Bolivia Hill upgrade

Addendum review of environmental factors

May 2017

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Roads and Maritime Services

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Prepared by Arcadis Australia Pacific Pty Ltd (Arcadis) and Roads and Maritime Services

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Approval and authorisation

Title	Bolivia Hill upgrade Addendum review of environmental factors
Accepted on behalf of NSW Roads and Maritime Services by:	Ric Church
Signed:	
Dated:	5 May 2017

Executive summary

The proposed modification

Roads and Maritime Services proposes to modify the Bolivia Hill upgrade (the project) by setting up a borrow pit on Lot 41 DP751498 (proposed modification) to source fill for the project. A borrow pit is an area where materials used during construction (usually soil, gravel, sand or rock) has been dug for use at another location. These materials will be used for the construction of embankments on the completed project. Key features of the proposed modification would include:

- building a borrow pit to source about 20,000 cubic metres of fill material for the northern embankment, bridge abutments and access tracks on the project site
- the borrow pit will cover an area of about 17,400 square metres (1.74 hectares) and would be accessed by an existing track from Pyes Creek Road that will be upgraded to handle heavy truck movements
- about 10,000 cubic metres of fill would be replaced in the borrow pit following the closure of temporary access tracks
- following any replacement of fill, the pit would be revegetated.

An existing track from Pyes Creek Road would be used to access the site and improved to handle heavy vehicles. The access track is located around 1.2 kilometres northwest of the intersection of Pyes Creek Road and New England Highway.

Background

A review of environmental factors (REF) was prepared for the Bolivia Hill upgrade on 21 September 2015 (referred to in this addendum REF as the project REF). The project REF was publicly displayed from 28 September to 26 October 2015 at eight locations and was also available to download from Roads and Maritime's project website. Submissions relating to the project and the REF were received by Roads and Maritime and a submissions report was prepared on 22 February 2016. The project was determined on 28 February 2016.

Need for the proposed modification

Chapter 2 of the project REF addresses the strategic need for the project and the project objectives. The proposed modification assessed in this addendum REF is consistent with the strategic need of the project.

The proposed modification is needed to provide a local source of fill which would reduce haulage costs and the volume of construction traffic associated with the project.

Proposal objectives and development criteria

Section 2.3 of the project REF identifies the proposal objectives and development criteria that apply to the proposed modification.

The establishment of the proposed borrow pit has the additional objective of locally sourcing fill for temporary and permanent project works.

Options considered

The following options were considered:

1. source fill from local private land (the proposal site)
2. source fill from a local quarry
3. 'do nothing'.

Option one is the preferred option as it is the closest to the site and has the cheapest associated costs. Material can be quarried at this site at a cheaper rate per cubic metre than from established quarries. Associated costs with haulage would be the least under option one, reducing the overall construction cost. Furthermore, option one will result in the fewest truck movements on the New England Highway which would result in better road safety, less construction traffic and lower carbon emissions than all other options.

Option one would generally meet the project objectives outlined in the project REF as follows:

- improve road transport productivity and efficiency
- minimise the impact on the natural, cultural and built environment
- provide value for money.

Statutory and planning framework

Clause 94 of the *State Environmental Planning Policy (Infrastructure) 2007* (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 proposed modification is sourcing fill for road construction 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 therefore not required.

This addendum review of environmental factors fulfils the requirements of Section 111 of the EP&A Act and has been prepared in accordance with clause 228 of the *Environmental Planning and Assessment Regulation 2000*. It has also considered the *Threatened Species Conservation Act 1995* (TSC Act), the *Fisheries Management Act 1994* (FM Act), and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Community and stakeholder consultation

Consultation has occurred between Roads and Maritime and the landowner. Roads and Maritime and the landowner are currently negotiating an agreement to lease the land for the duration of the project.

Roads and Maritime considers meaningful and engaging community consultation to be an essential part of the project. As such, community and stakeholder consultation has been carried out throughout the life of the project with the local community, Aboriginal community, local and State government agencies. Consultation will be ongoing throughout the construction phase of the project.

Environmental impacts

Biodiversity

The proposal site contains a mix of tilled agricultural land, supporting seedlings of a legume crop (*Vigna unguiculata* (Cowpea)) and a grassy paddock dominated by dense, mature *Eragrostis curvula* (African lovegrass)*, Cynodon dactylon* (Couch), *Juncus continuus* (Rush) and *Bromus* spp. A range of other grass and herb species are present, mainly exotic pasture species and including the noxious weed *Xanthium spinosum* (Bathurst Burr). No threatened flora or fauna species were recorded in the proposal site, and none are considered likely to occur there. No threatened ecological communities (TECs) are within the proposal site.

No threatened flora or fauna species listed under the TSC Act and/or EPBC Act are likely to be impacted by the proposed modification. No TECs listed under the TSC Act and/or EPBC Act are likely to be directly impacted by the proposed modification. Carex Fen EEC (Carex Sedgeland of the New England Tableland, Nandewar, Brigalow Belt South and NSW North Coast Bioregions) to the south east of the proposal site would be sensitive to any changes to hydrological regimes or

sedimentation/pollution. The EEC is more than 10 metres from the proposal site and as such impacts to this EEC are unlikely with proper environmental management at the site.

The excavation of a pit could lead to entrapment of fauna species, including livestock. Safeguards listed in Table 7-1 would be implemented during construction and rehabilitation stages to minimise the likelihood of entrapment of animals in the pit.

Non-aboriginal heritage

A bullock track (ID22) is located just south of the proposal site. The bullock track is not listed on any heritage registers, however it is likely to demonstrate local significance for historical values.

The former bullock track formed part of the Great Northern Road, which was the main road link between Sydney and Brisbane over the New England Tablelands. The former bullock track consisted of a cleared easement through the wooded hillslopes of Bolivia Hill, with records indicating a length of dry rubble retaining wall was constructed along sections of the road. For the majority of its alignment, the former bullock track would have consisted of an ephemeral unsealed vehicle track.

Based on the location of the proposed borrow pit and the approximate alignment of the former bullock track location, there will be negligible impact to significance of the former bullock track from the proposed modification. Exclusion fencing would be erected during the works to prevent impacts to the former bullock track.

Topography, geology and soils

The proposal site is located on gently sloping land. Runoff flows across the site generally in a north-easterly direction towards two nearby drainage lines that are tributaries of Splitters Swamp Creek, part of the Deepwater River catchment.

Excavation of material from the borrow pit would leave large areas of exposed soil during the construction phase of the project. In the event of rain, sediment-laden runoff from these exposed areas could reach nearby watercourses and affect water quality. With the installation of appropriate erosion and sediment control measures as outlined in Table 7-1, water quality impacts would be minor and localised.

Other impacts

Impacts to the following environmental aspects are expected to be minor and/or consistent with the impacts described in the project REF:

- hydrology and flooding
- traffic, transport and access
- Aboriginal heritage
- noise and vibration
- air quality
- climate change
- landscape character and visual amenity
- waste and resource management
- cumulative impacts.

Justification and conclusion

The proposed modification is consistent with the project objectives as stated in Section 2.3 of the project REF and Section 2.2 of this addendum REF. In particular, the proposed borrow pit supports the objectives of the original project REF by optimising the benefits and minimising adverse impacts on the natural and cultural environment.

This addendum 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.

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Appendices

1 Introduction

1.1 Proposal overview

Roads and Maritime Services proposes to modify the Bolivia Hill upgrade (the project) by establishing a borrow pit on Lot 41 DP751498 (proposed modification) to source fill for the project. Key features of the proposed modification would include:

- establishment of a borrow pit to source about 20,000 cubic metres of fill material for the northern embankment, bridge abutments and access tracks on the project site
- the borrow pit will cover an area of about 17,400 square metres (1.74 hectares) and would be accessed via an existing track from Pyes Creek Road that will be upgraded to handle heavy truck movements
- about 10,000 cubic metres of fill would be replaced in the borrow pit following decommissioning of temporary access tracks
- following any replacement of fill, the pit would be regraded and revegetated.

An existing access track from Pyes Creek Road would be utilised to access the proposal site and upgraded for the proposed modification. The access track is located around 1.2 kilometres northwest of the intersection of Pyes Creek Road and New England Highway as shown in Figure 3-1.

The location of the proposed modification (proposal site) is shown in Figure 1-1. Chapter 3 describes the proposed modification in more detail.

A review of environmental factors (REF) was prepared for the Bolivia Hill upgrade on 21 September 2015 (referred to in this addendum REF as the project REF). The project REF was publicly displayed from 28 September to 26 October 2015 at eight locations and was also available to download from Roads and Maritime's project website. Submissions relating to the project and the REF were received by Roads and Maritime and a submissions report was prepared on 22 February 2016. The project was determined on 28 February 2016.

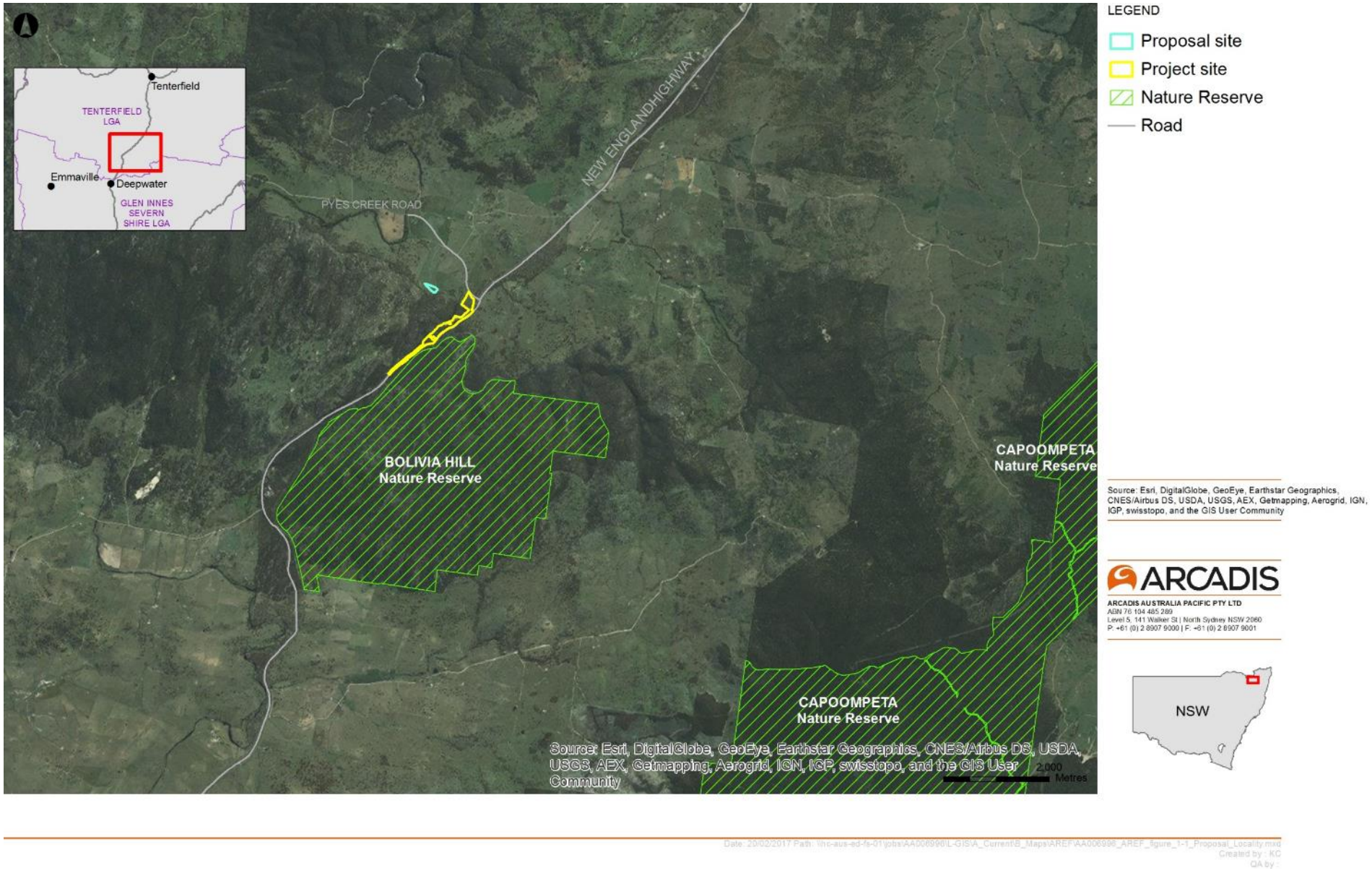

Figure 1-1: Proposed modification and project location

1.2 Purpose of the report

This addendum review of environmental factors (REF) has been prepared by Arcadis Australia Pacific Pty Ltd (Arcadis) on behalf of Roads and Maritime Infrastructure Development Division. 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).

This addendum REF is to be read in conjunction with the project REF and submissions report for the project. The purpose of this addendum REF is to describe the proposed modification, to document and assess the likely impacts of the proposed modification on the environment, and to detail protective measures to be implemented.

The description of the proposed work and associated environmental impacts have been undertaken in context of clause 228 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation), 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 addendum 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 findings of the addendum REF will be considered when assessing:

- whether the proposed modification is likely to result in 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 proposed modification to significantly impact any other matters of national environmental significance or Commonwealth land and therefore the need to make a referral to the Australian Government Department of the Environment and Energy for a decision by the Commonwealth Minister for the Environment and Energy on whether assessment and approval is required under the EPBC Act.

2 Need and options considered

2.1 Strategic need for the project

Chapter 2 of the project REF addressed the strategic need for the project, the project objectives and the options that were considered during concept design development. The proposed modification described and assessed in this addendum REF is consistent with the strategic need for the project.

The proposed modification is needed to provide a local source of fill which would reduce haulage costs and the volume of construction traffic associated with the project.

2.2 Project objectives and development criteria

Section 2.3 of the project REF identifies the proposal objectives and development criteria that apply to the proposed modification. The proposal objectives are as follows:

- improve road safety
- improve road transport productivity, efficiency and reliability of travel
- minimise the impact on the natural, cultural and built environment
- provide value for money.

The establishment of the proposed borrow pit has the additional objective of locally sourcing fill for temporary and permanent project works.

2.3 Alternatives and options considered

Other sources of local fill were identified, including existing quarries. The following options were considered:

1. source fill from local private land (the proposal site)
2. source fill from one of the following local quarries:
    a. Daryl McCarthy Constructions P/L (DMC) crushing plant 10 km north of Tenterfield on the New England Highway
    b. Townes Contracting Pty Ltd (TC) located within Tenterfield and operating out of numerous local quarries
    c. Glen Innes Aggregates Quarry (owned by Glen Innes Severn Council)
    d. Potential quarry on the north side of Bolivia Hill along Castlecrag Road
3. 'do nothing'.

2.3.1 Analysis of options

Option 1

This option provides a source fill approximately two kilometres from the project site which is the closest location of all options considered. The land is currently used for agriculture and a new quarry would need to be established. This option is the preferred option.

Option 2a

The crushing plant is approximately 43 kilometres north of the project site. Material that is crushed is primarily sourced from a quarry about 32 kilometres west of Tenterfield. DMC has a history of supplying road construction materials throughout the region and are well known to Roads and Maritime.

Option 2b

Previous upgrades around Bolivia Hill used material sourced from a weathered granite quarry (Hickey's Pit), which is operated by TC. It is located approximately seven kilometres north of the project site. This option may not be feasible as the pit is currently closed but could be re-opened in future. Inspection of the pit revealed excavation of the weathered granite has occurred to a reasonably hard base, i.e. less weathered granite. Pavement materials have been produced previously though required blending with crushed product to achieve the desired grading.

Option 2c

This quarry is located approximately 60 kilometres south of the project site, the furthest distance of all options considered. It produces basalt aggregate from fresh rock for concrete production and bitumen road sealing.

Option 2d

The potential quarry in Bolivia Hill is approximately eight kilometres south of the project site. This option may not be feasible as it is unknown whether the quarry is in operation and if the material produced at the quarry is suitable for the project.

Option 3

The 'do nothing' option would impede the viability of the project.

2.4 Preferred option

Option one is the preferred option as it is the closest to the site and has the cheapest associated costs. Material can be quarried at this site at a cheaper rate per cubic metre than from established quarries. Associated costs with haulage would be the least under option one, reducing the overall construction cost. Furthermore, option one will result in the fewest truck movements on the New England Highway which would result in better road safety, less construction traffic and lower carbon emissions than all other options.

Option one would generally meet the project objectives outlined in the project REF as follows:

- improve road transport productivity and efficiency
- minimise the impact on the natural, cultural and built environment
- provide value for money.

3 Description of the proposed changes

3.1 The proposed modification

Roads and Maritime proposes to modify the project by establishing a borrow pit on Lot 41 DP751498 to source fill for the project. About 20,000 cubic metres of fill material is proposed to be extracted from the borrow pit. The borrow pit would be utilised to source fill for the northern embankment, bridge abutments and access tracks on the project site. Up to 10,000 cubic metres of fill would be replaced in the borrow pit following decommissioning of temporary access tracks. Following replacement of fill, the pit would be regraded and revegetated.

The proposal site would be accessed via an existing track from Pyes Creek Road and covers an area of about 17,400 square metres (1.74 hectares). The proposal site is shown in Figure 3-1. It is located on agricultural land and comprises two (eastern and western) paddocks bisected by a north-south fence line. The fence line originates at Pyes Creek Road and follows the majority of the length of the existing access track.

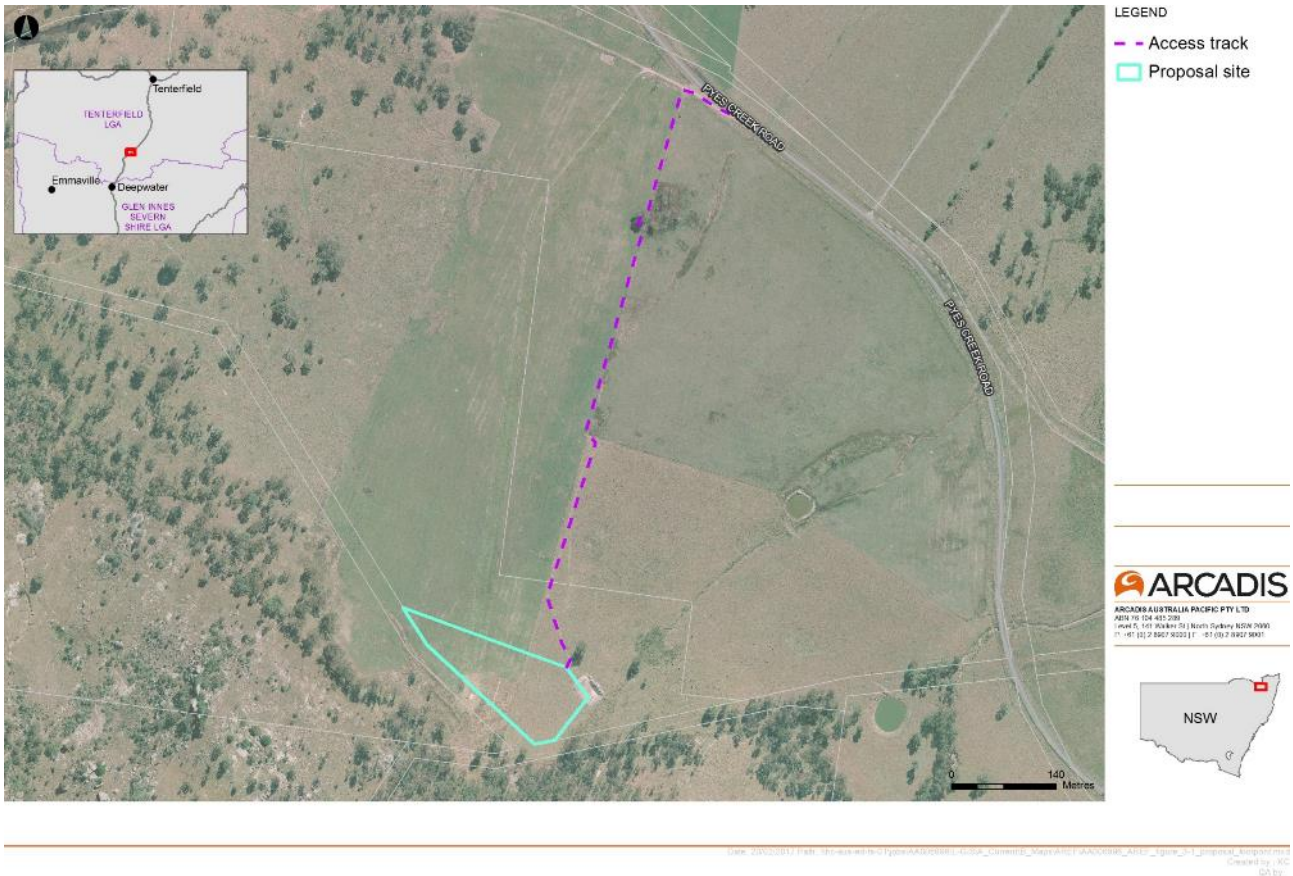

Figure 3-1: The proposal site

3.2 Construction activities

3.2.1 Work methodology

The proposed modification would involve the following works:

- site establishment including erection of temporary exclusion fencing
- topsoil stripping and storage
- stabilisation of the existing access track

- extraction of material
- rehabilitation:
  - regrading pit edges to batter slopes at least 2:1 and revegetation
  - potential topsoil replacement on the access track, subject to landowner consultation.

Indicative construction activities including construction hours, plant and equipment, traffic management and access to the project site required during construction are detailed in the project REF. These have been reviewed and are generally considered relevant to, and consistent with the proposal. Plant and equipment required for the proposed modification encompasses standard earthmoving equipment detailed in the project REF. Access to the proposal site is detailed below.

3.2.2 Access

An existing access track from Pyes Creek Road would be utilised to access the proposal site. The access track is located around 1.2 kilometres northwest of the intersection of Pyes Creek Road and New England Highway as shown in Figure 3-1. The access track would be stabilised with a gravel road base prior to commencement of construction. The access track would be graded and packed with introduced material or material extracted from the borrow pit prior to or during use. Temporary fencing may be required to delineate the access track during construction.

3.3 Property acquisition

The proposal would be undertaken on private land. The site would be leased for the duration of the project. At the time of writing this REF a lease agreement was being negotiated with the landholder.

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 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 proposed modification is for sourcing fill for road construction 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 therefore not required.

The proposed modification is not located on land reserved under the *National Parks and Wildlife Act 1974* and would 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 starting certain types of development. Consultation, including consultation as required by ISEPP, is discussed in Chapter 5 of this addendum REF.

4.2 Local Environmental Plans

4.2.1 Tenterfield Local Environmental Plan 2013

Under the *Tenterfield Local Environmental Plan 2013* land within the proposal site is zoned 'RU1 Primary Production'. The objectives of the RU1 Primary Production zone are as follows:

- to encourage sustainable primary industry production by maintaining and enhancing the natural resource base
- to encourage diversity in primary industry enterprises and systems appropriate for the area
- to minimise the fragmentation and alienation of resource lands
- to minimise conflict between land uses within this zone and land uses within adjoining zones.

Road construction is permitted without development consent in RU1 Primary Production. Though it is noted that council consent is not required in accordance with Clause 94 of ISEPP (refer to Section 4.1.1 of this addendum REF).

4.3 Other relevant NSW legislation

4.3.1 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* provides for the conservation and management of nature and objects, places and features of cultural value. It is the primary legislation for the protection of Aboriginal cultural heritage in NSW. Part 6 of the Act provides protection for all Aboriginal objects and Aboriginal places in NSW. Under Section 90 of the Act, an Aboriginal Heritage Impact Permit is required before the disturbance of Aboriginal objects or places.

The proposed modification would not impact any known Aboriginal sites, and Roads and Maritime would not need to obtain an Aboriginal Heritage Impact Permit (AHIP). A site walkover was conducted by Garry Ferguson (Roads and Maritime), James Jerome (Moombahlene Local Aboriginal Land Council), and Josh Symons (Artefact Heritage). This constitutes a stage 1 assessment under the Roads and Maritime Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI). The report is included in Appendix B.

4.3.2 Heritage Act 1977

The *Heritage Act 1977* provides a mechanism for the protection of items of both local and state non-Aboriginal heritage significance in NSW and establishes the State Heritage Council. Approval from the Heritage Council is required prior to the potential disturbance or excavation of items, relics and artefacts with historic heritage significance.

The proposed modification would not impact heritage items or archaeological sites beyond the items and sites identified and assessed in the project REF (refer to Sections 6.3 and 6.4 for further details).

4.3.3 Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act 1995* (TSC Act) provides for the conservation and protection of threatened species, populations, ecological communities and their habitat. All threatened species, populations or communities listed on Schedules 1, 1A and 2 of the Act which are identified as being known or likely to occur in the proposal site, should be subject to an assessment of significance. The assessment of significance must address the requirements of Section 5A of the EP&A Act and be prepared in accordance with the *Threatened Species Assessment Guidelines* (DECC, 2007). A species impact statement (SIS) is required if impacts are assessed as being significant.

Potential impacts to threatened species, populations and ecological communities are considered as part of Section 6.1 of this addendum REF.

4.3.4 Noxious Weeds Act 1993

The *Noxious Weeds Act 1993* establishes control mechanisms to reduce the negative impacts of weeds on the economy, community and environment, and also includes a system for the identification and control of noxious weeds. The *Noxious Weeds Act 1993* identifies noxious weeds as belonging to five categories which determine the level of control required.

Under Section 13 of the *Noxious Weeds Act 1993,* Roads and Maritime as a public authority is required to control noxious weeds on land that it owns, and to prevent noxious weeds from spreading to adjoining properties.

The management of noxious weeds will need to be considered further during construction and operation of the project. One noxious weed was identified in surveys of the proposal site as discussed in Section 6.1. It would be managed in accordance with the mitigation measures outlined in the project REF.

4.4 Commonwealth legislation

4.4.1 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 Chapter 6.

A referral under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is not required for road actions that may affect nationally listed threatened species, populations, endangered ecological communities and migratory species. This is because requirements for considering impacts to these biodiversity matters are the subject of a strategic assessment approval granted under the EPBC Act by the Australian Government in September 2015.

Potential impacts to species and ecological communities listed under the EPBC Act are considered in Section 6.1 of this addendum REF.

Findings – matters of national environmental significance (other than biodiversity matters)

The assessment of the proposed modification's impact on matters of national environmental significance and the environment of Commonwealth land found that there would be no change to the findings of the determined activity and would be unlikely to cause a significant impact on matters of national environmental significance or the environment of Commonwealth land. A referral to the Australian Department of the Environment is not required.

4.5 Confirmation of statutory position

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

5 Consultation

This section discusses the consultation undertaken during the detailed design stage of the project, and the proposed future consultation (ie during construction).

5.1 Consultation strategy

Roads and Maritime considers meaningful and engaging community consultation to be an essential component of the project. As such, community and stakeholder consultation has been carried out throughout the life of the project to date including the detailed design phase where relevant, and will be ongoing throughout the construction phase of the project.

5.2 Consultation outcomes

During the development of the project, consultation has been carried out with the local community, the Aboriginal community as well as government and agency stakeholders. The project REF was placed on public display from 28 September to 26 October 2015 and submissions relating to the project and the REF were received by Roads and Maritime. All submissions were responded to by Roads and Maritime on 27 January 2016 and a submissions report was prepared on 22 February 2016.

5.3 Landowner consultation

Consultation has occurred between Roads and Maritime and the landowner of the proposal site. Roads and Maritime and the landowner are currently negotiating an agreement to lease the land for the duration of the project.

5.4 Ongoing or future consultation

The following consultation would be carried out during the construction phase:

- Ongoing consultation with key agency and local government stakeholders to help manage impacts during construction. These stakeholders would include Tenterfield Shire Council, Glen Innes Severn Council, Office of Environment and Heritage, Crown Lands Division, Department of Primary Industries (Fisheries), utility providers, and Transport for NSW
- Ongoing updates throughout the planning phase and construction period for the immediately affected community and broader community, including users of the New England Highway
- Ongoing updates of the Roads and Maritime project webpage as required.

6 Environmental assessment

This section of the addendum REF provides a detailed description of the potential environmental impacts associated with the construction and operation of the proposed modification of the Bolivia Hill upgrade. All aspects of the environment potentially impacted upon by the proposed modification are considered. This includes consideration of the factors specified in the guidelines *Roads and Related Facilities* (DUAP 1996) and *Is an EIS required?* (DUAP 1999) as required under clause 228(1) of the Environmental Planning and Assessment Regulation 2000. The factors specified in clause 228(2) of the Environmental Planning and Assessment Regulation 2000 are also considered in Appendix A.

Site-specific safeguards and management measures are provided to ameliorate the identified potential impacts.

6.1 Biodiversity

6.1.1 Methodology

Field surveys were undertaken by Arcadis Ecologists Jane Rodd and Kate Carroll on 5 January 2017. The weather conditions at the time of survey were mild and sunny with light winds. The weather records from the Tenterfield (Federation Park) weather station (station 056032), 28 kilometres from the proposal site, show that on the day of survey temperatures ranged from 14.5°C to 23.2°C and there was no rainfall (BOM 2017).

The field surveys encompassed the two paddocks of the proposal site and the immediate surrounds (up to the southern boundary of Lot 41 DP751498) and a patch of trees adjacent to the mid northern portion of the access track.

Field surveys involved:

- detection and identification of native plant and animal species and their habitats and ecological communities
- detection and identification of noxious weeds declared under the NSW *Noxious Weeds Act 1993* for the Tenterfield LGA
- searches for indirect evidence of fauna (such as scats, nests, burrows, hollows, tracks, scratches and digging)
- assessment of potential habitat for threatened flora and fauna species previously recorded within the locality.

6.1.2 Existing environment

Flora

The eastern paddock of the proposal site is tilled agricultural land, supporting seedlings of a legume crop (*Vigna unguiculata* (Cowpea)). Some patches of exotic grass, mainly *Eleusine tristachya* (Goose Grass) and common pasture weeds such as *Cirsium vulgare* (Spear Thistle) and *Chenopodium album* (Fat Hen) are interspersed with the legume seedlings.

The western paddock of the proposal site is not under cultivation. This area is dominated by dense, mature grassland dominated by *Eragrostis curvula* (African Lovegrass), *Cynodon dactylon* (Couch), *Juncus continuus* (Rush) and *Bromus* spp. A range of other grass and herb species are present, mainly exotic pasture species and including the noxious weed *Xanthium spinosum* (Bathurst Burr). South of this area is a group of *Eucalyptus blakelyi* (Blakely's Red Gum), comprising one large mature tree and about 11 younger trees, 6 – 7 metres in height. The mature tree is in poor health and appears to be senescent; lots of mistletoe was present in the tree canopy.

South of the eastern paddock of the proposal site is cleared grassland dominated by African Lovegrass, with two isolated trees of Blakely's Red Gum, both of which have large quantities of *Amyema miquelii* (Box Mistletoe) in the canopy. Beneath the larger tree is a dense cover of grass and herbs, dominated by *Einadia trigonos* (Fishweed), *Einadia nutans* (Climbing Saltbush), *Bromus brevis* (Brome Grass) and African Lovegrass

Just east of the eastern paddock, outside the proposal site, there is a slight depression supporting a dense cover of sedges and grasses; it was observed to be mostly dry at the time of inspection. The dominant species is *Carex appressa* (Tall Sedge), with exotic grass species such as *Paspalum dilatatum* (Paspalum), *Setaria pumila* (Pale Pigeon Grass) and African Lovegrass abundant, especially at the edges of the drainage line. Other species in the sedgeland include *Juncus usitatus* (Common Rush), *Geranium solanderi* (Austral Cranesbill), *Alternanthera nana* (Hairy Joyweed) and *Persicaria prostrata* (Creeping Knotweed). Further to the east, the band of sedgeland becomes narrower and African Lovegrass dominates.

To the south of the Carex fen is forest with a canopy including Blakely's Red Gum and *Angophora subvelutina* (Broad-leaved Apple), with a grassy ground layer dominated by African Lovegrass.

To the west of the proposal site are hills supporting scattered eucalypts, mainly Blakely's Red Gum, with mixed native and exotic grasses and herbs in the ground layer.

The proposed access track is largely in cleared agricultural land along the fence line. In the mid-north of the study area is a large *Eucalyptus conica* (Fuzzy Box) near the fence; beneath this tree is disturbed ground cover with mostly exotic grasses and herbs including Brome Grass, Fat Hen, *Eleusine tristachya* (Goose Grass), *Polygonum aviculare* (Wire Weed) and the native herb Fishweed.

Native vegetation communities identified in the proposal site surrounds are mapped in Figure 6-1. Native vegetation communities were identified from vegetation mapping undertaken by Hewlett Hunter (2012) with some refinement and additions following field survey and included the following communities:

- C2: Fuzzy Box - Ribbon Gum – Blakely's Red Gum
- C4a: Derived Grassland (Red Grass – Wiregrass)
- C6: Carex Fen
- C7: Broad-leaved Stringybark – Rough-barked Apple – Blakely's Red Gum
- C8: Blakely's Red Gum – Rough-barked Apple – Fuzzy Box.

Threatened ecological communities (TECs)

Carex Fen

The Carex Fen (C6) in the south-east of the site would fall within one of two endangered ecological communities (EECs) listed under the TSC Act:

- Sedgelands dominated or co-dominated by Tall Sedge more likely to fall within the EEC Carex Sedgeland of the New England Tableland, Nandewar, Brigalow Belt South and NSW North Coast Bioregions; and
- Sedgelands largely dominated by *Carex gaudichaudiana* (Fen Sedge) and which may form a peaty subsurface layer fall into the EEC Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps.

Based on observations that the Carex Fen adjoining the proposal site was dominated by *Carex appressa,* it is considered likely that this vegetation falls within the Carex Sedgeland of the New England Tableland, Nandewar, Brigalow Belt South and NSW North Coast Bioregions. It is noted that Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps was recorded in the larger Bolivia Hill Upgrade project area.

The Carex Fen EEC adjoining the proposal site was a small, narrow patch along a drainage line, and was in poor condition with high cover of perennial exotic grass species, particularly at the edges of the patch.

Box Gum Woodland

The woodland areas mapped as Fuzzy Box - Ribbon Gum – Blakely's Red Gum (C2) and Blakely's Red Gum – Rough-barked Apple – Fuzzy Box (C8) around 10 – 20 metres to the south-west of the proposal site form part of the EEC White Box Yellow Box Blakely's Red Gum Woodland under the TSC Act (Box Gum Woodland).

White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland, listed as a critically endangered ecological community (CEEC) under the EPBC Act, overlaps with the TSC listing for Box Gum Woodland. The CEEC as listed under the EPBC Act only includes patches that meet certain size, condition and species composition thresholds.

Scattered trees of Blakely's Red Gum south of the proposal site would only fall within the TSC Act definition of the TEC, as the understorey in these locations is disturbed. The larger patch of Box Gum Woodland extending further south is likely to fall within the EPBC Act definition of the community, however this area was not inspected as it will not be impacted by the proposed modification.

Threatened flora species

No threatened flora species were recorded in the proposal site, and none are considered likely to occur there. The vegetation of the proposal site is highly modified with disturbed soils and dominance by exotic species; as such there is no potential habitat for any threatened plant species known or likely to occur in the locality, as reviewed in the flora assessment prepared for the project REF (Hyder Consulting 2015).

Noxious weeds

One of the 34 exotic species recorded in the proposal site is listed as a noxious weed in the Tenterfield Shire Council Local Control Authority area, namely Bathurst Burr. This species was observed in scattered locations in the proposal site, mainly in the western paddock and adjoining the proposed access track.

The *NSW Noxious Weeds Act 1993* imposes obligations on occupiers of land to control noxious weeds declared for their area. Bathurst Burr is a Class 4 locally controlled weed; the control requirements for this species are:

- the growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread.

Terrestrial fauna

The proposal site contains minimal fauna habitat value. The eastern paddock of the proposal site is cropped land and the western paddock is disturbed grassland. It provides foraging habitat for some ground-dwelling species and birds of prey such as Nankeen Kestrels (*Falco cenchroides*) observed foraging in these and nearby paddocks. Evidence of cows was found in the western paddock.

Beyond the proposal site, remnant mature trees are sparsely distributed in the paddocks, some of which contain hollows. This includes a small patch of trees and stags adjacent to the access track in the mid-north of the paddock and one just north of the proposal site.

All hollow-bearing trees recorded during field surveys are mapped in Figure 6-1. Hollows were either small (<7 cm diameter) or medium (7–15 cm diameter) in size. Fissures were also present in some trunks and branches.

Remnant woodland just south of the proposal site comprises mature and immature eucalypts with a mostly grassy understorey and sparse to absent mid-storey. Remnant woodland is mapped as vegetation communities C2 and C8 in Figure 6-1. Mistletoes were common in remnant woodland, providing a foraging resource for arboreal fauna. Native grasses and sedges provide ground foraging resources. Hollow-bearing trees, fallen timber, loose/embedded rocks and hollow logs/stumps are also present, providing shelter for ground and arboreal fauna, including threatened species. A range of woodland bird species were identified in remnant woodland such as Rufous Whistler (*Pachycephala rufiventris*), Scarlet Honeyeater (*Myzomela sanguinolenta*), Noisy Miner (*Manorina melanocephala*) and Red Wattlebird (*Anthochaera carunculata*).

Aquatic fauna

Several mapped watercourses are present downslope of the proposal site (Figure 6-3). These watercourses have intermittent flow and little or no defined drainage channel and as such are considered unlikely fish habitat. Aquatic fauna impacts are not considered further in this addendum REF.

Threatened fauna species

No threatened species or evidence of threatened species was identified during field surveys and none are considered likely to occur in the proposal site. There is no potential habitat in the proposal site for any threatened fauna species known or likely to occur in the locality, as reviewed in the fauna assessment prepared for the project REF (Sandpiper Ecological Surveys 2015). It should be noted however, that remnant woodland south of the proposal site and paddock trees with hollows contain habitat for threatened fauna species.

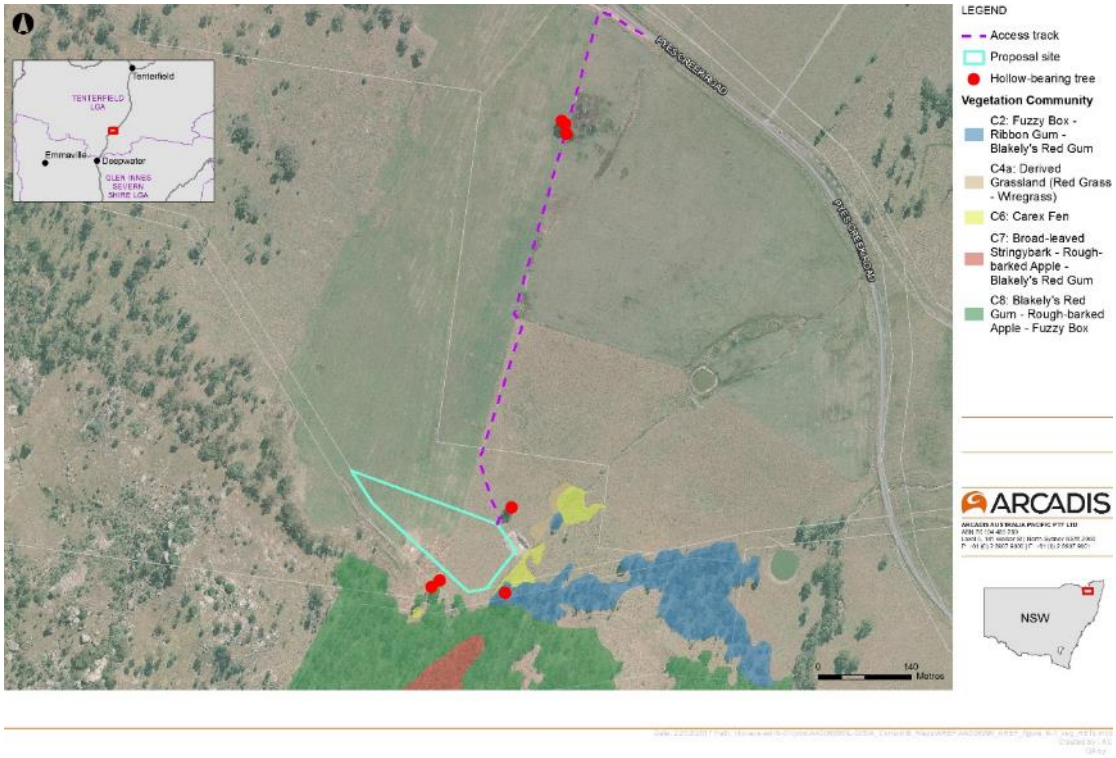

Figure 6-1: Ecological features of the proposal site surrounds

6.1.3 Potential impacts

Flora

The proposal would involve impacts to disturbed grassland and tilled agricultural land over an area of about 1.74 hectares. Native vegetation communities would not be directly impacted by the proposal.

The noxious weed Bathurst Burr, has the potential to spread through increased movement of people, vehicles, machinery, vegetation waste and soil during construction. Measures outlined in the project REF would be implemented to control the spread of this weed at the proposal site.

Threatened species and ecological communities

No threatened flora species listed under the TSC Act and/or EPBC Act are likely to be impacted by the proposal. No TECs listed under the TSC Act and/or EPBC Act are likely to be directly impacted by the proposal. Carex Fen EEC (Carex Sedgeland of the New England Tableland, Nandewar, Brigalow Belt South and NSW North Coast Bioregions) to the south east of the proposal site would be sensitive to any changes to hydrological regimes or sedimentation/pollution. The EEC is more than 10 metres from the proposal site and as such impacts to this EEC are unlikely with correct environmental management at the site.

Fauna

The temporary removal of 1.74 hectares of agricultural land would have a minor to negligible impact on fauna species. Construction noise and vehicle movements in and out of the proposal site could disturb fauna inhabiting adjacent woodland and hollow-bearing trees. Impacts would be short term and intermittent.

The excavation of the pit could lead to entrapment of fauna species, including livestock.

Threatened species and ecological communities
No threatened fauna species listed under the TSC Act and/or EPBC Act are likely to be impacted by the proposed modification.

6.1.4 Safeguards and management measures

Additional safeguards and management measures to be implemented to manage impacts related to biodiversity are detailed in Table 6-1.

Table 6-1: Additional environmental safeguards and management measures for biodiversity

Impact	Environmental safeguard	Responsibility	Timing	Standard / additional safeguard
Fauna protection	Profiling of the borrow pit would occur in a way that enables fauna to escape the pit.	Construction contractor	Construction and post construction	Additional safeguard

6.2 Traffic, transport and access

6.2.1 Existing environment

The existing traffic environment of the New England Highway was described in Section 6.2.1 of the project REF and is still relevant to the proposed modification.

Though no traffic data is available for Pyes Creek Road, it is a minor local road and considered to have relatively low volumes of traffic.

6.2.2 Potential impacts

The proposed modification would have temporary minor traffic impacts on the New England Highway and Pyes Creek Road. Impacts would be a result of truck movement transporting excavated material between the borrow pit and project site. The assessment of construction traffic impacts outlined in the project REF is consistent with the traffic impacts associated with the proposed modification.

It is not anticipated that property access would be affected at any time during construction.

6.2.3 Safeguards and management measures

No additional traffic, transport and access-related safeguards and management measures are proposed as a result of the proposed modification.

6.3 Aboriginal heritage

A report was prepared by Artefact (2017) to address potential Aboriginal heritage impacts associated with the proposed modification. It is provided in Appendix B. This section summarises the findings of this report.

6.3.1 Methodology

An extensive search of the Aboriginal Heritage Information System (AHIMS) database was undertaken on 31 January 2017. An area of about two kilometres (east-west) by three kilometres (north-south) was searched.

A site inspection was conducted on 2 February 2017. The site inspection targeted potential areas of impact for the proposed borrow pit. The site inspection team included Garry Ferguson (Roads and Maritime), James Jerome (Moombahlene Local Aboriginal Land Council), and Josh Symons (Artefact Heritage). This constitutes a stage 1 assessment under the Roads and Maritime Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI).

6.3.2 Existing environment

The existing environment as it relates to Aboriginal heritage, including historical land use was described in Section 6.3.1 of the project REF and is still relevant to the proposed modification.

A total of six sites were identified by the extensive AHIMS search. All six sites were recorded by Niche (2013) during the PACHCI Stage 2 report for the project REF. The sites consist of four potential archaeological deposits (PAD), one modified tree, and one art site with PAD. None of the sites are located within the proposed modification site. No Aboriginal objects or areas of potential archaeological deposit (PAD) were identified during the site survey. The proposed borrow pit location and associated access track were assessed as having no archaeological sensitivity.

6.3.3 Potential impacts

No identified Aboriginal sites or areas of PAD will be impacted by the proposed works.

6.3.4 Safeguards and management measures

No additional safeguards and management measures related to Aboriginal heritage are proposed as a result of the proposed modification.

6.4 Non-Aboriginal heritage

A report was prepared by Artefact (2017) to address potential non-Aboriginal heritage impacts associated with the proposed modification. It is provided in Appendix B. This section summarises the findings of this report.

6.4.1 Methodology

Updated register searches were completed by Artefact Heritage on 15 February 2017. The State Heritage Register, the S170 registers, heritage schedules of Tenterfield LEP, places on the National Heritage List and the Register of the National Estate were searched.

6.4.2 Existing environment

No additional heritage items were identified in the updated register searches. No historical structures or areas where relics may be located where identified during the site survey.

A bullock track (ID22), was identified through detailed historical research undertaken by Niche Environment and Heritage (2013), and is located just south of the proposal site (Figure 6-2). The bullock track is not listed on any heritage registers. Its condition is unknown and Niche prepared a preliminary assessment of significance, and indicated that the site was likely to demonstrate local significance for historical values.

The former bullock track formed part of the Great Northern Road, which was the main road link between Sydney and Brisbane over the New England Tablelands. The track was an integral component of the former township at Bolivia Hill, and served as a supply route for personnel and material during construction of the Great Northern Railway. The former bullock track consisted of a cleared easement through the wooded hillslopes of Bolivia Hill, with records indicating a length of dry rubble retaining wall was constructed along sections of the road. The road was temporarily “made good” in 1950 whilst works were carried out along the current alignment of the New England Highway. For the majority of its alignment, the former bullock track would have consisted of an ephemeral unsealed vehicle track.

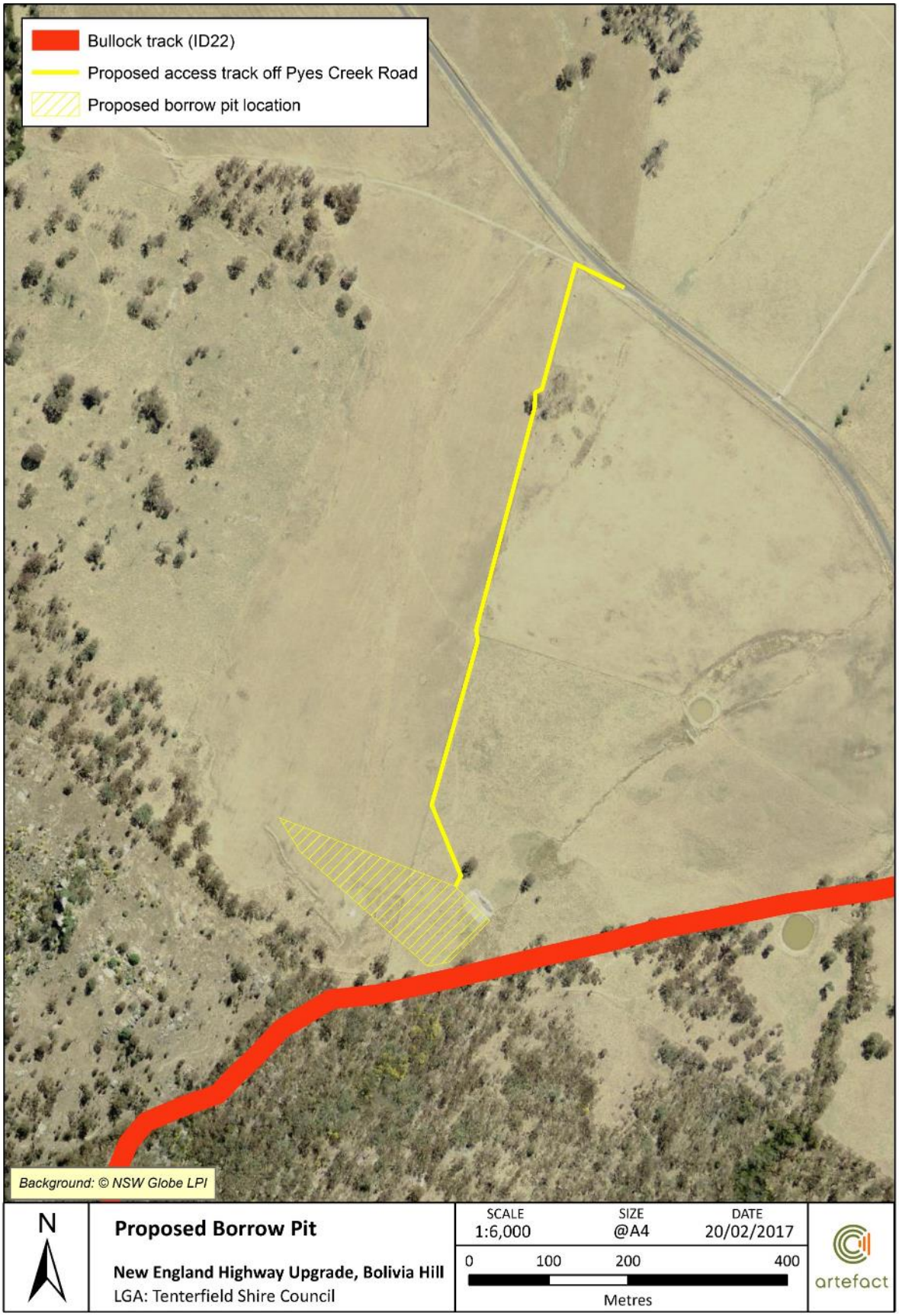

Figure 6-2: Approximate location of former bullock track in relation to the proposal site

6.4.3 Potential impacts

The alignment of the former bullock track, as shown in Figure 6-2, is likely to have been immediately south of the proposed modification site. The nature of the former bullock track would have been ephemeral with no associated structures or features likely to have been present in the vicinity of the investigation area. There is the possibility of occasional discarded items associated with use of the bullock track, such as horse shoes and glass bottles, however the proposed borrow pit location has been extensively cleared and ploughed, meaning that any relics would be mixed and in no discernible context. Based on the location of the proposed borrow pit and the approximate alignment of the former bullock track, there would be negligible impact to the significance of the former bullock track from the proposed modification.

6.4.4 Safeguards and management measures

Additional safeguards and management measures to be implemented to manage impacts related to non-Aboriginal heritage are detailed in Table 6-1.

Table 6-2: Additional environmental safeguards and management measures for non-Aboriginal heritage

Impact	Environmental safeguard	Responsibility	Timing	Standard / additional safeguard
Impacts to heritage item	Temporary exclusion fencing would be erected to protect the bullock track in conjunction with fencing for sensitive biodiversity features. This area would be identified as a no-go zone and conveyed as such to site staff.	Construction contractor	Pre-construction, construction	Additional safeguard

6.5 Hydrology and flooding

6.5.1 Existing environment

The proposal site is located on gently sloping land. Runoff flows across the site generally in a north-easterly direction towards two nearby drainage lines as shown in Figure 6-3. These drainage lines are tributaries of Splitters Swamp Creek, part of the Deepwater River catchment.

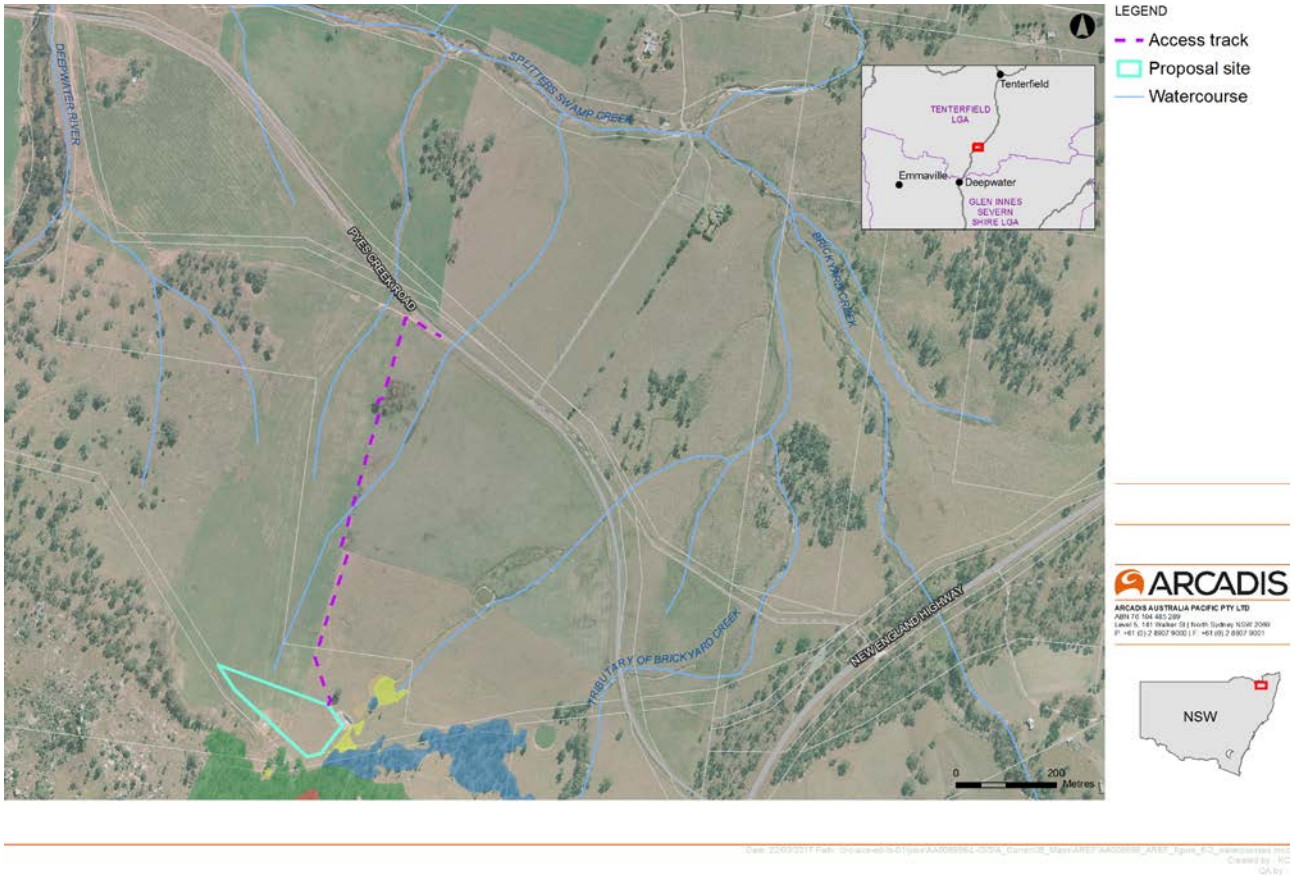

Figure 6-3: Watercourses near the proposal site

The flood modelling undertaken in the Preliminary Hydrology/Hydraulics Report (Hyder 2015) for the project REF shows the proposed modification is not located on flood prone land. It is outside the 100 year Average Recurrence Interval (ARI).

6.5.2 Potential impacts

The potential impacts of the proposed modification on hydrology and flooding are consistent with those outlined in the project REF.

6.5.3 Safeguards and management measures

No additional safeguards and management measures related to hydrology and flooding are proposed as a result of the proposed modification.

6.6 Topography, geology and soils

6.6.1 Existing environment

The elevation of the proposal site is about 840 m above the Australian height datum (AHD). The proposal site has a gradient of around six per cent.

The 1:250,000 Geological Map of the Grafton region (SH 56-6) indicates the proposal site is predominantly underlain by Dundee Rhyodacite. This is described as blue-grey crystal-rich ignimbritic rhydocite, with crystals of quartz and other volcanic materials (Geosciences Australia 2014).

The results of the geotechnical investigation for the project (Douglas Partners 2014) confirmed the predominance of granite and microgranite materials throughout the project site, with rhydocite at the northernmost borehole testing site, consistent with geological mapping. Fresh, slightly weathered granite outcrops are along the ridgelines and cliff faces of the Bolivia Ranges including southwest of the proposal site.

Soils throughout the project site are classified as rugged granitic areas with rock walls and tors (Cardno 2013) and are likely to be the same soils present in proposal site. This soil type largely consists of leached sands with various shallow sand soils. The Soil Conservation Service categorises soil types into one of four erosion classes. This soil would be considered 'Class C: Grey and yellow soils derived from granites, sediments and metasediments, especially coarse-grained types' (OEH 2012). This is considered to have very high soil erodibility.

6.6.2 Potential impacts

Due to the high erodibility of the soils likely to be present on the proposal site, erosion may occur during any works involving soil disturbance. This includes establishment of the borrow pit, excavation of material from the borrow pit, stockpiling topsoil and access track establishment/ decommissioning. In the event of rain, sediment-laden runoff from exposed areas could reach nearby watercourses and affect water quality. With the installation of appropriate erosion and sediment control measures as outlined in Section 6.7.3 of the project REF, water quality impacts would be minor and localised.

6.6.3 Safeguards and management measures

Additional safeguards and management measures to be implemented to manage impacts related to topography, geology and soils are detailed in Table 6-3.

Table 6-3: Additional environmental safeguards and mitigation measures for topography, geology and soils

Impact	Environmental safeguard	Responsibility	Timing	Standard/ additional safeguard
Erosion and sedimentation	Upon completion of the works, the borrow pit would be regraded and revegetated as soon as feasible and reasonable.	Construction contractor	Post construction	Additional safeguard

6.7 Noise and vibration

6.7.1 Policy setting

The policy setting relating to noise and vibration management was described in Section 6.8.1 of the project REF and is relevant to the proposed modification.

6.7.2 Existing environment

The proposal site is located on farmland in a rural locality and as such has relatively low background noise levels. Traffic on Pyes Creek Road and the New England Highway are the main source of background noise and vibration at the proposal site. Other sources of noise and vibration within at the proposal site would include light machinery and/or livestock from neighbouring farms.

The closest sensitive receivers to the proposal site include a residential dwelling 1.5 kilometres north-east of the proposal site and a residential dwelling 1.4 kilometres east of the proposed borrow pit. The residential dwelling to the north-east is 700 metres from the intersection of the proposed access track and Pyes Creek Road.

6.7.3 Potential impacts

Material extraction activities and vehicle movements have the potential to cause some short-term noise impacts to nearby sensitive receivers. Given the distances of these receivers to the proposal site, impacts are likely to be minor.

6.7.4 Safeguards and management measures

No additional safeguards and management measures related to noise and vibration are proposed as a result of the proposed modification.

6.8 Air quality

6.8.1 Existing environment

The existing environment as it relates to air quality was described in Section 6.9.1 of the project REF and is relevant to the proposal site.

The New England region generally experiences good air quality as it is largely rural and agricultural. The nearest large scale facility, Rangers Valley Cattle Station, is located roughly 28.7km from the proposal site (NPI, 2015). This facility is primarily used for sheep, cattle and grain farming and would have minimal impact on the local air quality at the proposal site and surrounds.

The closest sensitive receivers to the proposal site include a residential dwelling 700 metres north-east of the intersection of the proposed access track and Pyes Creek Road and a residential dwelling 1.4 kilometres east of the proposed borrow pit.

6.8.2 Potential impacts

Construction activities that could impact local air quality include:

- vehicles traveling on unsealed areas
- transport and handling of soils and material to, from and around the proposal site
- topsoil stripping and storage
- extraction of material
- regrading and landscaping
- vehicle and plant emissions.

Of these activities the main potential impact on ambient air quality during construction would be from dust generation. The magnitude and extent of any dust impact would be subject to the volume and duration of earthworks occurring at any one time, as well as meteorological conditions such as wind speed, wind direction and precipitation.

It is not considered likely that dust emissions during construction would impact sensitive receivers, given their proximity to the proposal site.

6.8.3 Safeguards and management measures

No additional safeguards and management measures related to air quality are proposed as a result of the proposed modification.

6.9 Climate change

6.9.1 Policy setting

The policy setting relating to climate change was described in section 6.10.1 of the project REF and is relevant to the proposed modification.

6.9.2 Potential impacts

The potential impacts of the proposed modification on climate change and the contribution of the proposed modification to climate change are consistent with those outlined in the project REF.

6.9.3 Safeguards and management measures

No additional safeguards and management measures related to climate change are proposed as a result of the proposed modification.

6.10 Landscape character and visual amenity

6.10.1 Existing environment

Bolivia Hill is characterised by steep forested escarpments and granite outcrops of the Bolivia Hill ranges. Largely cleared agricultural land occurs at lower elevations adjacent to the ranges. The proposal site is located on gently sloping agricultural land downslope of a vegetated hillside on the edge of the Bolivia Hill ranges as shown in Figure 6-4. The proposal site will be visible at 750 metres from Pyes Creek Road.

Figure 6-4: View of proposal site from Pyes Creek Road

6.10.2 Potential impacts

The proposal would impact on the visual environment for any road users travelling along Pyes Creek Road from the temporary placement of machinery and plant. Due to the small scale of the works and the distance of the receiving environment, visual impacts are considered to be minor.

6.10.3 Safeguards and management measures

No additional safeguards and management measures related to landscape character and visual amenity are proposed as a result of the proposed modification.

6.11 Land use, property and socio-economic impact

6.11.1 Existing environment

The existing socio-economic environment of the project site and surrounds was described in section 6.12.1 of the project REF and is relevant to the proposal site.

The current land use at the proposal site is agriculture, namely cropping and grazing. A cultivated legume is on the eastern paddock. No livestock were present, though evidence of cattle was found on the western paddock.

6.11.2 Potential impacts

The proposed modification would result in the temporary removal of small amounts of farmland. The proposal site is illustrated in Figure 3-1. It covers an area of about 17,400 square metres, 8,100 square metres of which contains the cultivated legume.

6.11.3 Safeguards and management measures

No additional land use-related safeguards and management measures are proposed as a result of the proposed modification.

6.12 Land use, property and socio-economic impact

6.12.1 Existing environment

The existing socio-economic environment of the project site and surrounds was described in Section 6.12.1 of the project REF and is relevant to the proposal site.

The current land use at the proposal site is agriculture, namely cropping and grazing. A cultivated legume is on the eastern paddock.

6.12.2 Potential impacts

The proposal would result in the temporary removal of a small area of farmland. The proposal site is illustrated in Figure 3-1. It covers an area of about 17,400 square metres, 8,100 square metres of which contains the cultivated legume.

6.12.3 Safeguards and management measures

No additional land use-related safeguards and management measures are proposed as a result of the proposed modification.

6.13 Waste management

6.13.1 Policy setting

The policy setting relating to waste management was described in Section 6.13.1 of the project REF and is relevant to the proposed modification.

6.13.2 Potential impacts

The proposed modification would generate the following waste:

- general waste (putrescible), including paper waste, food waste, and general rubbish generated by the construction workforce
- liquid waste, including small volumes of excess fuel, oils, and other chemicals from vehicle maintenance.

Waste impacts are consistent with the project REF.

6.13.3 Safeguards and management measures

No additional waste-related safeguards and management measures are proposed as a result of the proposed modification.

6.14 Cumulative impact

6.14.1 Potential impacts

The cumulative impacts of the project were described in Section 6.14 of the project REF and are consistent with the cumulative impacts of the proposed modification.

7 Environmental management

7.1 Environmental management plans

A number of safeguards and management measures have been identified to minimise adverse environmental impacts, including social impacts, which could potentially arise as a result of the proposed modification. Should the proposed modification proceed, these management measures would be addressed and incorporated into the Project Environmental Management Plan (PEMP) and Contractors Environmental Management Plan (CEMP) and applied during the construction and operation of the proposed modification.

7.2 Summary of safeguards and management measures

Environmental safeguards and management measures for the Bolivia Hill upgrade are summarised in Table 7-1. Additional safeguards and management measures identified in this addendum REF are included in bold and italicised font. The safeguards and management measures will be incorporated into the detailed design phase of the proposed modification, the CEMP and the PEMP and implemented during construction and operation of the proposed modification, should it proceed. These safeguards and management measures will minimise any potential adverse impacts arising from the proposed works on the surrounding environment.

Table 7-1: Summary of safeguards and management measures

No.	Impact	Environmental safeguards	Responsibility	Timing
1	General	All environmental safeguards must be incorporated within the following: • PEMP Environmental Management Plan • Detailed design stage • Contract specifications for the proposal • CEMP	Project Manager	Pre-construction
2	General	A risk assessment must be carried out on the proposal in accordance with the Roads and Maritime Services Project Pack and PMS risk assessment procedures to determine an audit and inspection program for the works. The recommendations of the risk assessment are to be implemented. A review of the risk assessment must be undertaken after the initial audit or inspection to evaluate if the level of risk chosen for the project is appropriate. Any work resulting from the proposal and as covered by the REF may be subject to environmental audit(s) and/or inspection(s) at any time during their duration.	Project Manager and regional environmental staff	Pre-construction After first audit
3	General	A contractual hold point must be maintained until the CEMP is	Project Manager	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		reviewed by the Roads and Maritime Services Environment Manager Northern.		
4	General	The Roads and Maritime Services Project Manager must notify the Roads and Maritime Services Environmental Officer Northern at least five working days prior to work commencing.	Project Manager	Pre-construction
5	General	All businesses and residences likely to be affected by the proposed works must be notified at least five working days prior to the commencement of the proposed activities.	Project Manager	Pre-construction
6	General	Environmental awareness training must be provided, by the contractor, to all field personnel and subcontractors.	Contractor	Pre-construction and during construction as required.
7	Impacts on threatened flora species	There is to be no disturbance or damage to threatened species or critical habitat. (Refer Sections 2.6.4 of the submissions report)	Roads and Maritime and construction contractor	During construction
8	Impacts on threatened flora species	If unexpected threatened fauna or flora species are discovered, stop work immediately and follow the Roads and Maritime Services Unexpected Threatened Species Find Procedure in the Roads and Maritime Services Biodiversity Guidelines 2011 – Guide 1 (Pre-clearing process). (Refer Sections 2.6.1 and 2.6.4 of the submissions report)	Roads and Maritime and construction contractor	During construction
9	Impacts on threatened fauna species	Work is not to harm threatened fauna (including where they inhabit bridges or other structures eg timber fence posts).	Roads and Maritime and construction contractor	During construction

No.	Impact	Environmental safeguards	Responsibility	Timing
10	Impacts on threatened flora species	Vegetation that has been protected or planted as part of offset work provided as part of an approved project (eg in association with fauna crossings) is not to be removed. (Refer Sections 2.6.1 and 2.6.4 of the submissions report)	Roads and Maritime and construction contractor	During construction
11	Impacts on fauna	Fauna handling must be carried out in accordance with the requirements of the Roads and Maritime Services Biodiversity Guidelines – Guide 9 (Fauna Handling).	Roads and Maritime and construction contractor	During construction
12	Impacts on fauna	Construction work is not to create an ongoing barrier to the movement of wildlife.	Roads and Maritime and construction contractor	During construction
13	Impacts on threatened flora species	The CEMP in accordance with Biodiversity Guidelines - Protecting and managing biodiversity on Roads and Maritime projects would include the following: • a map clearly showing vegetation clearing boundaries and sensitive areas/no-go zones • a site walk-over with site personnel including Roads and Maritime representatives to confirm clearing boundaries before the start of work. Clearing boundaries and location of exclusion zone fencing are marked out accurately with a surveyor due to the sensitive nature of Bolivia Wattle population • marking (for example, with flagging tape) of the clearing boundary and habitat features to be protected • a procedure for a suitably qualified ecologist to carry out pre-clearing flora and fauna surveys immediately before vegetation removal. Target species would include Bolivia Wattle (*Acacia pycnostachya*) • the 30 identified specimens of Bolivia Wattle are required to be protected prior to and during construction. There is to be no	Roads and Maritime and construction contractor	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		direct impact on these plants. These areas would need to be fenced off. The protection fencing would be removed at the completion of site work • a staged clearing process in accordance with Roads and Maritime's Biodiversity Guidelines (2011) including the requirements of guides 1, 2, 4 & 9 • identify control/ mitigation measures to prevent impacts on sensitive locations or no-go zones • protocols to prevent the introduction or spread of pathogens (eg Phytophthora) in accordance with Guide 7 of Roads and Maritime's Biodiversity Guidelines (2011).		
		Provision of education to all personnel taking part in construction activities with regards to the importance of clearing limits, land uses and threatened species and communities; and the legislative responsibilities of personnel. (Refer Sections 2.6.1, 2.6.4 and 2.1 of the submissions report)		
		If unexpected threatened flora is discovered, work would stop immediately and the Unexpected Threatened Species Find Procedure in the Roads and Maritime's Biodiversity Guideline (2011) implemented. (Refer Sections 2.6.1 and 2.6.4 of the submissions report)	Roads and Maritime and construction contractor	Construction
		The proposal design would be reviewed during detailed design to determine if it is possible to minimise clearing of native vegetation, particularly TECs. (Refer Sections 2.6.1 and 2.6.4 of the submissions report)	Roads and Maritime and construction contractor	Pre-construction
14	Impacts to riparian areas	Riparian areas disturbed by the proposal would be rehabilitated as soon as practicable in accordance with Roads and Maritime	Roads and Maritime and construction	Pre-construction, construction and

No.	Impact	Environmental safeguards	Responsibility	Timing
		Biodiversity Guidelines 2011 – Guide 10: Aquatic habitats and riparian zones. The Project Manager and/or Environment Manager should ensure that the following is considered during site rehabilitation: • stabilising the banks of the waterway through revegetation and/or armouring according to available landscape plans • banks are protected from stock and/or human access • appropriate fencing is used during rehabilitation and maintenance. Temporary stabilisation techniques are used while long-term measures such as the revegetation are establishing (techniques are described in the Blue Book).	contractor	monitoring post construction for establishment and weed invasion management
15	Impacts on the aquatic environment	Appropriate erosion and sediment controls would be established across the site and as a last line of defence to the Brickyard Creek tributary (refer to Section 6.1 of the project REF).	Roads and Maritime and construction contractor	Construction
		A spill management plan would be prepared to minimise the risk of spills and ensure adequate provision of spill management equipment on site, particularly at waterways.	Roads and Maritime and construction contractor	Construction
		Waterways (namely, Brickyard Creek and its tributary) would be identified as no-go zones to site staff. These exclusion zones would need to be fenced off to keep personnel and equipment out of these areas. Exclusion zones will incorporate a 10 metre buffer from the watercourse bank.	Roads and Maritime and construction contractor	Construction
		No work would occur within 10 metre of the edge of the channel banks of the Brickyard Creek tributary.	Roads and Maritime and construction contractor	Construction
		No snags (coarse woody debris) or rocks are to be removed from within any waterway.	Construction contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
16	Weeds and pathogens	Actions for weed management would be developed as part of the CEMP in accordance with the requirements of Roads and Maritime's Specification G36 and Specification G40. Actions would include, but not be limited to the following measures: • the identification of the type and location of weeds of concern (including noxious weeds) within the proposal area • the identification of sensitive receivers (such as native vegetation and waterways) within or near the proposal area • all pathogens (eg Chytid, Myrtle Rust and Phytophthora) would need to be managed in accordance with the Roads and Maritime Services Biodiversity Guidelines – Guide 7 (Pathogen Management) and DECC Statement of Intent 1: Infection of native plants by *Phytophthora cinnamomi* (for Phytophthora) • measures to prevent the spread of weeds, fungi and pathogens namely *Phytophthora cinnamomi* and myrtle rust including hygiene procedures for equipment, footwear and clothing • a requirement that weeds (including declared noxious weeds) be managed and disposed of in accordance with requirements of the Noxious Weeds Act 1993 and Guide 6 of Roads and Maritime's Biodiversity Guidelines (2011) • communication strategies to improve contractor awareness of weeds and weed management • any spray grass/hydromulching that incorporates exotic grass species must ensure that seeds are from a sterile strain. (Refer Section 2.10.1 of the submissions report)	Roads and Maritime and construction contractor	Pre-construction and post construction
		Any application of herbicide for weed management would be undertaken in accordance with the requirements of the *Pesticides Act*	Construction contractor	Pre-construction, construction and

No.	Impact	Environmental safeguards	Responsibility	Timing
		1999 and herbicide that is appropriate to the sensitivity of the area would be used. Approval by the Roads and Maritime's regional Environmental Officer would be obtained prior to use.		post construction. Especially in riparian areas adjacent to Brickyard Creek
17	Fauna protection	Install fauna exclusion fence on both sides and for the entire length of the proposed upgrade. Exclusion fence may be substituted with other natural features, such as vertical rock face, where these features occur in suitable locations. Gates should be installed where the exclusion fence crosses the former highway. An assessment shall be undertaken by a suitably qualified ecologist to determine the type and extent of exclusion fence, sections of the alignment where fence can be supplemented with natural barriers and suitable alternatives where there is a high risk of rock falls damaging the fence. Exclusion fence must tie into bridge and culvert underpasses to ensure it guides fauna to these structures. Returns should be installed at each end.	Roads and Maritime and construction contractor	Pre-construction and construction
		Signs would be installed warning motorists that quolls cross in the Bolivia Hill area.	Roads and Maritime and construction contractor	Pre-construction and construction
		A suitably qualified ecologist undertake targeted surveys during the breeding season to assess the status of the suspected little eagle nest. Surveys should aim to determine if the nest is active and confirm use by little eagle.	Roads and Maritime and construction contractor	Pre-construction
		If the subject nest is confirmed as an active little eagle nest, no high impact construction activities, such as blasting, rock cutting, rock splitting, crushing, dumping rock etc, should not occur within 100–200m to be determined by ecologist with respect to activity, of the nest site during the breeding season i.e. May to October. Following	Roads and Maritime and construction contractor	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		the commencement of construction the nest should be inspected for activity. If the nest is inactive during the construction period then no restrictions would apply.		
		Construction vehicles would remain within designated work zone areas and not encroach outside of these areas. Strict access restrictions would be imposed on the travelling stock route areas at the northern end of the subject site to avoid disturbance to threatened woodland birds.	Construction contractor	Construction
		Profiling of the borrow pit would occur in a way that enables fauna to escape the pit.	***Construction contractor***	***Construction and post construction***
18	Fauna connectivity	To improve connectivity, assess the feasibility of remediating a section of existing highway adjacent to the proposed large bridge underpass. A feasibility assessment would be undertaken to see if this area can be revegetated. Remediation may be feasible in areas where the existing highway is situated on fill, such as the drainage line extending from the cliff face.	Roads and Maritime and construction contractor	Pre-construction and construction
19	Fauna habitat loss	Rocks and large logs removed from the alignment should be stockpiled and used to create additional habitat in rehabilitated areas and near the large bridge underpass. (Refer Section 2.10.1 of the submissions report)	Construction contractor	Pre-construction and construction
		Detailed design would aim to further minimise vegetation removal. This can be achieved by restricting the clearing boundary to the area required for construction, placing stockpiles and ancillary facilities in cleared land and utilising existing access tracks for site access.	Roads and Maritime and construction contractor	Pre-construction
		A nest box management plan would be prepared that quantifies impacts on the extant hollow resource and determines the	Roads and Maritime and construction	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		appropriate number and type of boxes required to compensate for removal of arboreal hollows on threatened species and important prey for threatened species. The nest box management plan would include a detailed survey to quantify impacts on hollow-bearing trees.	contractor	
		The removal of mature Blakely's red gum would be minimised during construction of the access road. Also minimising removal of Mountain banksia (Banksia canei) at the southern end of the project.	Construction contractor	Pre-construction and construction
		Existing vegetation beneath the bridge would be retained were possible, and ancillary sites disturbed during bridge construction would be rehabilitated.	Roads and Maritime and construction contractor	Pre-construction and construction
		Ancillary sites will be remediated upon completion of work. Planting of key nectar species such as Blakely's red gum, Mountain banksia and Rough-barked apple in the revegetation of ancillary sites	Roads and Maritime and construction contractor	Construction and post-construction
		Implement standard clearing procedures in accordance with Roads and Maritime Services Biodiversity Guidelines 2011, including, but not limited to, daily pre-clearing survey, two-stage clearing protocol (non-hollow bearing trees and hollow bearing trees), hollow bearing tree inspection and fauna relocation.	Roads and Maritime and construction contractor	Construction and post-construction
		Where possible, current traffic movements and property accesses would need to be maintained during the works. Any disturbance is to be minimised to prevent unnecessary traffic delays.	Contractor	During construction
20	Construction traffic management	A traffic management plan would be prepared and implemented for the work site as part of the CEMP. The traffic management plan would be prepared in accordance with Traffic Control at Worksites (Roads and Maritime 2010), Australian Standard AS1742 and the Roads and Maritime Specification G10 work site manual. The traffic	Contractor	Pre-construction and construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		management plan would include: • identification of all public roads to be used by construction traffic • management methods to direct construction traffic to use identified roads • identification of all public roads that may be partially or completely closed during construction, and the expected timing and duration of closures • details of likely impacts on existing traffic • traffic controls to manage and regulate traffic movements, including minimising traffic switching • maintenance of continuous, safe and efficient movement of traffic for both the public and construction workers • details on access to construction sites, including entry and exit locations, and measures to prevent construction vehicles queuing on public roads • a response plan for any incident involving construction traffic • provision of appropriate warning and advisory signposting • mechanisms for monitoring, reviewing and amending the success of the plan. (Refer Sections 2.3.2, 2.3.4 and 2.3.5 of the submissions report)		
21	Vehicle movement	Vehicle movement plans and haulage route plans would be prepared. Drivers working on the project would be briefed on these vehicle movement plans during project induction. Deliveries would be planned to occur outside peak traffic periods, where possible.	Contractor	During construction
22	Road occupancy	Applications for Road Occupancy Licences (ROL) would be submitted to Roads and Maritime and the relevant council at least 10	Contractor	Pre-construction and during

No.	Impact	Environmental safeguards	Responsibility	Timing
		working days prior to proposed occupancy.		construction
23	Road damage	Pre-construction road dilapidation reports would be prepared by the contractor for this section of the New England Highway and Pyes Creek Road (and any other roads likely to be used by construction traffic). Post construction road dilapidation reports (including photographic records) would be prepared after the completion of construction for all roads assessed prior to construction Dilapidation resulting from construction activity would be repaired Copies of road dilapidation reports would be sent to the relevant road authority.	Contractor	Pre-construction, during construction and post construction
24	Impact on known Aboriginal heritage sites	The CEMP would specify the locations of BH AS1, PAD2 and PAD4 for the proposed work to ensure no direct or indirect (such as erosion) impact to those areas. (Refer Section 2.9 of the submissions report)	Contractor	Pre-construction
25	Impact on known Aboriginal heritage sites	Site inductions would include Aboriginal heritage information including the locations of BH AS1, PAD2 and PAD4 to ensure all site workers know of the areas. No-harm areas would need to be established around the perimeter of Bolivia Hill AS1 and around those portions of PAD 2 and PAD 4 that are closest to the construction work. (Refer Section 2.9 of the submissions report)	Contractor	Pre-construction and during construction
26	Impact on known Aboriginal heritage sites	High visibility fences/barricades would be placed around the BH AS1 exclusion area and around those portions of PAD 2 and PAD 4 that are closest to the construction work. This barricade will be constructed in consultation with a Roads and Maritime Aboriginal Heritage Officer.	Construction contractor	Pre-construction and construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		(Refer Section 2.9)		
27	Impact on known Aboriginal heritage sites	During detailed design, the proposed access track would be refined following survey to accommodate a three metre buffer zone on all sides of BH AS1. BH AS1 would be surveyed and pegged out in consultation with Roads and Maritime Aboriginal Heritage prior to being fenced with man proof fencing during survey fieldwork and geotechnical investigations. The proposed northern compound location boundary would be refined to avoid impact to PAD 2. (Refer Section 2.9 of the submissions report)	Principal consultant	Detailed design
28	Impact on unknown Aboriginal heritage sites	In the event of an unexpected find of an Aboriginal heritage item (or suspected item), work would cease in the affected area and Roads and Maritime's regional Environmental Officer and Senior Environmental Specialist (Aboriginal heritage) would be contacted for advice on how to proceed. Roads and Maritime's Unexpected Archaeological Finds Procedure (2011) would be implemented. (Refer Section 2.9 of the submissions report)	Construction contractor	Construction
29	Possible disturbance to known Aboriginal heritage	Detailed design would seek to minimise or avoid impacts on known heritage items. (Refer Section 2.9 of the submissions report)	Principal consultant	Detailed design
30	Impacts on known non-Aboriginal heritage Items	Where impacts are to occur on identified heritage items, mitigation measures would be followed. The mitigation measures would include following Roads and Maritime's Roadside Tributes Policy. (Refer Sections 2.7.1 of the submissions report)	Roads and Maritime	Pre-construction
31	Impacts on known non-Aboriginal heritage Items	A non-indigenous heritage management plan would be compiled as part of the CEMP. If potential archaeological relics are identified during construction, Roads and Maritime's Unexpected Archaeological Finds Procedure 2015 would be implemented.	Roads and Maritime	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		Any design changes in the area of the former Bolivia township and other areas of heritage significance would be assessed for potential impacts and included in an addendum REF. (Refer Sections 2.7.1, 2.7.2, 2.7.3, 2.7.4 and 2.7.5 of the submissions report)		
32	Possible disturbance of unexpected skeletal remains	In the unlikely event that skeletal remains are identified during construction the area should be cordoned off so that the site/s can be adequately assessed and managed in accordance with the Roads and Maritime Standard Management Procedure – Unexpected Heritage Finds (2015).	Construction contractor	Construction
33	Impacts on non-Aboriginal heritage Items	Archival recording of impacted items would be undertaken in accordance with the Roads and Maritime Guidelines on *How to Prepare Archival Records of Heritage Items*.	Construction contractor	Construction
34	Community Involvement	The development of an Aboriginal Participation Program in consultation with a Roads and Maritime Aboriginal Heritage Officer.	Roads and Maritime and construction contractor	Construction
35	Possible disturbance to unknown non-Aboriginal heritage items due to construction activities	All relevant staff, contractors and subcontractors should be made aware of their statutory obligations for heritage under the NSW *Heritage Act 1977* and best practice outlined in the Burra Charter 1999, which may be implemented as a heritage site induction.	Construction contractor	Construction
36	Increased area of flood inundation and flood velocities for construction and maintenance access	Flooding impacts would be reassessed following finalisation of construction and maintenance access requirements.	Roads and Maritime	Pre-construction and construction

No.	Impact	Environmental safeguards	Responsibility	Timing
37	Erosion and scour at culvert outlets	The drainage system would be designed to control outlet velocities. Scour protection devices would be incorporated at culvert outlets.	Roads and Maritime	Pre-construction and construction
38	Erosion and scour at culvert outlets	The drainage system would be designed to control outlet velocities and minimise the footprint of scour protection measures.	Roads and Maritime	Pre-construction and construction
39	Erosion and sediment control	Erosion and sediment control measures would need to be implemented and maintained to: • prevent sediment moving off-site and sediment laden water entering any water course, drainage lines, or drain inlets • reduce water velocity and capture sediment on site • minimise the amount of material transported from site to surrounding pavement surfaces • divert clean water around the site. (in accordance with the Landcom/Department of Housing Managing Urban Stormwater, Soils and Construction Guidelines (the Blue Book)).	Contractor	Pre-construction and construction
40	Erosion and sediment control	During detailed design, an erosion and sedimentation management report would be prepared. The report would include (as a minimum): • identified site catchment and sub-catchments, high risk areas and sensitive areas • sizing of each of the above areas and catchments • proposed staging plans for the project to ensure appropriate erosion and sediment control measures are possible • the likely volume of runoff from each catchment and sub-catchment in accordance with the Managing Urban Stormwater: Soils and Construction, Volume 1 and 2 (Landcom 2004)	Principal consultant	Detailed design

No.	Impact	Environmental safeguards	Responsibility	Timing
		• direction of water flow, both off-site and on-site • diversion of off-site water around or through the site or details of separation of on-site and off-site water • the direction of runoff and drainage points during each stage of construction • the locations and sizing of runoff and drainage points during each stage of construction • the location and sizing of sediment basins/sumps and associated drainage (as required) to direct site water to the basin or sumps • a mapped plan identifying the above at all major construction stages • a review process by a soil conservationist and a process for updating the report to address any recommendations.		
41	Erosion and sediment control	A soil and water management plan would be prepared prior to construction and would need to include (as a minimum): • identified site catchments and sub-catchments, high risk areas and sensitive areas • sizing of each of the above areas and catchments • the likely runoff from each sub-catchment • separation of on-site and off-site water • the direction of run-off and drainage points during each stage of construction • direction of flow of on-site and off-site water • the locations and sizing of sediment basins or sumps and associated catch drains and/or bunds • the locations of other erosion and sediment control measures • control measures to be implemented on wet weather events,	Contractor	Prior to construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		including a mapped plan • a dewatering procedure for on-site water and basins if applicable • a process for reviewing and updating the plan on a fortnightly basis and/or when work alters.		
42	Risk and hazards	Environmental Work Method Statements would be prepared for high-risk activities, such as: • clearing and grubbing • earthworks • temporary creek diversion • drainage work, including culvert construction • bridge construction.	Construction contractor	Pre-construction and construction
43	Risk and hazards	Environmental Work Method Statements include: • description of work/activities and machinery • outline of the sequence of the work/activities, including interfaces with other construction activities • identification of potential environmental risk/impact, including potential risk/impact associated with wet weather events • evaluation of methods to eliminate/reduce the environmental risk • mitigation measures to reduce environmental risk • any safeguards resulting from consultation with public authorities and other stakeholders, where appropriate • a map indicating sensitive locations, likely potential environmental impacts, and work areas • identification of work areas and exclusion zones • operational and monitoring measures to reduce	Construction contractor	Pre-construction and construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		environmental impact • a process for assessing and reporting the performance of the implemented environmental control measures • a process for resolving environmental issues or conflicts and reporting outcomes.		
44	Erosion and sediment control	Stabilisation would be carried out for areas exposed for two weeks or more (including stockpiles and batters); for example, by covering with geotextile fabric, stabilised mulch, soil binder or spray grass.	Contractor	Construction
45	Erosion and sediment control	Work areas would need to be stabilised progressively during the work.	Contractor	Construction
46	Erosion and sediment control	Localised erosion and sediment control measures would be implemented to minimise erosion and the volume of sediment transported from disturbed areas. Measures would include: • temporary revegetation/ rehabilitation work to reduce the extent of disturbed surfaces • temporary surface treatments or blanketing on exposed earth surfaces • sediment barriers and sumps, in series where necessary • vegetated buffer strips where necessary. All temporary erosion and sediment control devices would be removed once the permanent measures are sufficiently established. (Refer Section 2.10.1 of the submissions report)	Construction contractor	Pre-construction and construction
47	Erosion and sediment control	Erosion and sedimentation controls would need to be checked and maintained on a regular basis (including clearing of sediment from behind barriers) and records kept and provided on request.	Construction contractor	Pre-construction and construction

No.	Impact	Environmental safeguards	Responsibility	Timing
48	Erosion and sediment control	Control measures would be implemented at construction access points to the New England Highway within the proposal area to minimise dirt and mud tracking.	Construction contractor	Construction
49	Erosion and sediment control	All stockpiles would be designed, established, operated and decommissioned in accordance with the Road and Maritime *Stockpile Management Procedures* (2011a). Stockpiles would be sited: • at least 50 metres from the nearest waterway In an area of low ecological and heritage conservation significance • on relatively level ground • outside the 1 in 10 year ARI floodplain.	Construction contractor	Pre-construction and construction
50	Erosion and sediment control	Topsoil would be stockpiled separately for possible re-use in landscaping and rehabilitation. (Refer Section 2.10.1 of the submissions report)	Construction contractor	Construction
51	Erosion and sediment control	Any material transported onto road surfaces would be swept and removed at the end of each working day and before rainfall.	Construction contractor	Construction
52	Erosion and sediment control	An accredited soil conservationist would be engaged to regularly inspect work throughout the construction phase on a monthly basis and subsequent report to Roads and Maritime.	Construction contractor	Construction
53	Contamination identified during construction	If contaminated areas are encountered during construction, appropriate control measures would be implemented to manage the immediate risks of contamination, such as the diversion of surface runoff, capture of any contaminated runoff or temporary capping. All other work that may impact on the contaminated area would cease until the nature of the contamination is been confirmed and any necessary site-specific controls or further actions identified in	Construction contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		consultation with the Roads and Maritime Environment Manager and/or EPA.		
54	Accidental spill	A site specific emergency spill plan would be developed, and include spill management measures in accordance with the Roads and Maritime Code of Practice for Water Management and relevant EPA guidelines. The plan would 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)	Construction contractor	Pre-construction and construction
55	Water Quality	There is to be no release of dirty water into drainage lines and/or waterways.	Construction contractor	Construction
56	Water Quality	Visual monitoring of local water quality (ie turbidity, hydrocarbon spills/slicks) is to be undertaken on a regular basis to identify any potential spills or deficient erosion and sediment controls.	Construction contractor	Construction
57	Water Quality	Water quality control measures would need to be used to prevent any materials (eg. Concrete, grout, sediment etc) entering drain inlets or waterways.	Construction contractor	Construction
58	Water Quality	Measures to control pollutants from stormwater and spills would be investigated and incorporated in the pavement drainage system at locations where it discharges to the receiving drainage lines. Measures aimed at reducing flow rates during rain events and potential scour would also be incorporated in the design of the pavement drainage system.	Principal consultant	Detailed design
59	Water Quality	Potable water is used for wash down.	Construction contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
60	Water Quality	Excess debris from cleaning and washing is removed using hand tools.	Construction contractor	Construction
61	Water Quality	Containment material is used to capture / filter water used in wash down.	Construction contractor	Construction
62	Construction noise and vibration	A construction noise and vibration management plan (CNVMP) would be prepared as part of the CEMP in accordance with the Interim Construction Noise Guideline (DECCW 2009). The CNVMP would detail mitigation, monitoring and community liaison measures and: • identify potentially impacted locations and properties (including a detailed map) • assess potential risk for activities likely to impact residents • identify mitigation measures to reduce excessive noise and/or vibration during construction, including those associated with controlled blasting (if required) and truck movements • outline a process for assessing the performance of implemented mitigation measures • outline a process for resolving issues and complaints.	Construction contractor	Pre-construction
63	Construction noise and vibration	Work would be carried out during normal work hours (i.e. 7am to 6pm Monday to Friday; 8am to 1pm Saturdays). Any work performed outside normal work hours or on Sundays or public holidays would need to minimise noise impacts.	Construction contractor	During Construction
64	Construction noise and vibration	Noise impacts would need to be minimised in accordance with Practice Note 7 in the Roads and Maritime Services Environmental Noise Management Manual and Roads and Maritime Services Environmental fact sheet No. 2- Noise Management and Night	Construction contractor	During Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		Works.		
65	Air quality	An air quality management plan (AQMP) would be prepared as part of the construction environmental management plan (CEMP). The AQMP would include (as a minimum): • a map identifying locations of sensitive receivers • identification of potential risks/impacts due to dust-generating activities • management measures to minimise risk, including a progressive stabilisation plan • a process for monitoring on-site dust and weather conditions • a process for altering management measures as required. (Refer Section 2.10.2 of the submissions report)	Construction contractor	Pre-construction
66	Air quality	Measures (including watering or covering exposed areas) would need to be used to minimise or prevent air pollution and dust.	Construction contractor	Construction
67	Air quality	Work (including the spraying of paint and other materials) are not to be carried out during strong winds or in weather conditions where high levels of dust or air borne particulates are likely.	Construction contractor	Construction
68	Air quality	Vegetation or other materials are not to be burnt on-site.	Construction contractor	Construction
69	Air quality	Stockpiles or areas that may generate dust would need to be managed to suppress dust emissions in accordance with the Roads and Maritime Services Stockpile Site Management Guideline (EMS-TG-10)	Construction contractor	Construction
70	Dust and odour	To minimise or prevent air pollution and dust, loads that may produce dust or odour would be covered, and water would be sprayed on unsealed access roads and open areas during conditions conducive	Construction contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		to dust generation.		
71	Air quality	Construction equipment (including all internal combustion engines) would be properly maintained and running efficiently to ensure exhaust emissions are minimised, where practicable, and comply with the *Protection of Environment Operations Act 1997*.	Construction contractor	Construction
72	Exhaust emissions	Machinery would be turned off when not in use.	Construction contractor	Construction
73	Climate change	Design would consider the potential effects of climate change on the proposal, including drainage and stormwater management requirements.	Principal consultant	Detailed design
74	Climate change	The selection process for vehicle and plant would consider energy efficiency and related carbon emissions.	Construction contractor	Pre-construction and construction
75	Energy efficiency	Equipment would be serviced frequently to ensure it is operating efficiently.	Construction contractor	Construction
76	Energy efficiency	Machinery would be operated efficiently to ensure optimal performance, minimise downtime and improve fuel efficiency.	Construction contractor	Construction
77	Visual impact of structures	The use of shotcrete would need be to be managed in accordance with the Roads and Maritime Services Shotcrete Design Guidelines 2005.	Principal consultant	Detailed design
78	Visual impact of structures	Landscaping would need to be managed in accordance with the Roads and Maritime Services Landscape guideline, 2008.	Principal consultant	Detailed design

No.	Impact	Environmental safeguards	Responsibility	Timing
79	Visual impact of structures	Bridge work would need to be managed in accordance with the Roads and Maritime Services Bridge Aesthetics guidelines, 2012.	Principal consultant	Detailed design
80	Visual impact of structures	Work to be carried out in accordance with EIA-N04 Guideline for Landscape Character and visual impact assessment.	Principal consultant	Detailed design
81	Visual impact of structures	The bridge structure is to be well integrated into surrounding landforms	Principal consultant	Detailed design
82	Visual impact of structures	Concrete formwork is to be of a high standard with accurate tapers and clean edges.	Construction contractor	Construction
83	Visual impact of structures	The impact can be minimised through design that integrates with the existing landform. Using precast units for retaining walls where possible to minimise construction footprint and vegetation clearing.	Principal consultant	Detailed design
84	Visual impacts of earthworks design (cuttings, fill embankments, and retaining walls	Provide screen planting below walls where practicable and use visually recessive materials to minimise visual impact.	Principal consultant	Detailed design
85	Vegetation removal	Design to avoid impact to prominent trees and vegetation communities where possible. Retaining walls and batters steepened to grades suitable for the proposed surface treatment.	Principal consultant	Detailed design
86	Vegetation removal	Work areas to be clearly defined and managed minimising vegetation removal.	Construction contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
87	Road furniture visual impact	Coordinate signage location with other roadside elements including structures, fencing and landscape treatments.	Principal consultant	Detailed design
88	Road furniture visual impact	Look for opportunities to minimise design signage particularly where changes to the alignment have occurred.	Principal consultant	Detailed Design
89	Road furniture visual impact	Use soft engineering and well integrated drainage facilities. If concrete lining is required coloured or heavily roughened concreted should be used.	Principal consultant	Detailed Design
90	Impact on road users and the community	A comprehensive community consultation strategy would be prepared and implemented to fully inform the community of work during the construction process.	Roads and Maritime	Pre-construction and construction
91	Impact on road users and the community	Community consultation would need to be undertaken in accordance with the Community Involvement Practice Notes and Resource Manual.	Roads and Maritime	Pre-construction and construction
92	Impact on road users and the community	Complaints received are to be recorded and attended to promptly in accordance with the Community Involvement Practice Notes and Resource Manual.	Roads and Maritime	Pre-construction and construction
93	Impact on road users and the community	A complaints handling register would be included in the construction environmental management plan (CEMP).	Construction contractor	Pre-construction
94	Impact on landowners and the community	Access will be maintained. Prior to any temporary unavoidable disruption to access, the affected landowner would be consulted. (Refer Section 2.3.2 of the submissions report)	Construction contractor	Pre-construction and construction
95	Impact on businesses and the community	Community consultation would be carried out in accordance with Roads and Maritime's Community Involvement Practice Notes and Resource Manual (2012).	Roads and Maritime	Detailed design, pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
				and construction
96	Impact on property owners due to land acquisition	Property acquisition would be managed in accordance with the provisions of Roads and Maritime's Land Acquisition Policy and the *Land Acquisition (Just Terms Compensation) Act 1991.* (Refer Section 2.8.1 and 2.8.2 of the submissions report)	Roads and Maritime	Pre-construction
97	Waste management	Resource management hierarchy principles in accordance with the Waste Avoidance & Resource Recovery Act 2001 would need to be followed and include: • avoiding unnecessary resource consumption as a priority • resource recovery, including reuse of materials reprocessing, recycling and energy recovery • disposal being undertaken as a last resort. (in accordance with the Waste Avoidance & Resource Recovery Act 2001).	Construction contractor	Pre-construction and construction
98	Waste management	Bulk project waste (eg. fill) sent to a site not owned by the Roads and Maritime (excluding Office and Environment and Heritage licensed landfills) for land disposal would need to have prior formal written approval from the landowner, in accordance with Roads and Maritime Environmental Direction No. 20 – Legal offsite disposal of Roads and Maritime Services waste.	Construction contractor	During construction
99	Waste management	If coal tar asphalt is identified and would need to be removed, it is to be disposed of to landfill in accordance with Roads and Maritime Environmental Direction No.21 – Coal Tar Asphalt Handling and Disposal.	Construction contractor	During construction
100	Waste management	There is to be no disposal or re-use of construction waste on to other land.	Construction contractor	During construction
101	Waste management	Waste is not to be burnt on site.	Construction	During

No.	Impact	Environmental safeguards	Responsibility	Timing
			contractor	construction
102	Waste management	Waste material, other than vegetation and tree mulch, is not to be left on site once the work has been completed.	Construction contractor	During construction
103	Waste management	Working areas would need to be maintained, kept free of rubbish and cleaned up at the end of each working day.	Construction contractor	During construction
104	Waste management	A resource and waste management plan (RWMP) would be developed as a component of the CEMP. The RWMP would include: • the type and volume of all materials • destinations for each resource/waste type either for on-site reuse or recycling, off-site reuse or recycling, or disposal at a licensed waste facility • quantity and classification of excavated material generated as a result of the proposal • management measures for each type of material in accordance with the *Protection of the Environment Operations Act 1997* • details of how waste would be stored and treated on site • identification of suitable waste disposal locations to dispose of litter and other wastes on-site • identification of all non-recyclable waste • identification of strategies to 'avoid', 'reduce', 're-use' and 'recycle' in accordance with the waste hierarchy established under the WARR Act • identification of available recycling facilities on-site and off-site • identification of suitable methods and routes to transport waste	Construction contractor	Pre-construction and construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		• procedures and disposal arrangements for unsuitable excavated material or contaminated material.		
105	Waste management	Training in waste management principles would be included in site inductions for the workforce.	Construction contractor	Pre-construction and construction
106	Increases in production of waste materials	Types of waste collected, amounts, date/time and details of disposal would be recorded in a waste register.	Construction contractor	Pre-construction and construction
107	Sourcing of recycled materials	Roads and Maritime contractors would be required to propose recycled-content materials where they are cost and performance-competitive.	Construction contractor	Construction
108	Reuse and recycling of materials	Material identified for recycling would be stockpiled in an adequately bunded area (in accordance with the *Roads and Maritime Stockpile Site Management Guidelines*, 2011).	Construction contractor	Construction
109	Resource/ material storage	Fuel and chemical storage areas would be appropriately sized and imperviously bunded.	Construction contractor	Construction
110	Resource/ material storage	All fuels, chemicals and liquids would need to be stored in an impervious bunded area a minimum of 50 metres away from: • rivers, creeks or any areas of concentrated water flow • flooded or poorly drained areas • slopes above 10%.	Construction contractor	Construction
111	Resource/ material storage	Refuelling of plant and equipment would need to occur in impervious bunded areas located a minimum of 50 metres from drainage lines or waterways.	Construction contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
112	Waste disposal	Cleaning of spray bars (or equivalent equipment) would need to occur in suitable areas (e.g. not table drains) and not cause water pollution	Construction contractor	Construction
113	Waste disposal	Vehicle wash down and/or cement truck washout would need to occur in a designated bunded area.	Construction contractor	Construction
114	Hazardous spill management	An emergency spill kit is to be kept on site at all times. All staff would need to be made aware of the location of the spill kit and trained in its use.	Construction contractor	Construction
115	Hazardous spill management	If an incident (eg spill) occurs, the Roads and Maritime Services Environmental Incident Classification and Reporting Procedure would need to be followed and the Roads and Maritime Contract Manager notified as soon as practicable.	Construction contractor	Construction
116	Waste disposal	Solid and liquid wastes, as well as fuels, lubricants and chemical containers would be disposed of in accordance with OEH requirements.	Construction contractor	Construction
117	Waste disposal	Suitable containers would be provided for waste collection.	Construction contractor	Construction
118	Waste disposal	A dedicated concrete washout facility would be provided during construction so that runoff from the washing of concrete machinery and equipment could be collected and disposed of at an appropriate waste facility.	Construction contractor	Construction
119	Hazard and risk management	A Bushfire Management Plan would be prepared as part of the Project Health and Safety Plan. The Bushfire Management Plan would include (as a minimum):	Construction contractor	Pre-construction and construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		• bushfire management planning • site activities and processes to minimise fire risk • the management of the site in the event of bushfire • a process for altering management measures as required.		
120	Biodiversity	A Biodiversity Offset Strategy would be developed in accordance with Roads and Maritime Biodiversity Offset Guideline (2011). In preparing the strategy, Roads and Maritime would: • consult with relevant government departments, including OEH and Local Land Services • consider acquisition of offset properties under an appropriate legal instrument • consider purchasing and retiring biobanking credits • incorporate the proposed rehabilitation areas as part of the offset strategy • consider seed collection for the Bolivia Wattle and other affected threatened species. (Refer Sections 2.6.1 and 2.6.4 of the submissions report)	Roads and Maritime	Detailed design
121	Non-Aboriginal heritage	A Heritage Interpretation Plan will be prepared, with consideration of the location, safety of access, and style of interpretation appropriate to the project.	Roads and Maritime	Detailed design
122	***Impacts to heritage item***	***Temporary exclusion fencing would be erected to protect the bullock track in conjunction with fencing for sensitive biodiversity features. This area would be identified as a no-go zone and conveyed as such to site staff.***	***Construction contractor***	***Pre-construction, construction***
123	***Erosion and***	***Upon completion of the works, the borrow pit would be***	***Construction***	***Post***

No.	Impact	Environmental safeguards	Responsibility	Timing
	sedimentation	***regraded and revegetated as soon as feasible and reasonable.***	***contractor***	***construction***

7.3 Licensing and approvals

All relevant licenses, permits, notifications and approvals needed for the Bolivia Hill upgrade and when they need to be obtained are listed in Table 7-2. Additional or changed licenses and approval requirements identified in this addendum REF are indicated by underlined font.

Table 7-2: Summary of licensing and approval required.

Requirement	Timing
Section 220 of the *Fisheries Management Act* 1994 requires written notice to be provided to the Minister for blocking of fish passage. As noted in Section 4.3.2 of this REF, the proposal would be carried out so that fish passage would be maintained throughout construction. This would be verified during detailed design. If required, notification would be given to the Minister and any matters raised by the Minister would be considered within 28 days after giving of the notice.	At least 28 days before the start of work (if required).
Applying for a Surface Water Licence under the Water Act 1912 for water required during construction that would be taken from a local water course. Applications for temporary transfers of surface or groundwater should be lodged with State Water. An assessment will be undertaken to check if there are any supply constraints which would prohibit the transfer such as if the transfer would impact on other water users or the environment.	At least 28 days before the start of work (if required).
<u>In accordance with the POEO Act, an Environmental Protection Licence (EPL) is required for the extraction of more than 30,000 tonnes per year of extractive materials.</u>	<u>At least 60 days prior to construction commencing</u>

8 Conclusion

8.1 Justification

The proposed modification is consistent with the project objectives as stated in Section 2.3 of the project REF and Section 2.2 of this addendum REF. In particular, the proposed borrow pit supports the objectives of the original project REF by optimising the benefits and minimising adverse impacts on the natural and cultural environment.

8.2 Objects of the EP&A Act

Objects of the EP&A Act have been reviewed and updated where required to reflect changes in impacts due to the proposed modification. Table 8-1 explains how the proposed modification performs against the objects of the Act and references earlier sections of this addendum REF where greater detail is provided.

Table 8-1 Objects of the EP&A Act and relevance to the proposed modification and the project

Object	Comment
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 proposed modification has been developed to manage and conserve natural and artificial resources. The proposed modification supports the upgrade of the New England Highway, improving safety and travel efficiency which will benefit the local community. The selected location of the borrow pit is situated away from sensitive receivers and in close proximity to the project site will minimise impacts to the local community during construction.
5(a)(ii) To encourage the promotion and co-ordination of the orderly economic use and development of land.	The proposed modification provides a source of fill material that is economical due to its local source. The proposal site would be utilised temporarily and rehabilitated upon completion of the works.
5(a)(iii) To encourage the protection, provision and co-ordination of communication and utility services.	Not relevant to this proposal.
5(a)(iv) To encourage the provision of land for public purposes.	Not relevant to this proposal.
5(a)(v) To encourage the provision and co-ordination of community services and facilities.	Not relevant to this proposal.
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.	The proposed modification has been assessed against relevant environmental legislation that protects and conserves native animals and plants, including threatened species, populations and ecological communities, and their habitats (refer to Section 6.1). Ecological impacts as a result of the proposed modification would be indirect and minor.

Object	Comment
5(a)(vii) To encourage ecologically sustainable development.	Ecologically sustainable development is considered in Sections 8.3 of this addendum REF and in Sections 8.2.1 and 8.2.4 of the project REF.
5(a)(viii) To encourage the provision and maintenance of affordable housing.	Not relevant to the project.
5(b) To promote the sharing of the responsibility for environmental planning between different levels of government in the State.	Not relevant to the project.
5(c) To provide increased opportunity for public involvement and participation in environmental planning and assessment.	To date, consultation related to the proposed modification and/or project has included the landowner, local community, Tenterfield Shire Council, the Aboriginal community, Office of Environment and Heritage (OEH) and Department of Primary Industries (Fisheries).

8.3 Ecologically sustainable development

The application of the principles of ecologically sustainable development to the proposed modification are consistent with the project REF.

8.4 Conclusion

This addendum 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 where relevant, of conservation agreements and plans of management under the *National Parks and Wildlife Act 1974*, joint management and biobanking agreements under the TSC Act, wilderness areas, critical habitat, impacts on threatened species, populations and ecological communities and their habitats and other protected fauna and native plants. It has also considered potential impacts to matters of national environmental significance listed under the Federal EPBC Act.

A number of potential environmental impacts from the proposed modification have been avoided or reduced during the design development and options assessment. The proposed modification as described in the addendum REF best meets the project objectives, but would still result in some minor impacts on biodiversity, water quality, air quality and soils. Safeguards and management measures as detailed in this addendum REF would ameliorate or minimise these expected impacts. The proposed modification would also reduce the impact on the local community and on the local road users by reducing construction traffic on the New England Highway. On balance the proposed modification is considered justified and the following conclusions are made.

Significance of impact under NSW legislation

The proposed modification would not result in a change to the findings of the project REF or submissions report and would be unlikely to cause a significant impact on the environment. Therefore it is not necessary 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. A Species Impact Statement is not required. The proposed modification is subject to assessment under Part 5 of the EP&A Act. Consent from Council is not required.

Significance of impact under Australian legislation

The proposed modification would not likely cause a significant impact on matters of national environmental significance or the environment of Commonwealth land within the meaning of the E*nvironment Protection and Biodiversity Conservation Act 1999.* A referral to the Australian Department of the Environment is not required.

9 Certification

This addendum review of environmental factors provides a true and fair review of the proposed modification 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 proposed modification.

Kate Carroll
Ecologist
Arcadis
Date: 23 March 2017

I have examined this addendum review of environmental factors and accept it on behalf of Roads and Maritime Services.

Project Manager
Roads and Maritime Services Northern Region
Date: 5 May 2017

10 References

Artefact (2017) *DRAFT Bolivia Hill Upgrade Addendum Aboriginal and Non-Aboriginal Heritage Assessment Addendum Report.*

BOM (2017) *Bureau of Meteorology - Tenterfield, New South Wales January 2017 Daily Weather Observations* *http://www.bom.gov.au/climate/dwo/201701/html/IDCJDW2131.201701.shtml*

Douglas Partners (2014) *Geotechnical Investigation – Proposed Bolivia Hill Upgrade*

Hewlett Hunter (2012) *Survey of Vegetation and Flora Constraints: Bolivia Hill Road Realignment.* December 2012.

Hyder (2015) *Bolivia Hill upgrade: Review of environmental factors*. September 2015.

NPI (2015) *National Pollution Inventory*. *http://www.npi.gov.au/*

Office of Environment and Heritage 2012, *Erosion and sediment control on unsealed roads*: A field guide for erosion and sediment control maintenance practices.

Sandpiper Ecological Surveys (2015). *New England Highway Upgrade – Bolivia Hill Impact Assessment – Terrestrial Fauna*. Report prepared for Hyder Consulting.

11 Terms and acronyms used in this Addendum REF

Term / Acronym	Description
Artefact	Artefact Heritage Pty Ltd
EEC	Endangered Ecological Community
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW). Provides the legislative framework for land use planning and development assessment in NSW
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth). Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process.
FM Act	*Fisheries Management Act 1994* (NSW)
ISEPP	*State Environmental Planning Policy (Infrastructure) 2007*
MLALC	Moombahlene Local Aboriginal Land Council
MNES	Matters of National Environmental Significance
OEH	NSW Office of Environment and Heritage
Project REF	The Bolivia Hill upgrade review of environmental factors (Arcadis, 2015).
Roads and Maritime	NSW Roads and Maritime Services
REF	Review of environmental factors
SEPP	State Environmental Planning Policy. A type of planning instrument made under Part 3 of the EP&A Act.
Tenterfield LEP	*Tenterfield Local Environmental Plan 2013*
TSC Act	*Threatened Species Conservation Act 1995* (NSW)

Appendix A

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

Clause 228(2) Checklist

The following factors, listed in clause 228(2) of the *Environmental Planning and Assessment Regulation 2000*, have also been considered to assess the likely impacts of the proposal on the natural and built environment.

Factor	Impact
a) Any environmental impact on a community?	
Construction of the proposed modification is unlikely to impact the local community.	No impact.
b) Any transformation of a locality?	
The proposed modification would result in a temporary transformation of the locality from the removal of agricultural land for construction of the borrow pit. Impacts would be over a small area and the land would be rehabilitated upon completion of the works.	Short term, minor negative impact.
c) Any environmental impact on the ecosystems of the locality?	
The proposed modification is unlikely to have direct impacts to the local ecosystems. Carex Fen EEC (Carex Sedgeland of the New England Tableland, Nandewar, Brigalow Belt South and NSW North Coast Bioregions) to the south east of the proposal site would be sensitive to any changes to hydrological regimes or sedimentation/pollution. The EEC is more than 10 metres from the proposal site and as such impacts to this EEC are unlikely with proper environmental management at the site.	Short term, minor, negative impact.
d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?	
The proposed modification is unlikely to reduce the aesthetic, recreational, scientific or other environmental qualities or values of the locality.	No impact.
e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?	
The proposed modification is unlikely to effect a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value.	No impact.
f) Any impact on the habitat of protected fauna (within the meaning of the National Parks and Wildlife Act 1974)?	
The removal of 1.74 hectares of agricultural land would have a minor to negligible impact on fauna species.	Negligible impact.

Factor	Impact
g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?	
The proposed modification is considered unlikely to further endanger any species of flora or fauna, as the potential flora and fauna habitat to be removed has been significantly altered and is of low conservation significance.	Negligible impact.
h) Any long-term effects on the environment?	
The proposed modification would have a minor, short term impact on the environment through potential erosion and sedimentation impacts.	Short term, minor negative impact.
i) Any degradation of the quality of the environment?	
Excavation of material from the borrow pit would leave large areas of exposed soil during the construction phase of the project. In the event of rain, sediment-laden runoff from these exposed areas could reach nearby waterways and affect water quality. With the installation of appropriate erosion and sediment control measures as outlined in Table 7-1 water quality impacts would be minor and localised.	Short term, minor, negative impact.
j) Any risk to the safety of the environment?	
The excavation of a pit could lead to entrapment of fauna species, including livestock. Safeguards listed in Section 6.1.4 would be implemented during construction and rehabilitation stages to minimise the likelihood of entrapment of animals in the pit.	Long term, minor, negative impact.
k) Any reduction in the range of beneficial uses of the environment?	
The proposed modification would require the removal of 1.74 hectares of agricultural land.	Short term, minor, negative impact.
l) Any pollution of the environment?	
Excavation of material from the borrow pit would leave large areas of exposed soil during the construction phase of the project. In the event of rain, sediment-laden runoff from these exposed areas could reach nearby waterways and affect water quality. With the installation of appropriate erosion and sediment control measures as outlined in Table 7-1, water quality impacts would be minor and localised.	Short term, minor, negative impact.
m) Any environmental problems associated with the disposal of waste?	
Issues surrounding waste disposal are not anticipated to arise as a result of the project, including the proposed modification. The management and disposal of waste would be undertaken in accordance with the applicable State legislation and government policies. A Waste Management Plan would	No impact.

Factor	Impact
also be prepared as part of the CEMP.	
n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?	
The proposed modification would involve the extraction and use of fill. No additional resources to those identified in the project REF are required for the proposed modification. The proposed modification would not increase demand on any resources that are, or are likely to become, in short supply.	No impact.
o) Any cumulative environmental effect with other existing or likely future activities?	
The proposed modification is not likely to have any cumulative environmental effect with other existing or future activities due to its small scale and lack of other development in the locality.	No impact.
p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?	
The proposed modification is not located near the coast and will not have any impact on coastal processes or coastal hazards.	No impact.

Matters of National Environmental Significance

Under the environmental assessment provisions of the *Environment Protection and Biodiversity Conservation Act 1999*, the following matters of national environmental significance and impacts on Commonwealth land are required to be considered to assist in determining whether the proposal should be referred to the Australian Government Department of the Environment.

Under the EPBC Act strategic assessment approval a referral is not required for proposed road actions that may affect nationally listed threatened species, populations, endangered ecological communities and migratory species. Impacts on these matters are assessed in detail as part of this Addendum REF in accordance with Australian Government significant impact criteria and taking into account relevant guidelines and policies.

Factor	Impact
q) Any impact on a World Heritage property?	
There are no World Heritage properties in the vicinity of the proposed modification.	No impact.
r) Any impact on a National Heritage place?	
There are no National Heritage places in the vicinity of the proposed modification.	No impact.
s) Any impact on a wetland of international importance?	
There are no wetlands of international importance in the vicinity of the proposed modification.	No impact.
t) Any impact on a listed threatened species or communities?	
The proposed modification would not result in any impacts to threatened species or communities listed under the EPBC Act above what was assessed in the project REF.	No impact.
u) Any impacts on listed migratory species?	
No additional impacts to listed migratory species above those identified in the project REF would occur as a result of the proposed modification.	No impact.
v) Any impact on a Commonwealth marine area?	
There are no Commonwealth marine areas near the proposed modification.	No impact.
w) Does the proposal involve a nuclear action (including uranium mining)?	
The proposed modification would not involve a nuclear action.	No impact.
x) Additionally, any impact (direct or indirect) on Commonwealth land?	
No Commonwealth land would be directly or inadvertently impacted by the project.	No impact.

Appendix B

Aboriginal and Non-Aboriginal Heritage Assessment Report

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Customer feedback
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