have a dense tree canopy that helps create a sparse understorey.	1	**Low** The subject site is not considered important for this species given its low altitude (<300m). The species is therefore not considered in this assessment.	No
Aprasia parapulchella Pink-tailed Legless Lizard	BC Act – V EPBC Act - V	Inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by Kangaroo Grass (Themeda australis). Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks. Commonly found beneath small, partially-embedded rocks and appear to spend considerable time in burrows below these rocks; the burrows have been constructed by and are often still inhabited by small black ants and termites.	2	**Low** The subject site only contains common habitat which would not be considered important for the local survival of the species.	No
Hoplocephalus bitorquatus Pale-headed Snake	BC Act - V	A patchy distribution from north-east Queensland to the north-eastern quarter of NSW. In NSW it has historically been recorded from as far west as Mungindi and Quambone on the Darling Riverine Plains, across the north	23	**Low** The subject site only contains common habitat which would not be considered important for the local	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
		west slopes, and from the north coast from Queensland to Sydney. Found mainly in dry eucalypt forests and woodlands, cypress forest and occasionally in rainforest or moist eucalypt forest. In drier environments, it appears to favour habitats close to riparian areas.		survival of a threatened species. It is unlikely that the species inhabits the area and would likely be considered a transient visitor if ever encountered.	
			Aves		
Alectura lathami Australian Brush-turkey	BC Act - E	Largely coastal distribution from Cape York south as far as the Illawarra in NSW. Occurs in forested and wooded areas of tropical and warm-temperate districts, particularly above 300 m to at least 1200 m altitude. Usually prefers dry rainforest that is found within the Semi-evergreen Vine Thicket.	10	**Low** The subject site is not considered important for this species given its low altitude (<300m). The species is therefore not considered in this assessment.	No
Leipoa ocellata Malleefowl	BC Act – E EPBC Act – V	Predominantly inhabit mallee communities, preferring the tall, dense and floristically-rich mallee found in higher rainfall (300 - 450 mm mean annual rainfall) areas. Utilises mallee with a spinifex understorey, but usually at lower densities than in areas with a shrub understorey. Less frequently found in other eucalypt woodlands, such as Inland Grey Box, Ironbark or Bimble Box Woodlands with thick understorey, or in other woodlands such dominated by Mulga or native Cypress Pine species. Prefers areas of light sandy to sandy loam soils and habitats with a dense but discontinuous canopy and dense and diverse shrub and herb layers.	1	**Low** The subject site only contains common habitat which would not be considered important for the local survival of the species.	No
Anseranas semipalmata Magpie Goose	BC Act - V	Mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges. Equally at home in aquatic or terrestrial habitats; often seen walking and grazing on land; feeds on grasses, bulbs and rhizomes. Activities are centred on wetlands, mainly those on floodplains of rivers and large shallow wetlands formed by run-off; breeding can occur in both summer and winter dominated rainfall areas and is strongly influenced by water level; most breeding now occurs in monsoonal	K	**Unlikely** The subject site does not contain suitable habitat for the species and is therefore not considered important habitat.	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
		areas; nests are formed in trees over deep water; breeding is unlikely in south-eastern NSW. Often seen in trios or flocks on shallow wetlands, dry ephemeral swamps, wet grasslands and floodplains; roosts in tall vegetation.			
Oxyura australis Blue-billed Duck	BC Act - V	The Blue-billed Duck is endemic to south-eastern and south-western Australia. It is widespread in NSW, but most common in the southern Murray-Darling Basin area. Birds disperse during the breeding season to deep swamps up to 300 km away. The Blue-billed Duck prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. The species is completely aquatic, swimming low in the water along the edge of dense cover.	1	**Unlikely** The subject site does not contain suitable habitat for the species and is therefore not considered important habitat.	No
Stictonetta naevosa Freckled Duck	BC Act - V	The species breeds in large temporary swamps created by floods in the Bulloo and Lake Eyre basins and the Murray-Darling system, particularly along the Paroo and Lachlan Rivers, and other rivers within the Riverina. The duck is forced to disperse during extensive inland droughts when wetlands in the Murray River basin provide important habitat. The species may also occur as far as coastal NSW and Victoria during such times. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds.	4	**Low** The subject site does not form core habitat, and should the quarry contain standing water, they may be used temporarily by vagrants during times of extreme drought. This does not constitute important habitat for the species however, therefore the species is not considered in this assessment.	No
Ephippiorhynchus asiaticus Black-necked Stork	BC Act - E	Floodplain wetlands (swamps, billabongs, watercourses and dams) of the major coastal rivers are the key habitat in NSW for the Black-necked Stork. Secondary habitat includes minor floodplains, coastal sandplain wetlands and estuaries.	2	**Unlikely** The subject site does not contain suitable habitat for the species and is therefore not considered important habitat.	No
Botaurus poiciloptilus	BC Act - E	Australasian Bitterns are widespread but uncommon over south-eastern Australia. In NSW they may be found over most of the state except for the far north-west. The	P	**Unlikely** The subject site does not contain suitable habitat for the species and is	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
Australasian Bittern		species favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (*Typha* spp.) and spikerushes (*Eleocharis* spp.).		therefore not considered important habitat.	
Circus assimilis Spotted Harrier	BC Act - V	In New South Wales, this species is widespread from coast to inland, including the western slopes of the Great Dividing Range and farther west. It is sparsely scattered in, or largely absent from, much of the Upper Western region. Primarily inhabits woodlands and dry open sclerophyll forests, usually dominated by eucalypts, including mallee associations. It has also been recorded in shrublands and heathlands and various modified habitats, including regenerating forests; very occasionally in moist forests or rainforests. Generally, the understorey is open with sparse eucalypt saplings, acacias and other shrubs, including heath.	27	**Moderate** The site contains modified poor-quality habitat; however, the species has been recorded within the area and may hunt within and around the subject site.	Yes
Haliaeetus leucogaster White-bellied Sea-Eagle	BC Act - V	The White-bellied Sea-eagle is distributed around the Australian coastline, including Tasmania, and well inland along rivers and wetlands of the Murray Darling Basin. In New South Wales it is widespread along the east coast, and along all major inland rivers and waterways. Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea.	3	**Unlikely** The subject site does not contain suitable habitat for the species and is therefore not considered important habitat.	No
Hamirostra melanosternon Black-breasted Buzzard	BC Act - V	The Black-breasted Buzzard is found sparsely in areas of less than 500mm rainfall, from north-western NSW and north-eastern South Australia to the east coast. Lives in a range of inland habitats, especially along timbered watercourses which is the preferred breeding habitat. Also hunts over grasslands and sparsely timbered woodlands.	3	**Low** The subject site only contains common habitat which would not be considered important for the local survival of the species.	No
Hieraaetus morphnoides Little Eagle	BC Act - V	The Little Eagle is found throughout the Australian mainland. Occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall	23	**Low** The subject site only contains common habitat which would not be	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
		living trees within a remnant patch, where pairs build a large stick nest in winter.		considered important for the local survival of the species.	
Lophoictinia isura Square-tailed Kite	BC Act - V	In NSW, the species is a regular resident in the north, north-east and along the major west-flowing river systems. Found in a variety of timbered habitats including dry woodlands and open forests. Is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy, picking most prey items from the outer foliage. Appears to occupy large hunting ranges of more than 100km.	12	**Low** The subject site only contains common habitat which would not be considered important for the local survival of the species.	No
Falco hypoleucos Grey Falcon	BC Act – E1	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey. Preys primarily on birds, especially parrots and pigeons, using high-speed chases and stoops; reptiles and mammals are also taken. Like other falcons it utilises old nests of other birds of prey and ravens, usually high in a living eucalypt near water or a watercourse; peak laying season is in late winter and early spring; two or three eggs are laid. Population trends are unclear, though it is believed to be extinct in areas with more than 500mm rainfall in NSW.	2	**Low** The subject site only contains common habitat which would not be considered important for the local survival of the species.	No
Falco subniger Black Falcon	BC Act - V	The Black Falcon is widely, but sparsely, distributed in New South Wales, mostly occurring in inland regions. In New South Wales there is assumed to be a single population that is continuous with a broader continental population, given that falcons are highly mobile, commonly travelling hundreds of kilometres.	15	**Moderate** The site contains modified poor-quality habitat; however, the species has been recorded within the area and may hunt within and around the subject site.	Yes
Brolga *Grus rubicunda*	BC Act - V	The species was formerly found across most of Australia. Today it is still abundant in the northern tropics, but very sparse across the southern part of its range. Though Brolgas often feed in dry grassland or ploughed paddocks	1	**Unlikely** The subject site does not contain suitable habitat for the species and is	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
		or even desert claypans, they are dependent on wetlands too, especially shallow swamps, where they will forage with their head entirely submerged.		therefore not considered important habitat.	
Ardeotis australis Australian Bustard	BC Act - E	The Australian Bustard mainly occurs in inland Australia and is now scarce or absent from southern and south-eastern Australia. In NSW, they are mainly found in the north-west corner and less often recorded in the lower western and central west plains regions. Breeding now only occurs in the north-west region of NSW. Mainly inhabits tussock and hummock grasslands, though prefers tussock grasses to hummock grasses; also occurs in low shrublands and low open grassy woodlands; occasionally seen in pastoral and cropping country, golf courses and near dams.	1	**Low** The subject site only contains common habitat which would not be considered important for the local survival of the species.	No
Burhinus grallarius Bush Stone-curlew	BC Act - E	The Bush Stone-curlew is found throughout Australia except for the central southern coast and inland, the far south-east corner, and Tasmania. Inhabits open forests and woodlands with a sparse grassy ground layer and fallen timber. Feed on insects and small vertebrates, such as frogs, lizards and snakes. Nest on the ground in a scrape or small bare patch.	3	**Low** The subject site only contains common habitat which would not be considered important for the local survival of the species.	No
Rostratula australis Australian Painted Snipe	BC Act - E	In NSW many records are from the Murray-Darling Basin including the Paroo wetlands, Lake Cowal, Macquarie Marshes, Fivebough Swamp and more recently, swamps near Balldale and Wanganella. The species prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber.	1	**Unlikely** The subject site does not contain suitable habitat for the species and is therefore not considered important habitat.	No
Limosa limosa Black-tailed Godwit	BC Act - V	In NSW, it is most frequently recorded at Kooragang Island (Hunter River estuary), with occasional records elsewhere along the coast, and inland. Records in western NSW indicate that a regular inland passage is used by the species, as it may occur around any of the large lakes in the western areas during summer, when the muddy	P	**Unlikely** The subject site does not contain suitable habitat for the species and is therefore not considered important habitat.	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
		shores are exposed. The species is primarily coastal, and is usually found in sheltered bays, estuaries and lagoons with large intertidal mudflats and/or sandflats. Further inland, it can also be found on mudflats and in water less than 10 cm deep, around muddy lakes and swamps.			
Calyptorhynchus lathami Glossy Black-Cockatoo	BC Act - V	Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Black Sheoak and Forest Sheoak are important foods. Inland populations feed on a wide range of Sheoak. Belah is also utilised and may be a critical food source for some populations. Feeds almost exclusively on the seeds of several species of she-oak (*Casuarina* and *Allocasuarina* species), shredding the cones with the massive bill. Dependent on large hollow-bearing eucalypts for nest sites.	14	**Low** No Sheoak or Belah trees were recorded in the vicinity of the site. The subject site therefore only contains common habitat which would not be considered important for the local survival of the Glossy Black-Cockatoo.	No
Glossopsitta pusilla Little Lorikeet	BC Act - V	Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species. Nomadic movements are common, influenced by season and food availability.	156	**Low** The subject site only contains common habitat which would not be considered important for the local survival of the species.	No
Lathamus discolor Swift Parrot	BC Act – E EPBC Act - CE	In NSW mostly occurs on the coast and south west slopes. On the mainland they occur in areas where eucalypts are flowering profusely or where there is abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Forest Red Gum *E. tereticornis*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*.	5	**Low** Preferred habitat features and feed trees were not recorded within the study area, and the subject site is not considered important habitat for the species.	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
Neophema pulchella Turquoise Parrot	BC Act - V	Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants or browsing on vegetable matter. Nests in tree hollows, logs or posts, from August to December.	100	**Low** The subject site only contains common habitat which would not be considered important for the local survival of the species.	No
Polytelis swainsonii Superb Parrot	BC Act – V EPBC Act - V	Inhabit Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. In the Riverina the birds nest in the hollows of large trees (dead or alive) mainly in tall riparian River Red Gum Forest or Woodland. On the South West Slopes nest trees can be in open Box-Gum Woodland or isolated paddock trees. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box. Nest in small colonies, often with more than one nest in a single tree. May forage up to 10 km from nesting sites, primarily in grassy box woodland. Feed in trees and understorey shrubs and on the ground and their diet consists mainly of grass seeds and herbaceous plants. Also eaten are fruits, berries, nectar, buds, flowers, insects and grain.	3	**Low** The subject site only contains common habitat which would not be considered important for the local survival of the species.	No
Ninox connivens Barking Owl	BC Act - V	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey on these fertile riparian soils.	42	**Moderate** The site contains modified poor-quality habitat; however, the species has been recorded within the area and may hunt within and around the subject site.	Yes
Ninox strenua Powerful Owl	BC Act - V	The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands	P	**Low** The subject site only contains common habitat which would not be considered important for the local survival of the species.	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
		and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine, Black She-oak, Blackwood, Rough-barked Apple, Cherry Ballart and a number of eucalypt species.			
Tyto longimembris Eastern Grass Owl	BC Act - V	Eastern Grass Owls are found in areas of tall grass, including grass tussocks, in swampy areas, grassy plains, swampy heath, and in cane grass or sedges on flood plains. They rest by day in a 'form' - a trampled platform in a large tussock or other heavy vegetative growth. Always breeds on the ground. Nests are found in trodden grass, and often accessed by tunnels through vegetation.	2	**Unlikely** The subject site does not contain suitable habitat for the species and is therefore not considered important habitat.	No
Tyto novaehollandiae Masked Owl	BC Act - V	Extends from the coast where it is most abundant to the western plains. Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. The typical diet consists of tree-dwelling and ground mammals, especially rats. Pairs have a large home-range of 500 to 1000 hectares.	13	**Low** The subject site only contains common habitat which would not be considered important for the local survival of the species.	No
Climacteris picumnus victoriae Brown Treecreeper (eastern subspecies)	BC Act - V	The Brown Treecreeper is endemic to eastern Australia and occurs in eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range. Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species. When foraging in trees and on the ground, they peck and probe for insects, mostly ants, amongst the litter, tussocks and fallen timber, and along trunks and lateral branches. Hollows in standing dead or live trees and tree stumps are essential for nesting.	198	**Moderate** The site contains modified poor-quality habitat; however, the species has been recorded within the area and may hunt within and around the subject site.	Yes

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
Chthonicola sagittata Speckled Warbler	BC Act - V	The Speckled Warbler has a patchy distribution throughout the eastern half of NSW. There has been a decline in population density throughout its range, with the decline exceeding 40% where no vegetation remnants larger than 100ha survive. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. The diet consists of seeds and insects, with most foraging taking place on the ground around tussocks and under bushes and trees. The rounded, domed, roughly built nest of dry grass and strips of bark is located in a slight hollow in the ground or the base of a low dense plant, often among fallen branches and other litter.	322	**Low** The subject site only contains common habitat which would not be considered important for the local survival of the species.	No
Anthochaera phrygia Regent Honeyeater	BC Act – E EPBC Act - CE	The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Birds are also found in drier coastal woodlands and forests in some years. In NSW the distribution is very patchy and mainly confined to the two main breeding areas (Capertee Valley and the Bundarra-Barraba region) and surrounding fragmented woodlands. The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. Regent Honeyeaters inhabit woodlands that support a significantly high abundance and species richness of bird species. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. In some years, flocks converge on flowering coastal woodlands and forests.	4	**Low** The subject site only contains common habitat which would not be considered important for the local survival of the species.	No
Certhionyx variegatus Pied Honeyeater	BC Act - V	Inhabits wattle shrub, primarily Mulga (Acacia aneura), mallee, spinifex and eucalypt woodlands, usually when shrubs are flowering; feeds on nectar, predominantly from various species of emu-bushes (Eremophila spp.); also from mistletoes and various other shrubs (e.g.	1	**Low** The subject site only contains common habitat which would not be considered important for the local survival of the species.	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
		Grevillea spp.); also eats saltbush fruit, berries, seed, flowers and insects. Highly nomadic, following the erratic flowering of shrubs; can be locally common at times. Constructs a relatively large cup-shaped nest, usually robust, although occasionally loose, constructed of grasses and fine twigs, bound with spider webs, in the fork of a shrub or tree up to 5 m above the ground.			
Epthianura albifrons White-fronted Chat	BC Act - V	Gregarious species, usually found foraging on bare or grassy ground in wetland areas, singly or in pairs. They are insectivorous, feeding mainly on flies and beetles caught from or close to the ground. Have been observed breeding from late July through to early March, with 'open-cup' nests built in low vegetation. Nests in the Sydney region have also been seen in low isolated mangroves.	1	**Unlikely** The subject site does not contain suitable habitat for the species and is therefore not considered important habitat.	No
Grantiella picta Painted Honeyeater	BC Act - V	The Painted Honeyeater is nomadic and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. Inhabits Boree/Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus *Amyema*.	17	**Low** The subject site only contains common habitat which would not be considered important for the local survival of the species.	No
Melithreptus gularis gularis Black-chinned Honeyeater (eastern subspecies)	BC Act - V	The Black-chinned Honeyeater has two subspecies, with only the nominate (*gularis*) occurring in NSW where it is widespread, with records from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts. Feeding territories are large making the species locally nomadic. Recent studies have found that the Black-chinned	4	**Unlikely** The subject site does not contain suitable habitat for the species and is therefore not considered important habitat.	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
		Honeyeater tends to occur in the largest woodland patches in the landscape as birds forage over large home ranges of at least 5 hectares.			
Pomatostomus temporalis temporalis Grey-crowned Babbler (eastern subspecies)	BC Act - V	In NSW, the eastern sub-species occurs on the western slopes of the Great Dividing Range, and on the western plains reaching as far as Louth and Balranald. Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Woodlands on fertile soils in coastal regions. Feed on invertebrates, either by foraging on the trunks and branches of eucalypts and other woodland trees or on the ground, digging and probing amongst litter and tussock grasses.	317	**Moderate** The species has potential to utilise habitat within the property (wider subject area) during migration or seasonal availability of resources and has been recorded within 10km of the subject site.	Yes
Daphoenositta chrysoptera Varied Sittella	BC Act - V	Inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees, and from small branches and twigs in the tree canopy.	59	**Unlikely** There is no suitable habitat for the species in the subject site.	No
Artamus cyanopterus cyanopterus Dusky Woodswallow	BC Act - V	Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. Primarily eats invertebrates, mainly insects, which are captured whilst hovering or sallying above the canopy or over water. Most breeding activity occurs on the western slopes of the Great Dividing Range.	84	**Unlikely** There is no suitable habitat for the species in the subject site.	No
Melanodryas cucullata cucullata Hooded Robin (south-eastern form)	BC Act - V	The south-eastern form (subspecies *cucullata*) is found from Brisbane to Adelaide and throughout much of inland NSW, with the exception of the extreme north-west, where it is replaced by subspecies *picata*. Two other subspecies occur outside NSW. Requires structurally diverse habitats featuring mature eucalypts, saplings,	22	**Unlikely** There is no suitable habitat for the species in the subject site.	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
		some small shrubs and a ground layer of moderately tall native grasses.			
Petroica boodang Scarlet Robin	BC Act – V	The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. The Scarlet Robin breeds on ridges, hills and foothills of the western slopes, the Great Dividing Range and eastern coastal regions; this species is occasionally found up to 1000 metres in altitude.	K	**Low** The subject site only contains common habitat which would not be considered important for the local survival of the species.	No
Petroica phoenicea Flame Robin	BC Act - V	Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. The groundlayer of the breeding habitat is dominated by native grasses and the shrub layer may be either sparse or dense. Occasionally occurs in temperate rainforest, and also in herbfields, heathlands, shrublands and sedgelands at high altitudes. In winter, birds migrate to drier more open habitats in the lowlands (i.e. valleys below the ranges, and to the western slopes and plains). Often occurs in recently burnt areas; however, habitat becomes unsuitable as vegetation closes up following regeneration.	3	**Low** The subject site only contains common habitat which would not be considered important for the local survival of the species.	No
Stagonopleura guttata Diamond Firetail	BC Act - V	Found in grassy eucalypt woodlands, including Box-Gum Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Prefers clearings or areas with open understoreys. Feeds exclusively on the ground, on ripe and partly ripe grass and herb seeds and green leaves, and on insects. Nests are globular structures built either in the shrubby understorey, or higher up, especially under	29	**Low** The subject site only contains common habitat which would not be considered important for the local survival of the species.	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
		hawk's or raven's nests. Birds roost in dense shrubs or in smaller nests built especially for roosting.			
Mammalia					
Dasyurus maculatus Spotted-tailed Quoll	BC Act – V EPBC Act - E	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. Females occupy home ranges of 200-500 hectares, while males occupy very large home ranges from 500 to over 4000 hectares.	20	**Low** The subject site is not considered important habitat for this species given that no potential den sites observed on the subject site or in its vicinity.	No
Phascogale tapoatafa Brush-tailed Phascogale	BC Act - V	Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Also inhabit heath, swamps, rainforest and wet sclerophyll forest. Agile climber foraging preferentially in rough barked trees of 25 cm DBH or greater. Females have exclusive territories of approximately 20 - 40 ha, while males have overlapping territories often greater than 100 ha.	P	**Unlikely** There is no suitable habitat for the species in the subject site.	No
Sminthopsis macroura Stripe-faced Dunnart	BC Act - V	The species is rare on the NSW Central West Slopes and North West Slopes with the most easterly records of recent times located around Dubbo, Coonabarabran, Warialda and Ashford. Found in native dry grasslands and low dry shrublands, often along drainage lines where food and shelter resources tend to be better. Co-occupies areas with the more common Fat-tailed Dunnart, but prefers relatively ungrazed habitats with greater diversity and healthier understorey vegetation.	P	**Low** The subject site is not considered important habitat for the species given the species preference for ungrazed, native grasslands with a healthy species and structural diversity.	No
Phascolarctos cinereus Koala	BC Act – V EPBC Act - V	Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Home range size varies with quality of	1486	**Moderate** Whilst the property contains some feed tree species, the subject site consisted only of regrowth groundcover. Further, no mature	Yes

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
		habitat, ranging from less than two ha to several hundred hectares in size.		trees will be cleared as part of this proposal.	
Cercartetus nanus Eastern Pygmy-possum	BC Act - V	In NSW the species extends from the coast inland as far as the Pilliga, Dubbo, Parkes and Wagga Wagga on the western slopes. Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes. Shelters in tree hollows, rotten stumps, holes in the ground, abandoned bird-nests, Ringtail Possum (*Pseudocheirus peregrinus*) dreys or thickets of vegetation, (e.g. grass-tree skirts).	3	**Low** The subject site only contains common habitat which would not be considered important for the local survival of the species.	No
Petaurus australis Yellow-bellied Glider	BC Act - V	Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south. Feed primarily on plant and insect exudates, including nectar, sap, honeydew and manna with pollen and insects providing protein. Extract sap by incising (or biting into) the trunks and branches of favoured food trees, often leaving a distinctive 'V'-shaped scar. Den, often in family groups, in hollows of large trees. Very mobile and occupy large home ranges between 20 to 85 ha to encompass dispersed and seasonally variable food resources.	P	**Unlikely** There is no suitable habitat for the species in the subject site.	No
Petaurus norfolcensis Squirrel Glider	BC Act - V	The species is widely though sparsely distributed in eastern Australia, from northern Queensland to western Victoria. It inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the	17	**Unlikely** The subject site is not considered important habitat given the lack of suitable habitat.	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
		Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstorey. The species requires abundant tree hollows for refuge and nest sites.			
Aepyprymnus rufescens Rufous Bettong	BC Act - V	In NSW the species has largely vanished from inland areas but there are sporadic, unconfirmed records from the Pilliga and Torrington districts. Rufous Bettongs inhabit a variety of forests from tall, moist eucalypt forest to open woodland, with a tussock grass understorey. A dense cover of tall native grasses is the preferred shelter.	P	**Low** The subject site only contains common habitat which would not be considered important for the local survival of the species.	No
Lagorchestes leporides Eastern Hare-wallaby	BC Act – E4 EPBC Act - X	This species once inhabited the interior of New South Wales, Victoria and the Murray River region of South Australia. It was common in the level country between the Murray and Darling rivers, as well as the Liverpool Plains. The Eastern Hare-wallaby preferred habitat that consisted of open plains and grasslands. It was a strictly nocturnal animal which led a solitary lifestyle. During the day it sat still in a well-formed 'seat', usually in the shelter of a saltbush or a tussock. If approached too closely, it would bound off at great speed.	1	**Low** This species is presumed extinct and no recent records exist within the wider subject area. The subject site only contains common habitat which would not be considered important for the local survival of the species.	No
Macropus dorsalis Black-striped Wallaby	BC Act - E	From the Townsville area in Queensland to northern NSW where it occurs on both sides of the Great Divide. On the north west slopes of NSW, it occurs in Brigalow remnants to south of Narrabri. Preferred habitat is characterised by dense woody or shrubby vegetation within three metres of the ground. This dense vegetation must occur near a more open, grassy area to provide suitable feeding habitat. On the north west slopes, associated with dense vegetation, including brigalow, Ooline and semi-evergreen vine thicket.	4	**Low** The subject site only contains common habitat which would not be considered important for the local survival of the species.	No
Onychogalea fraenata	BC Act – E4 EPBC Act - E	The Bridled Nail-tail Wallaby previously occupied Acacia shrubland and grassy woodland in semi-arid regions of	1	**Low**	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
Bridled Nailtail Wallaby		eastern Australia. The wallabies are most active during the night-time and dusk periods. Day is usually spent sleeping in hollows near bushes or trees. In modern habitats, nail-tails keep close to the edges of pasture grasses.		This species is presumed extinct and no recent records exist within the wider subject area. The subject site only contains common habitat which would not be considered important for the local survival of the species.	
Petrogale penicillata Brush-tailed Rock-wallaby	BC Act – E1 EPBC Act - V	Occupy rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. Shelter or bask during the day in rock crevices, caves and overhangs and are most active at night when foraging. Browse on vegetation in and adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees. Highly territorial and have strong site fidelity with an average home range size of about 15 ha. Males tend to have larger home ranges than females.	11	**Unlikely** There is no suitable habitat for the species in the subject site.	No
Saccolaimus flaviventris Yellow-bellied Sheathtail-bat	BC Act - V	Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory.	221	**Moderate** There species may pass through the subject site and forage in adjacent suitable habitat.	Yes
Micronomus norfolkensis Eastern Coastal Free-tailed Bat	BC Act - V	Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in man-made structures. Usually solitary but also recorded roosting communally, probably insectivorous.	3	**Low** The subject site only contains common habitat which would not be considered important for the local survival of the species.	No
Chalinolobus dwyeri Large-eared Pied Bat	BC Act – V EPBC Act - V	Found mainly in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. It is generally rare with a very patchy distribution in NSW. Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the	42	**Low** No roosting habitat was observed in the vicinity of the study area. It is therefore unlikely that the species utilises the subject site, and it is	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
		disused, bottle-shaped mud nests of the Fairy Martin (*Petrochelidon ariel*), frequenting low to mid-elevation dry open forest and woodland close to these features. Found in well-timbered areas containing gullies.		therefore not considered important habitat.	
Chalinolobus nigrogriseus Hoary Wattled Bat	BC Act - V	In NSW the Hoary Wattled Bat occurs in dry open eucalypt forests, favouring forests dominated by Spotted Gum, boxes and ironbarks, and heathy coastal forests where Red Bloodwood and Scribbly Gum are common. Because it flies fast below the canopy level, forests with naturally sparse understorey layers may provide the best habitat. Roosts in hollows and rock crevices. Will occupy urban areas with suitable habitat.	1	**Low** The subject site is beyond the current distribution for this species and contains only common habitat which would not be considered important for the local survival of the species.	No
Chalinolobus picatus Little Pied Bat	BC Act - V	Occurs in dry open forest, open woodland, mulga woodlands, chenopod shrublands, cypress pine forest and mallee and Bimbil box woodlands. Roosts in caves, rock outcrops, mine shafts, tunnels, tree hollows and buildings. Feeds on moths and possibly other flying invertebrates.	6	**Moderate** The species may forage on site, given the presence of Bimblebox open woodland in the vicinity of the subject site.	Yes
Nyctophilus corbeni Corben's Long-eared Bat	BC Act – V EPBC Act - V	Inhabits a variety of vegetation types, including mallee, bulloak and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation. Roosts in tree hollows, crevices, and under loose bark. Slow flying agile bat, utilising the understorey to hunt non-flying prey - especially caterpillars and beetles - and will even hunt on the ground.	48	**Moderate** The species may forage within the subject site.	Yes
Vespadelus troughtoni Eastern Cave Bat	BC Act - V	Found in a broad band on both sides of the Great Dividing Range from Cape York to Kempsey, with records from the New England Tablelands and the upper north coast NSW. The western limit appears to be the Warrumbungle Range. Usually found in dry open forest and woodland, near cliffs or rocky overhangs. Has been recorded in disused mines. Occasionally found along cliff-lines in wet eucalypt forest and rainforest.	61	**Low** No roosting habitat was observed in the vicinity of the study area. It is therefore unlikely that the species utilises the subject site, and it is therefore not considered important habitat.	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
Conilurus albipes White-footed Tree-rat	BC Act – E4 EPBC Act - X	The White-footed Tree-rat was known to inhabit open forest woodlands and grassy ecosystems in Victoria. Habitat information is not known for other states in which the species occurred. The species was nocturnal had been observed sleeping in the hollow limbs of prostrate trees, or in hollow branches of large Eucalypts near the ground.	2	**Low** This species is presumed extinct and no recent records exist within the wider subject area. The subject site only contains common habitat which would not be considered important for the local survival of the species.	No
Pseudomys gouldii Gould's Mouse	BC Act – E4 EPBC Act - X	Little is known of Gould's Mouse. The species is reported to have preferred sandhills and plains, and to make burrows under bushes in loose soil.	1	**Unlikely** This species is presumed extinct and no recent records exist within the wider subject area. The subject site does not contain suitable habitat which would not be considered important for the local survival of the species.	No
Pseudomys pilligaensis Pilliga Mouse	BC Act – V EPBC Act - V	The Pilliga Mouse typically occurs at low densities and appears to prefer areas with sparse ground cover. Within the Pilliga region this species is largely restricted to low-nutrient deep sand soils which are recognised as supporting a distinctive vegetation type referred to as the Pilliga Scrub. Recent studies indicate that the Pilliga Mouse is found in greatest abundance in recently burnt moist gullies, areas dominated by broombush and areas containing an understorey of kurricabah (*Acacia burrowii*) with a bloodwood (*Corymbia trachyphloia*) overstorey. Consistent features of the latter two habitats were: a relatively high plant species richness; a moderate to high density of low-level shrub cover; and a moist groundcover of plants, litter and fungi. The gully where the highest rates of capture were encountered had an extensive cover of low grasses and sedges, with little shrub cover and large areas of ash-covered ground. The species is nocturnal, seeking refuge in burrows.	P	**Low** The subject site only contains common habitat which would not be considered important for the local survival of the species.	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
Rattus villosissimus Long-haired Rat	BC Act - V	Eats roots, stems and leaves of grasses and herbs, especially the more succulent species. Seeds, flowers and insects (e.g. locust) which become available in better seasons stimulate reproduction. Sustained in mesic, densely vegetated sites. During plagues can be found in virtually all inland habitats. Following extended periods of above average rainfall or flood this species can breed rapidly. Resulting populations disperse widely, then die away abruptly as food is depleted and water evaporates. Predators rely on these rat plagues for their own rapid reproduction. Nocturnal, sheltering during the day in complex burrow systems or in a shallow temporary burrow.	1	**Low** The subject site only contains common habitat which would not be considered important for the local survival of the species. This species may be present during periods of plague.	No
Flora					
Tylophora linearis	BC Act – V EPBC Act - E	Grows in dry scrub and open forest. Recorded from low-altitude sedimentary flats in dry woodlands of *Eucalyptus fibrosa, Eucalyptus sideroxylon, Eucalyptus albens, Callitris endlicheri, Callitris glaucophylla and Allocasuarina luehmannii*. Also grows in association with *Acacia hakeoides, Acacia lineata, Melaleuca uncinata, Myoporum* species and *Casuarina* species. Flowers in spring, with flowers recorded in November or May with fruiting probably 2 to 3 months later.	458	**Low** This species was not identified during the site inspection. Given the subject site contained only groundcover species, it is considered unlikely this species was present despite the inspection not occurring during the flowering period.	No
Lepidium aschersonii Spiny Peppercress	BC Act – V EPBC Act - V	Not widespread, occurring in the marginal central-western slopes and north-western plains regions of NSW (and potentially the south western plains). In the north of the State recent surveys have recorded a number of new sites including Brigalow Nature Reserve, Brigalow State Conservation Area, Leard State Conservation Area and Bobbiwaa State Conservation Area. Found on ridges of gilgai clays dominated by Brigalow (*Acacia harpophylla*), Belah (*Casuarina cristata*), Buloke (*Allocasuarina luehmanii*) and Grey Box (*Eucalyptus microcarpa*).	46	**Unlikely** The subject site and surrounding areas do not constitute suitable habitat for the species. Therefore, the subject site is not considered important habitat for the species.	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
Cyperus conicus	BC Act – E1	Occurs rarely in the Pilliga area of NSW and is also found across the tropics in in Qld, WA and the NT, including central deserts north of Alice Springs. Grows in open woodland on sandy soil. In central Australia, the species grows near waterholes and on the banks of streams in sandy soils. Recorded from Callitris forest in the Pilliga area, growing in sandy soil with *Cyperus gracilis, C. squarrosus* and *C. fulvus*.	P	**Low** Within NSW, this species is not known to occur outside of the Pilliga forest. The subject site and surrounding areas do not constitute suitable habitat for the species.	No
Bertya opponens Coolabah Bertya	BC Act – V EPBC Act - V	Coolabah Bertya occurs in a range of habitats including stony mallee ridges and cypress pine forest on red soils. The wide variation in habitat type between the populations makes the identification of critical habitat very difficult. Associated species at Jacks Creek State Forest include Eucalyptus chloroclada, Callitris glaucophylla and Eucalyptus fibrosa. The disturbance agents of fire and mechanical disturbance appear to trigger germination and/or suckering in Coolabah Bertya.	1	**Low** The subject site is beyond the current distribution for this species and contains only common habitat which would not be considered important for the local survival of the species.	No
Desmodium campylocaulon Creeping Tick-trefoil	BC Act – E	Occurs chiefly in the Collarenebri and Moree districts in the north-western plains of NSW. Creeping Tick-Trefoil is confined to clay soils, usually with *Astrebla* and *Iseilema* species. In NSW *Desmodium campylocaulon* grows on cracking black soils in the Narrabri, Moree and Walgett local government areas. The species is said to be hardy, but grazed where sheep have regular access. Plants are strongly stoloniferous and well-cropped by cattle.	1	**Moderate** The species was not identified during the site inspection. However, the species is considered hardy and can withstand grazing and is therefore included within the assessment in accordance with the precautionary principle.	Yes
Swainsona murrayana Slender Darling Pea	BC Act – V EPBC Act - V	Found throughout NSW, it has been recorded in the Jerilderie and Deniliquin areas of the southern riverine plain, the Hay plain as far north as Willandra National Park, near Broken Hill and in various localities between Dubbo and Moree. Grows in a variety of vegetation types including bladder saltbush, black box and grassland communities on level plains, floodplains and depressions and is often found with *Maireana* species. Plants have	2	**Moderate** The species was not identified during the site inspection. However, the species is considered hardy and can withstand grazing and is therefore included within the assessment in accordance with the precautionary principle.	Yes

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
		been found in remnant native grasslands or grassy woodlands that have been intermittently grazed or cultivated.			
Dichanthium setosum Bluegrass	BC Act – V EPBC Act - V	Bluegrass occurs on the New England Tablelands, North West Slopes and Plains and the Central Western Slopes of NSW, extending to northern Queensland. Associated with heavy basaltic black soils and red-brown loams with clay subsoil. Often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture.	19	**Low** This species is a non-cryptic flora species that was not observed during the site assessment. The species is therefore not considered in this assessment.	No
Digitaria porrecta Finger Panic Grass	BC Act – E	In NSW, the most frequently recorded associated tree species are *Eucalyptus albens* and *Acacia pendula*. Common associated grasses and forbs in NSW sites include *Austrostipa aristiglumis, Enteropogon acicularis, Cyperus bifax, Hibiscus trionum* and *Neptunia gracilis*. Common associated grasses and forbs in NSW sites include *Austrostipa aristiglumis, Enteropogon acicularis, Cyperus bifax, Hibiscus trionum* and *Neptunia gracilis*.	77	**Low** This species is a non-cryptic flora species that was not observed during the site assessment. The species is therefore not considered in this assessment.	No
Polygala linariifolia Native Milkwort	BC Act – E	North from Copeton Dam and the Warialda area to southern Queensland. The species has been recorded from the Inverell and Torrington districts growing in dark sandy loam on granite in shrubby forest of *Eucalyptus caleyi, Eucalyptus dealbata* and *Callitris*, and in yellow podsolic soil on granite in layered open forest.	1	**Low** This species is a non-cryptic flora species that was not observed during the site assessment. The species is therefore not considered in this assessment.	No
Pomaderris queenslandica Scant Pomaderris	BC Act – E	Widely scattered but not common in north-east NSW and in Queensland. It is known from several locations on the NSW north coast and a few locations on the New England Tablelands and North West Slopes. Found in moist eucalypt forest or sheltered woodlands with a shrubby understorey, and occasionally along creeks.	10	**Low** This species is a non-cryptic flora species that was not observed during the site assessment. The species is therefore not considered in this assessment.	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
Zieria odorifera subsp. copelandii	BC Act – E4A	This species grows in heath on rocky ridges and between rock outcrops. Subspecies *copelandii* is only known from Mount Kaputar National Park in the Warrumbungles.		**Low** This species is a non-cryptic flora species that was not observed during the site assessment. The species is therefore not considered in this assessment.	No
Thesium australe Austral Toadflax	BC Act – V EPBC Act - V	Austral Toad-flax is found in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. Often found in association with Kangaroo Grass (*Themeda australis*).	2	**Low** This species was not identified during the site inspection. Given that no associated species were present and the previous disturbance and grazing activities onsite it is considered unlikely that the species would be present.	No
Cadellia pentastylis Ooline	BC Act – V EPBC Act - V	Occurs along the western edge of the North West Slopes from north of Gunnedah to west of Tenterfield. Also occurs in Queensland. Ooline is a medium-sized spreading tree usually about 10 m tall, and rarely to 25 m. It forms a closed or open canopy mixing with eucalypt and cypress pine species.	79	**Low** Whilst there are records of the species within a 10 km radius of the site, Ooline was not recorded within the subject site during the site assessment. The species is therefore not considered in this assessment.	No
Communities					
Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions	BC Act – EEC	The Brigalow community is a low woodland or forest community dominated by Brigalow (*Acacia harpophylla*), with pockets of Belah (*Casuarina cristata*) and Poplar Box (*Eucalyptus populnea subsp. bimbil*). Scattered remnants on the North West Slopes and Plains and Darling River Plains in NSW. This community has been extensively cleared for agriculture, with most surviving remnants along roadsides and paddock edges.	K	**Unlikely** This EEC does not occur on the site, and the site is thus not considered important habitat.	No
Cadellia pentastylis (Ooline) community in the	BC Act – EEC	The Ooline community is an unusual and distinctive forest community with the canopy dominated by the tree Ooline (*Cadellia pentastylis*). The understorey is made up of a	K	**Unlikely**	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
Nandewar and Brigalow Belt South Bioregions		range of shrubs, such as Wattles (*Acacia* spp.), and grasses. Extensively cleared and now known from only seven main locations on the North West Slopes in NSW, between Narrabri and the Queensland border, and also in Queensland.		This EEC does not occur on the site, and the site is thus not considered important habitat.	
Carbeen Open Forest Community in the Darling Riverine Plains and Brigalow Belt South Bioregions	BC Act – EEC	This was previously an open forest community of flora and fauna that may now exist as woodland or as remnant trees. Carbeen Open Forest Community is a distinctive plant community on the riverine plains of the Mehi, Gwydir, MacIntyre and Barwon Rivers and in small remnants farther south. It is found on flats and gentle rises of alluvial or aeolian sandy soils derived from ancient watercourses (it also occurs on some clay alluvial soils but is mostly restricted to well-drained sandy sites)	K	**Unlikely** This EEC does not occur on the site, and the site is thus not considered important habitat.	No
Coolibah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions	BC Act – EEC	Abiotic factors that help define this community are that it typically occurs on grey self-mulching clays of periodically waterlogged floodplains, swamp margins, ephemeral wetlands and stream levees. The vegetative community provides characteristic habitat features of value to particular fauna, including a grassy understorey with scattered fallen logs, areas of deep-cracking clay soils, patches of thick regenerating Eucalyptus saplings, and large trees containing a diverse bark and foliage foraging resource and an abundance of small and large hollows.	P	**Unlikely** This EEC does not occur on the site, and the site is thus not considered important habitat.	No
Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	BC Act – EEC	Tall woodland or open forest dominated by Fuzzy Box *Eucalyptus conica*, often with Grey Box *Eucalyptus microcarpa*, Yellow Box *Eucalyptus melliodora*, or Kurrajong *Brachychiton populneus*. Buloke *Allocasuarina luehmannii* is common in places. Shrubs are generally sparse, and the groundcover moderately dense, although this will vary with season. The community occurs on brown loam or clay, alluvial or colluvial soils on prior	P	**Unlikely** This EEC does not occur on the site, and the site is thus not considered important habitat.	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
		streams and abandoned channels or slight depressions on undulating plains or flats of the western slopes.			
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	BC Act – EEC	Inland Grey Box Woodland occurs on fertile soils of the western slopes and plains of NSW. The community generally occurs where average rainfall is 375- 800 mm pa and the mean maximum annual temperature is 22- 26°C. Inland Grey Box Woodland includes those woodlands in which the most characteristic tree species, *Eucalyptus microcarpa* (Inland Grey Box), is often found in association with *E. populnea* subsp. *bimbil* (Bimble or Poplar Box), *Callitris glaucophylla* (White Cypress Pine), *Brachychiton populneus* (Kurrajong), *Allocasuarina luehmannii* (Bulloak) or *E. melliodora* (Yellow Box), and sometimes with *E. albens* (White Box). Shrubs are typically sparse or absent, although this component can be diverse and may be locally common, especially in drier western portions of the community. A variable ground layer of grass and herbaceous species is present at most sites. At severely disturbed sites the ground layer may be absent.	K	**Unlikely** This EEC does not occur on the site, and the site is thus not considered important habitat.	No
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	BC Act – EEC	This ecological community is scattered across the eastern parts of the alluvial plains of the Murray-Darling river system. Typically, it occurs on red-brown earths and heavy textured grey and brown alluvial soils within a climatic belt receiving between 375 and 500 mm mean annual rainfall. The structure of the community varies from low woodland and low open woodland to low sparse woodland or open shrubland, depending on site quality and disturbance history. The tree layer grows up to a height of about 10 metres and invariably includes *Acacia pendula* (Weeping Myall or Boree) as one of the dominant species or the only tree species present. The understorey includes an open layer of chenopod shrubs and other woody plant species	K	**Unlikely** This EEC does not occur on the site, and the site is thus not considered important habitat.	No

Species Name	Status	Habitat Description and Locally Known Populations	Local Records	Potential to Occur and Importance of Habitat Present	Assessment of Significance
		and an open to continuous groundcover of grasses and herbs.			
Semi-evergreen Vine Thicket in the Brigalow Belt South and Nandewar Bioregions	BC Act – EEC	A low, dense form of dry rainforest generally less than 10 m high, made up of vines and rainforest trees as well as some shrubs. This community often occurs on rocky hills, in deep, loam, high nutrient soils derived from basalt or other volcanic rocks, in areas which are sheltered from frequent fire.	K	**Unlikely** This EEC does not occur on the site, and the site is thus not considered important habitat.	No
White Box Yellow Box Blakely's Red Gum Woodland	BC Act – EEC	White Box Yellow Box Blakely's Red Gum Woodland is an open woodland, in which the most obvious species are one or more of the following: White *Box Eucalyptus albens*, Yellow Box *E. melliodora* and Blakely's Red *Gum E. blakelyi*. Intact sites contain a high diversity of plant species, including the main tree species, additional tree species, some shrub species, several climbing plant species, many grasses and a very high diversity of herbs. Characterised by the presence or prior occurrence of White Box, Yellow Box and/or Blakely's Red Gum. Shrubs are generally sparse or absent, though they may be locally common. Remnants generally occur on fertile lower parts of the landscape where resources such as water and nutrients are abundant.	K	**Unlikely** This EEC does not occur on the site, and the site is thus not considered important habitat.	No

Appendix 4 - Matters of National Environmental Significance Assessment

Development Background

The proposed development involves the operation of a 29,900 tonne/annum quarry within Narrabri Shire local government area. The property is known as "Avoca" and is located at 2171 Maules Creek Road, Tarriaro in northern NSW.

The subject site includes an existing farm quarry whilst the remaining area is currently utilised for grazing purposes. The total footprint of the proposed development is 1.46 hectares, whilst the maximum extent of clearing is limited to the quarry extraction area of 0.99 hectares.

In its current state, the subject site and study area do not constitute important habitat for identified species. Much of the region surrounding the proposed development site is disturbed by agricultural activities, however loosely contiguous areas of remnant vegetation persist, in particular along roads, watercourse corridors and in areas which are not easily exploited for agriculture. Extensive areas of remnant vegetation are also present in the wider region, to the south and east of the study area (e.g. Kaputar National Park). Such vegetation, in addition to water-based habitat associated with creeks in the locality, is likely to serve as significant remnant vegetation for a variety of threatened species, and is considered the preferred habitat for vulnerable species over the study area.

Study Area Delineation

The potential construction impacts of the development are predicted to be minimal. The subject site will not impact high-quality native vegetation. Minimal clearing will result from the proposed development. Construction will be undertaken in accordance with best practice construction measures to minimise the risk of erosion and protect environmental values, which will include measures such as installation of sediment traps and minimising the footprint of site disturbance.

A suite of measures will be implemented at the subject site to minimise the potential impact of the quarry upon the surrounding environment. Measures include:

- Establishment of diversion banks as required to divert clean surface runoff from the surrounding region away from the quarry site;
- Establishment of a Controlled Drainage Area (CDA) to capture polluted runoff generated from the subject site, for sustainable reuse/disposal; and
- Implementation of weed management program on site once the quarry is operational, to ensure that the quarry does not become a source of weeds for the surrounding region.

The potential impact of the quarry development is therefore considered to be limited to the quarry footprint itself.

Matters of National Significance

The EPBC Act requires consideration of the effect of an action on the following 7 Matters of National Environmental Significance (MNES):

- World Heritage properties;
- National Heritage places;
- RAMSAR wetlands of international importance;
- Threatened species or ecological communities listed in the EPBC Act;
- Migratory species listed in the EPBC Act;
- The Great Barrier Reef Marine Park;
- Commonwealth marine environment; and
- Nuclear actions.

The impact of an action on these matters is assessed under the criteria specified in: Matters of National Environmental Significance – Significant Impact Guidelines 1.1 (DoE 2013).

Consideration of EPBC Matters

A search was undertaken using the EPBC Protected Matters Search Tool (PMST) (DoEE 2018) to generate a list of World Heritage Properties, National Heritage Places, Ramsar wetlands and nationally threatened species, communities and migratory species protected under international agreements that may occur on or within the region surrounding the proposed development (Figure 1).

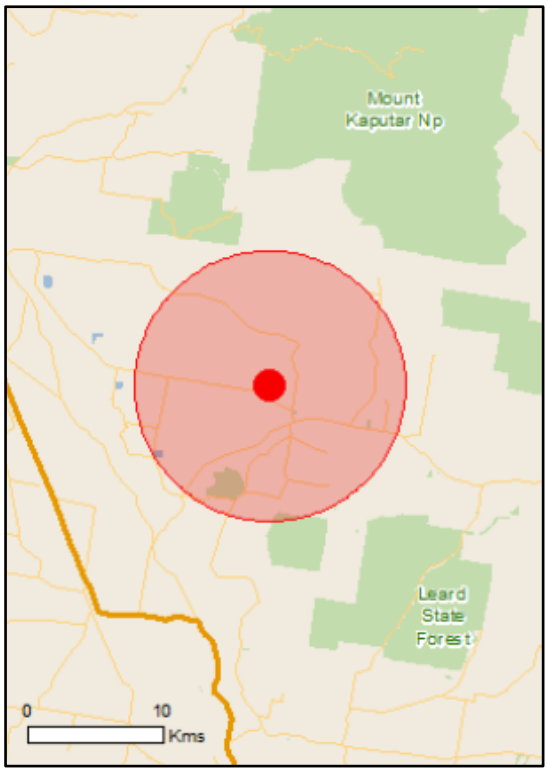


Figure 1: Region searched for MNES using the EPBC PMST (10km radius around subject site).

Results of Database Search

The EPBC PMST does not list any World Heritage Properties or National Heritage Places on or within the search area. The PMST identified two Ramsar wetlands upstream of the subject site: Banrock station wetland complex and Riverland both located approximately 900 - 1000km from the site; and one Ramsar wetland located downstream of the subject site: The coorong, and lakes alexandrina and albert wetland 1100 - 1200km.

Further, the proposal does not involve nuclear actions or impact on the marine environment; consequently, these matters are also not relevant to this assessment.

Nationally threatened species and migratory species protected under international agreements have been initially defined within the search area outlined in Figure 1 using the PMST. These species are listed in Tables 1 and 2.

Table 1: Threatened flora and fauna species predicted or known to occur on the proposal area

Category	Scientific Name	Common Name	Legal Status
Birds	*Anthochaera phrygia*	Regent Honeyeater	Critically Endangered
	Calidris ferruginea	Curlew Sandpiper	Critically Endangered; Listed Migratory (Bonn, CAMBA, JAMBA, ROKAMBA); Listed Marine
	Erythrotriorchis radiatus	Red Goshawk	Vulnerable
	Falco hypoleucos	Grey Falcon	Critically Endangered

Category	Scientific Name	Common Name	Legal Status
	Grantiella picta	Painted Honeyeater	Vulnerable
	Hirundapus caudacutus	White-throated Needletail	Vulnerable; Listed Migratory (CAMBA, JAMBA, ROKAMBA); Listed Marine
	Lathamus discolor	Swift Parrot	Critically Endangered
	Leipoa ocellata	Malleefowl	Vulnerable
	Polytelis swainsonii	Superb Parrot	Vulnerable
	Rostratula australis	Australian Painted Snipe	Endangered as *Rostratula australis*; Listed Marine as *Rostratula benghalensis* (sensu lato)
Mammals	*Chalinolobus dwyeri*	Large-eared Pied Bat, Large Pied Bat	Vulnerable
	Dasyurus maculatus maculatus	Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll	Endangered
	Nyctophilus corbeni	Corben's Long-eared Bat, South-eastern Long-eared Bat	Vulnerable
	Petauroides volans	Greater Glider	Vulnerable
	Petrogale penicillata	Brush-tailed Rock-Wallaby	Vulnerable
	Phascolarctos cinereus	Koala	Vulnerable
	Pteropus poliocephalus	Grey-headed Flying Fox	Vulnerable
Fish	*Maccullochella peelii*	Murray Cod	Vulnerable
Reptiles	*Anomalopus mackayi*	Five-clawed Worm-skink, Long-legged Worm-skink	Vulnerable
	Aprasia parapulchella	Pink-tailed Worm-lizard	Vulnerable
	Uvidicolus sphyrurus	Border Thick-tailed Gecko	Vulnerable
Plants	*Androcalva procumbens*		Vulnerable
	Cadellia pentastylis	Ooline	Vulnerable
	Dichanthium setosum	Bluegrass	Vulnerable
	Homopholis belsonii	Belson's Panic	Vulnerable
	Swainsona murrayana	Slender Darling-pea, Slender Swainson, Murray Swainson-pea	Vulnerable
	Thesium australe	Austral Toadflax	Vulnerable
	Tylophora linearis		Endangered

CAMBA = China Australia Migratory Bird Agreement; JAMBA = Japan Australia Migratory Bird Agreement; ROKAMBA = Republic of Korea Australia Migratory Bird Agreement;

Table 2: Migratory species predicted to occur on the proposal area

Category	Scientific Name	Common Name	Legal Status
Migratory Marine Birds	*Apus pacificus*	Fork-Tailed Swift	Listed Migratory (CAMBA, JAMBA, ROKAMBA); Listed Marine
Migratory Terrestrial Species	*Hirundapus caudacutus*	White-throated Needletail	Vulnerable; Listed Migratory (CAMBA, JAMBA, ROKAMBA); Listed Marine

Category	Scientific Name	Common Name	Legal Status
	Motacilla flava	Yellow Wagtail	Listed Migratory (CAMBA, JAMBA, ROKAMBA); Listed Marine
	Myiagra cyanoleuca	Satin Flycatcher	Listed Migratory (Bonn); Listed Marine
	Rhipidura rufifrons	Rufous Fantail	Listed Migratory (Bonn)
Migratory Wetland Species	*Actitis hypoleucos*	Common Sandpiper	Listed Migratory (Bonn, CAMBA, JAMBA); Listed Marine as *Actitis hypoleucos* Listed Migratory (ROKAMBA) as *Tringa hypoleucos*
	Calidris acuminata	Sharp-tailed Sandpiper	Listed Migratory (Bonn, CAMBA, JAMBA, ROKAMBA); Listed Marine
	Calidris ferruginea	Curlew Sandpiper	Critically Endangered; Listed Migratory (Bonn, JAMBA, ROKAMBA); Listed Marine
	Calidris melanotos	Pectoral Sandpiper	Critically Endangered; Listed Migratory (Bonn, CAMBA, JAMBA, ROKAMBA); Listed Marine
	Gallinago hardwickii	Latham's Snipe, Japanese Snipe	Listed Migratory (Bonn, JAMBA, ROKAMBA); Listed Marine
	Pandion haliaetus	Osprey	Listed Migratory (Bonn)

CAMBA = China Australia Migratory Bird Agreement; JAMBA = Japan Australia Migratory Bird Agreement; ROKAMBA = Republic of Korea Australia Migratory Bird Agreement; Bonn = Convention on the Conservation of Migratory Species of Wild Animals

The PMST also identified a range of threatened ecological communities which have the potential to be present within the study area. A site visit assessed the subject site and study area and determined that no endangered ecological communities are present. Therefore, no further consideration is given to threatened ecological communities in this assessment.

Assessment of Significance

Vulnerable Species

An action has, or will have, or is likely to have a significant impact on a vulnerable species if it does, will or is likely to:

- ***Lead to a long-term decrease in the size of an important population of species***
- ***Reduce the area of occupancy of an important population***
- ***Fragment an existing important population into two or more populations***
- ***Adversely affect habitat critical to the survival of a species***
- ***Disrupt the breeding cycle of an important population***
- ***Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline***
- ***Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat***
- ***Introduce disease that may cause the species to decline, or***

- ***Interfere substantially with the recovery of the species***

The proposed development is considered to pose a minor risk to the environment. The study area of the proposed development consists of an exposed gravel quarry and areas of grazing land which have been largely cleared of native vegetation. The habitat value of this land for threatened species is considered to be limited and is already considered to contribute to the fragmentation of the landscape by having been previously cleared. The study area does not offer any critical habitat features, such as water bodies or tree hollows, which are of ecological significance in supporting threatened species. It is important to note that vulnerable plant species identified by the PMST were not observed on site during site inspection. The proposed development is therefore not considered to have the potential to result in the decrease in the size of an important population of vulnerable species.

It is considered unlikely that the habitat area to be disturbed by the proposed development will have a significant impact upon any local populations of threatened species. The area of land to be disturbed is negligible in the context of the availability of higher-quality habitat (open woodland and riparian vegetation) in the wider locality. None of the threatened species identified would breed or reside long-term within the subject site and are only predicted to utilise the study area during times of duress (i.e. when food cannot be found in more suitable habitats). Therefore, the habitat within the subject site is not considered to be of importance to threatened native species.

Given that the habitat value of the land within the subject site is low, its disturbance is not considered to pose a significant risk to any threatened species which may be present within the wider region. It is considered that threatened species which may be present within the region are likely to preferentially reside/forage in areas of quality remnant and riparian vegetation both on the property and in the wider locality.

The land which will be disturbed by the development is considered to have the potential to offer marginal foraging habitat to identified threatened species. Minor loss of potential foraging resources through the extension of the quarry footprint is not considered to pose a significant risk to any identified species.

Once the site is operational, the site will be regularly maintained to minimise the occurrence of weeds within the disturbance footprint of the site, as required. The site is therefore not considered to increase the risk of establishment of invasive species. Further, as the development relates to the operation of a quarry site and therefore does not involve introduction of disease vectors into the locality, the development is not considered to pose a disease risk to native species.

Overall, the location of the proposed development at the subject site is suitable, as given the marginal habitat values of the site, the development will have a negligible environmental impact in comparison to other locations which may have greater habitat values.

Critically Endangered and Endangered Species

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

- ***Lead to a long-term decrease in the size of a population***
- ***Reduce the area of occupancy of the species***
- ***Fragment an existing population into two or more populations***
- ***Adversely affect habitat critical to the survival of a species***
- ***Disrupt the breeding cycle of a population***
- ***Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline***
- ***Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the critically endangered or endangered species' habitat***
- ***Introduce disease that may cause the species to decline, or***
- ***Interfere substantially with the recovery of the species***

As above, the proposed development involves disturbance of an area of land which has already been completely cleared of native vegetation and/or has been highly disturbed through agricultural use or quarry operations. Whilst the site may offer marginal foraging habitat to some species, the site is not considered to be of conservation significance to any identified threatened species. The site further will not contribute to the spread of invasive species and diseases; nor will it result in habitat fragmentation.

Overall, the proposed development is not considered to pose a risk to critically endangered or endangered species.

Listed Migratory Species

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- ***Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for migratory species***

Important habitat for a migratory species is defined as habitat which is:

- Utilised by migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, and/or

- Of critical importance to the species at particular life cycle stages, and/or
- Utilised by a migratory species which is at the limit of the species range, and/or
- Within an area where the species is declining.

The definition of an ecologically significant proportion of a migratory species varies depending on the characteristics of each species. Factors which should be considered in determining an ecologically significant proportion include the species' population status, genetic distinctiveness and species-specific behavioural patterns (such as site fidelity and dispersal rates).

It is possible that migratory species may utilise the subject site as minor foraging habitat whilst en-route during migration; however, the importance of the subject site in providing foraging habitat to migratory species is marginal at best. The subject site is devoid of significant habitat features (including trees which are often significant for roosting) and aquatic habitat features (such as wetlands), which often function as important habitat for migratory species. Water may accumulate within the existing and proposed pits at the quarry site, however given that this water feature is unlikely not support aquatic vegetation or aquatic species, it is not considered to be of great value to migratory species and may provide a temporary stopover site at best. In the event that migratory species are present within the locality near the subject site, it is considered to be more likely that species will choose to forage in less disturbed habitats, such as the riparian corridor to the south of the site, or small areas of remnant vegetation adjacent to the proposed quarry and National Parks in the wider locality, in preference to foraging at the subject site.

Overall, the subject site is not considered to incorporate important habitat for migratory species, as the site is infrequently used by such species, and does not offer key habitat features such as wetlands or tree hollows which may be utilised by these species en route during migration.

- ***Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or***

The proposed development will not impact upon important habitat for migratory species, either directly or indirectly.

- ***Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species***

The proposal is not considered a risk to the lifecycle of the listed migratory species.

Assessment of Significance Conclusions

The proposed development is to occur on land which has previously been cleared and is currently either utilised for agricultural use (grazing) or existing quarry operations. Whilst the site may serve as marginal habitat for a number of threatened or migratory species within the region, the site would not function as ecologically important habitat for any identified species and therefore alteration of the site is not predicted to pose a risk to threatened or migratory species.

No threatened ecological communities will be impacted by the proposed development. No other Matters of National Significance were identified by the PMST database search for the proposed development site. Therefore, it is concluded that the proposed development is likely to result in minimal impact to Matters of National Significance within the region, and subsequently no further assessment is required.

References

DoE (2013) *Matters of National Environmental – Significant Impact Guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999.* Department of the Environment.

DoEE Protected Matters Search Tool (accessed 2020). Department of the Environment and Energy Website: http://www.environment.gov.au/epbc/protected-matters-search-tool.

Appendix 5 – NGER Emissions and Energy Threshold Calculator 2019-2020

CORPORATION EMISSIONS & ENERGY CALCULATOR

DATA AS ENTERED

	Scope 1 emissions	Scope 2 emissions	TOTAL EMISSIONS	ENERGY CONSUMED	ENERGY PRODUCED	DAYS COVERED
Facility 1	54	0	54	772	0	365
Facility 2	0	0	0	0	0	365
Facility 3	0	0	0	0	0	365
Facility 4	0	0	0	0	0	365
Facility 5	0	0	0	0	0	365
Facility 6	0	0	0	0	0	365
Total for corporation - as entered	54	0	**54**	**772**	**0**	

FULL-YEAR DATA

	Scope 1 emissions	Scope 2 emissions	TOTAL EMISSIONS	ENERGY CONSUMED	ENERGY PRODUCED
Facility 1	54	0	54	772	0
Facility 2	0	0	0	0	0
Facility 3	0	0	0	0	0
Facility 4	0	0	0	0	0
Facility 5	0	0	0	0	0
Facility 6	0	0	0	0	0
Total for corporation - full year	54	0	**54**	**772**	**0**

ANNUAL REPORTING THRESHOLDS

	EMISSIONS THRESHOLD	ENERGY CONSUMED THRESHOLD	ENERGY PRODUCED THRESHOLD
Facility 1	Not met	Not met	Not met
Facility 2	Not met	Not met	Not met
Facility 3	Not met	Not met	Not met
Facility 4	Not met	Not met	Not met
Facility 5	Not met	Not met	Not met
Facility 6	Not met	Not met	Not met
Corporation	**Not met**	**Not met**	**Not met**

ANNUAL CORPORATE REPORTING THRESHOLDS

Total emissions threshold	0 tCO_2-e	50,000 tCO_2-e
Energy consumption threshold	0 GJ	200,000 GJ
Energy production threshold	0 GJ	200,000 GJ

Appendix 6 – Water Licence

Information about a water licence or approval

Use this tool to search for information about water licences and approvals issued under the *Water Act 1912* or *Water Management Act 2000*.

Select the type of licence or approval and enter the licence or approval number:

- **Water access licence (WAL):** a WAL number starts with the letters 'WAL' followed by several numbers; a WAL also has a reference number that starts with a two digit number, followed by 'AL' and then several numbers.
- **1912 water licence:** a water licence number starts with a two digit number, followed by a two letter code and then several numbers. Note: a PT reference number cannot be entered.
- **Approval:** an approval number starts with a two digit number, followed by a two letter code (WA, UA, CA or FW) and then several numbers.

Search for information about either a:

◉ **Water access licence (WAL) issued under the *Water Management Act 2000***

Water Access Licence (WAL) Number WAL 12779

A WAL number starts with the letters 'WAL' followed by several numbers

Can't find your WAL number? Do you have a reference number? A reference number starts with a two digit number, followed by 'AL' and then several numbers. Use the following tool to find your WAL by entering your reference number. Enter the reference number to find the WAL number.

Notes:

The search results will list the conditions imposed on the water access licence. Any approved water supply work/s nominated on the water access licence are identified by the approval number/s for the work/s.

The information about a water access licence provided in the search results is a summary and may not always be up to date. If you require full and up to date details about a particular water access licence (including current holders, share and extraction component details, encumbrances and notations) you should search the Water Access Licence Register administered by NSW Land Registry Services.

○ *Water Act 1912* Licences and Authorities

○ Approval issued under the *Water Management Act 2000*

Find out if a *Water Act 1912* licence has been converted

○ Water licence conversion status

<< Previous Search Print Export

Search Results

Category [Subcategory]	Status	Water Source	Tenure Type	Management Zone	Share Components (units or ML)
Aquifer	Current	Upper Namoi Zone 5 Namoi Valley (Gin'S Leap To Narrabri) Groundwater Source	Continuing		72.00

Extraction Times or Rates

Subject to conditions water may be taken at any time or rate

Nominated Work Approval(s)

90CA807154

- Conditions

Plan Conditions

Water sharing plan	Upper and Lower Namoi Groundwater Sources
	Take of water
MW0812-00001	This licence entitles its holder to the specified shares in the available water from the specified water source as described in this licence.
MW0697-00001	Where the licence holder is a member of a registered group formed under the plan, the licence holder must not cause or allow the combined restricted extraction calculated to apply to the group in any one year, to be exceeded.
MW0814-00001	The licence holder must only take water under this licence using the water supply work nominated by this licence, unless otherwise allowed by the Act or the plan.
MW0815-00001	The licence holder must comply with the terms of the extraction component specified on this licence, including the times, rates or circumstances in which, and the areas or locations from which, water may be taken under this licence, subject to any extraction restrictions in local impact areas.
MW0821-00001	The licence holder must comply with the water allocation account management rules established by the plan.
MW0820-00001	The licence holder must comply with all restrictions and reductions of extraction rates declared or ordered by the Minister to apply in a local impact area.
MW0818-00001	The licence holder must comply with all applicable available water determination(s).
MW0822-00001	The licence holder must not take water under this licence if the resulting debit from the water allocation account for this licence will exceed the volume of water in the account.
MW0824-00001	The licence holder must not take water through a water supply work located in areas where the extraction is likely to cause an adverse local impact on water levels, water quality, aquifer integrity or on groundwater dependent ecosystems.
MW0819-00001	The licence holder must not take more water than is allowed pursuant to an applicable AWD unless the taking is pursuant to a lawful transfer or assignment under Chapter 3 Part 2 of the Act.
MW0683-00001	The licence holder must not take water for any purpose other than domestic consumption and stock watering purposes or other than in exercising native title rights, through a water supply work

	nominated on this licence if the water supply work is within 200 m of any high priority groundwater dependent ecosystem listed in Schedule 4 of the plan, or within 200 m of any creek or river, or where impact may occur on aboriginal cultural heritage values, unless the water supply work: (A) only draws water from an aquifer at depths approved by the Minister, and complies with all specifications of the Minister under clause 39 of the plan, or (B) was authorised by licence under the Water Act 1912.

Water management works

MW0813-00001	The water supply work nominated by this licence is the water supply work authorised by a works approval nominated by this licence.

Additional conditions

MW0698-00001	The licence holder must comply with the access licence dealing principles as gazetted under section 71Z of the Act and all other access licence dealing rules established by the plan.
MW0823-00001	The licence holder must pay any charge imposed by the Minister under section 114 of the Act or regulations, for the cost of activities or works under the plan.

Other Conditions

NIL