Gocup Road upgrade –
Cookoomooroo
Review of environmental factors

September 2017
## Approval and authorisation

<table>
<thead>
<tr>
<th>Title</th>
<th>Gocup Road upgrade – Cookoomooroo review of environmental factors</th>
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</table>
|Accepted on behalf of NSW Roads and Maritime Services by: | Anthony Perera  
Project Manager  
Regional Project Office  
Infrastructure Development Division |
| Signed: | ![Signature] |
| Dated: | 5 September 2017 |
Executive summary

Overview

Roads and Maritime Services (referred to as Roads and Maritime) is proposing a program of works to upgrade sections of Gocup Road (MR279) to meet modern freight demands and address vehicle safety needs. Gocup Road is about 31 kilometres in length and runs north from the Snowy Mountains Highway (HW4) at Tumut to the Hume Highway (HW2) at Gundagai (see Figure 1.1). Some sections of Gocup Road have been completed or are under construction.

The Gocup Road upgrades are a medium to long-term action in the NSW ‘Long Term Transport Master Plan’ and the ‘Murray-Murrumbidgee Regional Transport Plan’. The NSW Government has committed $70 million over five years to upgrade Gocup Road.

The proposal

Roads and Maritime proposes to upgrade the Cookoomooroo section of Gocup Road (section 5.2). Key features of the proposal are shown in Figure 1.2 and include:

- widening of the sealed road width to 9.7 metres
- excavating and trimming cut batters and widening fill batters
- constructing a major cut section with a length of 420 metres and maximum depth of 18.8 metres
- constructing a major fill section with a length of 420 metres and a maximum height of 20.6 metres
- realigning some sections of road, including curve alignment changes of up to 115 metres
- providing three temporary sediment basins
- installing safety barriers
- revegetating decommissioned road sections
- a site compound and stockpile sites (including the existing stockpile site from the Abattoir project – section 6.1).

Need for the proposal

Gocup Road is used by heavy vehicles primarily associated with the local timber and milling industry. The road does not meet current road design standards. It is generally narrow, with tight corners and steep vertical alignment sections. There are no overtaking lanes, and overtaking opportunities are limited. Travel lanes are below standard widths and there are numerous clear zone hazards. The road surface is deteriorating and is not suitable for existing and future volumes of heavy vehicles.

Gocup Road does not meet road safety standards. Heavy vehicles are forced to travel at slow speeds in areas of steep vertical inclines and tight bends. Limited overtaking opportunities cause traffic delays.

Gocup Road does not provide access for high productivity vehicles, which are required for the future operations of the local timber and milling industry.

Proposal objectives and development criteria

The strategic objectives of the Gocup Road works program are to:

- provide a safer road environment to reduce the frequency and severity of crashes for all vehicles
- support current and future freight vehicle needs and provide a good level of service with minimal maintenance costs
- support more efficient high productivity vehicle access
be sensitive to the area’s natural environment, heritage and local communities.

Development criteria used to assess the proposal and other road upgrade options included:
- freight efficiency
- road safety
- affected land area and native vegetation removal (including associated impacts to listed biodiversity and woodland habitats)
- operational noise impacts
- heritage impacts
- land impact
- socio-economic/property impacts.

Options considered

Development of the proposal has included assessing seven route options for Cookoomooroo. The ‘do nothing’ option was also considered. These options were assessed against the development criteria using an equal weighting scoring approach. Option 6 achieved the highest overall score.

Option 6 is preferred for the following reasons:
- it provides the greatest improvement in road safety
- it provides a high to significant improvement in freight efficiency
- it has a favourable earthworks balance and associated cost of transporting material
- impacts on flora and fauna listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and *Threatened Species Conservation Act 1995* (TSC Act) are unlikely to be significant.

Statutory and planning framework

The NSW *State Environmental Planning Policy (Infrastructure)* 2007 permits development on any land for the purpose of a road or road infrastructure facilities to be carried out by or on behalf of a public authority without consent.

As the proposal is for the purpose of a road and is to be carried out by Roads and Maritime, it can be assessed under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Development consent is not required. This review of environmental factors (REF) has been prepared to assess the proposal.

The description of the proposal and associated environmental impacts has been carried out in the context of clause 228 of the NSW *Environmental Planning and Assessment Regulation 2000*, the *Threatened Species Conservation Act 1995* (TSC Act) and the *Fisheries Management Act 1994*. In doing so, the REF helps to fulfil the requirements of Section 111 of the EP&A Act; that Roads and Maritime examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the activity.

The REF assesses the impacts of the proposal on matters of national environmental significance listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Community and stakeholder consultation

Roads and Maritime has consulted with potentially affected property owners, stakeholders and government agencies when selecting the preferred options and developing the proposal designs. Government agencies and stakeholders consulted have included:
- Office of Environment and Heritage (OEH)
- Environment Protection Authority (EPA)
- Cootamundra-Gundagai Council
The purpose of consultation has been to:
- inform the community of the proposal
- advise government agencies and stakeholders of the proposal and its possible impacts.

If the proposal is determined to proceed, Roads and Maritime would continue to consult with community stakeholders and utility providers.

**Environmental impacts**

**Biodiversity**

The proposal would remove about 36.8 hectares of vegetation, of which 1.1 hectares is native vegetation. All native vegetation proposed to be removed is classified as Box-Gum Woodland, listed under the TSC Act. Of the 1.1 hectares of Box-Gum Woodland, 0.7 hectares is moderate/good condition woodland and 0.4 hectares is low condition woodland.

Woodland proposed to be removed comprises mature and juvenile trees and is known or likely to provide habitat for a range of woodland birds, reptiles and mammals. Removing woodland is likely to reduce habitat used by fauna for foraging, breeding, shelter and movement.

Surveys identified that seven hollow-bearing trees would likely be removed by the proposal. The removal of hollow bearing trees is likely to affect threatened hollow-dependent fauna species such as the Brown Treecreeper.

Woodland in the proposal site is highly fragmented. Existing connectivity is very limited due to a lack of adjacent vegetation corridors on either side of the road. It is unlikely that there is substantial fauna movement across this section of Gocup Road.

Assessments of significance, pursuant to section 5A of the EP&A Act, were completed for threatened species that are considered to have the potential to be impacted by the proposal. The proposal is not likely to have a significant impact on threatened species, populations or ecological communities listed under the TSC Act or FM Act.

**Soils, water, hydrology and groundwater**

The proposal would remove about 36.8 hectares of vegetation, exposing soils to weathering processes and increasing the risk of erosion and sedimentation. The proposal would involve cut and fill earthworks over an area of up to 10.4 hectares. The estimated volume of cut and fill is 280,000 cubic metres (including 10,000 cubic metres of topsoil). Large cut excavations have the potential to destabilise landforms, particularly on cutting faces.

Loose fill may erode during rainfall events. Earthworks erosion could cause sedimentation of creeks and drainage lines. Sedimentation may also influence nearby vegetation and habitat by smothering groundcover vegetation and changing soil surface characteristics.

Introduction of construction pollutants into the surrounding environment, if uncontrolled, could potentially increase sediment load and organic matter, affecting water quality. The potential for construction water quality impacts to Cookoomooroo Creek, Stony Creek and other drainage lines is considered to be low, given their distance from the proposal site.

Construction is likely to affect surface runoff characteristics near the proposal site through cut and fill earthworks and roadside drainage construction. No drainage lines would be permanently
redirected. The increase in the impermeable surface of the road would be likely to generate an increase in surface runoff. This would be directed to existing drainage lines, with measures installed to control scouring and sedimentation during operation.

Excavations for the proposal would have a maximum depth of 20.6 metres. Geotechnical investigations for the proposal have indicated that groundwater would not be intercepted at this depth.

Traffic and transport

Changed traffic conditions along Gocup Road at the proposal site during construction activities could potentially lead to reduced safety for motorists. Lane closures for short periods would cause minor traffic delays. During construction, the proposal would generate heavy vehicle movements through transporting materials, structures, machinery, fuel and general provisions.

Some property accesses may be re-located depending on land acquisition and final design. Access to properties would be maintained throughout construction.

The proposed increase in vehicle movements on Gocup Road during construction represents an increase of up to 36 per cent of the existing traffic volumes. Construction vehicle impacts on the local road network are generally expected to be low.

There will be an overall improvement to road safety as a result of the proposal based on the following:

- improved road safety by upgrading road geometry and alignment. The proposal would remove existing steep inclines and sharp corners and provide a continuous 100 kilometre per hour travel speed
- improved road freight efficiency by upgrading the alignment and providing a more efficient route for heavy vehicles
- improved travel times by removing constraints posed by the existing road alignment and road surface condition.

Noise and vibration

Noise impacts are expected during all construction stages due to the low existing background noise levels. The highest number of exceedances occurs during vegetation clear-zone works, bulk earthworks and pavement/asphalting works. This result highlights the need for scheduling all noise generating activities during less noise sensitive time periods where practicable.

No sleep disturbance impacts at sensitive receivers are predicted. Works are expected to occur during standard construction hours.

No residential receivers in the investigation area qualify for noise mitigation. Noise levels at sensitive receivers are expected to remain level or decrease when compared to existing conditions. This is due to the new road alignment moving further away from the sensitive receivers.

The road design is likely to reduce the maximum noise levels due to an improved road surface through reduced road irregularities and associated maximum noise level events and the new vertical road alignment which would require less acceleration and deceleration, reducing maximum noise events.

Noise impacts on affected residences are expected to vary as works progress along the proposed alignment. The primary contributions to noise levels during clear zone and drainage works can be attributed to the use of excavators and chainsaws.

Construction noise and vibration impacts can be mitigated through the implementation of a range of safeguards and management measures, the details of which are to be documented within a
construction noise and vibration management plan. A detailed blast management plan will be prepared by the construction contractor before carrying out any blasting.

**Air quality**

Potential air quality impacts during construction would predominantly be from dust generation. Dust generation could result in health and amenity impacts to nearby receivers. Potential air quality impacts related to dust generation are considered to be minor, as they would be limited to the construction phase and would be mitigated through the implementation of a range of safeguards and management measures.

Potential operational changes in air quality are considered to be low to negligible. The proposal would move the new road alignment slightly further away from residences. Emissions from heavy vehicles may decrease as a result of the proposal, as the new vertical road alignment would require less acceleration and deceleration.

**Landscape character and visual impacts**

Visual impacts during construction would be associated with road embankment construction, plant and equipment along the alignment, vegetation removal and establishment of the site compound and stockpile sites. These have the potential to temporarily affect views for residents with a line of sight to the proposal site, and local road users. Construction-related visual impacts would be temporary and progressive site stabilisation would reduce the magnitude of changes in the short to medium term.

The proposal would create large road embankments in areas of cut and fill earthworks. This would not introduce a new landscape feature, as road embankments already exist along Gocup Road. The proposal would not change the landscape character of the investigation area.

**Property and land use**

The total area of property acquisition for the proposal would be about 9.3 hectares, including 0.12 hectares of Crown land in the central section of the proposal site. The proposed acquisition of land is minor and would not have a substantial effect on the agricultural use of the land. The proposal would be unlikely to cause any significant negative impacts to land use.

In addition to permanent acquisition, land may be temporarily leased during construction for small temporary stockpile sites and other construction requirements.

Potential short term amenity and access impacts may occur during construction. These may include increased noise and vibration, increased truck movements on Gocup Road associated with materials delivery, dust and temporary visual impacts associated with construction activities.

Access along Gocup Road would be enhanced by providing a safer road with improved reliability for daily road users. Road safety would be enhanced by implementing current road design standards, improving horizontal and vertical alignments, providing overtaking lanes and wider sealed shoulders, and reducing roadside hazards.

**Socio-economic**

Minor social impacts associated with the proposal would arise in association with land acquisition. The proposal requires limited acquisition of private property and no residential dwellings would be directly impacted. There may be some minor access changes during the construction period which could potentially inconvenience motorists. These changes would likely be for short periods and would have only limited impacts.

A short-term increase in employment opportunities and procurement of local goods and services within the local region would occur. The proposal would improve road safety by upgrading the road.
to current road design standards. In the longer term, the proposal would support sustainable
growth and development of regional centres.

**Aboriginal heritage**

One area of Aboriginal cultural significance is located in the investigation area: ‘Site F: Stony Creek Pathway Cultural Site’ is a pathway associated with specific resource use that runs along Stony Creek, linking the country near Doctors Hill to the Murrumbidgee River near Gundagai. The site was assessed as being of moderate cultural significance. It is located about 100 metres from the southern end of the proposal site, and would be partially impacted by the proposal.

Two sites of Aboriginal heritage were identified in the investigation area south-west of the proposal site. Stony Creek AFT 01 is an artefact scatter located about 67 metres south of the proposal site. Stony Creek IF 01 is an isolated artefact located about 180 metres south of the proposal site. These sites are not located in the proposal site and would not be affected by the proposal.

An AHIP was granted for a number of upgrade sections along Gocup Road by OEH on 24 November 2015. An Aboriginal archaeological due diligence assessment was completed by Kelleher Nightingale Consulting (2017b) for the proposed extension of the approved AHIP area at Cookoomooroo.

**Non-Aboriginal heritage**

Two stone culverts (referred to as item 2 and 3) are located on the former Gocup Road alignment, located east of the proposal site. Item 2 is a small bridge/culvert constructed in mortared stone rubble with a concrete pipe. Item 3 is a large double span of roadway supported by mortared stone rubble. It is constructed across a natural drainage line with a concrete pipe.

It is unlikely that either of these items would be impacted by the proposal. The road would be moved further away from these items. The proposal would have a limited impact on the views and vistas surrounding the former Gocup Road alignment, and therefore would not affect items 2 and 3.

**Justification and conclusion**

The proposal is required to improve road safety and increase traffic and freight efficiency on Gocup Road by meeting current road design standards and supporting high productivity vehicle access.

This REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the activity. The REF found that the proposal would not result in significant environmental impacts or be of such a nature or extent as to be regarded as unacceptable. The safeguards and management measures detailed in this REF would avoid or minimise the expected impacts. Overall, the REF finds that any negative impacts are outweighed by the proposal’s longer term positive impacts.
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1 Introduction

1.1 Overview of Gocup Road upgrade program of works

Roads and Maritime Services (Roads and Maritime) is proposing a program of works to upgrade sections of Gocup Road (MR279) to meet modern freight demands and address vehicle safety requirements. Gocup Road is about 31 kilometres in length and runs north from the Snowy Mountains Highway (HW4) at Tumut to the Hume Highway (HW2) at Gundagai (see Figure 1.1). Some sections of Gocup Road have been completed or are under construction.

Gocup Road is used by heavy vehicles primarily associated with the local timber and milling industry. The road does not meet current road design standards. It is generally narrow, with tight corners and steep vertical alignment sections. There are no overtaking lanes, and overtaking opportunities are limited. Travel lanes are below standard widths and there are numerous hazards in the clear zones. The road surface is deteriorating and is not suitable for existing and future large volumes of heavy vehicles.

Due to these constraints, Gocup Road does not meet road safety standards. Heavy vehicles are forced to travel at slow speeds in areas of steep vertical inclines and tight bends. There are limited opportunities for overtaking, causing delays for traffic.

The strategic objectives of the Gocup Road works program are to:

- provide a safer road environment to reduce the frequency and severity of crashes for all vehicles
- support current and future freight vehicles needs and provide a good level of service with minimal maintenance costs
- support more efficient high productivity vehicle access
- be sensitive to the area’s natural environment, heritage and local communities.

The Gocup Road upgrades are a medium to long-term action in the NSW ‘Long Term Transport Master Plan’ and the ‘Murray-Murrumbidgee Regional Transport Plan’. The NSW Government has committed $70 million over five years to upgrade Gocup Road.

The Gocup Road works program has been underway since 2012. To date, eight projects have been completed, with the remaining major works in the development stages. Minor works including shoulder widening and barrier installation at two sections of Gocup Road are also in the development phase (sections 1 and 5.1 minor works) (Figure 1.1).

Table 1.1 summarises the program of works to date, which is also shown in Figure 1.1.

<table>
<thead>
<tr>
<th>Project name</th>
<th>Section</th>
<th>Length</th>
<th>Status</th>
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</thead>
<tbody>
<tr>
<td>Section 1 minor works</td>
<td>1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7</td>
<td>5.2 km</td>
<td>Development phase</td>
</tr>
<tr>
<td>Smarts Road</td>
<td>Section 2.1</td>
<td>2.7 km</td>
<td>Completed</td>
</tr>
<tr>
<td>Meadow Creek South</td>
<td>N/A</td>
<td>0.9 km</td>
<td>Completed</td>
</tr>
<tr>
<td>Meadow Creek</td>
<td>N/A</td>
<td>1.4 km</td>
<td>Completed</td>
</tr>
<tr>
<td>South Minjary</td>
<td>Section 3.1</td>
<td>1.2 km</td>
<td>Completed</td>
</tr>
</tbody>
</table>
### 1.2 Proposal identification

This review of environmental factors (REF) assesses the proposed upgrade of the Cookoomooroo section of Gocup Road (section 5.2) (‘the proposal’) (see location in Figure 1.1).

The proposal is located about three kilometres south of Gundagai in Roads and Maritime’s South West Region. The proposal site is located in the Cootamundra-Gundagai Regional Council local government area (LGA) (see Figure 1.2).

Key features of the proposal are shown in Figure 1.2 and include:

- widening the sealed road width to 9.7 metres
- excavating and trimming cut batters and widening fill batters
- constructing a major cut section with a length of 420 metres and maximum depth of 18.8 metres
- constructing a major fill section with a length of 420 metres and a maximum height of 20.6 metres
- realigning some sections of road. This would include curve alignment changes of up to 115 metres
- providing three temporary sediment basins
- installing safety barriers
- revegetation of decommissioned road sections
- a site compound and stockpile sites (including the existing stockpile site used for the Abattoir project – section 6.1).

Utility relocation, including Telstra underground utilities and overhead powerline poles, have been assessed in a separate Minor Works review of environmental factors (MWREF) titled ‘Gocup Road utilities relocation MWREF, February 2017’.

Construction activities are expected to start in 2018/2019. The expected construction duration is between 12 and 15 months. Work would generally be staged as follows:

- work to build new sections of realigned road
- building the section of new road where it crosses the existing road in the centre of the proposal site
- connecting the new realigned road to the existing road.
- shoulder widening and road reconstruction for all other sections of work along the current road alignment.

Chapter 3 describes the proposal in more detail.
The proposal site passes through land primarily used for agriculture (grazing). Two rural residences are located near the proposal site. A small area of land that contained a former alignment of Gocup Road is now Crown land.

Native woodland is present in the Gocup Road reserve and on private land next to the proposal site. Woodland in the area comprises the threatened ecological community White Box Yellow Box Blakely’s Red Gum Woodland (Box-Gum Woodland). Native woodland along Gocup Road is known to provide habitat for a number of threatened woodland birds and microchiropteran bats.

Cookoomooroo Creek runs along the eastern side of Gocup Road just north of the proposal site. Stony Creek crosses Gocup Road at the southern end of the proposal site, near the Gocup Road/Edwardstown Road intersection.

A more detailed location description is provided in chapter 6.

For the purposes of this REF, the following definitions are used:

- the ‘proposal site’ – refers to the area required for the construction of the proposal, including construction activities and construction vehicle access. It includes the construction footprint, site compound, stockpile sites, temporary sediment basins and any areas that would be disturbed
- the ‘investigation area’ – the area likely to be affected by the proposal, either directly or indirectly. The ‘investigation area’ is defined by the extent of the potential impacts of the proposal relating to each specific discipline
- the ‘locality’ – the area within a 10 kilometre radius of the proposal site.
1.3 Purpose of this report

This review of environmental factors (REF) has been prepared by GHD on behalf of Roads and Maritime. For the purposes of these works, Roads and Maritime is the proponent and the determining authority under Part 5 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

The purpose of the REF is to describe the proposal, to document the proposal’s likely impacts on the environment and to detail protective measures to be implemented.

The description of the proposed work and associated environmental impacts have been carried out in the context of clause 228 of the Environmental Planning and Assessment Regulation 2000, the factors in ‘Is an EIS Required? Best Practice Guidelines for Part 5 of the Environmental Planning and Assessment Act 1979’ (Is an EIS required? guidelines) (DUAP, 1995/1996), the Threatened Species Conservation Act 1995 (TSC Act), the Fisheries Management Act 1994 (FM Act), and the Australian Government’s Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

In doing so, the REF helps to fulfil the requirements of:

- section 111 of the EP&A Act that Roads and Maritime examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity
- the strategic assessment approval granted by the Australian Government under the EPBC Act in September 2015, with respect to the impacts of Roads and Maritime’s road activities on nationally listed threatened species, populations, ecological communities and migratory species.

The findings of the REF would be considered when assessing:

- whether the proposal is likely to have a significant impact on the environment and therefore the necessity for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning under Part 5.1 of the EP&A Act
- the significance of any impact on threatened species as defined by the TSC Act and/or FM Act, in section 5A of the EP&A Act and therefore the requirement for a Species Impact Statement
- the significance of any impact on nationally listed biodiversity matters under the EPBC Act, including whether there is a real possibility that the activity may threaten long-term survival of these matters, and whether offsets are required and able to be secured
- the potential for the proposal to significantly impact any other matters of national environmental significance or Commonwealth land and the need, subject to the EPBC Act strategic assessment approval, to make a referral to the Australian Government Department of the Environment and Energy for a decision by the Commonwealth Minister for the Environment on whether assessment and approval is required under the EPBC Act.
2 Need and options considered

2.1 Strategic need for the proposal

2.1.1 Existing road constraints

Gocup Road is used by heavy vehicles primarily associated with the local timber and milling industry. The road does not meet current road design standards. It is generally narrow, with tight corners and steep vertical alignment sections. There are no overtaking lanes, and overtaking opportunities are limited. Travel lanes are below standard widths and there are numerous hazards in the clear zones. The road surface is deteriorating and is not suitable for existing and future large volumes of heavy vehicles.

Due to these constraints, Gocup Road does not meet road safety standards. Heavy vehicles are forced to travel at slow speeds in areas of steep vertical inclines and tight bends. Limited overtaking opportunities cause traffic delays.

The condition of Gocup Road also means that the timber industry cannot use high productivity vehicles to transport freight from plantations across NSW to mills in the South West Slopes, and from these mills to markets across Australia and the ports of Sydney and Melbourne.

2.1.2 Crash history

Twenty-one crashes occurred on Gocup Road between Minjary Creek and the Hume Highway in the period 2010 to 2015 (see Table 2.1). None of these were fatal. Three involved serious injuries.

No crashes have been recorded in the Cookoomooroo section of Gocup Road in the last five years.

Table 2.1: Crash statistics for Gocup Road between Minjary Creek and Gundagai (2010 – 2015)

<table>
<thead>
<tr>
<th>Severity of crash</th>
<th>Number of crashes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatal</td>
<td>0</td>
</tr>
<tr>
<td>Serious injury</td>
<td>3</td>
</tr>
<tr>
<td>Moderate injury</td>
<td>1</td>
</tr>
<tr>
<td>Minor injury/other</td>
<td>1</td>
</tr>
<tr>
<td>Uncategorised injury</td>
<td>4</td>
</tr>
<tr>
<td>Non-casualty (tow away)</td>
<td>12</td>
</tr>
</tbody>
</table>

The proposal would improve road safety by realigning two curves, widening the road and reducing steep inclines.

2.1.3 Relevant strategies and plans

NSW 2021: A Plan to Make NSW No 1

‘NSW 2021: A Plan to Make NSW No 1’ (Department of Premier and Cabinet 2011) is a 10-year plan that provides goals and targets to rebuild the economy, provide quality services, renovate infrastructure, restore government accountability, and strengthen the local environment and communities. It is the NSW Government’s strategic business plan, setting priorities for action and guiding resource allocation.
‘NSW 2021: A Plan to Make NSW No 1’ lists a number of goals relevant to the proposal, identified in Table 2.2.

**Table 2.2: Relevant goals of NSW 2021: A Plan to Make NSW No 1**

<table>
<thead>
<tr>
<th>Goal</th>
<th>How the proposal would assist in meeting the goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce travel time</td>
<td>There would be a minor saving in travel time associated with the proposal.</td>
</tr>
<tr>
<td>Improve road safety</td>
<td>The proposal would improve safety by widening the road and improving road alignment to meet current road design standards.</td>
</tr>
<tr>
<td>Drive economic growth in regional NSW</td>
<td>Existing road constraints impact on the region’s productivity and economy. The proposal would provide an upgraded road allowing an easier route for high productivity vehicles. The proposal would therefore improve the strategic freight transport route between Tumut and Gundagai, contributing to economic growth in the region.</td>
</tr>
<tr>
<td>Protect our natural environment</td>
<td>The proposal would remove native vegetation for road widening and realignment (see section 6.1). Safeguards detailed in this REF would be carried out to minimise impacts on the natural environment.</td>
</tr>
</tbody>
</table>

Given the likely contribution of the proposal to the goals identified in Table 2.2, the proposal is considered to be consistent with ‘NSW 2021: A Plan to Make NSW No 1’.

**NSW State Infrastructure Strategy 2012-2032**

The ‘State Infrastructure Strategy 2012-2032’ (Infrastructure NSW 2012) includes details of priority infrastructure to be developed in NSW over the next 20 years and recommends how this will be achieved.

The proposal would help achieve these actions by upgrading the existing Gocup Road to allow for more efficient high productivity vehicle use. The proposal would enhance freight movement productivity to and from the South West Slopes, supporting timber product export from the region.

The proposal supports the following objectives for regional NSW in the strategy:

- improve employment access and connect people and communities
- improve local transport networks
- provide efficient market access, particularly mining and agriculture products to domestic and international markets.

**Roads and Maritime 2020 Strategy**

The ‘Roads and Maritime 2020 Strategy’ (Roads and Maritime 2015) outlines the organisation’s five strategic priorities:

- making safety paramount
- delivering Roads and Maritime’s infrastructure program
- meeting customer and community needs
- being an organisation that delivers
- enhancing economic and social outcomes.

The proposal would improve road safety by upgrading Gocup Road to meet current road design standards. The proposal would meet customer and community needs by making Gocup Road...
suitable for current and future projected heavy and light vehicle volumes. The proposal would enhance economic and social outcomes by improving heavy vehicle access along Gocup Road for the local timber and milling industry and by making the road safer for all users.

Although there would be environmental impacts associated with the proposal, these have been minimised as far as possible and would be managed through safeguards described in this REF. The community and stakeholders have been consulted during the development of the proposal. Consultation would continue into construction should the proposal proceed.

**NSW Long Term Transport Master Plan**

The ‘NSW Long Term Transport Master Plan’ sets the framework for the NSW Government to deliver an integrated, modern transport system that puts the customer first.

Upgrades to Gocup Road are a medium to long-term action in the ‘NSW Long Term Transport Master Plan’. The proposal would contribute to achieving this goal.

The proposal supports the following objectives in the ‘NSW Long Term Transport Master Plan’:

- improve quality of service
- improve liveability
- support economic growth and productivity
- support regional development
- improve safety and security
- improve sustainability.

**Murray-Murrumbidgee Regional Transport Plan**

The ‘Murray-Murrumbidgee Regional Transport Plan’ supports the ‘NSW Long Term Transport Master Plan’ and outlines specific actions to address transport issues in the Murray-Murrumbidgee region. It includes matters identified during consultation with the community in 2012.

Upgrades to Gocup Road are a medium to long-term action in the ‘Murray-Murrumbidgee Regional Transport Plan’. The proposal would contribute to achieving this goal.

**NSW Freight and Ports Strategy 2013**

The ‘NSW Freight and Ports Strategy’ (Transport for NSW 2013) sets out a range of strategic action programs to improve the efficiency, capacity and sustainability of the NSW freight network. Implementation includes assessment of the road network.

The Gocup Road upgrade is identified in the strategy as being required to enhance freight movement productivity to and from the South West Slopes, supporting export of timber products from the region, and to drive safety improvements and maintenance outcomes. It is also noted that the Gocup Road upgrade would improve its connectivity with the national road network by supporting the use of efficient heavy vehicles.

The proposal would support the following actions in the strategy:

- 1D-3: improve access for high productivity vehicles on state and local roads
- 2B: develop and maintain freight capacity on the road network
- 2G: develop and maintain projects to support network capacity
- 3B-2&3: mitigate noise and emissions from freight operations
- 3C-2: improve heavy vehicle safety.

**National Land Freight Network Strategy**

The overarching purpose of the ‘National Land Freight Network Strategy’ (Commonwealth of Australia 2012) is to drive development of efficient, sustainable freight logistics that balance the
needs of a growing Australian community and economy, with the quality of life aspirations of the Australian people. The objectives under consideration aim to:

- improve freight movement efficiency across infrastructure networks
- minimise impacts associated with such freight movements
- influence policy making in freight-related areas.

The proposal would improve the freight link between Tumut and Gundagai. This would benefit the local timber and milling industry and promote the state and regional economies.

**Tumut to Hume Highway Corridor Strategy**

The Tumut to Hume Highway Corridor Strategy (Transport for NSW 2016) sets out the NSW Government’s 20 year plan to manage and guide the development of Gocup Road and the Snowy Mountains Highway from Tumut to the Hume Highway.

The objectives of the strategy include improving access for high productivity vehicles and improving traffic efficiency, road safety and asset condition. Both Gocup Road and Snowy Mountains Highway connect rural communities, provide timber haulage routes from forests to timber mills and connected industries, and support agricultural distribution. The strategy also aims to maintain the corridor’s current high environmental conservation value and minimise impacts on the natural, built and community environments along the corridor.

Investment priorities for the Tumut to Hume Highway corridor include:

- road widening, road strengthening, straightening curves, providing overtaking lanes and safety improvement strategies
- addressing current and emerging crash cluster locations on both the Snowy Mountains Highway and Gocup Road
- investigating opportunities for future road realignment, overtaking opportunities and heavy vehicle rest areas
- improving active transport infrastructure for local communities.

The proposal would contribute to meeting the objectives and priorities of the Tumut to Hume Highway Corridor Strategy by upgrading the Cookoomooroo section of Gocup Road. The proposal would have impacts on biodiversity, as detailed in section 6.1. These have been minimised as far as possible and would be managed through the safeguards described in this REF.

### 2.2 Existing infrastructure

#### 2.2.1 Roads

**Local road network**

Gocup Road is about 31 kilometres in length and runs north from the Snowy Mountains Highway at Tumut to the Hume Highway at Gundagai. It is a two lane, two-way sealed road with a speed limit of 100 kilometres per hour. The existing road is typically nine metres wide, with two 3.5 metre travel lanes and two one metre unsealed shoulders. The road condition is considered average (Transport for NSW 2016). The Cookoomooroo section of Gocup Road has steep vertical inclines and tight bends, which force heavy vehicles to travel at slow speeds. There are limited overtaking opportunities, causing traffic delays.

There are no major intersections in the proposal site along Gocup Road. The intersection with Edwardstown Road is located south of the proposal site. Four property accesses would also be upgraded.

Gocup Road has been identified as a strategic freight route in NSW. Heavy vehicles use Gocup Road to travel between commercial and industrial areas around Tumut and the Hume Highway at Gundagai. It is an important local timber and milling industry route. Higher mass limit (HML) B-
double vehicles (B-double vehicles with additional mass entitlements) up to 4.6 metres high are permitted to travel along all of Gocup Road. Forestry product value-adding industry groups are interested in gaining access to the road network with ‘high productivity vehicles’ (truck and trailer combinations that carry higher volumes of freight more efficiently) to enable more efficient transport of timber products.

Gocup Road is an important route for residents and property owners between Tumut and Gundagai, and for people commuting between the towns for work.

**Traffic volumes**

Existing daily traffic volumes for Gocup Road are provided in Table 2.3.

**Table 2.3: Existing daily traffic volumes for Gocup Road**

<table>
<thead>
<tr>
<th>Road</th>
<th>Existing daily traffic volume (2012-13)</th>
<th>Existing daily heavy vehicle volume (2012-13)</th>
<th>Percentage of heavy vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gocup Road 2 km north of Snowy Mountains Highway</td>
<td>1672</td>
<td>293</td>
<td>18%</td>
</tr>
<tr>
<td>Gocup Road 4.7 km south of Hume Highway</td>
<td>1300</td>
<td>255</td>
<td>20%</td>
</tr>
</tbody>
</table>

Heavy vehicles comprise up to 25 per cent of vehicles on weekdays and up to 10 per cent of vehicles on weekends. Fifty to 75 per cent of heavy vehicles are articulated or combination vehicles. Daytime traffic is expected to have a peak flow of between 100 to 150 vehicles per hour.

A traffic survey was carried out as part of the noise assessment for the proposal. Traffic counts ran for one week in 2016 and are similar to the 2012-2013 traffic counts. Recorded daily traffic volumes were 1528 vehicles per day. A slight increase in the percentage of heavy vehicles was recorded in 2016, with 344 heavy vehicles per day (22 per cent of all vehicles). A growth rate in traffic volumes of about five per cent per year is expected into the future.

**2.2.2 Property access**

Four unsealed property access roads connect to the Cookoomooroo section of Gocup Road. One access road is located on the eastern side of Gocup Road at the southern end of the proposal site. Two access roads are located each side of Gocup Road at the northern end of the road section. Another private access road is located on the eastern side of the proposal site, about 330 metres south of the northern end of the road section. This road provides access to a residence.

**2.3 Proposal objectives and development criteria**

**2.3.1 Proposal objectives**

The proposal is part of the broader program of works to upgrade sections of Gocup Road. The work is required to meet modern freight demands and address vehicle safety requirements.

The strategic objectives of the Gocup Road program of works are to:

- provide a safer road environment to reduce the frequency and severity of crashes for all vehicles
- support current and future freight vehicle needs and provide a good level of service with minimal maintenance costs
- support more efficient high productivity vehicle access
- be sensitive to the area’s natural environment, heritage and local communities.
2.3.2 Development criteria

Development criteria used to assess the proposal and other road upgrade options included:

- freight efficiency
- road safety
- affected land area and native vegetation removal (including associated impacts to biodiversity listed under the EPBC Act and TSC Act and woodland habitats)
- operational noise impacts
- heritage impacts
- land impact
- socio-economic/property impacts.

The methodology used to assess the proposal and other road upgrade options against these criteria is discussed in more detail in section 2.4.1 below.

2.4 Alternatives and options considered

2.4.1 Methodology for selection of preferred option

A number of design options were identified and assessed against the proposal objectives and development criteria. These included seven options for Cookoomooroo (see section 2.4.2).

Each option was assessed against the development criteria listed in section 2.3.2 using an equal weighting scoring approach. Scores were assigned from a scale of 1 to 10 based on the scoring criteria listed in Table 2.4.

Table 2.4: Option scoring criteria

<table>
<thead>
<tr>
<th>Score</th>
<th>Design (freight efficiency, road safety)</th>
<th>Land/vegetation impacts</th>
<th>Environmental (noise, heritage)</th>
<th>Earthworks balance/cost</th>
<th>Property acquisition</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Significantly improved</td>
<td>No impacts</td>
<td>No impacts</td>
<td>Up to 30,000 m³ surplus or 20,000 m³ shortfall</td>
<td>0-2 ha</td>
</tr>
<tr>
<td>8</td>
<td>Highly improved</td>
<td>Minor impacts, &lt;15 ha</td>
<td>Minor impacts</td>
<td>Up to 50,000 m³ surplus or 30,000 m³ shortfall</td>
<td>2-10 ha</td>
</tr>
<tr>
<td>6</td>
<td>Adequately improved</td>
<td>More impacts, 15-30 ha</td>
<td>More impacts</td>
<td>Up to 70,000 m³ surplus or 35,000 m³ shortfall</td>
<td>10-20 ha</td>
</tr>
<tr>
<td>4</td>
<td>Partly improved</td>
<td>Medium impacts, 30-50 ha</td>
<td>Medium impacts</td>
<td>&gt; 70,000 m³ surplus or &gt;40,000 m³ shortfall</td>
<td>20-40 ha</td>
</tr>
<tr>
<td>2</td>
<td>Minor improvements</td>
<td>High impacts, &gt;50 ha</td>
<td>High impacts</td>
<td>Large difference in cut and fill</td>
<td>&gt;40 ha</td>
</tr>
<tr>
<td>1</td>
<td>Is not improved</td>
<td>N/A</td>
<td>Large impacts</td>
<td>Highest difference in cut and fill</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Scores for each option were added to give total scores, which were used to identify the preferred option.
2.4.2 Identified options
Route options for the proposal are described below in Table 2.5 and shown in Figure 2.1.

Table 2.5: Description of route options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option 0</td>
<td>Do nothing – no work beyond the current maintenance regime.</td>
</tr>
<tr>
<td>Option 1</td>
<td>Moderate realignment of southern and northern curves. Widen road and reduce road slope. Provide 100 km/h horizontal design speed and 80 km/h vertical design speed.</td>
</tr>
<tr>
<td>Option 2</td>
<td>Widen existing road. Provide 70 km/h horizontal design speed and 70 km/h vertical design speed.</td>
</tr>
<tr>
<td>Option 3</td>
<td>Moderate realignment of southern curve. Widen road and reduce road slope. Provide 100 km/h horizontal design speed and 80 km/h vertical design speed.</td>
</tr>
<tr>
<td>Option 4</td>
<td>Moderate realignment of southern and northern curves. Widen road and reduce road slope. Provide 100 km/h horizontal design speed and 90 km/h vertical design speed.</td>
</tr>
<tr>
<td>Option 5</td>
<td>Substantial realignment of northern curve. Widen road and reduce road slope. Provide 100 km/h horizontal design speed and 90 km/h vertical design speed.</td>
</tr>
<tr>
<td>Option 6</td>
<td>Moderate realignment of southern curve and substantial realignment of northern curve. Widen road and reduce road slope. Provide 110 km/h horizontal design speed and 90 km/h vertical design speed.</td>
</tr>
</tbody>
</table>

2.4.3 Analysis of options
The ‘do nothing’ option for Cookoomooroo was discounted as this option would not meet the project objectives. Also, it did not address the safety and freight efficiency constraints of Gocup Road.

Scores against the development criteria for each route option are detailed in Table 2.6.

The options were assessed as follows:
- options 1, 3, and 5 were discounted primarily due to large cut and fill earthworks imbalances and high associated costs to transport material to or from the proposal site
- option 2 was discounted due to providing only minor improvement in road safety
- option 4 was discounted due to having slightly lower scores for road safety, property acquisition and cut and fill earthworks balance than option 6
- option 6 achieved the highest overall score.
Table 2.6: Comparison of scores against development criteria for each route option

<table>
<thead>
<tr>
<th>Route option</th>
<th>Freight efficiency</th>
<th>Road safety</th>
<th>Land/vegetation impacts</th>
<th>Operational noise impacts</th>
<th>Heritage impacts</th>
<th>Property acquisition</th>
<th>Earthworks balance/cost</th>
<th>Total score (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option 1</td>
<td>8</td>
<td>6</td>
<td>2</td>
<td>4</td>
<td>8</td>
<td>7</td>
<td>2</td>
<td>62%</td>
</tr>
<tr>
<td>Option 2</td>
<td>9</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>8</td>
<td>10</td>
<td>10</td>
<td>75%</td>
</tr>
<tr>
<td>Option 3</td>
<td>10</td>
<td>6</td>
<td>2</td>
<td>4</td>
<td>8</td>
<td>8</td>
<td>2</td>
<td>67%</td>
</tr>
<tr>
<td>Option 4</td>
<td>10</td>
<td>7</td>
<td>2</td>
<td>4</td>
<td>10</td>
<td>7</td>
<td>8</td>
<td>80%</td>
</tr>
<tr>
<td>Option 5</td>
<td>9</td>
<td>6</td>
<td>2</td>
<td>4</td>
<td>8</td>
<td>8</td>
<td>2</td>
<td>65%</td>
</tr>
<tr>
<td>Option 6</td>
<td>9</td>
<td>8</td>
<td>2</td>
<td>4</td>
<td>9</td>
<td>8</td>
<td>9</td>
<td>82%</td>
</tr>
</tbody>
</table>

Note: See Table 2.4 in section 2.4.1 for description of option scoring criteria.
2.5 Preferred option

The preferred option is option 6. This option is considered to best achieve the proposal objectives.

Option 6 is preferred for the following reasons:
- it provides the greatest improvement in road safety
- it provides a high to significant improvement in freight efficiency
- it has a favourable earthworks balance and associated cost of transporting material
- impacts on flora and fauna listed under the EPBC Act and TSC Act are unlikely to be significant.

Option 6 achieves adequate outcomes in relation to ecologically sustainable development as:
- measures to prevent environmental degradation would not be postponed due to a lack of full scientific certainty about threats of serious or irreversible environmental damage
- the present generation would ensure the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations. The proposed Gocup Road upgrade would provide a safer road environment and would achieve greater freight efficiency into the future. The preferred option achieves highly favourable outcomes in relation to these factors compared to the other options and have lower environmental impacts than many of the other options
- conservation of biological diversity and ecological integrity is a fundamental consideration. The ecological impacts of the preferred option is unlikely to be significant (see section 6.1)
- environmental factors have been included in the valuation of assets and services. The development criteria for selection of the preferred option included environmental considerations, as described in this REF
- the preferred option is considered to be ecologically sustainable.

Further assessment against ecologically sustainable development principles is provided in section 8.2.2.

2.6 Design refinements

Following selection of the preferred option and preparation of concept designs, batter slope designs were steepened from 2 horizontal: 1 vertical to 1.5 horizontal: 1 vertical in sections of cut due to the presence of hard rock. After further investigation and geotechnical considerations, the batter slopes in one section of cut were flattened to 2 horizontal: 1 vertical.
3 Description of the proposal

3.1 The proposal

Roads and Maritime proposes to upgrade the Cookoomooroo section of Gocup Road (section 5.2).

Key features of the proposal are shown in Figure 1.2 and include:

- widening the sealed road width to 9.7 metres
- excavating and trimming cut batters and widening fill batters
- constructing a major cut section with a length of 420 metres and maximum depth of 18.8 metres
- constructing a major fill section with a length of 420 metres and a maximum height of 20.6 metres
- realigning some sections of road. This would include curve alignment changes of up to 115 metres
- providing three temporary sediment basins
- installing safety barriers
- revegetation of decommissioned road sections
- a site compound and stockpile sites (including the existing stockpile site from the Abattoir project – section 6.1).

Utility relocation, including Telstra underground utilities and overhead powerline poles, have been assessed in a separate MWREF.

The proposed site compound and stockpile sites are described in section 3.4.

The proposal would have an expected duration of between 12 and 15 months.

Gocup Road will remain operational during the construction period.

3.2 Design

3.2.1 Design criteria

Specific design criteria have been developed for the proposal. Key criteria include:

- posted speed of 100 km/h (110 km/h horizontal design speed and 90 km/h vertical design speed)
- travel lanes of 3.5 metres width
- two 1.35 metre sealed shoulders
- two 0.5 metre unsealed verges
- embankment batter slopes would be 4 horizontal: 1 vertical for batters with a height/depth of less than seven metres and generally 2 horizontal: 1 vertical for batters with a height/depth of greater than seven metres. Sections of high cut would have batters of 1.5 horizontal: 1 vertical
- designed to accommodate high productivity vehicles.

3.2.2 Engineering constraints

Engineering constraints identified for the proposal include:

- hard rock sections of the proposal site, which may require blasting
- steep terrain in some parts of the proposal site.

3.2.3 Major design features

Road upgrade

The proposed upgrade of the Cookoomooroo section of Gocup Road is shown in Figure 1.2.
The proposal involves straightening the road through moderate realignment of the southern curve and substantial realignment of the northern curve. The proposal also involves widening the road and reducing road slope.

Cut and fill

Proposed earthworks would create cut (excavation) and fill sections (see Figure 3.1) in the land surface with a width of up to 100 metres. Cut sections would have a maximum depth of 20.6 metres and fill sections would have a maximum height of 18.8 metres.

Embankment batter slopes would be 4 horizontal: 1 vertical for batters with a height/depth of less than seven metres and generally 2 horizontal: 1 vertical for batters with a height/depth of greater than seven metres. Sections of deep cut (around 21 metres) would have batters of 1.5 horizontal: 1 vertical.

Sections of steeper batters (1.5 to 2 horizontal: 1 vertical) would typically have lengths of about 200 metres. Cut and fill embankments would have benches to restrict the maximum slope length to nine metres.
Figure 3.1: Example cross sections of proposal in cut and fill sections
3.3 Construction activities

3.3.1 Work methodology

Staging of work

Work would occur in three stages:
- stage 1 includes bulk earthworks, drainage and road construction for all sections of new road. A temporary traffic diversion would also be constructed as shown in Figure 1.2. The expected duration for this stage of work is about 10 months
- stage 2 involves building the section of new road where it crosses the existing road in the centre of the proposal site. This stage is expected to take one to two months
- stage 3 involves work to connect the new realigned road to the existing road at the northern and southern limits of the proposal. Stage 3 work is expected to take about two months.

Pre-construction activities

Pre-construction activities would include:
- establishing the site (fencing, site compound and stockpile sites)
- installing environmental control measures and erosion and sediment controls, including clean and dirty water diversions
- setting up temporary stockpile sites for storing materials
- establishing the site compound including site office and toilet facilities
- establishing a turning area for vehicles, plant and equipment
- setting up temporary traffic controls.

Road construction activities

Road construction activities would include:
- removing trees and vegetation clearing (36.8 hectares of introduced and native vegetation – primarily groundcover)
- road work, including:
  - stripping, stockpiling and management of topsoil
  - excavating material and placing fill for new sections of road
  - excavating existing road shoulders and placing earth fill for road widening or realignment
  - blasting may be required depending on the hardness of the rock
  - constructing road drainage – agricultural (subsoil) pipes to drain the gravel layers, and surface drains
  - constructing road including placing and mixing gravel, mixing in lime or other products to improve the gravel, reshaping and compacting gravel
  - laying a bitumen seal on the new road surface
  - providing or adjusting safety barriers
  - replacing existing line marking, raised pavement markers, guideposts and signage.
- drainage work, including:
  - removing soil and other debris from culverts
  - installing three new culverts
  - extending, realigning or replacing eight culverts. This may include excavating fill around and above culverts, constructing with in situ and precast concrete, placing bedding material, installing pipe culvert or box units, placing and compacting gravel (rock scour protection), and installing concrete headwalls
  - re-grading table drains where required.
- using, storing and disposing of excavated material, spoil and unsuitable material including the following:
  - suitable excavated material would be re-used as fill
- excess gravel and other materials that can be re-used would be stockpiled permanently at previously approved locations on site, or permanently off site at Roads and Maritime facilities
- unsuitable materials that cannot be re-used would be transported to licensed disposal facilities

- reinstating property accesses
- removing about 100 tonnes of asphalt from decommissioned sections of road
- site clean-up and rehabilitation, including:
  - removing and revegetating temporary stockpile sites
  - revegetating disturbed areas
  - possible landscaping treatments to aid vegetation connectivity, which will form part of the biodiversity offset strategy
  - removing temporary erosion and sedimentation controls
  - removing temporary traffic controls.

3.3.2 Construction hours and duration
Construction is expected to start in 2018/2019. The expected construction duration is between 12 and 15 months.

It is anticipated most of the work for the proposal would be completed in line with OEH’s recommended standard hours for construction work (DECC 2009):

- Monday to Friday: 7am to 6pm
- Saturday: 8am to 1pm
- Sundays and public holidays: no work.

It is not anticipated that night work would be required. Any out of hours work would be subject to approval by Roads and Maritime and would be in line with the Roads and Maritime ‘Environmental Noise Management Manual 2001: Practice Note vii – Road works Outside of Normal Working Hours’ (RTA 2001). This would include notifying nearby residents before out of hours work.

3.3.3 Plant and equipment
Plant and equipment required for the proposal would be determined by the contractor(s) during the construction planning phase. Plant and equipment likely to be used for the proposal may include:

**General**
- excavators
- bulldozers
- graders
- water carts
- semi-trailers and large delivery trucks
- air compressors
- light vehicles
- water pumps
- trencher
- mulchers
- hand tools
- welding equipment
- haulage trucks
- backhoe
- front-end loader
- tree clearing and mulching equipment
- bobcats
- generators
- chainsaws
- air track drilling machines

**Road embankment and drainage work**
- scrapers
- graders
- vibrating and static rollers
- rock crusher
- excavators
- backhoes
- trenching machines
- rock breakers
- articulated trucks
- screens
### Road surface construction
- milling machine
- compactor
- vibrating sheepsfoot roller
- vibrating smooth roller
- multi-wheel rubber tyred roller
- concrete agitator trucks
- concrete pumps
- pugmill
- concrete vibrators
- bitumen spraying and asphalt paver
- mobile asphalt batching plant
- bitumen trucks
- kerb extruding machine
- profiler
- linemarking plant

### Traffic management
- safety barriers
- variable message boards

### 3.3.4 Earthworks
Road construction and utility relocation earthworks would occur over an area of up to 10.4 hectares (including about 10.2 hectares for road construction and about 0.2 hectares for utilities construction). The extents of cut and fill earthworks are shown in Figure 3.2.

The estimated volume of material excavation (cut and fill) is 280,000 cubic metres (including 10,000 cubic metres of topsoil). Subject to the suitability of the material for use as fill, all of this material would be used for road construction. Additional fill material may be required. This may be obtained from an existing stockpile at the proposed compound/stockpile site or from surplus material at the Halfway Hill/Doctors Hill upgrade section. If necessary, fill material may also be obtained from the existing road reserve.

Should there be any remaining volume of material due to lack of suitability for use, it would be stockpiled permanently at previously approved locations on site, or permanently off site at Roads and Maritime facilities.

All excavated topsoil would be stockpiled and re-used in landscaping following road construction.
3.3.5 Source and quantity of materials

Earthworks and other construction materials

The approximate quantities of materials required for the proposal are estimated to be:

- fill – up to 10,000 cubic metres
- base – 5000 cubic metres
- sub-base – 3400 cubic metres
- select material (material with specific size and moisture characteristics and of a high grade) – 3600 cubic metres
- verge material – 1000 cubic metres
- area of bitumen seal – 22,000 square metres.

These volumes are indicative only and may change as a result of detailed design. Base, sub base and aggregate materials would be sourced from a local supplier where feasible.

Water

Water would be required during construction for:

- suppressing dust
- adding moisture to earthworks and pavement materials to optimise compaction
- miscellaneous concrete works
- machinery wash-down.

The volume of water required would depend upon construction timing and weather conditions. Water for construction would be sourced firstly from sediment basins and then potentially from the Tumut or Murrumbidgee Rivers. Extraction of water from the Tumut and Murrumbidgee Rivers would require a water supply work approval under the NSW Water Management Act 2000.

3.3.6 Traffic management and access

Construction access management

Construction vehicles and machinery would access the proposal site using Gocup Road either from Gundagai or Tumut and enter the proposal site at designated access points.

Designated access tracks (haul roads) along the construction corridor would be used. All construction access routes would be included in the traffic management plan.

Construction plant would be restricted as much as possible to access tracks within the proposal site and would be kept isolated from road users during bulk earthworks. Construction vehicles would use Gocup Road to transport base and sub-base materials for road construction and to transport excavated material to fill locations in the proposal site (see Figure 1.1).

Vehicle movements

During construction, the proposal would generate heavy vehicle movements through transporting materials, structures, machinery, fuel and general provisions.

Heavy vehicle movements may vary depending on construction methodology and weather conditions. It is estimated that 150 to 200 heavy vehicles would access the site per day (300 to 400 movements per day) over the construction period.

Light vehicles would be required to transport staff to and from the proposal site and in various other roles on site. Light vehicles would generally be parked at the main site compound.
It is estimated that in the order of 50 light vehicles would access the site per day for transporting staff (100 movements per day). These movements would typically be expected to occur during early morning and late afternoon periods.

The proposed increase in vehicle movements on Gocup Road during construction represents an increase of up to 36 per cent of the existing traffic volumes.

Traffic management

A Traffic Management Plan would be prepared in line with the ‘Traffic Control at Work Sites Manual’ (RTA 2010) and Roads and Maritime ‘Specification G10 – Control of Traffic before start of construction’. The traffic management plan would provide details of traffic management to be implemented during construction, and to manage traffic flow and driving conditions during construction. All traffic management would be in line with current Roads and Maritime standards.

For short periods of time during construction of the proposal, traffic may be restricted to one lane on Gocup Road. This would occur during tie-in work at both ends of the proposal. Construction of the proposal would occur at the same time as other road upgrade projects and maintenance on Gocup Road. Construction of the Gocup Road program of works would be managed so that the maximum delay time for motorists on the entire length of Gocup Road would be 20 minutes.

It is likely that traffic barriers would be installed where necessary to separate the construction site from passing traffic. Temporary speed restrictions of 40 km/h would also be implemented.

A temporary road diversion would be implemented during construction at the southern end of the proposal site (see Figure 1.2). The diversion will run on the western side of the existing alignment for about 300 metres. The temporary diversion will allow for two-lane, two-way traffic and heavy vehicles. No major disruptions to traffic are expected. Access to properties along Gocup Road would be maintained throughout construction.

3.4 Ancillary facilities

3.4.1 Site compounds

A site compound would be established at the existing stockpile site from the Abattoir section of the program of works, north of the proposal site (see Figure 1.2).

The site compound would be used to store plant and equipment, to provide site offices, parking and amenities for construction staff, and to stockpile materials as required. Chemicals and fuels for construction would be stored in appropriate storage areas within the site compound.

3.4.2 Stockpile sites

Four stockpile sites are proposed for Cookoomooroo, including the existing site from the Abattoir section (section 6.1) north of the proposal site (see Figure 1.2). Other smaller stockpile sites may also be located within the proposal site as required.

Stockpile sites would primarily be used for storing construction materials. One stockpile site may also be used for plant operation (see section 3.4.4).

The stockpile sites would be subject to the criteria set out in Roads and Maritime’s ‘Stockpile Site Management Guideline’ (Roads and Maritime 2015c), ‘QA Specification R44 – Earthworks’, QA Specification G36 and QA Specification G38. Stockpile sites would be managed in line with the following guidelines where practicable:

- located in areas not prone to flash flooding and more than 50 metres from a watercourse
- have ready access to the road network or direct access to the construction corridor
• located in previously disturbed areas that do not require the clearing of native woodland vegetation
• located in areas of low ecological and heritage conservation significance
• located outside the drip line of trees
• located on relatively level land.

3.4.3 Sediment basins and drainage

Proposed temporary sediment basins are shown in Figure 1.2. Three sediment basins are proposed to be constructed. The most northern sediment basin would be within leased land. Additional sediment basins may be constructed within the proposal site if required.

The sediment basins would capture runoff from disturbed areas. Captured runoff would be used to settle suspended silt, minimising discharge of silt to adjacent drainage lines. Sediment basins would also reduce flow velocities and potential scouring.

The sediment basins have been designed based on volumes calculated for sediment control using the 'Blue Book - Soils and Construction - Managing Urban Stormwater' Volume 1 (Landcom 2004) and Volume 2D (DECC 2008). The sediment basins would also capture fuel or chemical spills that could potentially occur during construction. The sediment basins would capture runoff from 50 to 60 per cent of the proposal site, including all large cut sections.

Permanent and temporary drainage would:
• drain clean water around, away from, or through the proposal site
• drain most dirty water generated on-site to sediment basins.

Clean water diversion channels would be sized to convey a two year average recurrence interval storm event, where permitted by topography and clearing limits.

Runoff control from road embankments to sediment basins would be managed using:
• shaping of fill
• diversion drains and banks
• stormwater pits
• earth bunds along fill batters discharging to batter drains (see Figure 1.2).

Culverts would have inlet and outlet protection to minimise scouring.

3.4.4 Other ancillary facilities

The following plant may be operated at one of the proposed stockpile sites for the proposal (see Figure 1.2):
• rock crusher (used to crush rock excavated from the proposal site for re-use in road construction)
• mobile asphalt batch plant (used to prepare asphalt)
• pugmill (used for mixing road materials).

3.5 Public utility adjustment

Public utility adjustments are proposed to allow for the proposed Gocup Road upgrade at Cookoomooroo. These utility adjustments are described below and shown in Figure 1.2. The proposed utility adjustments have been assessed in a separate MWREF, but have also been assessed together with the proposed road upgrade in this REF.

Roads and Maritime is currently relocating the following utilities:
• Two kilometres of Telstra optic fibre cable
• Two kilometres of Telstra copper line
• 180 metres of 66kV Essential Energy overhead powerline.
The Telstra optic fibre cable and copper line utilities have been installed together in one trench. The utilities were installed using a four-metre wide construction corridor.

### 3.6 Property acquisition

Land acquisition locations for the proposal are shown in Figure 3.3. Details of land acquisition are provided in Table 3.1. These areas are indicative only and may change once boundaries are finalised during detailed design.

#### Table 3.1: Proposed property acquisition

<table>
<thead>
<tr>
<th>Area ID</th>
<th>Current owner</th>
<th>Land use</th>
<th>Acquisition area (ha)</th>
<th>Lot and DP</th>
<th>Land use zone (LEP)</th>
<th>Total area of property (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Acquisition on western side of Gocup Road</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1</td>
<td>Private property</td>
<td>Agriculture</td>
<td>0.315</td>
<td>Lot 1 DP609528</td>
<td>RU1</td>
<td>5.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.009</td>
<td>Lot 1 DP1095585</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.660</td>
<td>Lot 2 DP1095585</td>
<td></td>
<td>30.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5.688</td>
<td>Lot 3 DP1095585</td>
<td></td>
<td>10.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.209</td>
<td>Lot 268 DP 757248</td>
<td></td>
<td>6.5</td>
</tr>
<tr>
<td><strong>Acquisition on eastern side of Gocup Road</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C2</td>
<td>Crown Land</td>
<td>Agriculture</td>
<td>0.120</td>
<td>Lot 2 DP 240382</td>
<td>RU1</td>
<td>2.3</td>
</tr>
<tr>
<td>C3</td>
<td>Private property</td>
<td>Agriculture</td>
<td>0.258</td>
<td>Lot 151 DP 757251</td>
<td>RU1</td>
<td>47.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2.028</td>
<td>Lot 2 DP 609528</td>
<td></td>
<td>4.7</td>
</tr>
<tr>
<td>C4</td>
<td>Private property</td>
<td>Agriculture</td>
<td>0.0317</td>
<td>Lot 125 DP 757251</td>
<td>RU1</td>
<td>16.1</td>
</tr>
<tr>
<td><strong>Total Area</strong></td>
<td></td>
<td></td>
<td>9.309</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Some of these acquisition areas would be temporarily leased to allow access to the proposal site during the acquisition process. No full acquisitions of property are required for the proposal.

In relation to acquisition of Crown land, an assessment of the proposal against the objects and principles of the *Crown Lands Act 1989* is provided in Table 4.1 in section 4.2.7.

In addition to permanent acquisition, land may be temporarily leased during construction for small temporary stockpile sites and other construction requirements. These requirements have not yet been determined.

All property valuations, lease fees and acquisition payments would be carried out in line with the Roads and Maritime ‘Land Acquisition Information Guide’ (RTA 2011c) and the *Land Acquisition (Just Terms Compensation) Act 1991*. Property acquisition plans would be prepared for each of the properties where acquisition or leasing is required, as part of the detailed design.
Refer Table 3.1 of REF for information with area IDs
4 Statutory and planning framework

4.1 Environmental Planning and Assessment Act 1979

4.1.1 State Environmental Planning Policies

State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) aims to facilitate the effective delivery of infrastructure across the State.

Clause 94 of the ISEPP permits development on any land for the purpose of a road or road infrastructure facilities to be carried out by or on behalf of a public authority without consent.

As the proposal is for a new road and road infrastructure facilities and is to be carried out by Roads and Maritime, it can be assessed under Part 5 of the EP&A Act. Development consent from council is not required.

The proposal is not located on land reserved under the National Parks and Wildlife Act 1974 and does not affect land or development regulated by State Environmental Planning Policy No. 14 - Coastal Wetlands, State Environmental Planning Policy No. 26 - Littoral Rainforests, State Environmental Planning Policy (State and Regional Development) 2011 or State Environmental Planning Policy (Major Development) 2005.

Part 2 of the ISEPP contains provisions for public authorities to consult with local councils and other public authorities before the start of certain types of development. Consultation, including consultation as required by ISEPP, is discussed in chapter 5 of this REF.

4.1.2 Local Environmental Plans

Local government areas

The proposal site is located within the Cootamundra-Gundagai Regional Council LGA (see Figure 1.2), which was created with the amalgamation of the Cootamundra and Gundagai Shire Councils. Currently, the Gundagai Local Environmental Plan 2011 is still relevant to the proposal. Under the Gundagai Local Environmental Plan 2011, the proposal site is located in the RU1 – Primary Production land use zone.

The provisions of the Gundagai Local Environmental Plan 2011 do not apply to the proposal due to the application of the ISEPP. Nevertheless, consideration is given below to the provision of the LEP.

RU1 – Primary Production

The objectives of the RU1 Primary Production zone in the Gundagai Local Environmental Plan 2011 are:

- to encourage sustainable primary industry production by maintaining and enhancing the natural resource base
- to encourage diversity in primary industry enterprises and systems appropriate for the area
- to minimise the fragmentation and alienation of resource lands
- to minimise conflict between land uses within this zone and land uses within adjoining zones
- to encourage the efficient use and conservation of water resources
- to protect significant scenic landscapes
- to encourage development that does not adversely impact nearby agricultural activities
- to protect, enhance and conserve the natural environment, including native vegetation, wetlands and wildlife habitat
• to ensure development prevents or mitigates land degradation.

The proposal would permanently remove 9.3 hectares of agricultural land from production. Agricultural land is well represented in the investigation area and locality, and the proposed removal does not represent a large proportion of agricultural land. The proposal would not cause significant fragmentation of any rural properties. The proposal would therefore have only minor impacts on agricultural land. The proposal would benefit primary industry in the region by providing a safer road environment with a higher level of service.

4.2 Other relevant NSW legislation

4.2.1 Threatened Species Conservation Act 1995

The Threatened Species Conservation Act 1995 (TSC Act) lists a number of threatened species, populations and ecological communities to be considered in deciding whether there is likely to be a significant impact on threatened biota or their habitats. For any of these that could be impacted by the proposal, an assessment of significance that addresses the requirements of section 5A of the EP&A Act must be completed to determine the significance of the impact.

The potential impacts on ecology have been considered in section 6.1. The biodiversity assessment (Appendix B) concludes that the proposal would be unlikely to have a significant impact on any threatened species, populations, ecological communities or their habitats listed under the TSC Act. Therefore, a species impact statement is not required.

4.2.2 Biosecurity Act 2015

The primary object of the Biosecurity Act 2015 is to provide a framework for the prevention, elimination and minimisation of biosecurity risks posed by biosecurity matter, carriers and potential carriers.

In NSW, all plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.

The potential impacts of the proposal relating to priority weeds, and site specific safeguards, are included in section 6.1.

4.2.3 National Parks and Wildlife Act 1974

The National Parks and Wildlife Act 1974 (NPW Act) provides the basis for legal protection and management of Aboriginal sites within NSW, and for the management of National Parks estate.

An Aboriginal Heritage Impact Permit (AHIP) was granted for a number of upgrade sections along Gocup Road by OEH on 24 November 2015. An AHIP variation application for the proposal is currently in the process of being submitted to OEH. A due diligence assessment for the Cookoomooroo section is being completed to submit with the application.

4.2.4 Heritage Act 1977

The Heritage Act 1977 (Heritage Act) is concerned with all aspects of heritage conservation ranging from basic protection against indiscriminate damage and demolition of buildings and sites, through to restoration and enhancement.

Heritage places and items of particular importance to the people of NSW are listed on the State Heritage Register. Only those heritage items that are of State significance are listed on the State Heritage Register. Approval under Section 60 of the Heritage Act may be required for impacts to a listed heritage item.
The Heritage Act also protects ‘relics’, which can include archaeological material, features and deposits. Section 4(1) of the Heritage Act defines a ‘relic’ as follows:

*relic* means any deposit, artefact, object or material evidence that:

(a) relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, and

(b) is of State or local heritage significance.

Under Section 139 of the Heritage Act, NSW Heritage Council approval is required before the disturbance or excavation of land if a project will, or is likely to result in, disturbance to a relic.

### 4.2.5 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) establishes the procedures for issuing of licences for environmental protection in relation to aspects such as waste, air, water and noise pollution control. The owner or occupier of premises engaged in scheduled activities is required to hold an environment protection licence (EPL) and comply with the conditions of that licence.

The POEO Act defines land-based extractive activity as an activity that involves the extraction, processing or storage of more than 30,000 tonnes per year of extractive materials. The proposal would likely involve extraction of more than 200,000 tonnes of material.

The POEO Act declares material crushing to be a scheduled activity if it has a capacity to process more than 150 tonnes of materials per day or 30,000 tonnes of materials per year. The proposal may exceed either of these limits.

An EPL from the Environment Protection Authority (EPA) is therefore required. Roads and Maritime would apply to the EPA for an EPL.

### 4.2.6 Water Management Act 2000

The *Water Management Act 2000* controls the carrying out of activities in or near water sources in NSW, the extraction and use of water and the construction of works such as dams and weirs. ‘Water sources’ are defined as a river, lake, estuary, place where water occurs naturally on or below the surface of the ground or NSW coastal waters.

The proposal is exempt from the requirement to obtain a ‘controlled activity’ approval under section 38 of the *Water Management (General) Regulation 2011* for work on waterfront land.

Under clause 61 of the *Water Management Act 2000*, a person may apply to the Minister for Water for an access licence (section 56) if the application is for a specific purpose access licence and a management plan provides that an application for the licence may be made. Under clause 18 of the *Water Management (General) Regulation 2011*, Roads and Maritime is exempt from obtaining an access licence for road construction and maintenance operations, including dust suppression.

Under section 91B of the *Water Management Act 2000*, a water supply work approval authorises its holder to construct and use a specified water supply work at a specified location (eg for pumping water from a river). If extraction of water from the Tumut River and/or Murrumbidgee River is required for the proposal, a water supply work approval would be required.

Water sharing plans created under the *Water Management Act 2000* establish rules for sharing water between the environmental needs of a river or aquifer and water users, and also between different types of water use, such as town supply, rural domestic supply, stock watering, industry and irrigation.
The proposal occurs within the area administered by the *Water Sharing Plan for the Murrumbidgee Regulated River*. Water extraction approvals may be granted in the water sources covered by the Plan.

### 4.2.7 Crown Lands Act 1989

Acquisition of Crown land would be carried out in line with section 34 (1) of the *Crown Lands Act 1989*. The area of land to be acquired would be 0.12 hectares.

Clause 10 of the *Crown Lands Act 1989* lists the objects of the Act, while clause 11 details the principles of Crown land management. The proposal is assessed against these objects and principles in Table 4.1.

**Table 4.1: Assessment of the proposal against the objects and principles of the Crown Lands Act 1989**

<table>
<thead>
<tr>
<th>Object/principle</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clause 10 objects</strong></td>
<td></td>
</tr>
<tr>
<td>To ensure that Crown land is managed for the benefit of the people of NSW and in particular to provide for:</td>
<td></td>
</tr>
<tr>
<td>(a) a proper assessment of Crown land</td>
<td>Assessment of the environmental impacts of the proposal in this REF includes impacts on Crown land. This has included biodiversity values (see section 6.1) and the land use and social values of Crown land for the local community (see section 6.7). The proposal is unlikely to have any substantial impacts on Crown land.</td>
</tr>
<tr>
<td>(b) the management of Crown land having regard to the principles of Crown land management contained in this Act</td>
<td>See Clause 11 principles below.</td>
</tr>
<tr>
<td>(c) the proper development and conservation of Crown land having regard to those principles</td>
<td>See Clause 11 principles below.</td>
</tr>
<tr>
<td>(d) the regulation of the conditions under which Crown land is permitted to be occupied, used, sold, leased, licensed or otherwise dealt with</td>
<td>Not applicable to this REF.</td>
</tr>
<tr>
<td>(e) the reservation or dedication of Crown land for public purposes and the management and use of the reserved or dedicated land</td>
<td>Not applicable to this REF.</td>
</tr>
<tr>
<td>(f) the collection, recording and dissemination of information in relation to Crown land</td>
<td>Not applicable to this REF.</td>
</tr>
</tbody>
</table>
### Clause 11 principles of Crown land management

<table>
<thead>
<tr>
<th>Object/principle</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) that environmental protection principles be observed in relation to the management and administration of Crown land</td>
<td>Assessment of the environmental impacts of the proposal in this REF includes impacts on Crown land. This has included biodiversity values (see section 6.1). The proposal is unlikely to have any substantial impacts on Crown land.</td>
</tr>
<tr>
<td>(b) that the natural resources of Crown land (including water, soil, flora, fauna and scenic quality) be conserved wherever possible</td>
<td>The potential impacts of the proposal on soil and water (section 6.2), flora and fauna (section 6.1) and scenic quality (section 6.5) have been assessed by this REF. Safeguards and management measures are detailed in these sections to avoid or minimise the impacts of the proposal.</td>
</tr>
<tr>
<td>(c) that public use and enjoyment of appropriate Crown land be encouraged</td>
<td>Not applicable – the Crown land acquired is not available for public use.</td>
</tr>
<tr>
<td>(d) that, where appropriate, multiple use of Crown land be encouraged</td>
<td>The impacts of the proposal on all existing uses of Crown land have been assessed in this REF (see section 6.7). The proposal would acquire a small area (0.12 hectares) of Crown land currently being used for agricultural production. The proposed acquisition of land is minor and would not have a substantial effect on the agricultural use of the land.</td>
</tr>
<tr>
<td>(e) that, where appropriate, Crown land should be used and managed in such a way that both the land and its resources are sustained in perpetuity</td>
<td>This REF has provided safeguards to minimise the potential long term impacts of the proposal on Crown land and its resources as described in the sections of this table above.</td>
</tr>
<tr>
<td>(f) that Crown land be occupied, used, sold, leased, licensed or otherwise dealt with in the best interests of the State consistent with the above principles</td>
<td>The proposal would be constructed for the benefit of the people of NSW, with benefits for the timber and milling industry and local community, as detailed in section 6.8. This REF assesses that the acquisition of a small area (0.12 hectares) of Crown land is in the best interests of the State and is consistent with the above principles.</td>
</tr>
</tbody>
</table>

### 4.3 Commonwealth legislation

#### 4.3.1 Environment Protection and Biodiversity Conservation Act 1999

Under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) a referral is required to the Australian Government for proposed actions that have the potential to significantly impact on matters of national environmental significance or the environment of Commonwealth land. These are considered in Appendix A and chapter 6 of the REF.

A referral is not required for proposed road activities that may affect nationally listed threatened species, populations, endangered ecological communities and migratory species. Requirements for considering impacts to these biodiversity matters are detailed in a strategic assessment approval granted under the EPBC Act by the Australian Government in September 2015.

Potential impacts to these biodiversity matters are also considered as part of chapter 6 of the REF and Appendix B.
4.4 Confirmation of statutory position

The proposal is categorised as development for the purpose of a road and is being carried out by or on behalf of a public authority. Under clause 94 of the ISEPP the proposal is permissible without consent. The proposal is not State significant infrastructure or State significant development. The proposal can be assessed under Part 5 of the EP&A Act.

Roads and Maritime is the determining authority for the proposal. This REF fulfils Roads and Maritime’s obligation under clause 111 of the EP&A Act to examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the activity.
5 Consultation

5.1 Consultation for the Tumut to Hume Highway Corridor Strategy

Transport for NSW and Roads and Maritime developed the Tumut to Hume Highway Corridor Strategy (Transport for NSW 2016). This strategy addressed the constraints associated with the Snowy Mountains Highway and Gocup Road between Tumut and the Hume Highway.

Consultation with the community and stakeholders during the strategy’s development is directly relevant to the proposal.

During development of the Tumut to Hume Highway Draft Corridor Strategy, local councils and other government agencies were consulted. Feedback was included in the strategy.

The Tumut to Hume Highway Draft Corridor Strategy was released for community comment between Monday 1 February and Friday 26 February 2016. The draft report was published on the Transport for NSW and Roads and Maritime websites.

Relevant stakeholders were contacted in writing and invited to provide comment on the strategy. Community stakeholders contacted included:

- local government members of parliament
- local shire councils
- government agencies
- Aboriginal land councils
- local interest groups
- Chamber of Commerce
- local industry
- transport operators including freight, bus and taxi
- visitor information centres
- schools
- emergency services.

Community members and stakeholders were encouraged to send submissions via the Roads and Maritime website, email, mail or phone.

Issues identified during the strategy’s development, including community and stakeholder consultation, are broadly summarised in Table 5.1.

Table 5.1: Summary of issues identified during development of Tumut to Hume Highway Corridor Strategy

<table>
<thead>
<tr>
<th>Issues identified</th>
<th>Response / where addressed in REF</th>
</tr>
</thead>
<tbody>
<tr>
<td>The need for the Gocup Road upgrade to:</td>
<td></td>
</tr>
<tr>
<td>• meet current road design standards</td>
<td>• The need for the proposal is identified in chapter 2</td>
</tr>
<tr>
<td>• provide a safer road environment</td>
<td>• A description of the proposal, including the design, is provided in chapter 3.</td>
</tr>
<tr>
<td>• improve traffic and freight efficiency</td>
<td></td>
</tr>
<tr>
<td>• provide for high productivity vehicles</td>
<td></td>
</tr>
<tr>
<td>• provide overtaking opportunities</td>
<td></td>
</tr>
<tr>
<td>• improve the condition of the road surface.</td>
<td></td>
</tr>
<tr>
<td>• The need to inform road users about delays from road upgrade works.</td>
<td>• Measures to inform road users about delays from road works would be implemented as described in section 6.3.</td>
</tr>
</tbody>
</table>
5.2 Consultation strategy

Roads and Maritime has consulted with potentially affected property owners, stakeholders and government agencies during the selection of the preferred options and development of the proposal designs. The purpose of consultation has been to:

- inform the community of the proposal
- advise government agencies and stakeholders of the proposal and its possible impacts.

If the proposal is determined to proceed, Roads and Maritime would continue to consult with community stakeholders and utility providers.

5.3 Community involvement

5.3.1 Project website

Information regarding the full Gocup Road works program has been placed on the Roads and Maritime project website since the program began in 2012. The project website includes specific reference to the proposed upgrade of the Cookoomooroo section of Gocup Road. The project website provides the project manager’s contact details so the community can comment on the proposal or request further information.

5.3.2 Property owner consultation

Roads and Maritime has consulted individually with property owners near the proposal site, including owners of properties where acquisition is required. This consultation has included:

- notifying property owners of the proposed Gocup Road upgrade at Cookoomooroo
- informing property owners of the potential acquisition of land from various properties and new property boundaries, and establishing agreements
- meeting with property owners to discuss potential short-term leases for temporary stockpile sites
- identifying infrastructure impacts and requirements for infrastructure to be relocated.

Roads and Maritime would continue to consult with the owners of properties near the proposal site during the final stages of detailed design and throughout construction.

5.3.3 Summary of issues raised

Issues raised by the community during consultation for the Tumut to Hume Highway Corridor Strategy and during property owner consultation are summarised in Table 5.2.

Table 5.2: Summary of issues raised by the community

<table>
<thead>
<tr>
<th>Group</th>
<th>Issue raised</th>
<th>Response / where addressed in REF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residents and property owners</td>
<td>• Impacts to private infrastructure and relocation requirements.</td>
<td>• Impacts to various items of private infrastructure and relocation measures are described in section 6.7.</td>
</tr>
</tbody>
</table>

5.4 Aboriginal community involvement

Site investigation and consultation with the Aboriginal community was completed in line with the Roads and Maritime ‘Procedure for Cultural Heritage Consultation and Investigation’ (PACHCI) and in consultation with the Roads and Maritime Aboriginal Cultural Heritage Officer as summarised in Table 5.3.
### Table 5.3: Summary of Roads and Maritime Procedure for Aboriginal Cultural Heritage Consultation and Investigation

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1</td>
<td>Initial Roads and Maritime assessment – a focus group meeting was held on 21 November 2014 in Tumut, which was attended by registered Aboriginal parties.</td>
</tr>
<tr>
<td>Stage 2</td>
<td>Site survey and further assessment - a site assessment was carried out by Kelleher Nightingale Consulting (2012) in consultation with Aboriginal stakeholders under Stage 2 of the PACHCI. Further site assessments were carried out by Waters Consultancy (2015a) and Kelleher Nightingale (on 21 August 2015). The latter site survey team comprised the Roads and Maritime Aboriginal Cultural Heritage Officer, representatives from Kelleher Nightingale Consulting and members of the Brungle/Tumut Local Aboriginal Land Council. Additional assessment of concept design changes to sections of the program of works was completed by Waters Consultancy (2015b).</td>
</tr>
</tbody>
</table>
| Stage 3 | Formal consultation and preparation of an Aboriginal Cultural Assessment was carried out by Waters Consultancy (2015a) to inform the Cultural Heritage Assessment Report (CHAR) prepared by Kelleher Nightingale Consulting (2015) for the entire Gocup Road works program. Roads and Maritime consulted with the Aboriginal community as follows:  
- advertised the proposed program of works  
- contacted potential Aboriginal stakeholders identified from government agency notification responses  
- invited Aboriginal people with relevant knowledge of the Aboriginal objects and places in the area to register an interest in the program of works  
- conducted investigations which have included consultation with 62 Aboriginal community groups and individuals, including the Brungle Tumut Local Aboriginal Land Council.  

The cultural assessment identified eight Aboriginal archaeological sites that would be impacted by the Gocup Road upgrade works program. None of these sites are located in the Cookoomooroo investigation area.  

Following this, Waters Consultancy (2015b) completed a supplementary Aboriginal cultural assessment to assess changes to the concept designs for the Cookoomooroo, Doctors Hill, Halfway Hill and Gilmore Creek Bridge sections of Gocup Road.  

Additional assessment for utility relocations (Kelleher Nightingale Consulting 2017a) identified two sites of Aboriginal heritage in the Cookoomooroo investigation area.  

An Aboriginal archaeological due diligence assessment was completed by Kelleher Nightingale Consulting (2017b) for the proposed extension of the approved AHIP area at Cookoomooroo.  |
| Stage 4 | Implement environmental impact assessment recommendations – standard recommendations would be implemented in relation to unexpected archaeological finds.                                                                                                                                                                                                 |

A more detailed description of the Aboriginal community consultation process is provided in the Aboriginal heritage assessment in Appendix D.
5.5 ISEPP consultation

Clauses 13 to 16 of the ISEPP require that public authorities consult with councils and other public authorities for certain activities when proposing to carry out development without consent. Table 5.4 assesses the relevance of these clauses to the proposal.

Table 5.4: Assessment of clauses 13, 14, 15 and 16 of the ISEPP

<table>
<thead>
<tr>
<th>Clause</th>
<th>Is consultation required?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1(a) Substantial impact on stormwater management services provided by a council.</td>
<td>Stormwater management services provided by a council are not present in the investigation area. Formal consultation with Council is not required for this item.</td>
</tr>
<tr>
<td>1(b) Likely to generate traffic to an extent that would strain the capacity of the road system in a local government area.</td>
<td>The proposed increase in vehicle movements on Gocup Road during construction represents an increase of up to 36 per cent of the existing traffic volumes. This is unlikely to strain the capacity of the road system. Formal consultation with Council is not required for this item.</td>
</tr>
<tr>
<td>1(c) Involves connection to, and a substantial impact on the capacity of, any part of a sewerage system owned by a council.</td>
<td>A sewage system owned by Council is not present in the investigation area. Formal consultation with Council is not required for this item.</td>
</tr>
<tr>
<td>1(d) Involves connection to, and use of a substantial volume of water from, any part of a water supply system owned by a council.</td>
<td>A water supply system owned by Council is not present in the investigation area. Formal consultation with Council is not required for this item.</td>
</tr>
<tr>
<td>1(e) Involves the installation of a temporary structure on, or the enclosing of, a public place that is under a council’s management or control that is likely to cause a disruption to pedestrian or vehicular traffic that is not minor or inconsequential.</td>
<td>The proposal would not involve the construction of a temporary structure on, or the enclosing of, a public place that would cause a disruption to pedestrian or vehicular traffic. Formal consultation with Council is not required for this item.</td>
</tr>
<tr>
<td>1(f) Involves excavation that is not minor or inconsequential of the surface of, or a footpath adjacent to, a road for which a council is the roads authority under the Roads Act 1993 (if the public authority that is carrying out the development, or on whose behalf it is being carried out, is not responsible for the maintenance of the road or footpath).</td>
<td>The proposal would not involve excavation that is not minor or inconsequential, of the surface of a council road. Formal consultation with Council is not required for this item.</td>
</tr>
<tr>
<td>Clause 14</td>
<td>Is consultation required?</td>
</tr>
<tr>
<td>-----------</td>
<td>--------------------------</td>
</tr>
</tbody>
</table>
| Is likely to have an impact that is not minor or inconsequential on a local heritage item (other than a local heritage item that is also a State heritage item) or a heritage conservation area. | The proposal is unlikely to affect any local heritage items.  
Formal consultation with Council is not required for this item. |

<table>
<thead>
<tr>
<th>Clause 15</th>
<th>Is consultation required?</th>
</tr>
</thead>
</table>
| Development that is to be carried out on flood liable land that may be carried out without consent and that would change flood patterns other than to a minor extent. | The proposal may be located on flood liable land near Stony Creek. The proposal would not change flood patterns other than to a minor extent  
Formal consultation with Council is not required for this item. |

<table>
<thead>
<tr>
<th>Clause 16</th>
<th>Is consultation required?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clause 16 of the ISEPP states that a consent authority must not carry out any of the following development without giving written notice to the specified authority and taken their responses into consideration:</td>
<td></td>
</tr>
<tr>
<td>(a) development adjacent to land reserved under the <em>National Parks and Wildlife Act 1974</em>—the Office of Environment and Heritage,</td>
<td>The proposal is not located adjacent to land reserved under the <em>National Parks and Wildlife Act 1974</em>.</td>
</tr>
<tr>
<td>(b) development adjacent to a marine park declared under the <em>Marine Parks Act 1997</em>—the Marine Parks Authority,</td>
<td>The proposal is not located adjacent to a marine park.</td>
</tr>
<tr>
<td>(c) development adjacent to an aquatic reserve declared under the <em>Fisheries Management Act 1994</em>—Department of Primary Industries—Fishing and Aquaculture,</td>
<td>The proposal is not located adjacent to an aquatic reserve.</td>
</tr>
<tr>
<td>(d) development in the foreshore area within the meaning of the <em>Sydney Harbour Foreshore Authority Act 1998</em>—the Sydney Harbour Foreshore Authority,</td>
<td>The proposal is not located in the foreshore area.</td>
</tr>
<tr>
<td>(e) development comprising a fixed or floating structure in or over navigable waters—Roads and Maritime,</td>
<td>The proposal does not include development comprising a fixed or floating structure in or over navigable waters.</td>
</tr>
</tbody>
</table>
Clause | Is consultation required?
--- | ---
(f) development for the purposes of an educational establishment, health services facility, correctional centre or group home, or for residential purposes, in an area that is bush fire prone land (as defined by the Act)—the NSW Rural Fire Service. | The proposal is not for the purposes of an educational establishment, health services facility, correctional centre or group home, or for residential purposes.

Formal ISEPP consultation with a council is not required. Nevertheless, Roads and Maritime has consulted extensively with Cootamundra-Gundagai Council in relation to the proposal and entire program of works, and would continue to do so during the detailed design and construction of the proposal.

5.6 Government agency and stakeholder involvement

Various government agencies and stakeholders have been consulted about the proposal, listed in Table 5.5.

**Table 5.5: Government agencies and stakeholders consulted about the proposal**

<table>
<thead>
<tr>
<th>Agency</th>
<th>Methods of consultation</th>
</tr>
</thead>
</table>
| Office of Environment and Heritage (OEH) | • Letters re Aboriginal heritage  
• Liaison on additional knowledge holders for PACHCI process  
• Submission of (Aboriginal Heritage Impact Permit (AHIP) application  
• Letter sent to Biodiversity Conservation Officer (Sep 2016)  
• Meeting between Project Manager and OEH to discuss AHIP Variation Application (Oct 2016)  
• Discussion with OEH’s Archaeologist and Environmental Compliance Officer to discuss potential impacts on unidentified Aboriginal sites near Cookoomooroo  
• Due diligence assessment for the proposal is currently being completed to submit a variation to the AHIP boundary. |
| Environment Protection Authority (EPA) | • Discussion with EPA in early 2016 regarding Gocup Road upgrade and process for Environment Protection Licence (EPL)  
• Letter sent to EPA, Sep 2016 outlining proposals  
• Meeting with EPA in Oct 2016, to discuss EPL application and Gocup Road upgrade. |
| Cootamundra-Gundagai Council | • Bi-monthly steering committee meetings  
• Letter Sep 2016. |
<p>| Department of Primary Industries – Fishing and Aquaculture | • Letter Sep 2016. |</p>
<table>
<thead>
<tr>
<th>Agency</th>
<th>Methods of consultation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telstra</td>
<td>• Telstra engaged in Sep 2016 to design optic fibre relocations. Relocation works carried out in Jun 2017.</td>
</tr>
</tbody>
</table>

Issues that have been raised as a result of consultation with these agencies and stakeholders are summarised below in Table 5.6. The responses are included in full in Appendix F.

**Table 5.6: Issues raised through government agency and stakeholder consultation**

<table>
<thead>
<tr>
<th>Agency</th>
<th>Issue raised</th>
<th>Response / where addressed in REF</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPA</td>
<td>• The goals of the proposal should include the following:</td>
<td>• Sections 3.4.3 and 6.2</td>
</tr>
<tr>
<td></td>
<td>– no pollution of waters (including surface and groundwater)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– polluted water, including polluted stormwater, is captured on site and collected, treated and beneficially re-used, where this is safe and practicable to do so</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The REF should document measures that will achieve the above goals</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The REF should clearly detail site drainage and any natural or artificial waters within or near the development.</td>
<td></td>
</tr>
<tr>
<td>EPA</td>
<td>• The proposal’s goals should include mitigation of dust impacts such that potential impacts on sensitive receivers are minimised in line with the EPA particulate matter and deposited dust criteria</td>
<td>• Section 6.5</td>
</tr>
<tr>
<td></td>
<td>• Details should be provided on proposed measures to manage dust and their performance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The REF should identify any other existing impacts on air quality within the area and, if necessary, provide an assessment and commentary on the predicted cumulative impacts that may arise.</td>
<td></td>
</tr>
<tr>
<td>EPA</td>
<td>• The goals of the proposal should include design, construction, operation and maintenance of the proposed works in line with relevant noise policies, guidelines and criteria to minimise potential noise impacts</td>
<td>• Section 6.4</td>
</tr>
<tr>
<td></td>
<td>• Noise impacts need to be assessed and comply with the requirements of the ‘Interim Construction Noise Guideline’</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• All residential and noise sensitive receivers likely to be impacted must be identified and included in the REF</td>
<td></td>
</tr>
</tbody>
</table>

Gocup Road upgrade – Cookoomooroo
Review of environmental factors

49
<table>
<thead>
<tr>
<th>Agency</th>
<th>Issue raised</th>
<th>Response / where addressed in REF</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>● All feasible and reasonable work practices should be implemented to minimise noise impacts to noise sensitive receivers.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● The goals of the project should include the following in relation to waste and chemicals:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– it is in line with the principles of the waste hierarchy and cleaner production</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– where potential impacts associated with handling, processing and storage of all materials used at the site are identified, these should be mitigated</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– the beneficial re-use of all wastes generated at the site are maximised where it is safe and practical to do so</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– no waste disposal occurs on site</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● The REF needs to identify the type, quantity and location of all wastes and chemicals that will be generated or stored on site</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Wastes must be classified in line with the EPA guideline 'Waste Classifications Guidelines, Part 1: Classifying waste', November 2014.</td>
<td>● Section 6.11</td>
</tr>
<tr>
<td></td>
<td>● A goal of the proposal should ensure that environmental risks from hazardous chemicals and chemical waste are minimised</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Spill management measures, including items such as bunding, and emergency procedures should be clearly outlined for all liquid wastes or other liquid chemicals that may be used or stored on site.</td>
<td>● Section 6.2</td>
</tr>
<tr>
<td>OEH</td>
<td>● OEH recommends the determining authority consider whether a flora and fauna assessment (assessment of significance) is required for the development as habitat values may be present for threatened species</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● To address the impacts on threatened species, the REF should demonstrate how the principle of avoid, minimise and offset has been applied</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● The REF should include a timeframe for rehabilitation activities across the entire proposal site</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Negative impacts to native vegetation should be avoided where possible using prevention and mitigation measures</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Where impacts cannot be avoided, the REF should detail how residual direct and indirect impacts will be addressed through biodiversity offsetting. BioBanking provides a voluntary mechanism through which this can be achieved</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Impacts to flora and fauna may be assessed using either the BioBanking Assessment</td>
<td>● Section 6.1</td>
</tr>
<tr>
<td>Agency</td>
<td>Issue raised</td>
<td>Response / where addressed in REF</td>
</tr>
<tr>
<td>--------</td>
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</tr>
<tr>
<td></td>
<td>Methodology or a detailed biodiversity assessment.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• OEH has already provided advice about the REF requirements for this section of upgrade for Aboriginal cultural heritage. Aboriginal Heritage Impact Permit #C0001499 has been issued for a number of sections of Gocup Road</td>
<td>• The requested information and AHIP variation application are currently being completed.</td>
</tr>
<tr>
<td></td>
<td>• An addendum to the original archaeological and cultural value reports must be provided for each section. These reports must follow the Code of Practice requirements</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• An update on consultation with registered Aboriginal parties must be provided</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• This information must be provided with an AHIP variation application.</td>
<td></td>
</tr>
</tbody>
</table>

5.7 Ongoing or future consultation


The following ongoing consultation would be carried out by Roads and Maritime:

- consult with community stakeholders and property owners in the investigation area to acquire land and to assist in managing impacts during construction
- ongoing meetings with community stakeholders and utility providers as required
- ongoing updates throughout the planning phase and construction period to the immediately affected community
- affected landowners would be notified at least five days before construction activities that would directly impact on properties during construction
- the Roads and Maritime website would include updates, contact details for further information or complaints, and notices of upcoming work
- a contact number would be provided for the community to register any comments or complaints during construction of the proposal
- information would be published in local newspapers, including notices of traffic control.
6 Environmental assessment

This section of the REF provides a detailed description of the potential environmental impacts associated with the construction and operation of the proposal. All aspects of the environment potentially impacted upon by the proposal are considered. This includes consideration of:

- potential impacts on matters of national environmental significance under the EPBC Act
- the factors specified in the guidelines (DUAP 1995/1996) as required under clause 228(1) of the Environmental Planning and Assessment Regulation 2000 and the ‘Roads and Related Facilities EIS Guideline’ (DUAP 1996). The factors specified in clause 228(2) of the Environmental Planning and Assessment Regulation 2000 are also considered in Appendix A.

6.1 Biodiversity

A specialist biodiversity assessment of the proposal was prepared (GHD 2017a) and is provided in Appendix B. The outcomes of the assessment are summarised in this section.

6.1.1 Methodology

The investigation area for the biodiversity assessment is defined as the area within 500 metres of the proposal site.

The assessment involved the following methods:

- background ecology information was reviewed. This information included:
  - OEH (2016b) NSW threatened species, online profiles
  - DotEE (2016a) EPBC Act Protected Matters Search Tool – for a 10 kilometre radius around the proposal site (searched 18 July 2016)
  - DotEE (2016b) Species profile and threats database, online profiles
  - NSW Department of Primary Industries – priority weed declarations – Cootamundra-Gundagai local government area (DPI 2017) (searched 11 July 2017)

- previous reports prepared for Roads and Maritime were reviewed for background information, including:
  - Preliminary biodiversity investigation: Gocup Road (MR279)’ (EnviroKey 2012)
  - ‘Threatened Species Investigations: Selected sections of Gocup Road (MR279)’ (EnviroKey 2013a)
  - ‘Biodiversity impact assessment: Gocup Road (MR279) pavement reconstruction, south of Minjary’ (EnviroKey 2013b)
  - ‘Biodiversity impact assessment: Gocup Road (MR279) curve realignment, south of Meadow Creek’ (EnviroKey 2013c)
  - ‘Silky Swainson-pea management plan: Gocup Road (MR279)’ (EnviroKey 2013d)
  - ‘Biodiversity impact assessment: Gocup Road (MR279) – Abattoir widening and quarry realignment’ (EnviroKey 2014a)
  - ‘Biodiversity impact assessment: Gocup Road (MR279), Quidong 90 reconstruction’ (EnviroKey 2014b)
  - ‘Minor works review of environmental factors: Meadow Creek reconstruction, Gocup Road (MR279)’ prepared by GHD (2011)

- flora and fauna surveys were conducted by two ecologists at various times between 8 October 2014 and 7 April 2016 (see Figure 6.1). Surveys included:
  - flora plot and transect surveys
  - hollow-bearing tree surveys
  - fauna habitat assessment
  - diurnal bird surveys
  - reptile and amphibian searches
– opportunistic fauna observations
• an assessment of the likelihood of occurrence was completed for threatened species, populations and ecological communities, and migratory species, with the potential to occur in the investigation area. The possibility of an impact on each species, population or ecological community was also assessed
• potential impacts on species listed under the TSC Act were assessed in line with the Assessment of Significance included in section 5A of the EP&A Act, with reference to DECC (2007) (see biodiversity assessment in Appendix B)
• potential impacts on species listed under the EPBC Act were assessed in line with the EPBC Act Policy Statement ‘Matters of National Environmental Significance: Significant impact guidelines 1.1’ (DotE 2013) (see biodiversity assessment in Appendix B)
• safeguards and management measures for the proposal were developed based on site conditions and the potential impacts of the proposal.

6.1.2 Existing environment

Flora

Plant community types
White Box (Eucalyptus albens) and Blakely's Red Gum (Eucalyptus blakelyi) (see Figure 6.2) form an ecotone in the investigation area of two plant community types:
• ‘White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion’ (PCT ID 266)
• ‘Blakely's Red Gum – Yellow Box (Eucalyptus melliodora) grassy tall woodland of the NSW South Western Slopes Bioregion’ (PCT ID 277).

The PCTs contain patches of vegetation that are in moderate/good condition and low condition, as defined under the BioBanking Assessment Methodology (OEH 2014).

Stony Creek in the south of the investigation area and Cookoomooroo Creek in the north of the investigation area, are identified in the Atlas of Groundwater Dependent Ecosystems (BoM 2016b) as having ecosystems reliant on surface expression of groundwater. The creeks are ephemeral, depending on inflows from groundwater springs and surface runoff during periods of rainfall. The groundwater dependent ecosystem includes narrow strips of woodland along the creeks, generally dominated by Blakely’s Red Gum and Yellow Box.

Threatened ecological communities
Due to the presence of White Box, Blakely’s Red Gum and/or Yellow Box, the ecotone of two plant community types in the investigation area (PCT ID 266 and PCT ID 277 – see section above) meets the classification criteria for the ecological community ‘White Box Yellow Box Blakely’s Red Gum Woodland’ (listed as endangered under the TSC Act and hereon referred to as Box-Gum Woodland). Those patches that also contain a predominantly native understorey (assessed using perennial species only) and other distinguishing characteristics also meet the classification criteria for the ecological community ‘White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland’ (listed as critically endangered under the EPBC Act). No such areas were identified during surveys of the investigation area. The extent of Box-Gum Woodland in the investigation area is shown in Figure 6.5.

Many areas of Box-Gum Woodland in the investigation area have a ground layer dominated by introduced flora species. The highest diversity of native species occurs in the larger patches of woodland, which are not as heavily invaded by introduced perennial flora species.
Figure 6.2: Box-Gum Woodland in the central section of the proposal site

Figure 6.3: Box-Gum Woodland in the northern section of the proposal site
Areas of non-native vegetation are located throughout the proposal site. These occur mostly as introduced grassland dominated by pasture species such as Stinkgrass (*Eragrostis cilianensis*) and Potato Weed (*Heliotropium europaeum*). Introduced tree species that occur in the investigation area include planted English Elms (*Ulmus procera*) and blossom trees (*Prunus* sp.).

**Flora survey results and priority weeds**

Field surveys identified 54 flora species, of which 24 species are native and 30 species are introduced.

One flora species listed as a priority weed for the Riverina region, which includes the Cootamundra-Gundagai Local Control Area (LCA) area, (DPI 2017) was recorded during flora surveys; Blackberry (*Rubus* sp.).

Priority weeds are regulated with a ‘general biosecurity duty’ to prevent, eliminate or minimise any biosecurity risk they may pose. Blackberry is regulated with a ‘mandatory measure’, meaning it must not be imported into the State or sold.

Blackberry is also listed as a weed of national significance under the National Weeds Strategy.

**Fauna**

**Fauna habitats**

**Woodland**

Woodland habitat for fauna in the study includes patches of Box-Gum Woodland.

Mature eucalypt trees exist throughout the investigation area as isolated paddock trees and within patches of woodland. Regeneration of canopy species is occurring in Box-Gum Woodland patches. Mature trees in the investigation area would be used for nesting and foraging by a range of woodland birds, arboreal mammals and microchiropteran bats.

Hollow-bearing trees in the investigation area are likely to provide roosting and nesting habitat for microchiropteran bats, such as the threatened Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*), arboreal mammals including the Common Brushtail Possum (*Trichosurus vulpecula*), and a range of woodland birds. Owls such as the Barn Owl (*Tyto alba*), Southern Boobook (*Ninox novaeseelandiae*) and threatened Barking Owl (*Ninox connivens*), may use hollow-bearing trees for nesting.

Woodland areas with coarse woody debris and leaf litter would provide habitat for reptiles such as snakes and skinks, as well as foraging habitat for threatened woodland birds such as the Brown Treecreeper (*Climacteris picumnus victoriae*).

**Aquatic habitat**

No permanent watercourses occur in the investigation area. Cooookoomooroo Creek is an ephemeral creek in the north of the investigation area. This creek is mapped as key fish habitat by the Department of Primary Industries (Fishing and Aquaculture) and may provide habitat for fish during periods of flow.

The creek, drainage lines, and farm dams in the investigation area provide potential habitat for frogs such as the Eastern Sign-bearing Froglet (*Crinia parinsignifera*) and Peron’s Tree Frog (*Litoria peronii*). Aquatic habitat also provides foraging and breeding habitat for wetland birds, such as ducks and herons.
Fauna survey results
As part of biodiversity assessments for other proposals along Gocup Road, fauna surveys were completed at a number of locations outside the investigation area for Cookoomooroo. These results are also considered relevant to this proposal, given the mobility of most of the fauna species assessed (particularly birds). Results of fauna surveys completed for the full program of works along Gocup Road are therefore provided in this report, with reference to habitat present in the investigation area.

Field surveys along all sections of Gocup Road identified 78 fauna species, of which 75 are native and three are introduced (see biodiversity assessment in Appendix B).

Fifty-three bird species were identified during field surveys at other sections of Gocup Road, one of which, the Common Starling (*Sturnus vulgaris*), is introduced. Commonly occurring native species included the Willie Wagtail (*Rhipidura leucophrys*), Magpie-lark (*Grallina cyanoleuca*), White-plumed Honeyeater (*Lichenostomus penicillatus*) and Eastern Rosella (*Platycercus eximius*).

Two amphibian species and five reptile species were recorded during current surveys including:
- Eastern Sign-bearing Froglet (*Crinia parinsignifera*)
- Peron’s Tree Frog (*Litoria peronii*)
- Plain Snake-lizard (*Delma inornata*)
- Boulenger’s Morethia (*Morethia boulengeri*)
- Southern Rainbow Skink (*Carlia tetradactyla*)
- Cunningham’s Skink (*Egernia cunninghami*)
- Tree Skink (*Egernia striolata*).

Surveys along Gocup Road identified the following mammal species, including two introduced species:
- Eastern Grey Kangaroo (*Macropus giganteus*)
- Common Brushtail Possum
- Common Ringtail Possum (*Pseudocheirus peregrinus*)
- Yellow-footed Antechinus (*Antechinus flavipes*)
- European Red Fox (*Vulpes vulpes*) (introduced)
- European Rabbit (*Oryctolagus cuniculus*) (introduced).

Eleven species of bats were recorded during Anabat surveys at other sections of Gocup Road, including two threatened species, the Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*) and Yellow-bellied Sheathtail-bat. Both species are listed as vulnerable under the TSC Act and were identified to a ‘definite’ confidence level. Anabat survey results are included in the biodiversity assessment in Appendix B.

Wildlife connectivity corridors
The nearest remnant native vegetation is open woodland on the hills to the east of Gocup Road and the investigation area. The patch is over 400 hectares in size and despite being sparsely connected, would assist movement of some fauna species such as woodland birds.

Woodland in the investigation area is highly fragmented. Habitat connectivity in the investigation area has been largely reduced due to past clearing for agriculture. The existing connectivity of vegetation across Gocup Road in the investigation area is limited due to the lack of vegetation corridors on either side of the road. It is therefore unlikely that there is substantial movement of fauna across this section of Gocup Road.
 Threatened and migratory biota

Literature reviews, database searches and field surveys identified 16 bird species, four bat species and one endangered ecological community listed under the TSC Act and EPBC Act, which are known or likely to occur in the investigation area. These species are listed in Table 6.1.

Table 6.1: Listed species and communities known or likely to occur in the investigation area

<table>
<thead>
<tr>
<th>Species / population / ecological community</th>
<th>Status</th>
<th>Likelihood of occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ecological communities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Box-Gum Woodland</td>
<td>E</td>
<td>CE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Recorded (NSW community only)</td>
</tr>
<tr>
<td><strong>Birds</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barking Owl <em>Ninox connivens</em></td>
<td>V</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate</td>
</tr>
<tr>
<td>Black-chinned Honeyeater (eastern subspecies) <em>Melithreptus gularis gularis</em></td>
<td>V</td>
<td>-</td>
</tr>
<tr>
<td>Black Falcon <em>Falco subniger</em></td>
<td>V</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate</td>
</tr>
<tr>
<td>Brown Treecreeper (eastern subspecies) <em>Climacteris picumnus victoriae</em></td>
<td>V</td>
<td>-</td>
</tr>
<tr>
<td>Diamond Firetail <em>Stagonopleura guttata</em></td>
<td>V</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate</td>
</tr>
<tr>
<td>Flame Robin <em>Petroica phoenicea</em></td>
<td>V</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate</td>
</tr>
<tr>
<td>Gang-gang Cockatoo <em>Callocephalon fimbriatum</em></td>
<td>V</td>
<td>-</td>
</tr>
<tr>
<td>Hooded Robin <em>Melanodryas cucullata cucullata</em></td>
<td>V</td>
<td>-</td>
</tr>
<tr>
<td>Little Eagle <em>Hieraaetus morphnoides</em></td>
<td>V</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate</td>
</tr>
<tr>
<td>Little Lorikeet <em>Glossopsitta pusilla</em></td>
<td>V</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate</td>
</tr>
<tr>
<td>Scarlet Robin <em>Petroica boodang</em></td>
<td>V</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate</td>
</tr>
<tr>
<td>Speckled Warbler <em>Chthonicola sagittata</em></td>
<td>V</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate</td>
</tr>
<tr>
<td>Superb Parrot <em>Polytelis swainsonii</em></td>
<td>V</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate</td>
</tr>
<tr>
<td>Swift Parrot <em>Lathamus discolor</em></td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate</td>
</tr>
<tr>
<td>Turquoise Parrot <em>Neophema pulchella</em></td>
<td>V</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate</td>
</tr>
<tr>
<td>Varied Sittella <em>Daphoenositta chrysoptera</em></td>
<td>V</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate</td>
</tr>
<tr>
<td>Species / population / ecological community</td>
<td>Status</td>
<td>Likelihood of occurrence</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>--------</td>
<td>--------------------------</td>
</tr>
<tr>
<td></td>
<td>NSW</td>
<td>Comm</td>
</tr>
<tr>
<td>Bats</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eastern Bentwing-bat</td>
<td>V</td>
<td>-</td>
</tr>
<tr>
<td><em>Miniopterus schreibersii oceanensis</em></td>
<td></td>
<td>Moderate</td>
</tr>
<tr>
<td>Eastern False Pipistrelle</td>
<td>V</td>
<td>-</td>
</tr>
<tr>
<td><em>Falsistrellus tasmaniensis</em></td>
<td></td>
<td>Moderate</td>
</tr>
<tr>
<td>South-eastern Long-eared Bat</td>
<td>V</td>
<td>V</td>
</tr>
<tr>
<td><em>Nyctophilus corbeni</em></td>
<td></td>
<td>Moderate</td>
</tr>
<tr>
<td>Yellow-bellied Sheathtail-bat</td>
<td>V</td>
<td>-</td>
</tr>
<tr>
<td><em>Saccolaimus flaviventris</em></td>
<td></td>
<td>Moderate</td>
</tr>
</tbody>
</table>

V – vulnerable, E – endangered, CE – critically endangered

EP&A Act assessments of significance were completed for species listed under the TSC Act that are known or likely to occur in the investigation area and that are likely to be affected by the proposal. Significance assessments were also completed for species listed under the EPBC Act that are known or likely to occur in the investigation area and are likely to be affected by the proposal (see biodiversity assessment in Appendix B). The results of these are described in section 6.1.3.

### 6.1.3 Potential impacts

#### Construction

**Removal of native vegetation**

The proposal would remove about 36.8 hectares of vegetation, of which 1.1 hectares is native woodland (Table 6.2). All native vegetation proposed to be removed is classified as Box-Gum Woodland listed under the TSC Act (Table 6.3).

### Table 6.2: Impacts on vegetation

<table>
<thead>
<tr>
<th>Plant community type (PCT)</th>
<th>Status</th>
<th>Removal area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PCTID 266/277 – White Box / Blakely’s Red Gum woodland</strong></td>
<td>Endangered – TSC Act</td>
<td>1.1</td>
</tr>
<tr>
<td>Woodland</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Derived grassland</td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

The proposed removal of Box-Gum Woodland is shown in Table 6.3.

Of the 1.1 hectares of Box-Gum Woodland proposed to be removed, 0.7 hectares is moderate/good condition woodland and 0.4 hectares is low condition woodland. Low condition Box-Gum Woodland represents 36 per cent of all Box-Gum Woodland removal.

The proposal would remove six per cent of the moderate/good condition Box-Gum Woodland in the investigation area (not including derived grassland) (see Table 6.3).

The removal of Box-Gum Woodland for the entire Gocup Road works program has been assessed in relation to the amount of Box-Gum Woodland in the investigation area (see section 6.12).
Table 6.3: Assessment of Box-Gum Woodland removal from the investigation area

<table>
<thead>
<tr>
<th></th>
<th>Box Gum Woodland (meeting TSC Act criteria only) (ha)</th>
<th>Box Gum Woodland (meeting both TSC Act and EPBC Act criteria)</th>
<th>Total Box Gum Woodland (ha) (mod/good condition only, not incl derived grassland)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low condition (woodland)</td>
<td>Mod/good condition (woodland)</td>
<td>Mod/good condition (woodland)</td>
</tr>
<tr>
<td>Box-Gum Woodland removal</td>
<td>0.4 (36%)</td>
<td>0.7 (64%)</td>
<td>0</td>
</tr>
<tr>
<td>Box-Gum Woodland in investigation area</td>
<td>Not assessed</td>
<td>11.8</td>
<td>Not assessed</td>
</tr>
<tr>
<td>Percentage removed</td>
<td>6%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The removal of native woodland and derived grassland is classed as a key threatening process – clearing of native vegetation.

**Removal of threatened fauna species habitat**

**Woodland habitat removal**

Woodland proposed to be removed comprises mature and juvenile trees and is known or likely to provide habitat for a range of woodland birds, reptiles and mammals. The removal of small areas of woodland would marginally reduce habitat used by fauna for foraging, breeding, shelter and movement.

**Loss of hollow-bearing trees**

Surveys identified that seven hollow-bearing trees would likely be removed by the proposal (Figure 6.4). The characteristics of the hollow-bearing trees to be removed are listed in the biodiversity assessment in Appendix B, including tree diameter at breast height (dbh) and number and diameter of hollows. The seven hollow-bearing trees likely to be removed contain about 37 hollows.

The proposed removal of hollow-bearing trees is likely to affect threatened hollow-dependent fauna species such as the Brown Treecreeper.

Due to the long timeframe it takes for hollows to form in eucalypts (usually greater than 150 years) (Gibbons *et al.* 2000), the loss of these hollows represents a long-term reduction in fauna habitat resources within the investigation area. There are, however, a large number of hollow-bearing trees in the investigation area and the locality, and the hollows proposed to be removed are unlikely to represent a significant reduction in habitat for these species.

The loss of hollow-bearing trees is classed as a key threatening process.

**Removal of dead wood and dead trees**

Dead wood is an important habitat component for threatened species such as the Brown Treecreeper, which uses it for foraging. Dead wood would typically be relocated outside the proposal site and would not be removed from the investigation area.
Dead trees are also important for a range of threatened species. Birds such as the Little Eagle use them as a vantage point for perching while foraging, and Brown Treecreepers use them for foraging. The Eastern False Pipistrelle may use loose bark on dead trees for roosting.

The removal of dead wood and dead trees is classed as a key threatening process.

**Injury and mortality**

During construction, death or injury may occur to fauna present during clearing of trees and vegetation. If birds are present but not nesting during construction they will generally move away from the proposal site to escape disturbance. Clearing of hollow-bearing trees carries the risk of injury to hollow dependent fauna that may be using hollows at the time of clearing.

Potential impacts to fauna would be avoided through the implementation of pre-clearing safeguards outlined in section 6.1.4.

The proposal has the potential to result in increased impacts to fauna movements during the operation of the road through collisions. These impacts are likely to be greater than existing because of the increased width of the road and a likely increase in traffic speed due to improved road geometry. Species at greatest risk of impact are likely to be ground-dwelling mammals such as the Eastern Grey Kangaroo. Fauna collisions would be unlikely to cause substantial impacts to any threatened fauna species.

**Disturbance of fauna**

The proposal has the potential to temporarily affect the use of the investigation area by fauna as a result of increased disturbance during construction. Machinery use may temporarily deter some fauna species from using potential habitat in the investigation area during construction.

Culverts may be used as temporary roosting habitat by bat species such as the Eastern Bentwing-bat. Unmanaged construction works have the potential to result in stress, injury or mortality of microbats within a roosting colony. Disturbance of roosting individuals through noise, light or vibration, which may cause them to leave the roost during daylight hours, would increase energy expenditure and stress levels, and increase the risk of predation by diurnal birds.

Noise can cause change in behaviours such as foraging, requiring additional energy expenditure if fauna need to forage further afield. Impacts during construction would be short-term and temporary, and would be unlikely to deter fauna from using the investigation area in the long term.

With the implementation of safeguards in section 6.1.4 including culvert inspections and bat exclusion measures, if required, the proposal would be unlikely to substantially affect fauna in the investigation area.

**Groundwater dependent ecosystems**

The proposal is located in the catchment of the groundwater dependent ecosystem identified in section 0. Cut sections for the proposal would have a maximum depth of 20.6 metres. Geotechnical investigations for the proposal have indicated that groundwater would not be intercepted at this depth. It is anticipated that cut sections for the proposal would be unlikely to have any impacts on groundwater dependent ecosystems.

**Changes in surface hydrology**

Construction of the proposal is likely to affect surface runoff characteristics near the proposal site through cut and fill earthworks and construction of roadside drainage. No drainage lines would be permanently redirected. The increase in the impermeable surface of the road would be likely to generate an increase in surface runoff. This would be directed to existing drainage...
lines, with measures installed to control scouring and sedimentation during operation. The proposal is unlikely to cause any long-term changes in surface hydrology that would adversely impact biota in the investigation area.

Wildlife connectivity and habitat fragmentation
Woodland in the investigation area is highly fragmented. The existing connectivity of vegetation across Gocup Road in the investigation area is very limited due to a lack of adjacent vegetation corridors on either side of the road. It is unlikely that there is substantial movement of fauna across this section of Gocup Road.

Vegetation fragmentation in the investigation area has previously occurred through construction of Gocup Road and other local roads and clearing for agriculture and residential properties. These developments have created movement barriers for some fauna species, particularly those limited by dispersal abilities and habitat preferences.

Proposed earthworks would create cut (excavation) and fill sections (see Figure 3.1) in the land surface with a width of up to 100 metres. This has the potential to deter ground-dwelling species from moving through the investigation area. Cut sections would have a maximum depth of 20.6 metres and fill sections would have a maximum height of 18.8 metres. Embankment batter slopes would be 4 horizontal: 1 vertical for batters with a height/depth of less than seven metres and generally 2 horizontal: 1 vertical for batters with a height/depth of greater than seven metres. Sections of deep cut (around 21 metres) would have batters of 1.5 horizontal: 1 vertical. Sections of steeper batters (1.5 to 2 horizontal: 1 vertical) would typically have lengths of about 200 metres and would not prevent fauna from moving through the investigation area. The main sections of cut and fill are located in areas that have already been cleared of woodland, and contain very few trees. The proposed earthworks are unlikely to cause substantial habitat fragmentation.

The proposal would also remove some scattered paddock trees. Paddock trees are important for the movement of a number of species through the landscape, including the Brown Treecreeper, Diamond Firetail and Flame Robin. As the proposal is mainly located in areas that have been cleared of trees, the extent of paddock tree removal relative to the number of trees in the investigation area is minimal. It is unlikely that the proposed removal of paddock trees would substantially affect the movement of threatened woodland bird species through the landscape.

The small amount of vegetation removal is unlikely to result in significant additional fragmentation to that which has already occurred. The proposal would not remove any large areas of native vegetation, sever any important corridors or otherwise isolate any areas of habitat.

To minimise impacts on vegetation connectivity, sections of decommissioned road would be revegetated to improve connectivity of roadside vegetation.

Invasion and spread of weeds
Groundcover vegetation in the investigation area is heavily affected by introduced species. The proposal has the potential to further introduce and spread weeds in the investigation area by movement of machinery and light vehicle traffic during construction.

One priority weed species was identified during the surveys. The proposal has the potential to cause further spread of priority weeds such as Blackberry throughout the proposal site and investigation area.

The highest potential for spread of weeds would occur during construction. Due to the proposed widening and realignment of Gocup Road, there is also the potential for spread of weeds into new areas as a result of the operation of the road.
The spread of weeds would be managed by implementing safeguards identified in section 6.1.4.

**Sedimentation**
Sedimentation of creeks and drainage lines in the investigation area may result from vegetation removal and earthworks. These works have the potential to erode channels and deposit sediment, impacting on water quality during flow periods.

Sedimentation has the potential to affect flora and fauna, including fish, frogs, turtles and macroinvertebrates.

Fish normally move away from highly turbid water, however sedimentation may block fish passage, having detrimental impacts during times of migration. More extreme impacts on fish species as a result of sedimentation and accompanying turbidity increases in the creek can include:
- smothering gill surfaces with sediment leading to asphyxiation
- swallowing large amounts of sediment leading to illness
- inhibiting light penetration into the water column which can affect predator-prey interactions
- impacts on habitat diversity in the immediate area and downstream by smothering and filling interstitial spaces inhabited by fish.

An erosion and sediment control plan would be prepared as part of the construction environmental management plan (CEMP) to manage potential erosion and sedimentation issues during construction. Potential impacts from sedimentation would be managed by implementing safeguards identified in section 6.1.4.

**Contamination**
The proposal has the potential to impact native flora and fauna through fuel and chemical spills. This may occur during refuelling operations or during preparation and use of chemicals for weed management. Spills could potentially enter waterways and affect water quality, contaminating habitat for species dependent on habitat in creeks and drainage lines. Spills could also have localised impacts on terrestrial fauna.

Contamination impacts have the potential to occur during construction. Operational risk would not be greater than the current risk and may be less due to the proposed improvement in road design standard.

These impacts would be unlikely to be substantial due to the limited area of impact and the implementation of safeguards detailed in section 6.1.4.

**Invasion and spread of pathogens and disease**
The proposal has the potential to result in the spread of pathogens such as bacteria and fungi. This could occur through the spread of soils on vehicle tyres and workers’ footwear. Impacts of pathogens include spread of known diseases that are detrimental to fauna such as the amphibian chytrid fungus.

Invasion and spread of pathogens and disease have the potential to occur during construction. Due to the proposed widening and realignment of Gocup Road, there is also the potential for spread of pathogens and disease into new areas as a result of the operation of the road.

The potential spread of pathogens would be minimised through the implementation of safeguards outlined in section 6.1.4.

**Bushfire**
The proposal has potential to cause bushfire during construction. Impacts of bushfires may include death and injury to fauna, loss of woodland habitat including hollow bearing trees and loss of feed resources. In addition, bushfires may result in changes to structure and function of
woodland communities including changes to groundcover composition. This would be unlikely provided a bushfire management plan is developed and implemented, as detailed in section 6.1.4.

Operation

**Fauna collisions**

The proposal has the potential to result in increased impacts to fauna movements during the operation of the road through collisions. These impacts are likely to be greater than existing because of the increased width of the road and an increase in traffic speed. Species at greatest risk of impact are likely to be ground-dwelling mammals such as the Eastern Grey Kangaroo. Fauna collisions would be unlikely to cause substantial impacts to any threatened fauna species.

**Avoid, minimise, mitigate and offset impacts**

The "avoid, minimise, mitigate and offset" hierarchy has been followed in relation to impacts on threatened species, ecological communities and migratory species listed under the TSC Act and the EPBC Act.

To minimise impacts on Box-Gum Woodland and threatened species habitat, the design process incorporated vegetation mapping that had been carried out along the Gocup Road corridor. This process involved avoiding the threatened ecological community wherever possible.

Stockpile sites, site compounds and other features of the proposal have been located to avoid impacts to woodland areas wherever possible and have been placed in areas that have been cleared of woodland.

Safeguards to mitigate impacts on biodiversity are listed in section 6.1.4. The residual impacts of the proposal would be offset as detailed in section 6.1.5.

**Conclusion on significance of impacts**

The assessment of likelihood of occurrence found that the proposal may potentially impact on 16 bird species, four bat species and one ecological community listed under the TSC Act. Assessments of significance under Section 5A of the EP&A Act were completed for these (see biodiversity assessment in Appendix B).

The assessment of likelihood of occurrence found that the proposal may potentially impact upon two bird species and one bat species listed as threatened under the EPBC Act. Significance assessments (with reference to the EPBC Act Policy Statement ‘Matters of National Environmental Significance: Significant impact guidelines 1.1’) were completed for these (see biodiversity assessment in Appendix B).

The assessments of significance found that the proposal would be unlikely to have a significant impact on any of the species or ecological community assessed primarily due to:

- the relatively small area of habitat proposed to be removed from the investigation area and connected habitat outside the investigation area
- the disturbed nature of most of the habitat proposed to be removed
- the proposal being unlikely to significantly fragment habitat
- the relatively low number of hollow-bearing trees proposed to be removed compared to those present in the investigation area and in connected habitat outside the investigation area.

The proposal is not likely to significantly impact threatened species, populations or ecological communities or their habitats, within the meaning of the *Threatened Species Conservation Act*.
or Fisheries Management Act 1994 and therefore a species impact statement is not required.

The proposal is not likely to significantly impact threatened species, populations, ecological communities or migratory species, within the meaning of the Environment Protection and Biodiversity Conservation Act 1999.

### 6.1.4 Safeguards and management measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>Safeguards and management measures</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biodiversity – impacts to biodiversity</td>
<td>A detailed flora and fauna management plan will be prepared in line with Roads and Maritime’s Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects (RTA, 2011) and implemented as part of the construction environmental management plan (CEMP) to minimise the ecological impacts of the proposal. It will address terrestrial and aquatic matters and include, but not necessarily be limited to the safeguards and management measures detailed below.</td>
<td>Project manager and contractor</td>
<td>After award pre-construction</td>
</tr>
</tbody>
</table>
| Biodiversity – loss of native vegetation and fauna habitat | Plans will be prepared for the proposal site and adjoining area showing native vegetation, flora and fauna habitat, threatened species and endangered ecological communities  
• Plans will be prepared showing areas to be cleared and areas to be protected, including exclusion zones and protected habitat features (eg hollow bearing trees)  
• Where practicable, hollow-bearing tree removal will occur outside the main fauna breeding season (August to January) to avoid potential fauna breeding disturbance  
• The pre-clearing process detailed in RTA (2011) – ‘Biodiversity Guidelines Guide 1: Pre-clearing process’, will be implemented before start of work  
• Exclusion fencing and signage will be erected to ensure that environmentally sensitive areas are protected as detailed in RTA (2011) ‘Biodiversity guidelines: Guide 2 – Exclusion Zones’ (RTA 2011) and map these sites on sensitive areas plans. This will include locations of hollow-bearing trees to be retained and trees in the vicinity of stockpile sites  
• Large and hollow-bearing trees to be retained will be defined by survey before clearing and protected by a physical barrier or fence | Project manager and contractor      | After award pre-construction |
<table>
<thead>
<tr>
<th>Impact</th>
<th>Safeguards and management measures</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• The limits of the proposal will be defined by survey before clearing and grubbing.</td>
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</table>
| Biodiversity – loss of native vegetation and fauna habitat | • To the extent practicable, during detailed design, implement design measures (such as road realignment and safety barriers) that minimise the footprint and avoid native vegetation.  
  • Where possible, make design changes to avoid or minimise impacts to better quality patches of Box-Gum Woodland.  
  • Where possible, minimise removal of mature trees, including hollow-bearing trees, while still meeting operational objectives for road safety and design.  
  • Where possible, avoid disturbing native vegetation when building temporary access tracks to stockpile sites or establishing temporary facilities.  
  • A hollow replacement strategy will be investigated to compensate for removal of hollow-bearing trees for the full works program.  | Project manager and contractor  | Pre-construction         |
| Biodiversity – impacts to microbats using culverts | • Culverts will be inspected for roosting bats before culvert extension works are carried out. Inspections will be carried out in line with ‘Biodiversity Guidelines Guide 1: Pre-clearing process’ and ‘Biodiversity Guidelines Guide 9: Fauna handling’ (RTA 2011).  
  • If bats are found to inhabit the culverts, an ecologist will relocate the bats and implement exclusion measures before culvert works start. | Project manager and contractor  | After award pre-construction and construction |
| Biodiversity – spread of weeds | • A weed management plan will include measures to prevent the spread of weeds, particularly into areas of Box-Gum Woodland as detailed in RTA (2011) – ‘Biodiversity Guidelines Guide 6: Weed management’.  | Project manager and contractor  | After award pre-construction |
| Biodiversity – loss of native vegetation and fauna habitat | • Felled hollow-bearing trees will be left on site for at least 24 hours after felling to allow any resident fauna to relocate  
  • All staff working on site will complete a site-specific environmental induction. This will include the limits of vegetation clearing and the areas of vegetation to be retained  
  • All construction vehicles and equipment will follow the traffic management plan, including the vehicle movement plan. | Project manager and contractor  | Construction          |
<table>
<thead>
<tr>
<th>Impact</th>
<th>Safeguards and management measures</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
</table>
| Biodiversity – loss of woody debris and bush rock habitat            | • All existing woody debris and any bush rock encountered on the ground will be relocated in line with the Roads and Maritime ‘Biodiversity Guidelines Guide 4: Clearing of vegetation and removal of bush rock’ and ‘Biodiversity Guidelines Guide 5: Re-use of woody debris and bushrock’ (RTA 2011)  
• Some of the coarse woody debris generated by removing vegetation will be relocated outside the proposal site and retained as habitat on the ground. The retained woody debris will be spread in a fashion that replicates the natural occurrence of woody debris in the environment and will not be stacked. | Project manager and contractor           | Construction |
| Biodiversity – loss of mature trees, including hollow-bearing trees   | • Pruning or lopping of limbs will be conducted in preference to tree removal wherever possible.                                                                                                                                                                                                 | Project manager and contractor           | Construction |
| Biodiversity – impacts to fauna                                      | • Clearing of vegetation will be carried out as detailed in RTA (2011) – ‘Biodiversity Guidelines Guide 4: Clearing of vegetation and removal of bushrock’  
• Fauna handling during vegetation removal will be carried out by a licensed fauna ecologist or wildlife carer, as detailed in RTA (2011) – ‘Biodiversity Guidelines Guide 9: Fauna handling’. | Project manager and contractor           | Construction |
<p>| Biodiversity – impacts to threatened species                         | • If unexpected threatened fauna, flora or ecological communities are discovered, works will stop immediately in the vicinity of the find and the Roads and Maritime ‘Unexpected Threatened Species Find Procedure’ in RTA (2011) – ‘Biodiversity Guidelines Guide 1: Pre-clearing process’ will be followed. This will include notifying the Roads and Maritime environment officer immediately and commissioning an assessment of the likely impacts of the proposal on the threatened species. | Project manager and contractor           | Construction |
| Biodiversity – impacts to groundwater dependent ecosystems           | • Interruptions to water flows associated with groundwater dependent ecosystems will be minimised through detailed design.                                                                                                               | Project manager                          | Detailed design |
| Biodiversity – changes to hydrology                                  | • Changes to existing surface water flows will be minimised through detailed design.                                                                                                                                                  | Project manager                          | Detailed design |</p>
<table>
<thead>
<tr>
<th>Impact</th>
<th>Safeguards and management measures</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
</table>
| Biodiversity – spread of weeds             | • Declared priority weeds will be managed in line with the requirements of the NSW Biosecurity Act 2015  
• Weed infested topsoil will be disposed of or treated and will not be stockpiled near any areas of native vegetation. | Project manager and contractor | Construction     |
| Biodiversity – pathogen spread and establishment | • Measures for preventing the introduction and/or spread of disease-causing agents such as bacteria and fungi will be implemented, as detailed in RTA (2011) – ‘Biodiversity Guidelines Guide 7: Pathogen management’. | Project manager and contractor | Construction     |
| Biodiversity – fragmentation of habitat corridors | • To minimise impacts on vegetation connectivity, sections of decommissioned road will be revegetated to improve connectivity of roadside vegetation. | Project manager | Post-construction |
| Biodiversity – loss of native vegetation and fauna habitat | • Native vegetation will be re-established in line with the Roads and Maritime ‘Biodiversity Guidelines Guide 3: Re-establishment of native vegetation’ (RTA 2011)  
• Locally native species will be used for revegetation. Species will be consistent with those for the Commonwealth scientific committee determination of Box-Gum Woodland  
• The removal of native vegetation, particularly the areas of Box-Gum Woodland and threatened species habitat impacted for the project, will be offset in line with the Roads and Maritime ‘Guideline for Biodiversity Offsets’. | Project manager | Post-construction |

6.1.5 Biodiversity offsets

To determine if the proposal requires biodiversity offsets, the Roads and Maritime (2016d) Guideline for biodiversity offsets was applied to all sections of work along Gocup Road as a whole. Offsets are required for the full program of works.

Roads and Maritime would implement a biodiversity offset strategy in line with the Roads and Maritime policy document ‘Guideline for Biodiversity Offsets’.

In line with the guideline, an approved methodology would be used to calculate the required biodiversity offset for the entire Gocup Road works program.

Offsets would be sought for the total area of Box-Gum Woodland impacted by the full Gocup Road works program. Offsets would:
• be located, wherever practicable, close to the affected habitat, so that the local, regional or catchment biodiversity is maintained
• be located adjacent to other areas of habitat and shaped so as to enhance their ability to be protected
• contain or provide habitat for specific threatened species affected by the project.
Offsets would be managed to improve and protect biodiversity. Management actions may include:

- improved security of tenure (where the land tenure is secured for the purposes of conservation)
- fencing to protect threatened flora
- stock removal or management
- strategic revegetation activities
- weed and pest control
- replacing habitat features eg tree hollows or placement of hollow logs in adjacent vegetation
- preparing a management plan for each offset site to demonstrate how management actions would be implemented.

### 6.2 Soils, water quality, hydrology and groundwater

The investigation area for assessment of soils, water quality, hydrology and groundwater is defined as the area within 500 metres of the proposal site.

#### 6.2.1 Existing environment

**Topography**

The terrain of the investigation area is hilly to undulating. The investigation area is located in two Mitchell Landscapes; the Minjary Hills and Ranges and the Murrumbidgee – Tarcutta Channels and Floodplains. The general elevation of the Minjary Hills and Ranges Mitchell Landscape is 300 to 930 metres above sea level, with local relief 400 metres. The general elevation of the Murrumbidgee – Tarcutta Channels and Floodplains Mitchell Landscape is 200 to 400 metres above sea level, with local relief 25 metres (Mitchell 2002).

**Geology**

The Minjary Hills and Ranges Mitchell Landscape comprises steep hills and ranges on lower Silurian sandstone, greywacke, quartzite, dacite, tuff and phyllite, and Devonian ignimbrite and sandstone. The Murrumbidgee – Tarcutta channels and floodplains Mitchell Landscape comprises channels, floodplain and terraces of Murrumbidgee River tributaries on Quaternary alluvium (Mitchell 2002).

**Hydrology**

The drainage of the investigation area is shown in Figure 1.2. Two named ephemeral watercourses exist in the investigation area. Cookoomooroo Creek is a third order stream that passes through the north of the investigation area and runs along the eastern side of Gocup Road. Stony Creek is a fifth order stream that passes through the south of the investigation area.

Runoff from the northern half of the investigation area drains to Cookoomooroo Creek, which runs on the eastern side of Gocup Road, north of the proposal site. Runoff from the southern half of the investigation area drains to Stony Creek, which crosses Gocup Road about 160 metres south of the proposal site. Both creeks drain to the Murrumbidgee River three to five kilometres north of the investigation area.

**Soils**

The Minjary Hills and Ranges Mitchell Landscape contains rubbly scree with sandy loam matrix on steep slopes and thin red to yellow texture-contrast soils on lower slopes. The Murrumbidgee – Tarcutta channels and floodplains Mitchell Landscape contains undifferentiated organic sand and loam on the floodplain, and brown gradational loam and yellow texture-contrast soils on higher terraces (Mitchell 2002).
Contamination
A search of the EPA 'Contaminated Land: Record of Notices' (EPA 2017a) and 'List of NSW contaminated sites notified to EPA' (EPA 2017b) did not find any sites issued with regulatory notices, or any sites notified to the EPA, located in or near the investigation area.

Water quality
The water quality of creeks and drainage lines in the investigation area is affected by agricultural runoff. Agricultural runoff may contain farm chemicals and fertilisers that degrade water quality. Agricultural runoff may also contain manure from stock, which can increase:
- biochemical oxygen demand
- Levels of nutrients such as nitrogen
- Levels of bacteria such as faecal coliforms.

Groundwater
A geotechnical investigation found that depth to groundwater in the vicinity of the proposed cut sections is greater than the proposed depth of cut. The southern cut would be to a depth of no more than 17 metres and the northern cut to a depth of no more than 20.6 metres. Borehole data from the geotechnical investigation indicated the groundwater depth in these areas is a minimum of 17.3 and 20.4 metres, respectively. Groundwater bores registered with the Office of Water, from just outside the investigation area record depth to groundwater at 22 metres, 52 metres and 54 metres below ground level.

Generally, the level of the water table in the investigation area is likely to fluctuate with a range of factors including proximity to creeks and drainage lines, soil type, location of aquifers, elevation, season and rainfall.

6.2.2 Potential impacts

Construction

Soil erosion
There are no major geotechnical or soil constraints to the construction and long term maintenance of the proposal.

Vegetation removal
The proposal would remove about 36.8 hectares of vegetation. Vegetation removal would expose soils to weathering processes, increasing the risk of erosion and sedimentation.

Earthworks
The proposal would involve cut and fill earthworks over an area of up to 10.4 hectares. The estimated volume of material excavation (cut and fill) is 280,000 cubic metres (including 10,000 cubic metres of topsoil). Subject to the material’s suitability for use as fill, it is intended that this material would be used for road construction. Additional fill material may be required. This may be obtained from an existing stockpile at the proposed compound/stockpile site or from surplus material at the Halfway Hill/Doctors Hill upgrade section. If necessary, fill material may also be obtained from the existing road reserve.

Large cut excavations have the potential to destabilise landforms, particularly on cutting faces. Loose fill may erode during rainfall events. Erosion of earthworks could cause sedimentation of creeks and drainage lines. Sedimentation may also influence nearby vegetation and habitat by smothering groundcover vegetation and changing soil surface characteristics.
Construction of new road

During construction of new roads there would be a risk of soil compaction from the movement and operation of large machinery such as excavators, rollers and trucks. Heavy machinery can disturb the soil surface, increasing the potential for erosion.

Vehicle movements, including machinery and support vehicles

Machinery and support vehicles used for construction would be driven off road and would have the potential to transport excess material onto sealed roads near the construction site.

Stockpiling

Material would be stockpiled at various stages during construction. Inadequately stabilised stockpile material could erode in high rainfall or windy conditions.

Soil contamination

Fuel and chemical spills

There is potential for fuel or chemical spills during construction, which may result in localised contamination of soils. Spills could occur during refuelling or through leaking of hydraulic and lubricating oil from plant and equipment. The potential for contamination from fuel and chemical spills is considered to be low provided the safeguards and management measures outlined in section 6.2.3 are implemented.

Exposure of contaminated soil

No known contaminated sites are located in or near the investigation area. Given the agricultural land use of the investigation area, it is unlikely that any soil contamination would be exposed during construction.

Water quality

The introduction of pollutants from construction into the surrounding environment, if uncontrolled, could potentially have the following impacts on the water quality of creeks and drainage lines:

- increased sediment load and organic matter causing adverse impacts to water quality, such as increased turbidity. Provided safeguards and management measures are implemented, this is unlikely
- gross pollutants (large waste items such as rubbish and construction materials) entering creeks and drainage lines, particularly during high rainfall events
- reduced water quality in creeks and drainage lines due to an influx of contaminants such as fuel or chemicals from accidental spills.

Water quality impacts could also occur through uncontrolled release of rinse water from plant washing and concrete slurries.

The potential for construction water quality impacts to Cookoomooroo Creek, Stony Creek and other drainage lines is considered to be low, given their distance from the proposal site.

A temporary road diversion would be in place to allow for construction of the southern section of fill, allowing drainage structures to be built offline.

Hydrology

Construction of the proposal is likely to affect surface runoff characteristics near the proposal site through cut and fill earthworks and roadside drainage construction. No drainage lines would be permanently redirected. The increase in the impermeable surface of the road would be likely to generate an increase in surface runoff. This would be directed to existing drainage lines, with measures installed to control scouring and sedimentation during operation.
Some minor drainage works would occur on private property to allow for better drainage during construction work. Two earth bunds would be shaped in the central section of the proposal site, on the eastern side of Gocup Road, to allow water to flow better. The most southern bund would connect to an existing earth bund that is present. The proposal is unlikely to cause any substantial long-term changes in surface hydrology.

The proposal may involve extraction of water from the Tumut and/or Murrumbidgee Rivers. The volume of water extracted would be unlikely to substantially affect flows in these rivers. Extraction of water would be managed to minimise impacts to the environment of these rivers.

**Groundwater**

Excavations for the proposal would have a maximum depth of 20.6 metres. Geotechnical investigations for the proposal have indicated that groundwater would not be intercepted at this depth. Depth to groundwater may be less in areas of the proposal site located away from hills. Cut in these areas would be minimal and would also be unlikely to intercept groundwater.

**Operation**

**Topography and soils**

Impacts to landscape, geology, and soils may occur through the operation of the proposal, due to:

- an increase in the amount and velocity of water runoff due to the sealed road surface and road embankments
- alterations to the topographic environment through road work and landscaping.

These changes could result in erosion and scouring in the investigation area. Maintenance activities during operation that could disturb soils and landforms include cleaning of culverts and table drains. Potential impacts during maintenance would be minimised by following the relevant Roads and Maritime specifications. Impacts would also be minimal due to the infrequent nature of the activities. Revegetation and installing water control structures would reduce water velocity and the potential for erosion during operation.

**Water quality**

Stormwater runoff from the road may impact on the water quality of creeks, drainage lines and dams. Operation of roads leads to the build-up of contaminants on road surfaces and roadside corridors. During rain events these contaminants can be transported by run-off into surrounding waterbodies and lands. These potential impacts are unlikely to have any greater risk than that which is already present.

Maintenance during operation may result in a spill of chemicals or fuels near a creek or drainage line, however the risk of this occurring is low.

### 6.2.3 Safeguards and management measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soils and water quality – soil erosion,</td>
<td>• A soil and water management plan (SWMP) will be prepared as part of the CEMP in line with Roads and Maritime specification G38 – ‘Soil and Water Management’</td>
<td>Project manager and contractor</td>
<td>Pre-construction and construction</td>
</tr>
<tr>
<td>sedimentation and water quality</td>
<td>• The soil and water management plan will also address the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>− The Blue Book - ‘Soils and Construction – Managing Urban’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact</td>
<td>Environmental safeguards</td>
<td>Responsibility</td>
<td>Timing</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Stormwater Volume 1’ (Landcom 2004) and Volume 2 (DECC 2008a) | • Technical Guideline: ‘Temporary Stormwater Drainage for Road Construction’ (Roads and Maritime 2011b)  
• Guideline for Batter Surface Stabilisation Using Vegetation (RMS 2015)  
• A site specific Erosion and Sediment Control Plan (ESCP) will be prepared and implemented as part of the Soil and Water Management Plan. The ESCP will include arrangements for wet weather events, including monitoring of potential high risk events (such as storms) and follow-up measures to be applied in the event of wet weather. The ESCP will also include:  
  – a maintenance schedule for ongoing maintenance of temporary erosion and sediment controls  
  – a sediment basin management plan to guide appropriate management of runoff during construction and operation  
  – a site specific emergency spill plan, which will include spill management measures in line with the Roads and Maritime Code of Practice for Water Management (RTA 1999) and relevant EPA guidelines. The plan will address measures to be implemented in the event of a spill, including initial response and containment, notification of emergency services and relevant authorities (including Roads and Maritime and EPA officers). | Project manager and contractor | Pre-construction and construction |
<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
</table>
| Soils and water quality – soil contamination | • The CEMP will include a contaminated land management plan, which must comply with the *Contaminated Land Management Act 1997*, ‘*Guideline for the Management of Contamination*’ (Roads and Maritime 2013), ‘*Environmental Incident Classification and Reporting Procedure*’ (Roads and Maritime 2014) and EPA guidelines on contaminated land management  
  • The contaminated land management plan will include:  
    - unexpected contamination finds  
    - any land contamination caused during construction  
    - measures to ensure the safety of site personnel and local communities during construction. | Project manager and contractor | Construction |
| Soils and water quality – soil erosion and sedimentation | • Sediment and erosion controls (including sediment basins), clean water diversions and culverts will be constructed and be on line before earthworks start  
  • Sediment basins will be regularly serviced and maintained to comply with water quality and capacity requirements  
  • Vegetation clearing and stabilisation/revegetation activities will be carried out progressively to limit the time disturbed areas are exposed to erosion processes  
  • Site stabilisation of disturbed areas will be carried out progressively as stages are completed  
  • Topsoil and mulch will each be stockpiled separately for possible re-use in rehabilitation works. Mulch may also be used for erosion and sediment controls  
  • High risk soil erosion activities such as earthworks will not be carried out immediately before or during high rainfall or wind events | Project manager and contractor | Construction |
<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
</table>
| Soils and water quality – water contamination | • Any material transported onto pavement surfaces will be swept and removed at the end of each working day  
• Erosion and sediment control measures will be maintained until the works are complete and areas are stabilised  
• Sediment fencing will be installed downstream of any works in drainage lines. | Project manager and contractor | Construction |
| | • All fuels, chemicals, and liquids will be stored at least 50 metres away from any drainage lines and waterways and will be stored in an impervious bunded area within the compound site  
• Refuelling of plant and planned maintenance of machinery and plant will be carried out 50 metres away from waterways and drainage lines  
• Vehicles and plant will be properly maintained and regularly inspected for fluid leaks  
• Control of dirty water will be managed on site to avoid release into drainage lines and/or waterways  
• Potable water will be used for wash downs  
• Containment material will be used to capture/filter water used in vehicle washdowns  
• Vehicle and plant wash downs and/or concrete truck washouts will be carried out within a designated bunded area with an impervious surface or will be carried out off site  
• Visual monitoring of local water quality (ie turbidity, hydrocarbon spills/slicks) at drainage lines will be carried out on a regular basis to identify any potential spills or deficient erosion and sediment controls. Inspection records will be kept  
• Emergency spill kits will be kept on site at all times  
• All staff will be inducted about incident and emergency procedures and made aware of the locations of emergency spill kits  
• Should a spill occur during construction, the emergency response plan will be implemented, and the Roads and Maritime senior regional environmental officer contacted. The EPA will also be notified as per Part 5.7 of the POEO Act. | | |
### Impact

<table>
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<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soils and water quality – soil contamination</td>
<td>• If contaminated areas are encountered during construction, appropriate control measures will be implemented to manage immediate contamination risks. All other works that may impact on the contaminated area will stop until the nature and extent of the contamination has been confirmed and any necessary site-specific controls or further actions identified in consultation with the Roads and Maritime environment officer and/or EPA.</td>
<td>Project manager and contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>Soils and water quality – soil erosion and sedimentation</td>
<td>• Carry out surveillance to monitor the effectiveness of soil stabilisation and erosion management measures. • Additional erosion management measures may be implemented if measures implemented during construction are not performing to requirements.</td>
<td>Project manager and contractor</td>
<td>Construction and post-construction</td>
</tr>
</tbody>
</table>

### 6.3 Traffic and transport

#### 6.3.1 Existing environment

The investigation area for the traffic and transport assessment is defined as the Cookoomooroo section of Gocup Road and connected property accesses.

**Existing roads**

Gocup Road is about 31 kilometres in length and runs north from the Snowy Mountains Highway at Tumut to the Hume Highway at Gundagai. It is a two lane, two-way sealed road with a speed limit of 100 kilometres per hour. The road typically has lane widths of 3-3.5 metres and 0.5 metre sealed shoulders. The road condition is considered average (Transport for NSW 2016). Sections of the road at Cookoomooroo are steep, causing heavy vehicles to travel slowly.

Gocup Road has no major intersections in the proposal site. An intersection with Edwardstown Road is located south of the proposal site.

Gocup Road has been identified as a strategic freight route in NSW. Heavy vehicles use Gocup Road to travel between commercial and industrial areas around Tumut and the Hume Highway at Gundagai. This is an important route for the local timber and milling industry. Higher mass limit B-double vehicles up to 4.6 metres high are permitted to travel along the entire length of Gocup Road. Forestry product value-adding industry groups are interested in gaining access to the road network with ‘high productivity vehicles’ to enable more efficient transport.

Gocup Road is also an important route for residents and property owners between Tumut and Gundagai, and for people commuting between the towns for work.

**Traffic volumes**

Existing and projected future daily traffic volumes for roads in the investigation area are described in section 2.2.1.
Crash history
The crash history of Gocup Road between Minjary Creek and the Hume Highway at Gundagai is described in section 2.1.2.

Property access
Four unsealed property access roads connect to the Cookoomooroo section of Gocup Road. One access road is located on the eastern side of Gocup Road at the southern end of the proposal site. Two access roads are located each side of Gocup Road at the northern end of the road section. Another private access road is located on the eastern side of the proposal site, about 330 metres south of the northern end of the road section. This road provides access to a residence.

6.3.2 Potential impacts

Construction

Changed traffic conditions
Much of the proposal site is located on, or next to, the existing Gocup Road. Construction impacts to traffic would occur during construction in these areas. Where construction activities would be carried out away from the existing Gocup Road, impacts to traffic would be minimal.

Changed traffic conditions on Gocup Road near construction activities could potentially lead to reduced safety for motorists.

Lane closures for short periods would cause minor traffic delays. A temporary road diversion would be implemented during construction at the southern end of the proposal site. The diversion will run on the western side of the existing alignment for about 300 metres. The temporary diversion will allow for two-lane, two-way traffic and heavy vehicles.

Increased traffic on Gocup Road
Construction vehicles and machinery would access the proposal site using Gocup Road either from Gundagai or Tumut and enter the proposal site at designated access points. Designated access tracks (haul roads) along the construction corridor would be used.

During construction, the proposal would generate heavy vehicle movements through transporting materials, structures, machinery, fuel and general provisions.

Light vehicles would be required to transport staff to and from the site and in various other roles on site.

As described in section 3.3.6, the following vehicle movements are expected during construction:
- 150 to 200 heavy vehicles would access the site per day (300 to 400 movements per day)
- about 50 light vehicles would access the site per day for transporting staff (100 movements per day).

The proposed increase in vehicle movements on Gocup Road during construction represents an increase of up to 36 per cent of the existing traffic volumes. Construction vehicle impacts on the local road network are generally expected to be low.

Changes to property access
Changes to property access would be required during construction. Some property accesses may be re-located, depending on land acquisition and final design. Access to properties would be maintained throughout construction.
Operation

The main benefits of the proposal during operation include the following:

- improved road safety by upgrading the road geometry and alignment of Gocup Road. The proposal would remove existing steep inclines and sharp corners and provide a continuous 100 kilometre per hour travel speed
- improved road freight efficiency by upgrading the alignment of Gocup Road, providing a more efficient route for heavy vehicles
- improved travel times on Gocup Road by removing the constraints posed by the existing road alignment and road surface condition.

6.3.3 Safeguards and management measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
</table>
| Traffic and transport – construction impacts to traffic | A Traffic Management Plan (TMP) will be prepared and implemented as part of the CEMP. The TMP will be prepared in line with the Roads and Maritime ‘Traffic Control at Work Sites Manual’ (RTA, 2010) and ‘QA Specification G10 Control of Traffic’. The TMP will include:  
  • confirmation of haulage routes  
  • measures to maintain access to local roads and properties  
  • site specific traffic control measures (including signage) to manage and regulate traffic movement  
  • requirements and methods to consult and inform the local community of local road network impacts in line with the Roads and Maritime ‘Community Engagement and Communication Manual’ (Roads and Maritime 2012)  
  • access to construction sites including entry and exit locations and measures to prevent construction vehicles queuing on public roads  
  • a response plan for any construction traffic incident  
  • monitoring, review and amendment mechanisms. | Contractor and Project Manager | Pre-construction and construction |
| Traffic - construction impacts to traffic   | Property access will be maintained at all times unless otherwise agreed with affected property owners. Where changes to access arrangements are necessary, Roads and Maritime will advise owners and tenants and consult with them on alternate access arrangements  
  • Construction traffic will enter/exit the construction zone only in areas designated for this purpose in the Traffic Management Plan | Project manager and contractor | Construction                    |
<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• The community will be kept informed about upcoming road construction activities, including through advertisements in the local media and by prominently placed advisory notices.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.4 **Noise and vibration**

A specialist noise and vibration assessment of the proposal was prepared (GHD 2017b) and is provided in Appendix C. The outcomes of the assessment are summarised in this section.

6.4.1 **Methodology**

**Overview**

The investigation area for the noise and vibration assessment includes all sensitive receivers within the distance that could potentially be affected by the proposal. The area encompasses four sensitive receivers within 600 metres of the proposal site (see Figure 6.6).

To assess potential noise and vibration impacts arising from construction and operation of the proposal, an assessment has been carried out considering the following:

- ‘NSW Road Noise Policy’ (RNP) (DECCW 2011)
- ‘Noise Criteria Guideline’ (NCG) (Roads and Maritime 2014b)
- ‘Noise Mitigation Guideline’ (NMG) (Roads and Maritime, 2014c)
- ‘Noise Model Validation Guideline’ (NVG) (Roads and Maritime 2016c) (currently in draft form)
- ‘Preparing an Operational Traffic and Construction Noise and Vibration Assessment Report’ (Roads and Maritime 2016a)
- ‘Interim Construction Noise Guideline’ (ICNG) (DECC 2009)
- ‘Construction Noise and Vibration Guideline’ (CNVG) (Roads and Maritime 2016b)

**Noise monitoring**

Noise monitoring (attended and unattended) was carried out from 11 August to 22 August 2016, at one location near the proposal site (shown in Figure 6.6). Noise monitoring was carried out to determine background noise levels for the construction noise assessment and existing road traffic noise levels for the operational noise assessment noise modelling verification process. All noise monitoring activities were carried out and processed in line with the ‘Industrial Noise Policy’ (EPA 2000) long-term monitoring method. A more detailed description of the noise monitoring method is provided in the noise and vibration assessment in Appendix C.

Traffic counts were conducted in conjunction with long-term noise monitoring for the operational noise assessment noise modelling verification process.

**Construction noise and vibration assessment**

**Overview**

The methodology for the construction noise and vibration assessment included:

- establishing the construction investigation area in line with the CNVG
• calculating the rating background levels (RBL) for the proposal from the noise monitoring data obtained from the noise monitoring location. The RBLs were used to establish the construction noise management levels in line with the ICNG
• sourcing a list of likely construction activities. Typical sound power levels for each activity were sourced from the CNVG
• predicting and assessing potential noise impacts on the surrounding sensitive receivers against the construction noise management levels and sleep disturbance criteria for each construction activity
• assessing noise impacts associated with construction traffic impacts
• carrying out a construction vibration assessment and identifying potentially impacted sensitive receivers for vibratory plant and equipment
• assessing vibratory impacts due to blasting and the impacts on nearby sensitive receivers
• considering construction noise and vibration mitigation measures with reference to the CNVG.

Construction noise source emissions
Noise levels for construction scenarios (see Table 6.4) have been sourced from the CNVG. It should be noted that the scenario sound power level is a representative worse-case value assigned to the scenario and not the sum of each of the individual equipment pieces operating simultaneously.

Table 6.4: Construction noise scenarios

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Activity</th>
<th>Typical construction equipment</th>
<th>Activity sound power level, dBA</th>
<th>Construction hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>S01</td>
<td>Site establishment</td>
<td>Trucks, scissor lifts, franna crane, light vehicles</td>
<td>115</td>
<td>Standard</td>
</tr>
<tr>
<td>S02</td>
<td>Clear zone works</td>
<td>Excavator, chainsaws, trucks, mulcher</td>
<td>121</td>
<td>Standard</td>
</tr>
<tr>
<td>S03</td>
<td>Drainage works</td>
<td>Backhoe, excavator, concrete pump and trucks</td>
<td>115</td>
<td>Standard</td>
</tr>
<tr>
<td>S04</td>
<td>Utility, property and service adjustment</td>
<td>Excavator, dump truck, backhoe, generator</td>
<td>116</td>
<td>Standard</td>
</tr>
<tr>
<td>S05</td>
<td>Bulk earthworks</td>
<td>Bulldozer, scraper, excavator, grader, compactor, vibratory roller, water cart, trucks</td>
<td>123</td>
<td>Standard</td>
</tr>
<tr>
<td>S06</td>
<td>Pavement/asphalting</td>
<td>Pavement machine, bitumen truck and sprayer, concrete pump and truck, dump truck</td>
<td>118</td>
<td>Standard</td>
</tr>
<tr>
<td>S07</td>
<td>Compound operation</td>
<td>Front end loader, excavator, trucks, compressors, light vehicles, generators</td>
<td>114</td>
<td>Standard</td>
</tr>
<tr>
<td>S08</td>
<td>Site clean-up and rehabilitation</td>
<td>Trucks, scissor lifts, franna crane</td>
<td>115</td>
<td>Standard</td>
</tr>
</tbody>
</table>

The construction noise scenarios were categorised into the overall construction stages in Table 6.5 and were used to assess noise impacts during construction on sensitive receivers.
Table 6.5: Categorised construction scenarios

<table>
<thead>
<tr>
<th>Construction stage category</th>
<th>Included construction scenarios</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1</td>
<td>S01, S02, S03, S04, S05, S06</td>
</tr>
<tr>
<td>Stage 2</td>
<td>S06</td>
</tr>
<tr>
<td>Stage 3</td>
<td>S06, S08</td>
</tr>
<tr>
<td>Compound operation</td>
<td>S07</td>
</tr>
</tbody>
</table>

**Construction vibration levels**

Safe working buffer distances to comply with the human comfort, cosmetic damage and heritage structural damage criteria were sourced from the CNVG and are presented in Table 6.6.

Table 6.6: Vibration safe working buffer distances

<table>
<thead>
<tr>
<th>Activity</th>
<th>Human comfort</th>
<th>Cosmetics damage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Heritage building/structure</td>
</tr>
<tr>
<td>Vibratory roller (1-2 tonnes)</td>
<td>15 to 20 m</td>
<td>10 m</td>
</tr>
<tr>
<td>Vibratory roller (2-4 tonnes)</td>
<td>20 m</td>
<td>12 m</td>
</tr>
<tr>
<td>Vibratory roller (4-6 tonnes)</td>
<td>40 m</td>
<td>24 m</td>
</tr>
<tr>
<td>Vibratory roller (7-13 tonnes)</td>
<td>100 m</td>
<td>30 m</td>
</tr>
<tr>
<td>Vibratory roller (13-18 tonnes)</td>
<td>100 m</td>
<td>40 m</td>
</tr>
<tr>
<td>Vibratory roller (&gt; 18 tonnes)</td>
<td>100 m</td>
<td>50 m</td>
</tr>
<tr>
<td>Small hydraulic hammer</td>
<td>7 m</td>
<td>4 m</td>
</tr>
<tr>
<td>Jackhammer</td>
<td>2 m</td>
<td>2 m (nominal)</td>
</tr>
</tbody>
</table>

Operational noise assessment

The methodology for the operational road traffic noise assessment included the following:
- establishing the noise investigation area in line with the NCG
- assessing road classification changes were assessed for existing side roads
- analysing the effects on noise levels due to road surface changes
- using these models to assess the potential noise impact against the noise criteria and assess any road traffic noise increase at sensitive receivers.

6.4.2 Existing environment

Noise environment and sensitive receivers

The existing noise environment in the investigation area is influenced predominantly by road traffic noise from Gocup Road. Additional contributions to the noise environment can be attributed to agricultural operations from rural land uses, domestic and agriculture animals and natural noise sources.
Very few rural residences are located along the proposal site. The investigation area contains four sensitive receivers within 600 metres of the proposal site (see Figure 6.6).

Summary of noise monitoring results

**Attended noise monitoring results**
Details of the attended noise monitoring results is provided in Table 6.7.

**Table 6.7: Attended noise monitoring results**

<table>
<thead>
<tr>
<th>Location</th>
<th>Start</th>
<th>End</th>
<th>$L_{Aeq}$</th>
<th>$L_{A90}$</th>
<th>$L_{Amin}$</th>
<th>$L_{Amax}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>519 Edwardstown Road</td>
<td>14:30</td>
<td>14:45</td>
<td>54.8</td>
<td>50.2</td>
<td>30.6</td>
<td>82.9</td>
</tr>
<tr>
<td>519 Edwardstown Road</td>
<td>14:45</td>
<td>15:00</td>
<td>53.9</td>
<td>44.4</td>
<td>28.0</td>
<td>84.0</td>
</tr>
</tbody>
</table>

**Unattended noise monitoring results**
A summary of the noise logger data results, including rating background levels (RBL) and road traffic noise descriptors, is provided in Table 6.8. Data has been provided for the full noise monitoring period.

**Traffic survey results**
A traffic survey was carried out as part of the noise assessment for the proposal. Traffic counts ran for one week in 2016 and are similar to the 2012-2013 traffic counts. Recorded daily traffic volumes were 1528 vehicles per day. A slight increase in the percentage of heavy vehicles was recorded in 2016, with 344 heavy vehicles per day (22 per cent of all vehicles).
### Table 6.8: Summary of noise monitoring results, dBA

<table>
<thead>
<tr>
<th>Date</th>
<th>Background noise descriptors</th>
<th>Road traffic noise descriptors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$L_{A90}(\text{Day})$</td>
<td>$L_{A90}(\text{Evening})$</td>
</tr>
<tr>
<td>7am to 6pm, Monday to Saturday; 8am to 6pm Sundays &amp; public holidays</td>
<td>6pm to 10pm, Monday to Sunday &amp; public holidays</td>
<td>10pm to 7am, Monday to Saturday; 10pm to 8am Sunday &amp; public holidays</td>
</tr>
<tr>
<td>519 Edwardstown Road</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summary (overall)</td>
<td>29.9</td>
<td>28.2</td>
</tr>
</tbody>
</table>
6.4.3 Criteria

Construction noise management levels

Construction noise management levels for the proposal are based on the ICNG and the CNVG. Construction work would occur during standard construction hours stated in the ICNG. Plant and equipment that generate tonal or impulsive noise emissions and blasting activities would be carried out during construction hours stated in the CNVG (see noise and vibration assessment in Appendix C).

The ICNG outlines a method to determine construction noise management levels for residential premises. Guidance to determine the residential noise management levels during and outside standard construction hours are provided in Table 6.9. The highly noise affected level (75 dB (A)) represents the level above which strong community reaction to noise is likely.

Table 6.9 details the ICNG construction noise management levels at sensitive receivers. The noise management levels for the proposal during and outside standard construction hours at sensitive receivers located inside the investigation area are summarised in Table 6.10.

Table 6.9: Noise management levels at residences

<table>
<thead>
<tr>
<th>Time of day</th>
<th>Management level $L_{Aeq(15min)}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended standard hours: Monday to Friday - 7am to 6pm Saturday - 8am to 1pm No work on Sundays or public holidays</td>
<td>Noise affected Rating background level plus 10 dBA</td>
</tr>
<tr>
<td>Outside recommended standard hours</td>
<td>Noise affected Rating background level plus 5 dBA</td>
</tr>
</tbody>
</table>

The ICNG states that where construction works are planned to extend over more than two consecutive nights, the analysis should include maximum noise levels and the extent and number of times the maximum exceeds the rating background levels. The CNVG recommends a 65 dBA $L_{Amax}$ external noise level for sleep disturbance. This level has been adopted for this assessment.

Table 6.10: Proposal specific construction noise management levels, dBA

<table>
<thead>
<tr>
<th>Receivers</th>
<th>Construction noise management level, $L_{Aeq (15min)}$</th>
<th>Sleep disturbance noise level $L_{Amax}$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>During standard hours</td>
<td>Outside standard hours</td>
</tr>
<tr>
<td></td>
<td>Noise affected</td>
<td>Day</td>
</tr>
<tr>
<td>Residence</td>
<td>40$^1$</td>
<td>35$^1$</td>
</tr>
</tbody>
</table>

Note 1: Noise management levels are based on a RBL of 30 dBA as the measured background levels were below 30 dBA.
Construction vibration criteria

**Human comfort**

Human comfort vibration criteria have been set with consideration to ‘Assessing Vibration: A Technical Guideline’ (DEC 2006). British Standard BS 6472 – 1992, ‘Guide to Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz)’ is recognised by the guideline as the preferred standard for assessing the ‘human comfort criteria’.

Typically, construction activities generate ground vibration of an intermittent nature. Intermittent vibration is assessed using the vibration dose value. Acceptable values of vibration dose are presented in Table 6.11 for sensitive receivers.

While the assessment of response to vibration in BS 6472-1:1992 is based on vibration dose value (refer to Table 6.11) and weighted acceleration, for construction related vibration, it is considered more appropriate to provide guidance in terms of a peak value, since this parameter is likely to be more routinely measured based on the more usual concern over potential building damage.

Humans are capable of detecting vibration at levels which are well below those causing risk of building damage. The degrees of perception for humans are suggested by the vibration level categories given in British Standard, BS 5228.2 – 2009, ‘Code of Practice Part 2 Vibration for noise and vibration on construction and open sites – Part 2: Vibration’ and are shown below in Table 6.12.

Table 6.11: Human comfort intermittent vibration limits (BS 6427-1992)

<table>
<thead>
<tr>
<th>Receiver type</th>
<th>Period</th>
<th>Intermittent vibration dose value (m/s$^{1.75}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Preferred value</td>
</tr>
<tr>
<td>Residential</td>
<td>Day (7am and 10pm)</td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td>Night (10pm and 7am)</td>
<td>0.13</td>
</tr>
<tr>
<td>Offices, schools, educational institutes and places of worship</td>
<td>When in use</td>
<td>0.4</td>
</tr>
</tbody>
</table>

Table 6.12: Guidance on effects of vibration levels for human comfort (BS 5228.2-2009)

<table>
<thead>
<tr>
<th>Vibration level</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.14 mm/s</td>
<td>Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction.</td>
</tr>
<tr>
<td>0.3 mm/s</td>
<td>Vibration might be just perceptible in residential environments.</td>
</tr>
<tr>
<td>1.0 mm/s</td>
<td>It is likely that vibration at this level in residential environments will cause complaints, but can be tolerated if prior warning and explanation has been given to residents.</td>
</tr>
<tr>
<td>10 mm/s</td>
<td>Vibration is likely to be intolerable for any more than a very brief exposure.</td>
</tr>
</tbody>
</table>

**Structural damage**

The CNVG refers to British Standard BS 7385 Part 2-1993 Evaluation and measurement for vibration in buildings Part 2 for the assessment of building damage cause by vibration.
Table 6.13 presents guideline values for the maximum absolute value of the velocity “at the foundation of various types of building. Experience has shown that if these values are complied with, damage that reduces the serviceability of the building will not occur. If damage nevertheless occurs, it is to be assumed that other causes are responsible.”

Measured values exceeding those listed in Table 6.13 “does not necessarily lead to damage; should they be significantly exceeded, however, further investigations are necessary.”

Table 6.13: Guideline values for short term vibration on structures

<table>
<thead>
<tr>
<th>Type of building</th>
<th>Peak component particle velocity in frequency range of predominant pulse</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4 Hz to 15 Hz</td>
</tr>
<tr>
<td>Reinforced or framed structures. Industrial and heavy commercial buildings</td>
<td>50 mm/s at 4 Hz and above</td>
</tr>
<tr>
<td>Unreinforced or light framed structures. Residential or light commercial type buildings</td>
<td>15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz</td>
</tr>
</tbody>
</table>

Operational road traffic noise criteria

Noise criteria are assigned to sensitive receivers using the Roads and Maritime ‘Noise Criteria Guideline’. The ‘Noise Criteria Guideline’ provides guidance on how to apply the ‘NSW Road Noise Policy’.

Criteria are based on the road development type which is affecting the residential receiver. In some instances, residential receivers may be exposed to noise from both new and redeveloped roads. In this instance the proportion of noise from each road is used to establish transition zone criteria.

When the project specific criteria have been exceeded, a receiver may qualify for consideration of noise mitigation.

Sleep disturbance

The RNP provides a literature review for the assessment of sleep arousal due to traffic noise, however does not set a sleep disturbance assessment criterion. Sleep disturbance impacts are likely to depend on the following:

- maximum noise level of an event
- number of occurrences
- event duration
- level above background or ambient noise levels.

For continuous rather than intermittent traffic flow, the ENMM recommends $L_{A_{\text{max}}}$ noise pass-by events should not exceed $L_{A_{\text{eq 1hr}}}$ noise levels by more than 15 dBA. The ENMM advises that maximum noise levels can be used as a tool to prioritise and rank mitigation strategies, but should not be applied as a decisive criterion in itself.

Proposal specific operational noise criteria

The proposal has been classed within the ‘new’ and ‘redeveloped’ road categories. Sections of Gocup Road that have been substantially realigned are classified as ‘new’ while sections that involve widening of the corridor have been classified as ‘redeveloped’. Transition zones have been identified at the following road junctions:

- Gocup Road (existing) to Gocup Road (new). There are two transition zones, one located at each end of the proposal. The noise criteria for residences located within the transition zones would have specific noise criteria between the new and redeveloped NCG noise criteria.
Proposal specific operational noise criteria at all identified receivers are summarised in the noise and vibration assessment in Appendix C and shown in Figure 6.7 and Figure 6.8.
LEGEND

dBA

53
55 52
54 51

Operational noise criteria, night

Figure 6.8

© 2016. Whilst every care has been taken to prepare this map, GHD (and DATA CUSTODIAN) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.
6.4.4 Potential impacts

Construction

Noise impacts during standard construction hours

Overview
Predicted noise levels from the construction scenarios outlined in Table 6.4 provide an estimate of the maximum noise levels at each receiver. It is unlikely that the predicted level would be realised over a continuous period as the location of noise sources will vary as construction progresses. Noise levels are predicted to exceed the noise management levels during standard construction hours.

The level of exceedance above the noise management level is dependent upon the type of equipment operating and the type of construction works being carried out. The predicted noise levels for each construction stage category outlined in Table 6.5 is provided below. Noise impacts have only been assessed during standard construction hours as works are not anticipated to occur outside these hours.

Stage 1
Noise management levels during stage one works are expected to be exceeded at all sensitive receivers located within 1100 metres of the proposal site. Noise levels are predicted to exceed the noise management level of 40 dBA by up to 35 dBA at receivers located near the proposal site.

The highly noise affected level of 75 dBA is predicted to be exceeded at one residence, which is located within 60 metres of the proposal site.

Stage 2/3
Noise management levels during stage two and three are expected to be exceeded at all residences located within 600 metres of the construction investigation area. Noise levels are predicted to exceed the noise management level of 40 dBA by up to 33 dBA at the receivers located near the proposal site.

The highly noise affected level of 75 dBA is not predicted to be exceeded during stage two and three.

The noise impacts on affected residences are expected to vary as works progress along the proposed alignment. The primary contributions to noise levels during clear zone and drainage works can be attributed to the use of excavators and chainsaws.

Compound operation
Noise management levels during compound operation are not expected to be exceeded at any residential receiver.

Summary of impacts
Noise impacts are expected during all construction stages due to the low existing background noise levels. The highest number of exceedances occurs during vegetation clear-zone works, bulk earthworks and pavement/asphalting works.

Construction noise mitigation measures are recommended to reduce noise levels. These are identified in section 6.4.5.

The number of predicted exceedances for each construction scenario is provided in Table 6.14.
Table 6.14: Number of receivers exceeding the NML

<table>
<thead>
<tr>
<th>Time period</th>
<th>Construction scenario and number of receivers exceeding NML</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S1</td>
</tr>
<tr>
<td>Standard construction hours (exceeds NML)</td>
<td>3</td>
</tr>
<tr>
<td>Standard construction hours (exceeds highly noise affected-residential receivers)</td>
<td>0</td>
</tr>
</tbody>
</table>

**Sleep disturbance impacts**
No sleep disturbance impacts at sensitive receivers are predicted. Works are expected to occur during standard construction hours.

**Vibration**
High vibration generating activities such as vibratory rolling, pavement breaking and pavement milling have the potential to cause cosmetic damage to standard dwellings. Safe working distances for the proposal are based on a vibratory roller between seven to 13 tonnes. No receivers have been identified within the 100 metres buffer for human comfort and 15 metres for cosmetic damage.

**Construction blasting impacts**
There is potential for blasting to be carried out at a few locations within the investigation area. Potential blasting locations are shown in Figure 6.9.

Blasting details, such as explosive charge mass or local ground properties, are not known at this stage of the proposal. A general blasting assessment has been carried out in line with AS2187.2 Explosives – storage and use, which provides site exponents for ‘average’ meteorological attenuation and ground conditions.

Ground vibration and airblast overpressure levels at various distances from the blasting site have been calculated and are shown in Figure 6.10 and Figure 6.11 for various charge masses. The relevant noise and vibration criteria have also been plotted on the graphs.

Depending on the mass of the charge used for the proposal, airblast overpressure and ground vibration levels may be exceeded at some sensitive receivers within the investigation area. Mitigation measures have been recommended in section 6.4.5 to minimise these impacts.
Figure 6.10: Ground vibration overpressure levels for various charge masses with distance
Figure 6.11: Airblast overpressure levels for various charge masses with distance
**Operation**

**Assessment of noise impacts against NCG controlling criterion**

No residential receivers in the investigation area qualify for noise mitigation.

Noise impact assessment results have been modelled in line with the RNP, NCG and NMG and are as follows:

- the NCG controlling criterion is not predicted to be exceeded at any sensitive receivers during the day-time period
- the NCG controlling criterion is predicted to be exceeded at one sensitive receiver during the night-time period
- no noise levels are predicted to exceed the cumulative limit, defined as the noise level 5 dBA or more above the NCG controlling criterion, during the day-time or night-time period
- the new road does not create a large increase in existing noise levels for any sensitive receiver located within the noise and vibration investigation area. Therefore, the relative increase criterion is not applicable to any receiver.

Noise levels at sensitive receivers are expected to remain level or decrease when compared to existing conditions. This is due to the new road alignment moving further away from the sensitive receivers. A summary of receivers exceeding the criteria is provided in Table 6.15.

**Table 6.15: Properties where the NCG controlling criterion is exceeded**

<table>
<thead>
<tr>
<th>Controlling criterion exceeded day</th>
<th>Controlling criterion exceeded night</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>RES04 2937 Gocup Road</td>
</tr>
</tbody>
</table>

The NMG is used to assess whether a receiver that exceeds the controlling criterion qualifies for additional mitigation. No receivers that exceed the controlling criterion qualify for additional mitigation as:

- the increases in noise levels between the no-build and build scenarios in the design year are below 2.0 dBA
- the predicted build levels in the design year are under the cumulative limit.

**Maximum noise level / sleep disturbance assessment**

For continuous rather than intermittent traffic flow, the ENMM recommends $L_{A_{max}}$ noise pass-by events may lead to sleep disturbance if the $L_{A_{max}}$ noise levels exceeds the $L_{A_{eq}}$ noise level by more than 15 dBA when the $L_{A_{max}}$ noise levels is greater than 65 dBA.

The $L_{A_{max}}$ noise levels greater than 65 dBA and more than 15 dBA over the $L_{A_{eq}}$ (1 hour) noise levels during the night-time period (10 pm to 7am) at the monitoring locations are summarised in Table 6.16.

**Table 6.16: Summary of maximum noise levels (10 pm to 7 am) – dBA**

<table>
<thead>
<tr>
<th>Noise monitoring location</th>
<th>$L_{A_{max}}(1hr)$ range</th>
<th>$L_{A_{eq}}(1hr)$</th>
<th>Highest $L_{A_{max}}(1hr)$ $L_{A_{eq}}(1hr)$ average</th>
<th>Number of $L_{A_{max}}(1hr)$ events &gt; 65 dBA and 15 dBA above $L_{A_{eq}}(1hr)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location 1</td>
<td>22-52</td>
<td>33-50</td>
<td>34</td>
<td>19</td>
</tr>
</tbody>
</table>

The current maximum noise levels exceed the $L_{A_{eq}}(1hr)$ noise levels by more than 15 dBA and are above 65 dBA on several occasions per night.

However, in general the road design is likely to reduce the maximum noise levels due to:
• an improved road surface which is likely to reduce road irregularities and associated maximum noise level events
• the new vertical road alignment which would require less acceleration and deceleration, reducing maximum noise events.

No treatments are required to manage sleep disturbance impacts.

6.4.5 Safeguards and management measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise and vibration – construction noise and vibration impacts</td>
<td>• A noise and vibration management plan (NVMP) will be prepared and implemented as part of the CEMP. The NVMP will generally follow the approach in the Roads and Maritime Construction Noise and Vibration Guideline (CNVG).</td>
<td>Contractor and project manager</td>
<td>Pre-construction and construction</td>
</tr>
</tbody>
</table>
| Noise and vibration – construction noise and vibration impacts | • All potentially impacted residents will be informed of the nature of works, expected noise levels and duration of works. A point of contact will be provided  
• Notification detailing work activities, dates and hours, impacts and mitigation measures, indication of work schedule over the night-time period, any operational noise benefits from the works (where applicable) and contact telephone number  
• Notification will be a minimum of five calendar days before the start of works. For projects other than maintenance works more advanced consultation or notification may be required. Roads and Maritime Communication and Stakeholder Engagement will be contacted for further guidance  
• The following may be implemented:  
  – periodic notification (letterbox drop or equivalent)  
  – website  
  – project info-line  
  – construction response line  
  – email distribution list  
  – community based forums (if required by approval conditions).  
• All employees, contractors and subcontractors are to receive an environmental induction. The induction must at least include:  
  – all relevant project specific and standard noise and vibration mitigation measures  
  – relevant licence and approval conditions  
  – permissible work hours  
  – any limitations on high noise generating activities | Contractor | Pre-construction and construction |
<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>– location of nearest sensitive receivers</td>
<td>Contractor</td>
<td>Pre-construction and construction</td>
</tr>
<tr>
<td></td>
<td>– construction employee parking areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>– designated loading/unloading areas and procedures</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>– construction traffic routes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>– site opening/closing times (including deliveries)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• environmental incident procedures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Specific management measures (notification, phone calls, respite offers and verification) will be implemented for sensitive receivers RES01, RES02, RES03 and RES04 as detailed in Table 4-21 of the noise and vibration assessment in Appendix C.</td>
<td>Contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>Noise and vibration – specific impacts to receivers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noise and vibration – construction impacts</td>
<td>• The CEMP must be regularly updated to account for changes in noise and vibration management issues and strategies</td>
<td>Contractor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• A non-vibratory roller must be used when compacting within 15 metres of a residential receiver</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Where feasible and reasonable, construction will be carried out during standard daytime working hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The use of mulchers, jack hammers, concrete saws, rock breakers, compaction or other equipment used in very close proximity to the receivers will be limited where feasible and reasonable to standard construction hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Use quieter and less vibration emitting construction methods where reasonable and feasible</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Ensure plant including the silencer is well maintained</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The noise levels of plant and equipment must have operating sound power or sound pressure levels compliant with the criteria listed in Appendix H of the CNVG</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Plant used intermittently will be throttled down or shut down</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Locate compounds away from sensitive receivers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The use of ambient sensitive alarms that adjust output relative to the ambient noise level will be considered</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact</td>
<td>Environmental safeguards</td>
<td>Responsibility</td>
<td>Timing</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------</td>
<td>--------</td>
</tr>
</tbody>
</table>
|                              | • Loading and unloading of materials/deliveries is to occur as far as possible from sensitive receivers  
  • Schedule construction works that have potential to produce high noise or vibration levels during less sensitive times  
  • Avoid or minimise out of hours movements where possible  
  • Minimise noise and vibration impacts from blasting operations by:  
    – reducing maximum instantaneous charge size  
    – choosing appropriate blast charge configurations  
    – ensuring appropriate blast hole preparation  
    – optimising blast design, location, orientation and spacing  
    – selecting appropriate blast times  
    – considering prevailing meteorological conditions  
  • Carry out building condition inspections on all buildings located within 50 metres of blasting activities before commencing activities with the potential to cause property damage  
  • A detailed blast management plan will be prepared by the construction contractor before carrying out any blasting. | Contractor      | Construction |
| Noise and vibration – Complaints | • Complaint monitoring measurements will be taken at the complainant’s location for reasonable complaints and the monitoring will cover the time of day when the impacts were reported to occur and the activity. | Contractor      | Construction |

### 6.5 Air quality

#### 6.5.1 Existing environment

The investigation area for the air quality assessment is defined as the area within 500 metres of the proposal site. The area contains two sensitive receivers within 500 metres of the proposal site.

The proposal is located in a rural area between Gundagai and Tumut dominated by agricultural land use (see Figure 1.2).

Sources of air pollution in the investigation area are likely to include:

- dust from vehicles travelling on unsealed roads
- emissions from vehicles on Gocup Road
- dust from agricultural activities
- Smoke from paddock stubble burn-off in agricultural areas during autumn.
A search of the National Pollutant Inventory (DotEE 2017) on 7 July 2017 did not identify any air pollutant substances for the 2015 to 2016 reporting period near the investigation area.

6.5.2 Potential impacts

Construction
During construction the following activities would potentially result in air quality impacts:
- vegetation clearing
- stripping and stockpiling topsoil
- windblown dust from exposed surfaces eg stockpiles, roads etc
- earthworks
- road construction
- transport and handling of soils and materials
- vehicular dust from traffic movements on unpaved roads
- use of construction vehicles, generating exhaust fumes.

Potential air quality impacts during construction would predominantly be from dust generation. Dust generation could result in health and amenity impacts to nearby receivers.

The quantity of dust dispersed would depend on the dust generation rate and the drift of dust particles which is influenced by atmospheric stability as well as wind speed and direction. Larger particles generally settle closer to the source while finer particles disperse over greater distances.

Dust settlement may impact properties near the proposal site. Air quality impacts as a result of dust generation are considered to be minor, as they would be limited to the construction phase and would be minimised by implementing the safeguards and management measures outlined in section 6.5.3.

Machinery and other construction vehicles would emit exhaust fumes. Gaseous emissions are associated with diesel fuel and petrol combustion from vehicle movements and operation of on-site plant and construction machinery. These sources would generate emissions of carbon monoxide, carbon dioxide, oxides of nitrogen, sulphur dioxide and trace amounts of non-combustible hydrocarbons.

The emissions rate and potential impact would depend on the number and power output of the engines, the quality of fuel used, the condition of the engines and the intensity (engine speed) of use. A number of plant items would be in use at any given time. The volume of gaseous emissions would be influenced by the number and type of items that are running at full power or idling.

The impact of these emissions would be temporary in nature (limited to the duration of construction and staging of construction) and are considered to be minor. Implementation of the safeguards and management measures outlined in section 6.5.3 would minimise these impacts.

Odours may be generated during the application of bitumen and line marking. However, the construction period would be temporary and there would be no long-term odour impacts for nearby receivers.

With the implementation of safeguards and management measures in section 6.5.3, it is expected the potential air quality impacts during construction would be low and short-term.

Operation
Changes in air quality as a result of the proposal would be considered low to negligible. The proposal would move the new road alignment slightly further away from residences. Emissions
from heavy vehicles may decrease as a result of the proposal, as the new vertical road alignment would require less acceleration and deceleration. The proposal is therefore unlikely to cause any substantial adverse air quality impacts at the residence.

### 6.5.3 Safeguards and management measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
</table>
| Air quality – construction air quality impacts | An Air Quality Management Plan (AQMP) will be prepared and implemented as part of the CEMP. The AQMP will include, but not be limited to:  
- potential sources of air pollution  
- air quality management objectives consistent with any relevant published EPA and/or OEH guidelines  
- mitigation and suppression measures to be implemented  
- methods to manage work during strong winds or other adverse weather conditions  
- a progressive rehabilitation strategy for exposed surfaces  
- monitoring and reporting procedures  
- a management procedure to deal with air quality complaints. | Contractor | Pre-construction and construction |
| Air quality – dust management |  
- Exposed surfaces will be watered regularly to minimise dust emissions as necessary  
- Vegetation clearing will be minimised where possible  
- Disturbed surfaces will be stabilised as soon as practicable  
- Stockpiles or areas that may generate dust will be managed to suppress dust emissions in line with the Roads and Maritime ‘Stockpile Site Management Guideline’ (RTA 2011a)  
- All trucks will be covered when transporting dust generating material to and from the site  
- Dust and/or particulate matter (PM$_{10}$) will be monitored if considered necessary to identify the potential for nuisance dust impacts. | Project manager and contractor | Construction |
| Air quality – other air emissions |  
- Plant and machinery will be turned off when not in use as much as possible and will be fitted with emission control devices complying with Australian Design Standards where practicable  
- Construction plant, vehicles and equipment will be maintained in good working condition to limit impacts on air quality  
- No burning of any materials will occur. | Project manager and contractor | Construction |
6.6 Landscape character and visual impacts

6.6.1 Existing environment

The investigation area for the landscape character and visual assessment is defined as the area within which the proposal may affect visual characteristics for key receivers.

The landscape character of the investigation area is generally defined by rural properties used for agriculture (primarily grazing) and areas of scattered woodland. The terrain of the investigation area is hilly to undulating. Native vegetation is densest on the surrounding hills.

Key receivers in the investigation area include four rural residences located along the length of the proposal site. Key receivers also include local road users.

6.6.2 Potential impacts

Construction

Visual impacts during construction would generally be associated with:

- road embankment construction
- plant and equipment along the alignment
- vegetation removal
- establishing the site compound and stockpile sites.

These have the potential to temporarily affect views for residents with a line of sight to the proposal site, and local road users. Construction-related visual impacts would be temporary and progressive site stabilisation would reduce the magnitude of changes in the short to medium term.

Operation

The proposal would create large road embankments in areas of cut and fill earthworks (see Figure 3.1 and Figure 3.2 in section 3.3.4). Cut and fill sections have a width of up to 100 metres. Cut sections would have a maximum depth of 20.6 metres and fill sections would have a maximum height of 18.8 metres.

The proposed cut and fill embankments would not introduce a new landscape feature, as road embankments already exist along Gocup Road. The proposal would not change the landscape character of the investigation area.

The proposed road embankments would be larger than the existing embankments, making these features more prominent along Gocup Road. The major section of cut would be shifted to the west, moving the road alignment further from the nearest residence. Due to the sufficient distance of the residence from the cut, and the existing presence of a cut section at that location, the proposal is unlikely to cause a substantial visual impact to the residence. For other sections of major cut and fill, residences are located at sufficient distances from the proposal site to avoid substantial visual impacts (greater than 450 metres).

6.6.3 Safeguards and management measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
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</thead>
<tbody>
<tr>
<td>Landscape and visual – visual impacts of the proposal</td>
<td>- The proposal footprint will be limited as much as possible to minimise earthworks and maintain existing vegetation wherever possible.</td>
<td>Project manager</td>
<td>Detailed design</td>
</tr>
</tbody>
</table>
6.7 **Property and land use**

The investigation area for the land use and property assessment includes the proposed road reserve and the surrounding area in which land uses could be affected by the proposal.

### 6.7.1 Existing environment

The surrounding landscape is dominated by agricultural land use, including grazing. About four residences are located within about 600 metres of the proposal site. Two of these are located on the western side of Gocup Road, one on the eastern side, and one north of the proposal site.

Woodland in the road reserve is limited to scattered patches of native vegetation and introduced trees. A small area of the reserve in the central section of the proposal site is used as a stopping bay.

### 6.7.2 Potential impacts

**Construction**

**Land acquisition**

Locations of land acquisition for the proposal are shown in Figure 3.3. Details of land acquisition are provided in Table 3.1 in section 3.6. These areas are indicative only and may change once boundaries are finalised during detailed design. No full property acquisitions are required for the proposal.

A small area (0.12 hectares) of Crown land would be acquired in the central section of the proposal site. The land is currently being used for grazing by a neighbouring landholder. The proposed acquisition of land is minor and would not have a substantial effect on the agricultural use of the land. An assessment of the proposal against the objects and principles of the *Crown Lands Act 1989* is provided in Table 4.1 in section 4.2.7.

Proposed land acquisition has generally been minimised where possible. Land acquisition would not result in any unreasonable land use impacts. The future land uses of these properties and adjoining properties would remain consistent with existing land uses. The direct area of loss would be relatively small.

All property valuations, lease fees and acquisition payments would be carried out in line with the Roads and Maritime 'Land Acquisition Information Guide' (RTA 2011c) and the *Land Acquisition (Just Terms Compensation) Act 1991*. Property acquisition plans would be prepared for each of the properties where acquisition or leasing is required, as part of the detailed design.

In addition to permanent acquisition, land may be temporarily leased during construction for small temporary stockpile sites and other construction requirements. These requirements have not yet been determined; however two earth bunds in the central section of the proposal site,
and the most northern sediment basin would be constructed on private property. This land would be temporarily leased.

**Utilities**

Utilities are located within the proposal site as described in section 3.5. Service relocation and protection activities would be required for public utilities, including Telstra optic fibre cable and copper line, and 66kV powerline. There would be three short outages during the relocation of the powerline and two short outages for the relocation of the Telstra utilities.

Service disruption impacts are considered to be temporary, and would be managed to minimise customer disruption. This would include providing notification before disruptions occur. The relocation of utilities has been assessed in a separate MWREF.

**Private infrastructure**

The proposal would require relocation or replacement of a number of infrastructure items on private properties including:

- fences and gates
- silage pits
- a farm dam
- water system
- tree plantings
- signage
- waste pit

**Amenity and access**

Potential short term amenity and access impacts may occur during construction. These may include increased noise and vibration, increased truck movements on Gocup Road associated with materials delivery, dust and temporary visual impacts associated with construction activities.

**Operation**

In the longer term, the proposal would be unlikely to cause any significant negative impacts to land use.

Access along Gocup Road would be enhanced by providing a safer road with improved reliability for daily road users. Road safety would be enhanced by implementing current road design standards, improving horizontal and vertical alignments, providing overtaking lanes and wider sealed shoulders, and reducing roadside hazards.

The proposal would benefit local residents and the towns of Gundagai and Tumut by supporting regional growth, improving connectivity and providing more efficient movement between the towns. Local industry would benefit from increased freight efficiency along Gocup Road.

### 6.7.3 Safeguards and management measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
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</thead>
<tbody>
<tr>
<td>Land use and property – impacts to utilities</td>
<td>Roads and Maritime will consult with relevant service providers during detailed design to minimise the potential for service interruptions.</td>
<td>Project manager and contractor</td>
<td>Detailed design</td>
</tr>
</tbody>
</table>
### 6.8 Socio-economic

The investigation area for the socio-economic assessment is defined as the region between, and surrounding, the towns of Tumut and Gundagai.

#### 6.8.1 Existing environment

Gocup Road connects the regional centres of Tumut and Gundagai. Demographic data for these towns is provided below.

#### Gundagai

The 2011 Census (ABS 2016a) provides the following core demographic data about Gundagai:

- at the time of the 2011 Census there were 3664 people living in Gundagai
- 60.9 per cent of the people living in Gundagai over the age of 15 and who identified as being in the labour force were employed full time
- 35 per cent were working on a part time basis
- the median weekly household income was $761 per week
- the average household size was 2.5 people
- the main method of travel to work was by car, with 1062 people driving or travelling as a passenger in a vehicle
- the total number of registered motor vehicles was 3080
- the largest age demographic was 0 to 14 years (21.3 per cent of the population).

The top employment industries for Gundagai (ABS 2016a) are provided in Table 6.17.

#### Table 6.17: Top employment industries for Gundagai in 2011

<table>
<thead>
<tr>
<th>Industry</th>
<th>Percentage of people employed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managers</td>
<td>22.7</td>
</tr>
<tr>
<td>Labourers</td>
<td>20.6</td>
</tr>
<tr>
<td>Technicians and trade workers</td>
<td>12.6</td>
</tr>
<tr>
<td>Professionals</td>
<td>10.2</td>
</tr>
<tr>
<td>Clerical and administrative</td>
<td>9.1</td>
</tr>
</tbody>
</table>
The 2011 Census (ABS 2016b) provides the following core demographic data about Tumut:

- at the time of the 2011 Census there were 4785 people living in Tumut
- 60.4 per cent of the people living in Tumut over the age of 15 and who identified as being in the labour force were employed full time
- the median weekly household income was $811 per week
- the average household size was 2.4 people
- the main method of travel to work was by car, with 1440 people driving or travelling as a passenger in a vehicle
- the total number of registered motor vehicles was 4126.

The top employment industries for Tumut (ABS 2016b) are provided in Table 6.18.

**Table 6.18: Top employment industries for Tumut in 2011**

<table>
<thead>
<tr>
<th>Industry</th>
<th>Percentage of people employed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managers</td>
<td>21</td>
</tr>
<tr>
<td>Labourers</td>
<td>18</td>
</tr>
<tr>
<td>Technicians and trade workers</td>
<td>14</td>
</tr>
<tr>
<td>Professionals</td>
<td>11.4</td>
</tr>
<tr>
<td>Machinery operators and drivers</td>
<td>10.7</td>
</tr>
<tr>
<td>Clerical and administrative</td>
<td>9.4</td>
</tr>
<tr>
<td>Community and personal service workers</td>
<td>7.9</td>
</tr>
<tr>
<td>Sales workers</td>
<td>5.6</td>
</tr>
</tbody>
</table>

Gocup Road

Gocup Road is an important regional road connecting Tumut to Gundagai. Heavy vehicles use Gocup Road to travel between commercial and industrial areas around Tumut and the Hume Highway at Gundagai. This is an important route for the local timber and milling industry. Higher mass limit B-double vehicles up to 4.6 metres high are permitted to travel along the entire length of Gocup Road. Forestry product value-adding industry groups are interested in gaining access to the road network with 'high productivity vehicles' to enable more efficient transport.

Gocup Road is also an important route for residents and property owners between Tumut and Gundagai, and for people commuting between the towns for work.
6.8.2 Potential impacts

Construction

Land acquisition

Minor social impacts associated with the proposal would arise in association with land acquisition. The proposal would require only very limited acquisition of private property and no residential dwellings would be directly impacted.

Land acquisition impacts are described in more detail in section 6.7.

Road users

There may be some minor access changes during the construction period which could potentially inconvenience motorists. These changes would likely be for short periods and would have only limited impacts. These impacts are assessed in section 6.3.

Amenity and access

Potential short term amenity and access impacts may occur during construction as summarised in section 6.7.1.

Benefits

The local area would experience a short-term increase in employment opportunities and procurement of local goods and services.

Operation

Benefits

The proposal would improve road safety by upgrading the road to current road design standards.

In the longer term, the proposal to upgrade Gocup Road would support sustainable growth and development of regional centres. The proposal upgrades existing infrastructure to improve safety and transit times to residential and commercial growth areas within Gundagai and Tumut.

6.8.3 Safeguards and management measures

<table>
<thead>
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<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
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</table>
| Socio-economic – construction impacts on the community | • Potentially affected property owners and residents will be contacted before the start of work in line with the Roads and Maritime ‘Community Engagement and Communication Manual’ (Roads and Maritime 2012). Residents will be notified via door knocks, newsletters or letter box drops providing information on the proposed work, working hours and a contact name and number should any complaints wish to be registered  
• A complaints management procedure and register will be included in the CEMP. | Project manager and contractor | Pre-construction |
### 6.9 Aboriginal heritage

The following Aboriginal archaeological and cultural heritage investigations have been carried out for the entire length of Gocup Road:

- Aboriginal Archaeological Survey Report Stage 2 PACHCI (Kelleher Nightingale Consulting 2012)
- Aboriginal Cultural Assessment (Waters Consultancy 2015a)
- Aboriginal Cultural Heritage Assessment Report (CHAR) (Kelleher Nightingale Consulting 2015)
- Aboriginal Cultural Assessment – Supplementary Report on Cookoomooroo, Doctors Hill, Halfway Hill and Gilmore Creek Bridge potential additional works (Waters Consultancy 2015b)
- Gocup Road (MR297) Upgrade Utility Works Aboriginal Archaeological Due Diligence Assessment (Kelleher Nightingale Consulting 2017a) (Draft) (Kelleher Nightingale Consulting 2017a)

The Kelleher Nightingale Consulting (2015) and Waters Consultancy (2015b) reports are provided in Appendix D. The findings relevant to the proposal are summarised below.

#### 6.9.1 Methodology

Aboriginal heritage assessments were completed for the entire Gocup Road works program. Site investigation and consultation with the Aboriginal community was completed in line with the Roads and Maritime ‘Procedure for Cultural Heritage Consultation and Investigation’ (PACHCI) and in consultation with the Roads and Maritime Aboriginal Cultural Heritage Officer. A methodology overview for the Aboriginal heritage assessments is summarised in Table 5.3 in section 5.4.

The investigation area for the Aboriginal heritage assessment is defined by the areas mapped in the Aboriginal heritage assessments.

#### 6.9.2 History

The investigation area is situated in Wiradjuri country, a region with boundaries defined by traditional language-speaking areas (MacDonald 1998). The Wiradjuri language group is the largest group in NSW, encompassing the Macquarie, Lachlan and Murrumbidgee Rivers (NPWS 2003).

Early historical sources noted large numbers of Aboriginal people in the Tumut River valley (Hume and Hovell 1824; Sturt 1833). Localised resources would have centred on the Tumut River and associated tributaries, wetlands and billabongs. From the waterways, crayfish, a variety of fish, mussels, eels, tortoises and numerous water birds were available as well as reeds and vegetable shoots, roots, fruits and leaves across the floodplains of the Tumut River (Sams 1982). Terrestrial mammals, reptiles and birds, including wombats, kangaroos, goannas and bush turkeys, were also recorded as being hunted in the region (Sams 1982).
Seasonal movement of Aboriginal groups along the Tumut River valley in relation to Bogong Moth (Agrotis infusa) hunts in the nearby mountains were observed in post contact times. Flood (1980:73) notes the gathering of people along the Tumut River valley in preparation for moth feasts also functioned as a means of fulfilling social obligations between neighbouring groups such as marriage, ceremonies, trade and initiation.

6.9.3 Existing environment

Overview of the program of works investigation area

Gocup Road crosses a cultural landscape of interlinked elements that connect a range of ceremonial areas and significant ancestral beings lying within the landscape. Identified Aboriginal cultural sites along, and surrounding Gocup Road are part of a wider network of cultural elements that connect two key cultural areas: Mudjarn and Minjary (located south and south-east of the investigation area, respectively).

The ‘Site F: Stony Creek Pathway Cultural Site’ and ‘Site A: Gilmore Creek Pathway Cultural Site’ are part of a network of pathways that facilitated the movement of people into the Bogong Peaks, where a wide variety of inter-group social, economic and ceremonial activities occurred as part of the Bogong Moth gatherings.

Artefact scatters and isolated artefacts have generally been found next to creeks or rivers. Water sources would have been focal points for Aboriginal people due to the accessibility of resources at these locations. Culturally modified trees have been documented near creeks and rivers in the region, however the spatial distribution of this site type may be distorted due to European farming practices.

Archaeological surveys of the investigation area for all of Gocup Road were carried out as part of the Stage 2 PACHCI and identified eight artefact scatters, two isolated artefacts and one potential archaeological deposit within the proposed upgrade program of works corridor. The majority of identified sites were close to Stuckeys Creek, over eight kilometres south of the Cookoomooroo proposal site, in areas of remnant Box Gum woodland. The majority of stone tools identified during the survey were created from quartz which was locally available.

Six areas of Aboriginal cultural significance were identified within and around the program of works investigation area. The six Aboriginal cultural areas (labelled as Sites A – F) comprised two ceremonial pathways, one seasonal pathway, one meeting place and camping area, one pathway associated with specific resource use and one remnant wetland that constituted a resource gathering area.

Aboriginal heritage sites in the proposal investigation area

Areas of Aboriginal cultural significance

One area of Aboriginal cultural significance, Site F, is located in the investigation area and is described below.

Site F: Stony Creek Pathway Cultural Site

‘Site F: Stony Creek Pathway Cultural Site’ is a pathway associated with specific resource use that runs along Stony Creek, linking the country near Doctors Hill to the Murrumbidgee River near Gundagai. The site is associated with the use of grass trees (Xanthorrhoea sp.), primarily for the production of spears, and the seasonal movement of Aboriginal people to the Bogon Peaks (Waters Consultancy 2015a). The dry flower stalks of grass trees were used to make spear butts and fire sticks while the resin was used as an adhesive for the attachment of stone points, hafting stone axe heads and mending wooden implements (Waters Consultancy 2015a).

The site extends along Stony Creek from the confluence with Big Ben Creek into the hills north of Doctors Hill and continues along Slaughterhouse Creek towards the Tumut River. The
The investigation area encompasses a portion of the site at the southern end of the proposal site and the western side of Gocup Road.

The site was assessed as being of moderate cultural significance. It is located about 100 metres from the southern end of the proposal site at its nearest and is shown in Figure 4 of Kelleher Nightingale (2015) in Appendix D.

**Archaeological sites**

Two sites of Aboriginal heritage were identified in the investigation area west of the proposal site:

- Stony Creek AFT 01 is an artefact scatter located in the south of the investigation area about 67 metres from the proposal site. The site is situated on an elevated location next to Stony Creek. The artefact scatter consisted of one quartz core and one quartz flake, located in an area of disturbance associated with the recent infilling of a utility trench.

- Stony Creek IF 01 was an isolated artefact also located in the south of the investigation area about 180 metres from the proposal site. The site is in a heavily disturbed fluvial deposit on a creek flat next to Stony Creek. The visual inspection identified one quartz core in a surface exposure on a dirt track.

### 6.9.4 Potential impacts

The two identified sites Stony Creek AFT 01 and Stony Creek IF 01 are not located in the proposal site and would not be affected by the proposal.

The proposal would have a partial impact on ‘Site F: Stony Creek Pathway Cultural Site’.

An AHIP was granted for a number of upgrade sections along Gocup Road by OEH on 24 November 2015. An Aboriginal archaeological due diligence assessment was completed by Kelleher Nightingale Consulting (2017b) for the proposed extension of the approved AHIP area at Cookoomooroo.

### 6.9.5 Safeguards and management measures

<table>
<thead>
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<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
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</thead>
</table>
| Aboriginal heritage – impacts on known sites of Aboriginal heritage significance | • Exclusion fencing will be erected around sites Stony Creek AFT 01 and Stony Creek IF 01 before work starts  
• All workers will be inducted before work starts about the nature of the Aboriginal heritage resource in the investigation area (including sites Stony Creek AFT 01 and Stony Creek IF 01) and the penalties for breaches of the National Parks and Wildlife Act 1974  
• Interpretative signage will be developed locating ‘Site F: Stony Creek Pathway Cultural Site’ within the broader cultural landscape. The content of the signage will be developed in consultation with the Aboriginal knowledge holders. The preferred location for the placement of the signage, dependent on consultation with the relevant landholders, is within the townships of Tumut and Gundagai. | Project manager and contractor | Pre-construction and construction |
<table>
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<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
</table>
| Aboriginal heritage – impacts on potential unknown sites of Aboriginal heritage significance | • All construction activities must stay within the defined AHIP boundary  
• The ‘Standard Management Procedure - Unexpected Heritage Items’ (Roads and Maritime 2015) will be followed in the event that an unknown or potential Aboriginal object/s, including skeletal remains, is found during construction. This applies where Roads and Maritime does not have approval to disturb the object/s or where a specific safeguard for managing the disturbance (apart from the Procedure) is not in place  
• Work will only re-start once the requirements of that Procedure have been satisfied. | Project manager and contractor | Construction |

6.10 Non-Aboriginal heritage

A non-Aboriginal heritage assessment has been carried out for the entire length of Gocup Road (OnSite Cultural Heritage Management 2013) and is provided in Appendix E.

6.10.1 Methodology

Non-Aboriginal heritage for entire Gocup Road upgrade

The methodology for the non-Aboriginal heritage assessment of the entire Gocup Road program of works (OnSite Cultural Heritage Management 2013) included:

• historical research of the investigation area  
• an on-site inception meeting  
• field survey investigation  
• preliminary assessment of identified heritage and archaeological sites (built, landscape and sub-surface)  
• preparation of maps or plans showing identified sites and curtilage where applicable  
• predictive modelling (zoning) for potential archaeological sites (where appropriate), presented as an investigation area plan showing the high, moderate and low zones of archaeological potential  
• a statement of heritage impact, where applicable, for individual sites  
• recommendations to avoid, minimise or mitigate against any impact  
• the identification of any legislative requirements under the NSW Heritage Act 1977.

6.10.2 History

The local region was first explored by Hume and Hovell in 1824, who passed through the region now known as Tumut on their expedition from Lake George to Port Phillip (Clouston 1924). When travelling through Gundagai, they recorded seeing trees already marked by steel tomahawks. Tumut is recorded as the Aboriginal name for the area, or alternatively Doomut, meaning camping ground (French 1965).

The local area’s history is closely linked with pastoralism, with this being the dominant local industry throughout the 19th and 20th centuries, and gold mining to an extent, which came to its peak in the latter half of the 19th century.
The area that now forms the town of Gocup was first inhabited sometime in the late 1830s or early 1840s, by John Archer Broughton, the son of William Broughton, who came to Australia on the First Fleet.

The original Gocup Road was, in its earliest form, a rough track used by settlers and travellers. It crossed hilly terrain between Gundagai and Tumut and was first known as the Gundagai or Tumut Road. When Cobb and Co expanded their services into New South Wales in 1861, they used the road between Tumut and Gundagai (Butcher 2002) for mail delivery and passenger fares.

The earliest reference to the road being named as 'Gocup Road' is from 1866, in a newspaper which described a man being robbed on Gocup Road (Tumut and Adelong Times 1866).

A number of small towns developed along the road, including Gocup and Minjary. Historical developments along the road included hotels, schools and a post office to support the surrounding properties.

By the end of the 19th century, Gocup Road had become a much more formalised track and was listed as the main road between Gundagai and Tumut on Parish Maps for the area. With the opening of the rail link between Tumut and Gundagai in 1903, the road became less used, at least with regard to the hauling of produce and heavy goods, and was not as well maintained. It was speculated, at least in parts, that it was impassable in heavy wet weather (OnSite Cultural Heritage Management 2013).

The current roadway was built to the standards of 1960s road design, with its alignment designed to minimise earthworks in construction. As a result of this it follows in many areas the original tracks from the 1860s and earlier (Miller 2008).

**6.10.3 Existing environment**

Two stone culverts (referred to as item 2 and 3 in the heritage assessment in Appendix E) are located on the former Gocup Road alignment, which is located east of the proposal site, on the eastern side of the existing road (see Figure 6.12). Item 2 (see Figure 6.13) is a small bridge/culvert constructed in mortared stone rubble with a concrete pipe. Item 3 (Figure 6.14) is a large double span of roadway supported by mortared stone rubble. It is constructed across a natural drainage line with a concrete pipe.

It is likely that these culverts are remnants of road upgrades in the 1920s to make the road more serviceable to motor vehicles. The use of rubble stone indicates the use of locally available materials, as was typical of road construction at the time. The items are considered representative in nature, given the number of other examples in the region.
Figure 6.12: Location of stone culverts along former Gocup Road alignment (shown in blue)

Figure 6.13: Small stone culvert (item 2) taken from current road level and showing built-up road surface of former alignment
6.10.4 Potential impacts

Construction
Given the proximity of item 2 to the current road alignment (within five metres) on a sweeping bend, the heritage assessment identified a risk of impact to the item. However, the detailed design for the Cookoomooroo section is located on the western side of the existing road, about 80 metres from item 2 and 150 metres from item 3. Therefore it is unlikely that either of these items would be impacted by the proposal.

Operation
The proposal would have a limited impact on the views and vistas surrounding the former Gocup Road alignment, and therefore would not affect items 2 and 3. The road would be moved further away from these items.

6.10.5 Safeguards and management measures

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<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
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</thead>
</table>
| Non-Aboriginal heritage – inadvertent impacts on heritage items | - Exclusion fencing will be installed around the stone culverts (items 2 and 3) on the former Gocup Road as necessary  
- As part of the site induction, all workers will be advised of their obligations in relation to heritage before working on the site and the guidelines to follow if unanticipated heritage | Project manager and contractor | Construction |
### Environmental safeguards for non-Aboriginal heritage – unanticipated archaeological finds

- In the event of an unexpected find of an archaeological deposit (or suspected item), work will stop in the affected area and Roads and Maritime's Environment Officer will be contacted for advice on how to proceed. The ‘Unexpected Heritage Items Procedure’ (Roads and Maritime 2015) will be followed if a potential artefact is uncovered.
- Work will only re-start once the requirements of that Procedure have been satisfied.

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<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Aboriginal heritage – unanticipated archaeological finds</td>
<td>items or deposits are located during construction.</td>
<td>Project manager and contractor</td>
<td>Construction</td>
</tr>
</tbody>
</table>
## 6.11 Other impacts

### 6.11.1 Existing environment and potential impacts

<table>
<thead>
<tr>
<th>Environmental factor</th>
<th>Existing environment</th>
<th>Potential impacts</th>
</tr>
</thead>
</table>
| Waste management     | N/A                  | The proposal has the potential to generate waste from the following sources, some of which would be recycled or re-used:  
  • green waste from vegetation clearing (native and introduced vegetation). Priority weed material would be separated from native green waste  
  • excess spoil from material excavation—this would be transported stockpiled permanently at previously approved locations on site, or permanently off site at Roads and Maritime facilities  
  • roadside materials (fencing, guide posts etc)  
  • general waste from staff (lunch packaging, portable toilets etc)  
  • chemicals and oils  
  • waste water from wash-down and bunded areas  
  • redundant erosion and sediment controls  
  • paper and office waste from site and management facilities. |
| Hazards and risk     | The existing hazards and risks in the investigation area are generally associated with operation of the existing road network. | • The proposal could potentially generate a bushfire through the operation of machinery and equipment in areas of long flammable grass  
• The proposal has the potential to intercept utilities during earthworks. This risk would be managed by further investigation during detailed design, including ‘Dial Before You Dig’  
• Spills or leakage of contaminants such as fuels, chemicals and hazardous substances entering surface and groundwater or contaminating soils  
• Flooding of the proposal site during extreme rain events |
<table>
<thead>
<tr>
<th>Environmental factor</th>
<th>Existing environment</th>
<th>Potential impacts</th>
</tr>
</thead>
</table>
| Climate change impacts on the proposal | The Gundagai/Tumut area receives an average annual rainfall of 303.5 millimetres. Rainfall is spread throughout the year but tends to reach a maximum in November with an average of 67.8 millimetres (BOM 2016). Average monthly minimum temperature varies from 2.5 degrees celsius in July to 16.7 degrees celsius in February. The average monthly maximum temperature varies from 12.9 degrees celsius in July to 32.7 degrees celsius in January (BOM 2016). | **Potential climate change impacts on the proposal**  
*Construction*  
- Increases in temperatures may reduce work capacity and increase the risk of heat stress for site workers  
- Impacts to various construction activities from climate change, such as increased temperatures interfering with concreting  
- An increase in extreme weather events, such as intense rainfall interfering with construction timeframes or dry, hot weather conducive to generation of dust  
- Increased summer and autumn rainfall may result in increased flooding and erosion risks at the site, and associated erosion and sediment loss  
*Operation*  
- Increases in temperature may affect pavement integrity and other aspects of the proposal in the long term  
- Increased potential for localised flooding  
- Drainage and stormwater impacts  
- Aquaplaning (cars sliding in pooled water on the road)  
- Changes to flora and fauna species and distribution, including pest and weed species  
- Erosion impacts, resulting in sediment loss from the site  
- Watercourse impacts, including changes to channel structure and other characteristics resulting from changed hydrological conditions |
<table>
<thead>
<tr>
<th>Environmental factor</th>
<th>Existing environment</th>
<th>Potential impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Potential impacts of the proposal on climate change</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Construction</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Carbon dioxide and nitrous oxide would be generated from liquid fuel use in plant and vehicles (diesel, petrol) during construction, and disposal and transport of materials</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Atmospheric carbon dioxide may increase as a result of vegetation clearing (minor reduced uptake of carbon dioxide from the atmosphere, as well as decomposition of cleared vegetation)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Use of materials such as concrete that have high embodied energy content</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Methane would be released from landfilling any carbon based waste, and from possible fugitive emissions from natural gas use</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Various greenhouse gas emissions would be associated with the extraction and production of materials used in the road construction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• On-site electricity usage.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Operation</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• the proposal would upgrade Gocup Road to provide a road with improved horizontal and vertical alignment meeting current road design standards. This is likely to reduce the need for acceleration and deceleration and associated fuel consumption, thereby reducing operational greenhouse gas emissions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Provision for high productivity vehicles would also increase freight efficiency, reducing fuel consumption per quantity of product transported.</td>
</tr>
</tbody>
</table>
### 6.11.2 Safeguards and management measures

<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
</table>
| Hazards and risk                      | - Emergency response plans will be incorporated into the CEMP  
- An incident response plan will be developed and implemented as required as part of the CEMP to manage any identified risks on site  
- A design safety audit will be carried out before construction  
- The CEMP will include provisions to minimise the potential for ignition or spread of fire. This will include the preparation of a bushfire management plan. Consultation with the local Rural Fire Service will be carried out during preparation of the plan. | Project manager and contractor | Pre-construction       |
| Hazards and risk                      | - The contractor must keep the general public from entering the proposal site and facilities, with appropriate measures and fencing for security as required. The contractor must erect clear and visible signs to advise that entry to the proposal site and facilities is prohibited by unauthorised persons. | Project manager and contractor | Construction          |
| Waste management – general impacts    | - A Waste Management Plan (WMP) will be prepared and implemented as part of the CEMP. The WMP will include but not be limited to:  
  - measures to avoid and minimise waste associated with the project  
  - classification of wastes and management options (re-use, recycle, stockpile, disposal)  
  - statutory approvals required for managing both on and off-site waste, or application of any relevant resource recovery exemptions  
  - procedures for storage, transport and disposal  
  - monitoring, record keeping and reporting  
- The WMP will be prepared taking into account the *Environmental Procedure - Management of Wastes on Roads and Maritime Services Land* (Roads and Maritime 2014) and relevant Roads and Maritime Waste Fact Sheets. | Contractor                  | Pre-construction and construction |
<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
</table>
| Waste management – general impacts | • Resource management hierarchy principles will be followed:  
  – avoid unnecessary resource consumption as a priority  
  – recover resources as far as is practicable (including re-use of materials, reprocessing, and recycling and energy recovery). This may include reuse of asphalt removed from decommissioned sections of road  
  – disposal is carried out as a last resort (in line with the Waste Avoidance and Resource Recovery Act 2001)  
  • Site inductions will be carried out (and recorded) by a site supervisor for all staff, to provide a thorough knowledge of all key environmental/safety issues, including waste disposal protocols  
  • All wastes will be managed and disposed of in line with the Waste Classification Guidelines (EPA 2014) and the POEO Act  
  • Stockpiles will be managed to avoid causing pollution or contamination in line with the ‘Stockpile Site Management Guideline’ (RTA 2011a)  
  • Garbage receptacles will be provided and recycling of materials encouraged. Rubbish will be transported to an appropriate waste disposal facility  
  • All working areas will be maintained, kept free of rubbish and cleaned up at the end of each working day. | Project manager and contractor | Construction |
| Climate change – impacts of climate change on the proposal | • Detailed design will take into consideration the potential effect of climate change on the proposal, including flooding and drainage requirements, in line with the Roads and Maritime climate change plan. | Project manager and contractor | Detailed design |
| Climate change – impacts of the proposal on climate change | • Material and waste transport will be scheduled to achieve full loads and to minimise required number of vehicle trips  
  • Materials will be transported from local suppliers, and surplus materials and wastes will be transported to local sites and facilities, wherever possible  
  • Appropriately sized construction equipment, plant and vehicles will be used  
  • Regular equipment servicing will be carried out to maintain optimal performance and to minimise down time (which can improve overall efficiency)  
  • The layout of access, machinery and facilities will be designed to minimise movement and vegetation clearing. | Project manager and contractor | Construction |
6.12 Cumulative impacts

6.12.1 Investigation area
The cumulative impact assessment has considered the entire area within 500 metres of the full Gocup Road works program, which is shown in Figure 1.1.

6.12.2 Gocup Road upgrade program of works
The full Gocup Road works program is described in section 1.1.

Biodiversity
The cumulative biodiversity impacts of all Gocup Road upgrade sections have been assessed in the ‘Gocup Road upgrade corridor assessment’ completed for the entire program of works (GHD 2017c). A summary of this assessment is provided below.

Removal of Box-Gum Woodland
Total Box-Gum Woodland removal for all road upgrade sections is shown in Table 6.19 below.

The full program of works along Gocup Road would remove 41.6 hectares of the Box-Gum Woodland ecological community. Of this, 12.8 hectares is moderate/good condition woodland, 19.8 hectares is derived grassland and 9.0 hectares is low condition woodland. The derived grassland is modified by grazing and has a relatively low diversity of native flora species. Low condition Box-Gum Woodland and derived grassland represent 69 per cent of all Box-Gum Woodland removal.
<table>
<thead>
<tr>
<th>Section name</th>
<th>Works section</th>
<th>Status/confidence on extent of vegetation removal</th>
<th>Source</th>
<th>Box Gum Woodland removal (meeting TSC Act criteria only)</th>
<th>Box Gum Woodland removal (meeting both TSC Act and EPBC Act criteria)</th>
<th>Total Box Gum Woodland removal (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Low condition (woodland)</td>
<td>Mod/good condition (woodland)</td>
<td>Derived grassland (mod/good)</td>
</tr>
<tr>
<td>Section 1 Minor Works</td>
<td>1.1</td>
<td>Proposed/area of vegetation removal known</td>
<td>GHD</td>
<td>0.24</td>
<td></td>
<td>0.24</td>
</tr>
<tr>
<td></td>
<td>1.2</td>
<td>Proposed/area of vegetation removal known</td>
<td>GHD</td>
<td>0.06</td>
<td></td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>1.3</td>
<td>Proposed/area of vegetation removal known</td>
<td>GHD</td>
<td></td>
<td></td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>1.4</td>
<td>Proposed/area of vegetation removal known</td>
<td>GHD</td>
<td></td>
<td></td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>1.5</td>
<td>Proposed/area of vegetation removal known</td>
<td>GHD</td>
<td>0.24</td>
<td></td>
<td>0.24</td>
</tr>
<tr>
<td></td>
<td>1.6</td>
<td>Proposed/area of vegetation removal uncertain</td>
<td>GHD</td>
<td>0.06</td>
<td></td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>1.7</td>
<td>Proposed/area of vegetation removal uncertain</td>
<td>GHD</td>
<td></td>
<td></td>
<td>1.3</td>
</tr>
<tr>
<td>Smarts Road</td>
<td>2.1</td>
<td>Being constructed/area of vegetation removal known</td>
<td>GHD</td>
<td>1.2</td>
<td></td>
<td>1.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.9</td>
</tr>
<tr>
<td>Meadow Creek South</td>
<td>Meadow Creek South</td>
<td>Completed/area of vegetation removal known</td>
<td>EnviroKey (2013c)</td>
<td>0.58</td>
<td></td>
<td>0.58</td>
</tr>
<tr>
<td>Meadow Creek</td>
<td>Meadow Creek</td>
<td>Completed/area of vegetation removal known</td>
<td>GHD (2011)</td>
<td>0.09</td>
<td></td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.59</td>
</tr>
<tr>
<td>Section name</td>
<td>Works section</td>
<td>Status/confidence on extent of vegetation removal</td>
<td>Source</td>
<td>Box Gum Woodland removal (meeting TSC Act criteria only)</td>
<td>Box Gum Woodland removal (meeting both TSC Act and EPBC Act criteria)</td>
<td>Total Box Gum Woodland removal (ha)</td>
</tr>
<tr>
<td>------------------------------</td>
<td>---------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>-------------------------</td>
<td>---------------------------------------------------------</td>
<td>---------------------------------------------------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Low condition (woodland)</td>
<td>Mod/good condition (woodland)</td>
<td>Mod/good condition (woodland)</td>
</tr>
<tr>
<td>Minjary South</td>
<td>3.1</td>
<td>Completed/area of vegetation removal known</td>
<td>EnviroKey (2013b)</td>
<td>0.22</td>
<td>0.62</td>
<td>0.84</td>
</tr>
<tr>
<td>Quidong 90</td>
<td>3.2</td>
<td>Completed/area of vegetation removal known</td>
<td>EnviroKey (2014b)</td>
<td>0.08</td>
<td></td>
<td>0.08</td>
</tr>
<tr>
<td>Quidong Corner/Stuckeys Creek</td>
<td>3.3</td>
<td>Being constructed/area of vegetation removal known</td>
<td>GHD</td>
<td>0.9</td>
<td>0.2</td>
<td>1.1</td>
</tr>
<tr>
<td></td>
<td>3.4</td>
<td>Being constructed/area of vegetation removal known</td>
<td>GHD</td>
<td>1.6</td>
<td>1.2</td>
<td>2.8</td>
</tr>
<tr>
<td>Doctors Hill/Halfway Hill</td>
<td>4</td>
<td>Proposed/area of vegetation removal known</td>
<td>GHD</td>
<td>4.0</td>
<td>4.8</td>
<td>9.8</td>
</tr>
<tr>
<td>Edwardstown Road</td>
<td>5.1</td>
<td>Proposed/area of vegetation removal uncertain</td>
<td>EnviroKey (2012)/GHD</td>
<td>0.19</td>
<td></td>
<td>0.19</td>
</tr>
<tr>
<td>Cookoomooroo</td>
<td>5.2</td>
<td>Proposed/area of vegetation removal known</td>
<td>GHD</td>
<td>0.4</td>
<td>0.7</td>
<td>1.1</td>
</tr>
<tr>
<td>Abattoir</td>
<td>6.1</td>
<td>Completed/area of vegetation removal known</td>
<td>EnviroKey (2014a)</td>
<td>0.32</td>
<td></td>
<td>0.32</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>8.99</strong></td>
<td><strong>5.81</strong></td>
<td><strong>19.8</strong></td>
</tr>
</tbody>
</table>
The investigation area for the full works program contains about 212 hectares of moderate/good condition Box-Gum Woodland (not including derived grassland). The works program would therefore remove six per cent of this moderate/good condition Box-Gum Woodland in the investigation area (see Table 6.20).

Low condition woodland and derived grassland forms of the community were not mapped within the wider investigation area, however large areas of both forms of the community were observed during surveys.

Table 6.20: Assessment of Box-Gum Woodland removal from the investigation area (full program of works)

<table>
<thead>
<tr>
<th></th>
<th>Box Gum Woodland (meeting TSC Act criteria only)</th>
<th>Box Gum Woodland (meeting both TSC Act and EPBC Act criteria)</th>
<th>Total Box Gum Woodland (ha) (mod/good condition only, not incl derived grassland)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low condition (woodland)</td>
<td>Low condition (woodland) 8.99 (22%)</td>
<td>Derived grassland (mod/good) 19.8 (48%)</td>
<td>12.81 (31%)</td>
</tr>
<tr>
<td>Mod/good condition (woodland)</td>
<td>5.81 (14%)</td>
<td>Mod/good condition (woodland) 7.00 (17%)</td>
<td></td>
</tr>
<tr>
<td>Derived grassland (mod/good)</td>
<td>Not assessed</td>
<td>Not assessed</td>
<td>212.4</td>
</tr>
<tr>
<td>Percentage removed</td>
<td>10%</td>
<td>5%</td>
<td>6%</td>
</tr>
</tbody>
</table>

In addition, other areas of Box-Gum Woodland are present outside the investigation area, which are connected to woodland in the investigation area. These areas were observed on private properties from a distance during surveys and have been recorded in Minjary National Park, which is about 1.8 kilometres from the Gocup Road works program (NPWS 2004). The works program would therefore remove only a minor fraction of the adjacent connected Box-Gum Woodland in the locality. It is therefore unlikely that the works program would have a significant cumulative impact.

Compensatory measures would be implemented to offset the cumulative residual impacts of the Gocup Road upgrade (see section 6.1.5).

**Removal of woodland habitat for threatened fauna**

The works program would remove 25.0 hectares of native woodland, including 16.0 hectares of moderate/good condition native woodland and 9.0 hectares of low condition woodland. This comprises a large number of mature and juvenile trees, including 75 hollow-bearing trees.

The investigation area for the works program contains about 358 hectares of moderate/good condition native woodland (Box-Gum Woodland and Red Box/Long-leaved Box woodland). The program of works would therefore remove 4.5 per cent of the moderate/good condition woodland in the investigation area and a much smaller proportion of the connected woodland habitat in the locality.
For nearly all hollow-bearing trees identified for removal, many other hollow-bearing trees were observed nearby in the investigation area, indicating that the trees to be removed do not form a large proportion of the hollow-bearing trees in the investigation area.

Woodland in the investigation area is connected to larger areas of woodland in the locality, including Minjary National Park, 1.8 kilometres from the proposal site, and in woodland remnants on private properties. The proposal would remove only a minor fraction of the adjacent connected woodland in the locality.

The removal of a relatively small area of woodland would be unlikely to have a significant cumulative impact on any threatened biota.

### 6.12.3 Other potential impacts

<table>
<thead>
<tr>
<th>Environmental factor</th>
<th>Construction</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic</td>
<td>The proposal would occur at the same time as other Gocup Road construction and maintenance work, creating cumulative traffic delays along Gocup Road.</td>
<td>The proposal and other upgrade sections of Gocup Road would result in cumulative changes to the visual characteristics along Gocup Road through the construction of large embankments in areas of cut and fill earthworks. The proposed cut and fill embankments would not introduce new features in the landscape, as road embankments already exist along Gocup Road. Therefore the proposal would not change the landscape character of the investigation area. The proposed road embankments would be larger than the existing embankments, making these features more prominent along Gocup Road. However, the proposal and other upgrade sections would be in keeping with the current road environment.</td>
</tr>
<tr>
<td>Landscape and visual</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Property and land use</td>
<td>The proposal and other upgrades of sections of Gocup Road would have a cumulative impact in relation to private property acquisition. The areas proposed to be acquired are relatively small and are unlikely to substantially affect land use in the region.</td>
<td></td>
</tr>
<tr>
<td>Environmental factor</td>
<td>Construction</td>
<td>Operation</td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------</td>
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</tr>
<tr>
<td>Socio-economic</td>
<td>The proposal and other upgrades of sections of Gocup Road would have a positive cumulative impact, benefitting the community and regional economy by improving traffic and freight efficiency between Gundagai and Tumut and by improving safety for all road users.</td>
<td></td>
</tr>
</tbody>
</table>

### 6.12.4 Safeguards and management measures

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<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
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</thead>
</table>
| Cumulative traffic impacts    | - The Traffic Management Plan will consider other developments that may be under construction to minimise traffic conflict and congestion that may occur due to the cumulative increase in construction vehicle traffic  
- Construction of the Gocup Road works program will be managed so that the maximum delay time for motorists on the entire length of Gocup Road would be 20 minutes. | Project manager and contractor          | Construction    |
7 Environmental management

7.1 Environmental management plans

A number of safeguards and management measures have been identified in the REF to minimise adverse environmental impacts, including social impacts, which could potentially arise as a result of the proposal. Should the proposal proceed, these safeguards and management measures would be incorporated into the detailed design and applied during the construction and operation of the proposal.

A construction environmental management plan (CEMP) would be prepared to describe the safeguards and management measures identified. The CEMP would provide a framework for establishing how these measures will be implemented and who would be responsible for their implementation.

The CEMP would be prepared before construction of the proposal and must be reviewed and certified by a Roads and Maritime Environment Officer before the start of any on-site work. The CEMP would be a working document, subject to ongoing change and updated as necessary to respond to specific requirements. The CEMP would be developed in line with the specifications set out in QA Specification G36 – Environmental Protection (Management System), QA Specification G38 – Soil and Water Management (Soil and Water Plan), QA Specification G40 – Clearing and Grubbing, QA Specification G10 - Traffic Management.
7.2 Summary of safeguards and management measures

Environmental safeguards and management measures outlined in this REF will be incorporated into the detailed design phase of the proposal and during construction and operation of the proposal, should it proceed. These safeguards and management measures will minimise any potential adverse impacts arising from the proposed works on the surrounding environment. The safeguards and management measures are summarised in Table 7.1.

Table 7.1: Summary of safeguards and management measures

<table>
<thead>
<tr>
<th>No.</th>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEN1</td>
<td>General - minimise environmental impacts during construction</td>
<td>A CEMP will be prepared and submitted for review and endorsement of the Roads and Maritime Environment Officer prior to start of the activity. As a minimum, the CEMP will address the following: • any requirements associated with statutory approvals • details of how the project will implement the identified safeguards outlined in the REF • issue-specific environmental management plans • roles and responsibilities • communication requirements • induction and training requirements • procedures for monitoring and evaluating environmental performance, and for corrective action • reporting requirements and record-keeping • procedures for emergency and incident management • procedures for audit and review. The endorsed CEMP will be implemented during the activity.</td>
<td>Project manager and contractor</td>
<td>Pre-construction / detailed design</td>
</tr>
<tr>
<td>GEN2</td>
<td>General - notification</td>
<td>All businesses, residential properties and other key stakeholders (eg bus companies, local councils, Visy Pulp and Paper Mill) affected by the activity will be notified at least five days before start of the activity.</td>
<td>Project manager and contractor</td>
<td>Pre-construction</td>
</tr>
<tr>
<td>No.</td>
<td>Impact</td>
<td>Environmental safeguards</td>
<td>Responsibility</td>
<td>Timing</td>
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</tbody>
</table>
| GEN3| General – environmental awareness | All personnel working on site will receive training to ensure awareness of environment protection requirements to be implemented during the project. This will include up-front site induction and regular "toolbox" style briefings. Site-specific training will be provided to personnel engaged in activities or areas of higher risk. These include:  
- threatened species habitat  
- adjoining residential areas requiring particular noise management measures  
- areas containing features of potential non-Aboriginal heritage significance  
- areas containing features of potential Aboriginal heritage significance and location of AHIP boundary. | Project manager and contractor | Pre-construction / detailed design |
| GEN4| General – stockpile sites | Stockpile sites will be managed in line with the following guidelines where practicable:  
- located in areas not prone to flash flooding and more than 50 metres from a watercourse  
- have ready access to the road network or direct access to the construction corridor  
- located in previously disturbed areas that do not require the clearing of native woodland vegetation  
- located in areas of low ecological and heritage conservation significance  
- located outside the drip line of trees  
- located on relatively level land. | Project manager and contractor | Pre-construction and construction |
<p>| B1  | Biodiversity – impacts to biodiversity | A detailed flora and fauna management plan will be prepared in line with Roads and Maritime's Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects (RTA, 2011) and implemented as part of the construction environmental management plan (CEMP) to minimise the ecological impacts of the proposal. It will address terrestrial and aquatic matters and include, but not necessarily be limited to the safeguards and management measures detailed below. | Project manager and contractor | After award pre-construction |</p>
<table>
<thead>
<tr>
<th>No.</th>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
</table>
| B2  | Biodiversity – loss of native vegetation and fauna habitat | • Plans will be prepared for the proposal site and adjoining area showing native vegetation, flora and fauna habitat, threatened species and endangered ecological communities  
• Plans will be prepared showing areas to be cleared and areas to be protected, including exclusion zones and protected habitat features (eg hollow bearing trees)  
• Where practicable, hollow-bearing tree removal will occur outside the main fauna breeding season (August to January) to avoid potential fauna breeding disturbance  
• The pre-clearing process detailed in RTA (2011) – ‘Biodiversity Guidelines Guide 1: Pre-clearing process’, will be implemented before start of work  
• Exclusion fencing and signage will be erected to ensure that environmentally sensitive areas are protected as detailed in RTA (2011) ‘Biodiversity guidelines: Guide 2 – Exclusion Zones’ (RTA 2011) and map these sites on sensitive areas plans. This will include locations of hollow-bearing trees to be retained and trees in the vicinity of stockpile sites  
• Large and hollow-bearing trees to be retained will be defined by survey before clearing and protected by a physical barrier or fence  
• The limits of the proposal will be defined by survey before clearing and grubbing. | Project manager and contractor | After award pre-construction |
| B3  | Biodiversity – loss of native vegetation and fauna habitat | • To the extent practicable, during detailed design, implement design measures (such as road realignment and safety barriers) that minimise the footprint and avoid native vegetation  
• Where possible, make design changes to avoid or minimise impacts to better quality patches of Box-Gum Woodland  
• Where possible, minimise removal of mature trees, including hollow-bearing trees, while still meeting operational objectives for road safety and design  
• Where possible, avoid disturbing native vegetation when building temporary access tracks to stockpile sites or establishing temporary facilities  
• A hollow replacement strategy will be investigated to compensate for removal of hollow-bearing trees for the full works program. | Project manager and contractor | Pre-construction |
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| B4  | Biodiversity – impacts to microbats using culverts | • Culverts will be inspected for roosting bats before culvert extension works are carried out. Inspections will be carried out in line with ‘Biodiversity Guidelines Guide 1: Pre-clearing process’ and ‘Biodiversity Guidelines Guide 9: Fauna handling’ (RTA 2011)  
• If bats are found to inhabit the culverts, an ecologist will relocate the bats and implement exclusion measures before culvert works start. | Project manager and contractor  | After award pre-construction and construction |
| B5  | Biodiversity – spread of weeds              | • A weed management plan will include measures to prevent the spread of weeds, particularly into areas of Box-Gum Woodland as detailed in RTA (2011) – ‘Biodiversity Guidelines Guide 6: Weed management’. | Project manager and contractor  | After award pre-construction          |
| B6  | Biodiversity – loss of native vegetation and fauna habitat | • Felled hollow-bearing trees will be left on site for at least 24 hours after felling to allow any resident fauna to relocate  
• All staff working on site will complete a site-specific environmental induction. This will include the limits of vegetation clearing and the areas of vegetation to be retained  
• All construction vehicles and equipment will follow the traffic management plan, including the vehicle movement plan. | Project manager and contractor  | Construction                       |
| B7  | Biodiversity – loss of woody debris and bush rock habitat | • All existing woody debris and any bush rock encountered on the ground will be relocated in line with the Roads and Maritime ‘Biodiversity Guidelines Guide 4: Clearing of vegetation and removal of bush rock’ and ‘Biodiversity Guidelines Guide 5: Re-use of woody debris and bushrock’ (RTA 2011)  
• Some of the coarse woody debris generated by removing vegetation will be relocated outside the proposal site and retained as habitat on the ground. The retained woody debris will be spread in a fashion that replicates the natural occurrence of woody debris in the environment and will not be stacked. | Project manager and contractor  | Construction                       |
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<tr>
<td>B8</td>
<td>Biodiversity – loss of mature trees, including hollow-bearing trees</td>
<td>• Pruning or lopping of limbs will be conducted in preference to tree removal wherever possible.</td>
<td>Project manager and contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>B9</td>
<td>Biodiversity – impacts to fauna</td>
<td>• Clearing of vegetation will be carried out as detailed in RTA (2011) – ‘Biodiversity Guidelines Guide 4: Clearing of vegetation and removal of bushrock’&lt;br&gt; • Fauna handling during vegetation removal will be carried out by a licensed fauna ecologist or wildlife carer, as detailed in RTA (2011) – ‘Biodiversity Guidelines Guide 9: Fauna handling’.</td>
<td>Project manager and contractor</td>
<td>Construction</td>
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<tr>
<td>B10</td>
<td>Biodiversity – impacts to threatened species</td>
<td>• If unexpected threatened fauna, flora or ecological communities are discovered, works will stop immediately in the vicinity of the find and the Roads and Maritime ‘Unexpected Threatened Species Find Procedure’ in RTA (2011) – ‘Biodiversity Guidelines Guide 1: Pre-clearing process’ will be followed. This will include notifying the Roads and Maritime environment officer immediately and commissioning an assessment of the likely impacts of the proposal on the threatened species.</td>
<td>Project manager and contractor</td>
<td>Construction</td>
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<tr>
<td>B11</td>
<td>Biodiversity – impacts to groundwater dependent ecosystems</td>
<td>• Interruptions to water flows associated with groundwater dependent ecosystems will be minimised through detailed design.</td>
<td>Project manager</td>
<td>Detailed design</td>
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<tr>
<td>B12</td>
<td>Biodiversity – changes to hydrology</td>
<td>• Changes to existing surface water flows will be minimised through detailed design.</td>
<td>Project manager</td>
<td>Detailed design</td>
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<tr>
<td>B13</td>
<td>Biodiversity – spread of weeds</td>
<td>• Declared priority weeds will be managed in line with the requirements of the NSW Biosecurity Act 2015&lt;br&gt; • Weed infested topsoil will be disposed of or treated and will not be stockpiled near any areas of native vegetation.</td>
<td>Project manager and contractor</td>
<td>Construction</td>
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<td>B14</td>
<td>Biodiversity – pathogen spread and establishment</td>
<td>• Measures for preventing the introduction and/or spread of disease-causing agents such as bacteria and fungi will be implemented, as detailed in RTA (2011) – ‘Biodiversity Guidelines Guide 7: Pathogen management’.</td>
<td>Project manager and contractor</td>
<td>Construction</td>
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<tr>
<td>B15</td>
<td>Biodiversity – fragmentation of habitat corridors</td>
<td>• To minimise impacts on vegetation connectivity, sections of decommissioned road will be revegetated to improve connectivity of roadside vegetation.</td>
<td>Project manager</td>
<td>Post-construction</td>
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| B16 | Biodiversity – loss of native vegetation and fauna habitat             | • Native vegetation will be re-established in line with the Roads and Maritime ‘Biodiversity Guidelines Guide 3: Re-establishment of native vegetation’ (RTA 2011)  
• Locally native species will be used for revegetation. Species will be consistent with those for the Commonwealth scientific committee determination of Box-Gum Woodland  
• The removal of native vegetation, particularly the areas of Box-Gum Woodland and threatened species habitat impacted for the project, will be offset in line with the Roads and Maritime ‘Guideline for Biodiversity Offsets’. | Project manager                | Post-construction |
| SW1 | Soils and water quality – soil erosion, sedimentation and water quality | • A soil and water management plan (SWMP) will be prepared as part of the CEMP in line with Roads and Maritime specification G38 – ‘Soil and Water Management’  
• The soil and water management plan will also address the following:  
  – Guideline for Batter Surface Stabilisation Using Vegetation (RMS 2015)  
• A site specific Erosion and Sediment Control Plan (ESCP) will be prepared and implemented as part of the SWMP. The ESCP will include arrangements for wet weather events, including monitoring of potential high risk events (such as storms) and follow-up measures to be applied in the event of wet weather. The ESCP will also include: | Project manager and contractor | Pre-construction and construction |
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<td>– a maintenance schedule for ongoing maintenance of temporary erosion and sediment controls</td>
<td>Project manager and contractor</td>
<td>Pre-construction and construction</td>
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<td>– a sediment basin management plan to guide appropriate management of runoff during construction and operation</td>
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<td>The SWMP will include a site specific emergency spill plan, which will include spill management measures in line with the Roads and Maritime Code of Practice for Water Management (RTA 1999) and relevant EPA guidelines. The plan will address measures to be implemented in the event of a spill, including initial response and containment, notification of emergency services and relevant authorities (including Roads and Maritime and EPA officers).</td>
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<td>SW2</td>
<td>Soils and water quality – soil erosion and water quality</td>
<td>A Roads and Maritime approved soil conservationist will be engaged to provide advice through all stages of the project to assess and advise on erosion and sediment control, including progressive preparation of the ESCP. The soil conservationist must regularly (at least once a month and before and after rain events) review and inspect works throughout the construction phase and provide written recommendations on the ESCP drawings and the effectiveness of controls in place. A copy of the report is to be provided to the Principal</td>
<td>Project manager and contractor</td>
<td>Pre-construction and construction</td>
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<td>Controls will be implemented before topsoil removal and start of earthworks within the catchment area of each structure. This includes construction of sediment basins and other water quality structures.</td>
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<td>SW3</td>
<td>Soils and water quality – soil contamination</td>
<td>The CEMP will include a contaminated land management plan, which must comply with the Contaminated Land Management Act 1997, ‘Guideline for the Management of Contamination’ (Roads and Maritime 2013), ‘Environmental Incident Classification and Reporting Procedure’ (Roads and Maritime 2014) and EPA guidelines on contaminated land management</td>
<td>Project manager and contractor</td>
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<td>The contaminated land management plan will include:</td>
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<td>– unexpected contamination finds</td>
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<td>– any land contamination caused during construction</td>
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<td>– measures to ensure the safety of site personnel and local communities during construction.</td>
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| SW4 | Soils and water quality – soil erosion and sedimentation | - Sediment and erosion controls (including sediment basins), clean water diversions and culverts will be constructed and be on line before earthworks start  
- Sediment basins will be regularly serviced and maintained to comply with water quality and capacity requirements  
- Vegetation clearing and stabilisation/revegetation activities will be carried out progressively to limit the time disturbed areas are exposed to erosion processes  
- Site stabilisation of disturbed areas will be carried out progressively as stages are completed  
- Topsoil and mulch will each be stockpiled separately for possible re-use in rehabilitation works. Mulch may also be used for erosion and sediment controls  
- High risk soil erosion activities such as earthworks will not be carried out immediately before or during high rainfall or wind events  
- Any material transported onto pavement surfaces will be swept and removed at the end of each working day  
- Erosion and sediment control measures will be maintained until the works are complete and areas are stabilised  
- Sediment fencing will be installed downstream of any works in drainage lines. | Project manager and contractor | Construction |
| SW5 | Soils and water quality – water contamination | - All fuels, chemicals, and liquids will be stored at least 50 metres away from any drainage lines and waterways and will be stored in an impervious bunded area within the compound site  
- Refuelling of plant and planned maintenance of machinery and plant will be carried out 50 metres away from waterways and drainage lines  
- Vehicles and plant will be properly maintained and regularly inspected for fluid leaks  
- Control of dirty water will be managed on site to avoid release into drainage lines and/or waterways  
- Potable water will be used for wash down  
- Containment material will be used to capture/filter water used in vehicle wash-downs | Project manager and contractor | Construction |
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|     |        | • Vehicle and plant wash downs and/or concrete truck washouts will be carried out within a designated bunded area with an impervious surface or will be carried out off site  
  • Visual monitoring of local water quality (ie turbidity, hydrocarbon spills/slicks) at drainage lines will be carried out on a regular basis to identify any potential spills or deficient erosion and sediment controls. Inspection records will be kept  
  • Emergency spill kits will be kept on site at all times  
  • All staff will be inducted about incident and emergency procedures and made aware of the locations of emergency spill kits  
  • Should a spill occur during construction, the emergency response plan will be implemented, and the Roads and Maritime senior regional environmental officer contacted. The EPA will also be notified as per Part 5.7 of the POEO Act. | Project manager and contractor | Construction |
| SW6 | Soils and water quality – soil contamination | • If contaminated areas are encountered during construction, appropriate control measures will be implemented to manage immediate contamination risks. All other works that may impact on the contaminated area will stop until the nature and extent of the contamination has been confirmed and any necessary site-specific controls or further actions identified in consultation with the Roads and Maritime environment officer and/or EPA. | Project manager and contractor | Construction |
| SW7 | Soils and water quality – soil erosion and sedimentation | • Carry out surveillance to monitor the effectiveness of soil stabilisation and erosion management measures  
  • Additional erosion management measures may be implemented if measures implemented during construction are not performing to requirements. | Project manager and contractor | Construction and post-construction |
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| T1  | Traffic and transport – construction impacts to traffic               | A Traffic Management Plan (TMP) will be prepared and implemented as part of the CEMP. The TMP will be prepared in line with the Roads and Maritime ‘Traffic Control at Work Sites Manual’ (RTA, 2010) and ‘QA Specification G10 Control of Traffic’. The TMP will include:  
- confirmation of haulage routes  
- measures to maintain access to local roads and properties  
- site specific traffic control measures (including signage) to manage and regulate traffic movement  
- requirements and methods to consult and inform the local community of local road network impacts in line with the Roads and Maritime ‘Community Engagement and Communication Manual’ (Roads and Maritime 2012)  
- access to construction sites including entry and exit locations and measures to prevent construction vehicles queuing on public roads  
- a response plan for any construction traffic incident  
- monitoring, review and amendment mechanisms. | Contractor and Project Manager | Pre-construction and construction |
| T2  | Traffic - construction impacts to traffic                              | - Property access will be maintained at all times unless otherwise agreed with affected property owners. Where changes to access arrangements are necessary, Roads and Maritime will advise owners and tenants and consult with them on alternate access arrangements  
- Construction traffic will enter/exit the construction zone only in areas designated for this purpose in the Traffic Management Plan  
- The community will be kept informed about upcoming road construction activities, including through advertisements in the local media and by prominently placed advisory notices. | Project manager and contractor | Construction                 |
<p>| NV1 | Noise and vibration – construction noise and vibration impacts         | A noise and vibration management plan (NVMP) will be prepared and implemented as part of the CEMP. The NVMP will generally follow the approach in the Roads and Maritime Construction Noise and Vibration Guideline (CNVG). | Contractor and project manager | Pre-construction and construction |</p>
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| NV2 | Noise and vibration – construction noise and vibration impacts | • All potentially impacted residents will be informed of the nature of works, expected noise levels and duration of works. A point of contact will be provided  
• Notification detailing work activities, dates and hours, impacts and mitigation measures, indication of work schedule over the night-time period, any operational noise benefits from the works (where applicable) and contact telephone number  
• Notification will be a minimum of five calendar days before the start of works. For projects other than maintenance works more advanced consultation or notification may be required. Roads and Maritime Communication and Stakeholder Engagement will be contacted for further guidance  
• The following may be implemented:  
  – periodic notification (letterbox drop or equivalent)  
  – website  
  – project info-line  
  – construction response line  
  – email distribution list  
  – community based forums (if required by approval conditions).  
• All employees, contractors and subcontractors are to receive an environmental induction. The induction must at least include:  
  – all relevant project specific and standard noise and vibration mitigation measures  
  – relevant licence and approval conditions  
  – permissible work hours  
  – any limitations on high noise generating activities  
  – location of nearest sensitive receivers  
  – construction employee parking areas  
  – designated loading/unloading areas and procedures  
  – construction traffic routes  
  – site opening/closing times (including deliveries)  
  – environmental incident procedures. | Contractor | Pre-construction and construction |
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<tr>
<td>NV3</td>
<td>Noise and vibration – specific impacts to receivers</td>
<td>• Specific management measures (notification, phone calls, respite offers and verification) will be implemented for sensitive receivers RES01, RES02, RES03 and RES04 as detailed in Table 4-21 of the noise and vibration assessment in Appendix C.</td>
<td>Contractor</td>
<td>Pre-construction and construction</td>
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</table>
| NV4 | Noise and vibration – construction impacts       | • The CEMP must be regularly updated to account for changes in noise and vibration management issues and strategies  
• A non-vibratory roller must be used when compacting within 15 metres of a residential receiver  
• Where feasible and reasonable, construction will be carried out during standard daytime working hours  
• The use of mulchers, jack hammers, concrete saws, rock breakers, compaction or other equipment used in very close proximity to the receivers will be limited where feasible and reasonable to standard construction hours  
• Use quieter and less vibration emitting construction methods where reasonable and feasible  
• Ensure plant including the silencer is well maintained  
• The noise levels of plant and equipment must have operating sound power or sound pressure levels compliant with the criteria listed in Appendix H of the CNVG  
• Plant used intermittently will be throttled down or shut down  
• Locate compounds away from sensitive receivers  
• Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site  
• The use of ambient sensitive alarms that adjust output relative to the ambient noise level will be considered  
• Loading and unloading of materials/deliveries is to occur as far as possible from sensitive receivers  
• Schedule construction works that have potential to produce high noise or vibration levels during less sensitive times  
• Avoid or minimise out of hours movements where possible  
• Minimise noise and vibration impacts from blasting operations by: | Contractor      | Construction                            |
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<td>– reducing maximum instantaneous charge size</td>
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<td>– choosing appropriate blast charge configurations</td>
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<td>– ensuring appropriate blast hole preparation</td>
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<td>– optimising blast design, location, orientation and spacing</td>
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<td>– selecting appropriate blast times</td>
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<td>– considering prevailing meteorological conditions</td>
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<td>• Carry out building condition inspections on all buildings located within 50 metres of blasting activities before commencing activities with the potential to cause property damage</td>
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<td>• A detailed blast management plan will be prepared by the construction contractor before carrying out any blasting.</td>
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<td>NV5</td>
<td>Noise and vibration – Complaints</td>
<td>• Complaint monitoring measurements will be taken at the complainant's location for reasonable complaints and the monitoring will cover the time of day when the impacts were reported to occur and the activity.</td>
<td>Contractor</td>
<td>Construction</td>
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<td>AQ1</td>
<td>Air quality – construction air quality impacts</td>
<td>An Air Quality Management Plan (AQMP) will be prepared and implemented as part of the CEMP. The AQMP will include, but not be limited to:</td>
<td>Contractor</td>
<td>Pre-construction and construction</td>
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<td>• potential sources of air pollution</td>
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<td>• air quality management objectives consistent with any relevant published EPA and/or OEH guidelines</td>
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<td>• mitigation and suppression measures to be implemented</td>
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<td>• methods to manage work during strong winds or other adverse weather conditions</td>
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<td>• a progressive rehabilitation strategy for exposed surfaces</td>
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<td>• monitoring and reporting procedures</td>
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<td>• a management procedure to deal with air quality complaints.</td>
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<td>AQ2</td>
<td>Air quality – dust management</td>
<td>- Exposed surfaces will be watered regularly to minimise dust emissions as necessary &lt;br&gt; - Vegetation clearing will be minimised where possible &lt;br&gt; - Disturbed surfaces will be stabilised as soon as practicable &lt;br&gt; - Stockpiles or areas that may generate dust will be managed to suppress dust emissions in line with the Roads and Maritime ‘Stockpile Site Management Guideline’ (RTA 2011a) &lt;br&gt; - All trucks will be covered when transporting dust generating material to and from the site &lt;br&gt; - Dust and/or particulate matter (PM$_{10}$) will be monitored if considered necessary to identify the potential for nuisance dust impacts.</td>
<td>Project manager and contractor</td>
<td>Construction</td>
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<tr>
<td>AQ3</td>
<td>Air quality – other air emissions</td>
<td>- Plant and machinery will be turned off when not in use as much as possible and will be fitted with emission control devices complying with Australian Design Standards where practicable &lt;br&gt; - Construction plant, vehicles and equipment will be maintained in good working condition to limit impacts on air quality &lt;br&gt; - No burning of any materials will occur.</td>
<td>Project manager and contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>LV1</td>
<td>Landscape and visual – visual impacts of the proposal</td>
<td>- The proposal footprint will be limited as much as possible to minimise earthworks and maintain existing vegetation wherever possible.</td>
<td>Project manager</td>
<td>Detailed design</td>
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<tr>
<td>LV2</td>
<td>Landscape and visual – visual impacts of construction works</td>
<td>- The work site will be left in a tidy manner at the end of each work day.</td>
<td>Project manager and contractor</td>
<td>Construction</td>
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<tr>
<td>LV3</td>
<td>Landscape and visual – views of cut and fill batters</td>
<td>- Batters will be rehabilitated progressively as shown on drawings.</td>
<td>Contractor</td>
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<td>LP1</td>
<td>Land use and property – impacts to utilities</td>
<td>• Roads and Maritime will consult with relevant service providers during detailed design to minimise the potential for service interruptions.</td>
<td>Project manager and contractor</td>
<td>Detailed design</td>
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<td>LP2</td>
<td>Land use and property – land use impacts</td>
<td>• All property acquisition will be carried out in line with the Roads and Maritime ‘Land Acquisition Information Guide’ (RTA 2011c) and the <em>Land Acquisition (Just Terms Compensation) Act 1991</em>&lt;br&gt;• Relocation or replacement of private infrastructure costs required for the proposal will be funded by Roads and Maritime&lt;br&gt;• Affected landowners and tenants will be consulted on an ongoing basis about acquisition status and timing.</td>
<td>Project manager and contractor</td>
<td>Pre-construction and construction</td>
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<td>SE1</td>
<td>Socio-economic – construction impacts on the community</td>
<td>• Potentially affected property owners and residents will be contacted before the start of work in line with the Roads and Maritime ‘Community Engagement and Communication Manual’ (Roads and Maritime 2012). Residents will be notified via door knocks, newsletters or letter box drops providing information on the proposed work, working hours and a contact name and number should any complaints wish to be registered&lt;br&gt;• A complaints management procedure and register will be included in the CEMP.</td>
<td>Project manager and contractor</td>
<td>Pre-construction</td>
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<tr>
<td>SE2</td>
<td>Socio-economic – construction impacts on the community</td>
<td>• Local residents and road users will be kept regularly informed of construction activities during the construction process.</td>
<td>Project manager and contractor</td>
<td>Construction</td>
</tr>
<tr>
<td>No.</td>
<td>Impact</td>
<td>Environmental safeguards</td>
<td>Responsibility</td>
<td>Timing</td>
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</tr>
</tbody>
</table>
| AH1 | Aboriginal heritage – impacts on known sites of Aboriginal heritage significance | - Exclusion fencing will be erected around sites Stony Creek AFT 01 and Stony Creek IF 01 before work starts  
- All workers will be inducted before work starts about the nature of the Aboriginal heritage resource in the investigation area (including sites Stony Creek AFT 01 and Stony Creek IF 01) and the penalties for breaches of the *National Parks and Wildlife Act 1974*  
- Interpretative signage will be developed locating ‘Site F: Stony Creek Pathway Cultural Site’ within the broader cultural landscape. The content of the signage will be developed in consultation with the Aboriginal knowledge holders. The preferred location for the placement of the signage, dependent on consultation with the relevant landholders, is within the townships of Tumut and Gundagai. | Project manager and contractor | Pre-construction and construction |
| AH2 | Aboriginal heritage – impacts on potential unknown sites of Aboriginal heritage significance | - All construction activities must stay within the defined AHIP boundary  
- The ‘Standard Management Procedure - Unexpected Heritage Items’ (Roads and Maritime 2015) will be followed in the event that an unknown or potential Aboriginal object/s, including skeletal remains, is found during construction. This applies where Roads and Maritime does not have approval to disturb the object/s or where a specific safeguard for managing the disturbance (apart from the Procedure) is not in place  
- Work will only re-start once the requirements of that Procedure have been satisfied. | Project manager and contractor | Construction |
| NAH1 | Non-Aboriginal heritage – inadvertent impacts on heritage items | - Exclusion fencing will be installed around the stone culverts (items 2 and 3) on the former Gocup Road as necessary  
- As part of the site induction, all workers will be advised of their obligations in relation to heritage before working on the site and the guidelines to follow if unanticipated heritage items or deposits are located during construction. | Project manager and contractor | Construction |
<table>
<thead>
<tr>
<th>No.</th>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
</table>
| NAH2| Non-Aboriginal heritage – unanticipated archaeological finds | - In the event of an unexpected find of an archaeological deposit (or suspected item), work will stop in the affected area and Roads and Maritime’s Environment Officer will be contacted for advice on how to proceed. The ‘Unexpected Heritage Items Procedure’ (Roads and Maritime 2015) will be followed if a potential artefact is uncovered  
- Work will only re-start once the requirements of that Procedure have been satisfied.                                                                                                                                                                                                 | Project manager and contractor         | Construction |
| HR1 | Hazards and risk | - Emergency response plans will be incorporated into the CEMP  
- An incident response plan will be developed and implemented as required as part of the CEMP to manage any identified risks on site  
- A design safety audit will be carried out before construction  
- The CEMP will include provisions to minimise the potential for ignition or spread of fire. This will include the preparation of a bushfire management plan. Consultation with the local Rural Fire Service will be carried out during preparation of the plan. | Project manager and contractor         | Pre-construction |
<p>| HR2 | Hazards and risk | - The contractor must keep the general public from entering the proposal site and facilities, with appropriate measures and fencing for security as required. The contractor must erect clear and visible signs to advise that entry to the proposal site and facilities is prohibited by unauthorised persons. | Project manager and contractor         | Construction |</p>
<table>
<thead>
<tr>
<th>No.</th>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
</table>
| W1  | Waste management – general impacts | • A Waste Management Plan (WMP) will be prepared and implemented as part of the CEMP. The WMP will include but not be limited to:  
  – measures to avoid and minimise waste associated with the project  
  – classification of wastes and management options (re-use, recycle, stockpile, disposal)  
  – statutory approvals required for managing both on and off-site waste, or application of any relevant resource recovery exemptions  
  – procedures for storage, transport and disposal  
  – monitoring, record keeping and reporting  
  • The WMP will be prepared taking into account the *Environmental Procedure - Management of Wastes on Roads and Maritime Services Land* (Roads and Maritime 2014) and relevant Roads and Maritime Waste Fact Sheets. | Contractor | Pre-construction and construction |
|     |        |                          |               |        |
| W2  | Waste management – general impacts | • Resource management hierarchy principles will be followed:  
  – avoid unnecessary resource consumption as a priority  
  – recover resources as far as is practicable (including re-use of materials, reprocessing, and recycling and energy recovery). This may include reuse of asphalt removed from decommissioned sections of road  
  – disposal is carried out as a last resort (in line with the Waste Avoidance and Resource Recovery Act 2001)  
  • Site inductions will be carried out (and recorded) by a site supervisor for all staff, to provide a thorough knowledge of all key environmental/safety issues, including waste disposal protocols  
  • All wastes will be managed and disposed of in line with the Waste Classification Guidelines (EPA 2014) and the POEO Act  
  • Stockpiles will be managed to avoid causing pollution or contamination in line with the ‘Stockpile Site Management Guideline’ (RTA 2011a)  
  • Garbage receptacles will be provided and recycling of materials encouraged. Rubbish will be transported to an appropriate waste disposal facility  
  • All working areas will be maintained, kept free of rubbish and cleaned up at the end of each working day. | Project manager and contractor | Construction |
<table>
<thead>
<tr>
<th>No.</th>
<th>Impact</th>
<th>Environmental safeguards</th>
<th>Responsibility</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC1</td>
<td>Climate change – impacts of climate change on the proposal</td>
<td>• Detailed design will take into consideration the potential effect of climate change on the proposal, including flooding and drainage requirements, in line with the Roads and Maritime climate change plan.</td>
<td>Project manager and contractor</td>
<td>Detailed design</td>
</tr>
</tbody>
</table>
| CC2 | Climate change – impacts of the proposal on climate change            | • Material and waste transport will be scheduled to achieve full loads and to minimise required number of vehicle trips  
• Materials will be transported from local suppliers, and surplus materials and wastes will be transported to local sites and facilities, wherever possible  
• Appropriately sized construction equipment, plant and vehicles will be used  
• Regular equipment servicing will be carried out to maintain optimal performance and to minimise down time (which can improve overall efficiency)  
• The layout of access, machinery and facilities will be designed to minimise movement and vegetation clearing. | Project manager and contractor     | Construction |
| CT1 | Cumulative traffic impacts                                            | • The Traffic Management Plan will consider other developments that may be under construction to minimise traffic conflict and congestion that may occur due to the cumulative increase in construction vehicle traffic  
• Construction of the Gocup Road works program will be managed so that the maximum delay time for motorists on the entire length of Gocup Road would be 20 minutes. | Project manager and contractor     | Construction |
7.3 Licensing and approvals

If a contractor carries out an activity requiring approval from an authority, it is the responsibility of the contractor to obtain the necessary approval. Licences and approvals that may be required for the proposal are summarised in Table 7.2.

### Table 7.2: Summary of licensing and approvals required

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Requirement</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Protection of the Environment Operations Act 1997 (s43)</em></td>
<td>Environment protection licence (EPL) for scheduled activities (extractive and crushing activities) from the EPA.</td>
<td>Before start of the activity.</td>
</tr>
<tr>
<td><em>National Parks and Wildlife Act 1974 (s90)</em></td>
<td>Aboriginal heritage impact permit variation for the proposal from the OEH Chief Executive.</td>
<td>Before start of the activity.</td>
</tr>
<tr>
<td><em>Water Management Act 2000 (s91B)</em></td>
<td>Extraction of water from the Tumut River or Murrumbidgee River would require a water supply work approval from DPI (Water).</td>
<td>Before start of the activity.</td>
</tr>
</tbody>
</table>
8 Conclusion

8.1 Justification

This section provides the justification for the proposal taking into account its biophysical, social and economic impacts, the suitability of the site and whether or not the proposal is in the public interest. The proposal is also considered in the context of the objectives of the Environmental Planning and Assessment Act 1979 (EP&A Act), including the principles of ecologically sustainable development as defined in Schedule 2 of the Environmental Planning and Assessment Regulation 2000.

The proposal is considered to be consistent with a number of strategies or plans, including:

- NSW 2021: A Plan to Make NSW No 1
- NSW State Infrastructure Strategy 2012-2032
- Roads and Maritime 2020 Strategy
- NSW Long Term Transport Master Plan
- Murray-Murrumbidgee Regional Transport Plan
- NSW Freight and Ports Strategy 2013
- National Land Freight Network Strategy
- Tumut to Hume Highway Corridor Strategy.

Gocup Road has been identified as a strategic freight route in NSW. It is an important route for the local timber and milling industry. Gocup Road is also an important route for residents and property owners between Tumut and Gundagai, and for people commuting between the towns for work.

Gocup Road does not meet current road design standards and has a number of constraints for motorists and heavy vehicles. Due to these constraints, Gocup Road does not meet road safety standards and has low freight and travel efficiency.

The proposal would improve road safety and increase traffic and freight efficiency by meeting current road design standards and supporting high productivity vehicle access, with benefits for the regional economy.

There would also be a number of adverse environmental impacts as a result of the proposal. Where possible, impacts would be avoided or minimised through the design process and site-specific safeguards.

On balance, it is considered that the adverse environmental impacts of the project are outweighed by the beneficial effects and that the proposal is therefore justified.

8.2 Objects of the EP&A Act

8.2.1 Summary of the proposal against the objects of the EP&A Act

Table 8.1 provides a summary of the proposal against the objects of the EP&A Act.
**Table 8.1: Objects of EP&A Act**

<table>
<thead>
<tr>
<th>Object</th>
<th>Comment</th>
</tr>
</thead>
</table>
| 5(a)(i) To encourage the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment. | The proposal would remove about 1.1 hectares of native vegetation, all of which classifies as TSC Act-listed Box-Gum Woodland. This woodland provides habitat for listed fauna. Impacts on listed biota are unlikely to be significant, as detailed in section 6.1.  
<br>The proposal would acquire about 9.3 hectares of land from rural properties, which is a relatively small proportion of the total agricultural land in the area and is unlikely to substantially affect any property owners.  
<br>Roads and Maritime would aim to use all excavated material as fill for proposal.  
<br>The proposal would have amenity impacts (noise, air quality and visual) during construction. These impacts would be minimised with the implementation of safeguards.  
<br>The proposal would benefit the community and regional economy by improving traffic and freight efficiency between Gundagai and Tumut and by improving safety for all road users. |
| 5(a)(ii) To encourage the promotion and coordination of the orderly economic use and development of land. | Roads and Maritime is carrying out consultation and environmental investigations required to properly plan and develop the proposal without undue impacts on the local economy.  
<br>The proposal would benefit the regional economy by improving traffic and freight efficiency between Gundagai and Tumut. |
<p>| 5(a)(iii) To encourage the protection, provision and co-ordination of communication and utility services. | Roads and Maritime is consulting with utility providers about the potential protection and relocation of utilities near the proposal site, and would continue to consult with these providers during the detailed design phase and construction. |
| 5(a)(iv) To encourage the provision of land for public purposes. | The proposal involves work for the purpose of a road, which is for a public purpose. |
| 5(a)(v) To encourage the provision and co-ordination of community services and facilities. | The proposal is located in a rural environment. No community services or facilities would be affected by the proposal. |</p>
<table>
<thead>
<tr>
<th>Object</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>5(a)(vi) To encourage the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats.</td>
<td>The proposal would remove about 1.1 hectares of native vegetation, all of which classifies as TSC Act-listed Box-Gum Woodland. This woodland provides habitat for listed fauna. Impacts on listed biota are unlikely to be significant, as detailed in section 6.1.</td>
</tr>
<tr>
<td>5(a)(vii) To encourage ecologically sustainable development.</td>
<td>Ecologically sustainable development is considered in sections 8.2.2 below.</td>
</tr>
<tr>
<td>5(a)(viii) To encourage the provision and maintenance of affordable housing.</td>
<td>Not relevant to the proposal.</td>
</tr>
<tr>
<td>5(b) To promote the sharing of the responsibility for environmental planning between different levels of government in the State.</td>
<td>Not relevant to the proposal.</td>
</tr>
<tr>
<td>5(c) To provide increased opportunity for public involvement and participation in environmental planning and assessment.</td>
<td>Roads and Maritime has consulted with the community and stakeholders for the proposal as described in chapter 5. This has included the Aboriginal community. Issues raised during consultation in relation to the proposal have been addressed during the environmental planning and assessment process.</td>
</tr>
</tbody>
</table>

**8.2.2 Ecologically sustainable development**

Australia's 'National Strategy for Ecologically Sustainable Development 1992' defines ecologically sustainable development as “using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased”.

The principles of ecologically sustainable development have been incorporated into the concept design and environmental assessment of the proposal. The integration of these principles is discussed below.

**The precautionary principle**

This principle states that “if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation”.

Evaluation and assessment of alternative options have aimed to reduce the risk of serious and irreversible environmental impacts. Community consultation considered issues raised by the community and a range of specialist studies were carried out for key issues to provide accurate and impartial information to assist in options evaluation.

The detailed assessment of potential environmental impacts in the preparation of the design has sought to minimise impacts on the amenity of the area, while maintaining engineering feasibility and safety for all road users.

This process has enabled the proposal's impacts to be predicted within a reasonable degree of certainty. All predictions, however, contain a degree of variability, which reflects the variable nature of the environment. Where there has been any uncertainty in the prediction of impacts throughout
the environmental impact assessment process, a conservative approach was adopted to ensure the worst case scenario was predicted in the assessment of impacts. A number of safeguards have been proposed to minimise potential impacts. These safeguards would be implemented during construction and operation of the proposal. No safeguards have been postponed as a result of lack of scientific certainty.

A CEMP would be prepared before construction starts. This requirement would ensure the proposal achieves a high-level of environmental performance.

**Intergenerational equity**

The principle states, “the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations”.

The proposal would benefit future generations by ensuring the proposal does not give rise to long-term adverse environmental impacts and by ensuring that potential impacts are minimised by implementing appropriate safeguards. This would ensure the principle of intergenerational equity is not compromised.

Should the proposal not proceed, the principle of intergenerational equity may be compromised, as future generations would inherit a road with a lower level of service and of poorer quality. The proposal would benefit future generations by improving traffic and freight efficiency and road safety.

**Conservation of biological diversity and ecological integrity**

This principle states that the “conservation of biological diversity and ecological integrity should be a fundamental consideration”.

An assessment of the existing local environment has been carried out to identify and manage the potential impacts of the proposal on local biodiversity. The proposal would remove about 1.1 hectares of native vegetation, all of which classifies Box-Gum Woodland a. This woodland provides habitat for listed fauna. Impacts on listed biota are unlikely to be significant, as detailed in section 6.1. A specialist biodiversity assessment is provided in Appendix B. Detailed design and implementation of safeguards and management measures would aim to minimise biodiversity impacts. On this basis, the conservation of biological diversity and ecological integrity has been a fundamental consideration in the assessment of the proposal.

**Improved valuation, pricing and incentive mechanisms**

This principle requires that “environmental factors should be included in the valuation of assets and services, such as:

(i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,

(ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,

(iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.”

The REF has examined the environmental consequences of the proposal and identified safeguards and management measures for areas that have the potential to experience adverse impacts. Requirements imposed in terms of implementation of these safeguards and management
measures would result in an economic cost to Roads and Maritime. The implementation of safeguards and management measures would increase both the capital and operating costs of the proposal. This signifies environmental resources have been given appropriate valuation.

The concept design for the proposal has been developed with an objective of minimising potential impacts on the surrounding environment. This approach would also be applied to the detailed design.

All contractors engaged by Roads and Maritime are to abide by the environmental standards and procedures established by Roads and Maritime, and are to factor environmental management measures (such as waste management) into the cost of their work.

8.3 Conclusion

Roads and Maritime proposes to upgrade the Cookoomooroo section of Gocup Road.

The proposal would benefit the community and regional economy by improving traffic and freight efficiency between Gundagai and Tumut and by improving safety for all road users.

The proposal is subject to assessment under Part 5 of the EP&A Act. This REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity. This has included consideration of conservation agreements and plans of management under the National Parks and Wildlife Act 1974, joint management and biobanking agreements under the Threatened Species Conservation Act 1995, wilderness areas, critical habitat, impacts on threatened species, populations and ecological communities and their habitats and other protected fauna and native plants.

The proposal as described in this review of environmental factors best meets the proposal objectives but would still result in the following impacts:
- native vegetation removal, including the threatened ecological community Box-Gum Woodland, and habitat for listed fauna. The impacts of the proposal on species and ecological communities listed under the TSC Act and EPBC Act
- minor traffic delays and changed road conditions during construction
- potential noise, airblast, air quality and visual impacts to residences during construction
- private property and Crown land acquisition.

These adverse environmental impacts would be minimised through the implementation of safeguards and management measures outlined in this review of environmental factors. On balance, it is considered that the adverse environmental impacts of the proposal are outweighed by the beneficial effects and that the proposal is therefore justified.

This review of environmental factors concludes that the proposal is unlikely to have a significant impact on any threatened species, populations or ecological communities or their habitats, listed under the Threatened Species Conservation Act 1995 or Fisheries Management Act 1994 and therefore a species impact statement is not required.

This review of environmental factors finds that the proposal is unlikely to have a significant environmental impact and therefore an Environmental Impact Statement is not required. Approval from the Minister for Planning and Infrastructure under Part 5.1 of the Environmental Planning and Assessment Act 1979 is not required.

The proposal is unlikely to affect Commonwealth land or have a significant impact on any matters of national environmental significance and therefore a referral under the Environment Protection and Biodiversity Conservation Act 1999 to the Australian Government Department of the Environment and Energy is not required.
This review of environmental factors provides a true and fair review of the proposal in relation to its potential effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the proposal.

Reuben Robinson  
Senior Environmental Scientist  
GHD Pty Ltd  
Date: 5 September 2017

I have examined this review of environmental factors and the certification by Melissa Cotterill of GHD Pty Ltd and accept the review of environmental factors on behalf of Roads and Maritime Services.

Anthony Perera  
Project Manager  
Regional Project Office  
Roads and Maritime Services  
Date: 5 September 2017
[Accessed September 2016]

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Roads and Maritime, 2013a, Contaminated Land Management Guideline.


Roads and Maritime, 2014a, Environmental Incident Classification and Reporting Procedure.


Roads and Maritime, 2014c, Noise Mitigation Guideline.

Roads and Maritime 2015b, Unexpected Heritage Items Procedure.

Roads and Maritime 2015c, Stockpile Site Management Guidelines.


Roads and Maritime 2016c, Noise Model Validation Guideline (draft form).

Roads and Maritime, 2016d, Guideline for biodiversity offsets.


RTA, 2011a, Stockpile Site Management Guideline.

RTA, 2011b, Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects. Revision 0/September 2011.


Transport for NSW, 2016, Tumut to Hume Highway (Snowy Mountains Highway and Gocup Road) Corridor Strategy.


Waters Consultancy Pty Ltd, 2015a, Gocup Road Upgrade, Aboriginal Cultural Assessment.

Waters Consultancy Pty Ltd, 2015b, RMS Gocup Road Upgrade: Aboriginal Cultural Assessment: Supplementary Report on Cookoomooroo, Doctors Hill, Halfway Hill & Gilmore Creek Bridge potential additional works.
## Terms and acronyms used in this REF

<table>
<thead>
<tr>
<th>Term / Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>ABS</td>
<td>Australian Bureau of Statistics</td>
</tr>
<tr>
<td>AHIMS</td>
<td>Aboriginal Heritage Information Management System</td>
</tr>
<tr>
<td>Biota</td>
<td>The flora and fauna of a region</td>
</tr>
<tr>
<td>CEMP</td>
<td>Construction Environmental Management Plan</td>
</tr>
<tr>
<td>Chainage</td>
<td>The distance of a point along a control line, measured from a datum point.</td>
</tr>
<tr>
<td>Construction environmental management plan</td>
<td>A site or proposal specific plan developed to ensure that appropriate environmental management practices are followed during the construction and/or operation of a proposal.</td>
</tr>
<tr>
<td>CSIRO</td>
<td>Commonwealth Scientific and Industrial Research Organisation</td>
</tr>
<tr>
<td>Culvert</td>
<td>One or more subsurface adjacent pipes or enclosed channels for conveying surface water or a stream below a road.</td>
</tr>
<tr>
<td>Cumulative impact</td>
<td>An impact created by accumulation or successive additions of individual impacts, which may not themselves be substantial.</td>
</tr>
<tr>
<td>Cut</td>
<td>The depth from the natural surface of the ground to the construction level.</td>
</tr>
<tr>
<td>dB(A)</td>
<td>Frequency weighting filter used to measure ‘A-weighted’ sound pressure levels, which conforms approximately to the human ear response, as our hearing is less sensitive at very low and very high frequencies</td>
</tr>
<tr>
<td>dbh</td>
<td>Diameter at breast height</td>
</tr>
<tr>
<td>DECC</td>
<td>Department of Environment and Climate Change, now OEH (see below)</td>
</tr>
<tr>
<td>DECCW</td>
<td>NSW Department of Environment, Climate Change and Water, now OEH (see below)</td>
</tr>
<tr>
<td>Decibel [dB]</td>
<td>The units that sound is measured in.</td>
</tr>
<tr>
<td>‘Do nothing’ option</td>
<td>This assumes that the Cookoomooroo section of Gocup Road is not upgraded and assumes existing road conditions and networks remain unchanged.</td>
</tr>
<tr>
<td>DotEE</td>
<td>Australian Department of the Environment and Energy</td>
</tr>
<tr>
<td>Earthworks</td>
<td>All operations involved in loosening, removing, depositing, shaping and compacting soil or rock</td>
</tr>
<tr>
<td>Ecologically sustainable development</td>
<td>Development which uses, conserves and enhances the resources of the community so that ecological processes on which life depends, are maintained and the total quality of life, now and in the future, can be increased.</td>
</tr>
<tr>
<td>EIS</td>
<td>Environmental Impact Statement</td>
</tr>
<tr>
<td>Term / Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Environment</td>
<td>For the purpose of the REF, environment incorporates physical, biological, heritage, cultural, economic and social aspects.</td>
</tr>
<tr>
<td>EP&amp;A Act</td>
<td>Environmental Planning and Assessment Act 1979</td>
</tr>
<tr>
<td>EP&amp;A Regulation</td>
<td>Environmental Planning and Assessment Regulation 2000</td>
</tr>
<tr>
<td>EPBC Act</td>
<td>Environment Protection and Biodiversity Conservation Act 1999</td>
</tr>
<tr>
<td>ESD</td>
<td>Ecologically sustainable development. Development which uses, conserves and enhances the resources of the community so that ecological processes on which life depends, are maintained and the total quality of life, now and in the future, can be increased.</td>
</tr>
<tr>
<td>Fill</td>
<td>One or more of the following: 1. The depth from the subgrade level to the natural surface. 2. That portion of road where the formation is above the natural surface. 3. The material placed in an embankment.</td>
</tr>
<tr>
<td>FM Act</td>
<td>Fisheries Management Act 1994</td>
</tr>
<tr>
<td>GHD</td>
<td>GHD Pty Ltd</td>
</tr>
<tr>
<td>High productivity vehicles</td>
<td>Truck and trailer combinations that that carry higher volumes of freight more efficiently, resulting in greater environmental and safety performance.</td>
</tr>
</tbody>
</table>
| Higher mass limit vehicles | Heavy vehicles with higher mass entitlements, which provide increased road freight productivity. In NSW, vehicle types eligible to operate with higher mass limits include:  
  - B-doubles  
  - Type 1 A double road trains  
  - B-triples  
  - AB-triples  
  - Modular B-triples  
  - Vehicles operating under Performance Based Standards (PBS) schemes, including quad axle combinations. |
<p>| Investigation area | The area identified for assessing the potential impacts of the proposal relating to a specific discipline. Generally the investigation area is defined as the area of impact and any additional areas that are likely to be affected by the proposal, either directly or indirectly. |
| ISEPP | State Environmental Planning Policy (Infrastructure) 2007 |
| km/h | Kilometres per hour |
| $L_{Aeq(period)}$ | Equivalent sound pressure level: the steady sound level that, over a specified period of time, would produce the same energy equivalence as the fluctuating sound level actually occurring. |
| $L_{Aeq(15hr)}$ | The $L_{Aeq}$ noise level for the period 7 am to 10 pm. |</p>
<table>
<thead>
<tr>
<th>Term / Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>$L_{Aeq(9hr)}$</td>
<td>The $L_{Aeq}$ noise level for the period 10 pm to 7 am.</td>
</tr>
<tr>
<td>$L_{Aeq(1hr)}$</td>
<td>The highest hourly $L_{Aeq}$ noise level during the day and night periods.</td>
</tr>
<tr>
<td>LALC</td>
<td>Local Aboriginal Land Council</td>
</tr>
<tr>
<td>$L_{Amax}$</td>
<td>The maximum sound level recorded during the measurement period.</td>
</tr>
<tr>
<td>Land use</td>
<td>The type of development existing or permitted in an area whether it be industrial, commercial, residential, recreational or a combination of some or all of these different uses.</td>
</tr>
<tr>
<td>LEP</td>
<td>Local Environmental Plan</td>
</tr>
<tr>
<td>LGA</td>
<td>Local government area</td>
</tr>
<tr>
<td>Likely</td>
<td>Taken to be a real chance or possibility.</td>
</tr>
<tr>
<td>Locality</td>
<td>The area within a 10 kilometre radius of the proposal.</td>
</tr>
<tr>
<td>Lot</td>
<td>A part (consisting of one or more pieces) of any land (except a road, a reserve, or common property) shown on a plan, which can be disposed of separately and includes a unit or accessory unit on a registered plan of strata subdivision and a lot or accessory lot on a registered cluster plan.</td>
</tr>
<tr>
<td>NPW Act</td>
<td>National Parks and Wildlife Act 1974</td>
</tr>
<tr>
<td>NSW</td>
<td>New South Wales</td>
</tr>
<tr>
<td>OEH</td>
<td>NSW Office of Environment and Heritage</td>
</tr>
<tr>
<td>PACHCI</td>
<td>RTA Procedure for Aboriginal Cultural Heritage Consultation and Investigation</td>
</tr>
<tr>
<td>Proposal</td>
<td>The proposed upgrade of the Halfway Hill and Doctors Hill sections of Gocup Road.</td>
</tr>
<tr>
<td>Proposal site</td>
<td>The area required for the construction of the proposal, including construction activities and construction vehicle access. It includes the construction footprint, site compound, stockpile sites, temporary sediment basins and any areas that would be disturbed.</td>
</tr>
<tr>
<td>QA Specifications</td>
<td>Specifications developed by Roads and Maritime for use with roadworks and bridgeworks contracts let by Roads and Maritime Services.</td>
</tr>
<tr>
<td>Rating background level</td>
<td>The overall single-figure background noise level measured in each relevant assessment period (during or outside the recommended standard hours).</td>
</tr>
<tr>
<td>Receiver</td>
<td>Any person, as well as a residence, business or facility, with the potential to be affected by an environmental impact (eg noise or air quality).</td>
</tr>
<tr>
<td>REF</td>
<td>Review of environmental factors</td>
</tr>
<tr>
<td>Term / Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Road reserve</td>
<td>A road reserve is a legally described area within which facilities such as roads, footpaths, and associated features may be constructed for public travel. It is the total area between boundaries shown on a cadastral plan.</td>
</tr>
<tr>
<td>Roads and Maritime Services</td>
<td>Roads and Maritime Services is the proponent for the Gocup Road – Cookoomooroo REF. Roads and Maritime Services is the NSW state government department responsible for the environmental assessment on the proposal.</td>
</tr>
<tr>
<td>RTA</td>
<td>NSW Roads and Traffic Authority. The RTA now forms part of Roads and Maritime Services.</td>
</tr>
<tr>
<td>SEPP</td>
<td>State Environmental Planning Policy</td>
</tr>
<tr>
<td>Threatened species</td>
<td>A species specified in Schedule 1 Part 1 (endangered species), Part 4 (presumed extinct) and Schedule 2 (vulnerable species) of the TSC Act, in Schedule 4 (endangered species), 4A (critically endangered species) and Schedule 5 (vulnerable species) or under the EPBC Act.</td>
</tr>
<tr>
<td>TSC Act</td>
<td>Threatened Species Conservation Act 1995</td>
</tr>
<tr>
<td>Unlikely</td>
<td>Taken to be an unlikely or remote possibility of occurring.</td>
</tr>
</tbody>
</table>
Appendix A

Consideration of clause 228(2) factors and matters of national environmental significance
Appendix B

Biodiversity assessment
Appendix C

Noise and vibration assessment
Appendix D

Aboriginal heritage assessments
Appendix E

Non-Aboriginal heritage assessments
Appendix F

Responses to government agency consultation
Database searches