REVIEW OF ENVIRONMENTAL FACTORS

Nerriga Road Stage 5

March 2021

Project Number: 20-066

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ACRONYMS AND ABBREVIATIONS

AHIMS	Aboriginal heritage information management system
ASL	Above sea level
AWS	Automatic weather station
BC Act	*Biodiversity Conservation Act 2016* (NSW)
Biosecurity Act	*Biosecurity Act 2015* (NSW)
BOM	Australian Bureau of Meteorology
CEMP	Construction environmental management plan
Cwth	Commonwealth
DECCW	Refer to OEH
DoEE	(Cwth) Department of the Environment and Energy
DPIE	(NSW) Department of Planning, Industry and Environment
EEC	Endangered ecological community – as defined under relevant law applying to the proposal
EIA	Environmental impact assessment
EPBC Act	(Cwth) *Environment Protection and Biodiversity Conservation Act 1999*
EP&A Act	(NSW) *Environmental Planning and Assessment Act 1979*
ESD	Ecologically Sustainable Development
FM Act	(NSW) *Fisheries Management Act 1994*
ha	hectares
Heritage Act	(NSW) *Heritage Act 1977*
ISEPP	(NSW) *State Environmental Planning Policy (Infrastructure) 2007*
KFH	Key Fish Habitat
km	kilometres
LALC	Local Aboriginal Land Council
LEP	Local Environment Plan

m	Metres
NES	Matters of National environmental significance under the EPBC Act (*c.f.*)
NPW Act	*National Parks and Wildlife Act 1974* (NSW)
NSW	New South Wales
OEH	(NSW) Office of Environment and Heritage, formerly Department of Environment, Climate Change and Water
QPRC	Queanbeyan Palerang Regional Council
REF	Review of Environmental Factors
REP	Regional Environmental Plan
SEPP	(NSW) State Environmental Planning Policy
SIS	Species Impact Statement
sp/spp	Species/multiple species

EXECUTIVE SUMMARY

NGH was engaged by Queanbeyan Palerang Regional Council (QPRC) to assess the environmental impacts of upgrading 4.4 kilometres (km) of Nerriga Road between Charleyong Bridge and Ningee Nimble Creek Road, Tomboye. The proposal site is approximately 28.5km north of Braidwood and 24km south of Nerriga.

The proposal would involve the sealing and realignment of a section of Nerriga Road, known as Stage 5. The Nerriga Road Stage 5 upgrade would improve road safety and traffic efficiency for motorists using the road. Construction is expected to take approximately six months to complete and is anticipated to be completed in December 2020.

QPRC is both the proponent and the determining authority and as such, the proposal would be assessed under Part 5 of the *Environmental Planning and Assessment Act 1979 (EP&A Act)*. This REF has been prepared according to the requirements of Section 5.5 of the EP&A Act, specifying a "duty to consider environmental impact". It provides a full analysis of all environmental, economic, physical and social implications of the proposal.

The road upgrade works include:

- Establish compound sites
- Establish sediment and erosion controls
- Clearing and grubbing
- Construction of road formation
- Construction of road drainage
- Construction of pavement
- Construction of roadside furniture and safety devices
- Reinstatement of disturbed areas

The key environmental risks of the works have been identified as biodiversity and heritage. Additionally, rigorous controls will be required to manage soil and water impacts, public amenity impacts including noise and traffic safety in direct consultation with nearby receivers. The key safeguards are outlined below.

Biodiversity

The Plant Community Types (PCTs) on site were determined to be:

- PCT 1100 - Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion
- PCT 728 - Broad-leaved Peppermint - Brittle Gum shrubby open forest on the Eastern Tablelands, South Eastern Highlands Bioregion
- PCT 817 - Dwarf She-oak closed heathland of escarpment ranges, South Eastern Highlands Bioregion

None would quality as Endangered Ecological Communities and much of the site's habitat values have been degraded by drought and fire. However, to avoid significant impacts, a targeted survey for Mongarlowe Mallee is required to provide further assurance that this species does not occur. If it is identified, given its important, exclusion zones would be recommended to protect remaining individuals.

Additionally, prior to construction, a biodiversity management plan should be developed to guide construction, including tool box talks to ensure that staff are familiar with several key species and their mitigation strategies.

If the Mongarlowe Mallee is absent (or is found and can be avoided) neither the Biodiversity Offset Scheme nor referral under the EPBC Act is considered to be required. Heritage

Heritage (Aboriginal)

- To negate the need to conduct further archaeological assessment, Council would need to redesign the proposed road realignment to avoid the PAD within Lot 7 DP 755964 (mapped in Appendix H) and stay within the area assessed in this report. Other works can proceed with caution.
- If the PAD area within Lot 7 DP 755964 *cannot be avoided*, a programme of subsurface testing must be undertaken to establish the true archaeological potential and extent of archaeological sites within the works area by undertaking an Aboriginal Cultural Heritage Assessment (ACHA). All subsurface testing must comply with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW.* If Aboriginal objects are recovered during the testing programme an Aboriginal Heritage Impact Permit (AHIP) must be obtained from the DPIE.

Heritage (historic)

- Advice should be sought from a heritage consultant and/or the Queanbeyan Palerang Council's heritage officer to determine if the values and/or significance of the locally listed item Tomboye Homestead and outbuildings (I355) would be affected by the proposed works.
- Pending the advice provided from a heritage consultant and/or the Queanbeyan Palerang Councils heritage officer a Statement of Heritage Impacts (SOHI) may be required prior to any works.

Public amenity

- Nearby receivers would be notified of the duration of works and justification and benefits of the project. A contact number should be provided for further information.
- A quantitative noise assessment should be undertaken in accordance with ICNG to assist manage the sequence of works and guide mitigation strategies.
- Restore all access ways to the existing or better condition, in consultation with affected landowners.
- Rehabilitation works would take place as soon as possible following the completion of construction.

Traffic

- A Traffic Management Plan would be prepared to provide for the safe passage of traffic at all times and to minimise delays and disruptions.
- Consultation would be undertaken with residents who would be directly affected by access disruptions.

Soil and water

The works would involve excavation in close proximity to waterways. The key mitigation measures to protect the area around the proposal site, waterways and drainage lines include:

- DPI Fisheries Permit for work within the waterway – works methods likely to include drop nets, shade clothes, instream booms to prevent debris entering the creek
- Flood Contingency protocols to identify potential flood threats and implement measures to reduce the potential impact to site during a flood
- An Emergency Spill Plan to avoid spillages of hydrocarbons and biological contaminants

The works would improve safety and traffic efficiency for all motorists using Nerriga Road. It would also reduce ongoing maintenance costs for QPRC associated with maintenance of the existing unsealed road. It

would improve freight efficiency. Additionally, the new sealed road would assist with connecting communities. The sealing of the road would reduce sediment runoff into waterways and drainage lines that intersect the road. Of benefit, the road upgrade would address a safety issue as well as potentially reduce current noise, air, visual, soil and water impacts in the long term.

With the effective implementation of the safeguards listed in this REF the potential impacts of the proposal are considered acceptable and justified and unlikely to generate a significant adverse impact.

1. INTRODUCTION

This Review of Environmental Factors (REF) have been prepared to assess the environmental impacts of upgrading 4.4 kilometres (km) of Nerriga Road between Charleyong Bridge and Ningee Nimble Creek Road, Tomboye. The proposal is located within the Sydney Drinking Water Catchment. The works are proposed by Queanbeyan-Palerang Regional Council (QPRC).

This section of Nerriga Road is currently unsealed. The proposal involves upgrading the road pavement and alignment to achieve safety, efficiency and environmental benefits. It would enable heavy vehicles to travel at 100km/hr increasing freight connectivity. Specifically, it includes:

- Earthworks to shape batters and road formation.
- Realignment of the road. The construction for the road realignment requires vegetation removal, rock blasting, earthworks to shape batters and road formation.
- Construction of drainage requirements such as culverts to protect the road from flooding events.
- Construction of pavement including connection to 9 existing access tracks/driveways
- Sealing of the road surface for waterproofing.
- Installing road furniture for safety requirements.

The proposal would provide a more sustainable commute along Nerriga Road and is expected to improve water quality benefits for the Sydney Drinking Water Catchment through the sealing of the road.

The proposal would be funded by the Australian Government. Construction is expected to take 6 months to complete and is anticipated to commence in July 2020 and aiming to end construction by the end of December 2020.

1.1. PURPOSE OF THE REF

QPRC is both the proponent and the determining authority and as such, the proposal would be assessed under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). This REF has been prepared according to the requirements of Section 5.5 of the EP&A Act, specifying a “duty to consider environmental impact”. It provides a full analysis of all environmental, economic, physical and social implications of the proposal.

2. PROPOSAL

2.1. BACKGROUND

Nerriga Road is used as a primary access route for commuters in rural towns between Braidwood and the Shoalhaven area towards the South Coast NSW. The Nerriga Road is approximately 50km long and unsealed road. It is being upgraded progressively. In total, the upgrades currently consist of 11.22km of unsealed road and the upgrade of the Nerriga Road and Kings Highway intersection. There is a total of six stages of upgrade development along Nerriga Road, refer to Table 2-1 below (QPRC, 2020).

Table 2-1 Nerriga Road upgrades

Stage	Upgrade	Length to be upgraded
Stage 1	Grants Road to Stewarts Crossing Road	5km
Stage 2	Stewarts Crossing Road to Charleyong Bridge	3.1km
Stage3	Durran Durra Range, Brightside Road to Grants Road	3km
Stage 4	Kings Highway/Nerriga Road intersection	800m
Stage 5	**Ningee Nimble Creek, Monaro roads package upgrade**	**4.4km**
Stage 6	200m west of Oallen Ford Road to 200m east of Wouldow Forest Road	400m

Stage 1 was completed in December 2018 and Stage 2 was completed in October 2019. Stages 3 to 6 are expected to start development this year (2020). This REF addresses Stage 5 only – Ningee Nimble Creek.

2.2. LOCATION OF THE ACTIVITY

The proposal is located within the Queanbeyan-Palerang Local Government Area (LGA) within the South Eastern Highlands Bioregion, subregion Bungonia and South East Local Land Services (LLS) Region, refer to Figure 2-2. The proposal is also located within the Sydney Drinking Water Catchment.

Nerriga Road is approximately 28.5km drive north of Braidwood and 24kn drive south of Nerriga. This REF is for Stage 5, which is the upgrade of an approximately 4.4km section of Nerriga Road between Charleyong Bridge and Ningee Nimble Creek Road at Tomboye. It is sign posted as a 80km/hr two lane unsealed road (Figure 2-1). There are 9 driveways that connect onto the proposal site that would also be upgraded to meet the new alignment of the proposal. The site has recently been affected by bushfire.

The proposal site includes three ephemeral waterways that transverse the existing road via culverts:

- Glenrea Creek,
- Ningee Nimble Creek
- Jimmy Wrights Gully.

The waterways are located within the mid-section of the proposal site and flow in a southern direction.

Figure 2-1 Proposal site photos

Sections of the current road is proposed to be realigned into private land and public land reserves. The Lot and DP of the private land included:

- Lot 1 DP755970
- Lot 2 DP830605
- Lot 5 DP755964
- Lot 6 DP755964
- Lot 7 DP755964
- Lot 12 DP755964
- Lot 25 DP755964
- Lot 66 DP755964
- Lot 67 DP755964
- Lot 68 DP755964
- Lot 69 DP755964
- Lot 71 DP755964
- Lot 75 DP755964
- Lot 90 DP755964

The Lot and DP of the Crown Land included in the proposal include:

- Lot 7004 DP1033209
- Lot 7006 DP1033208

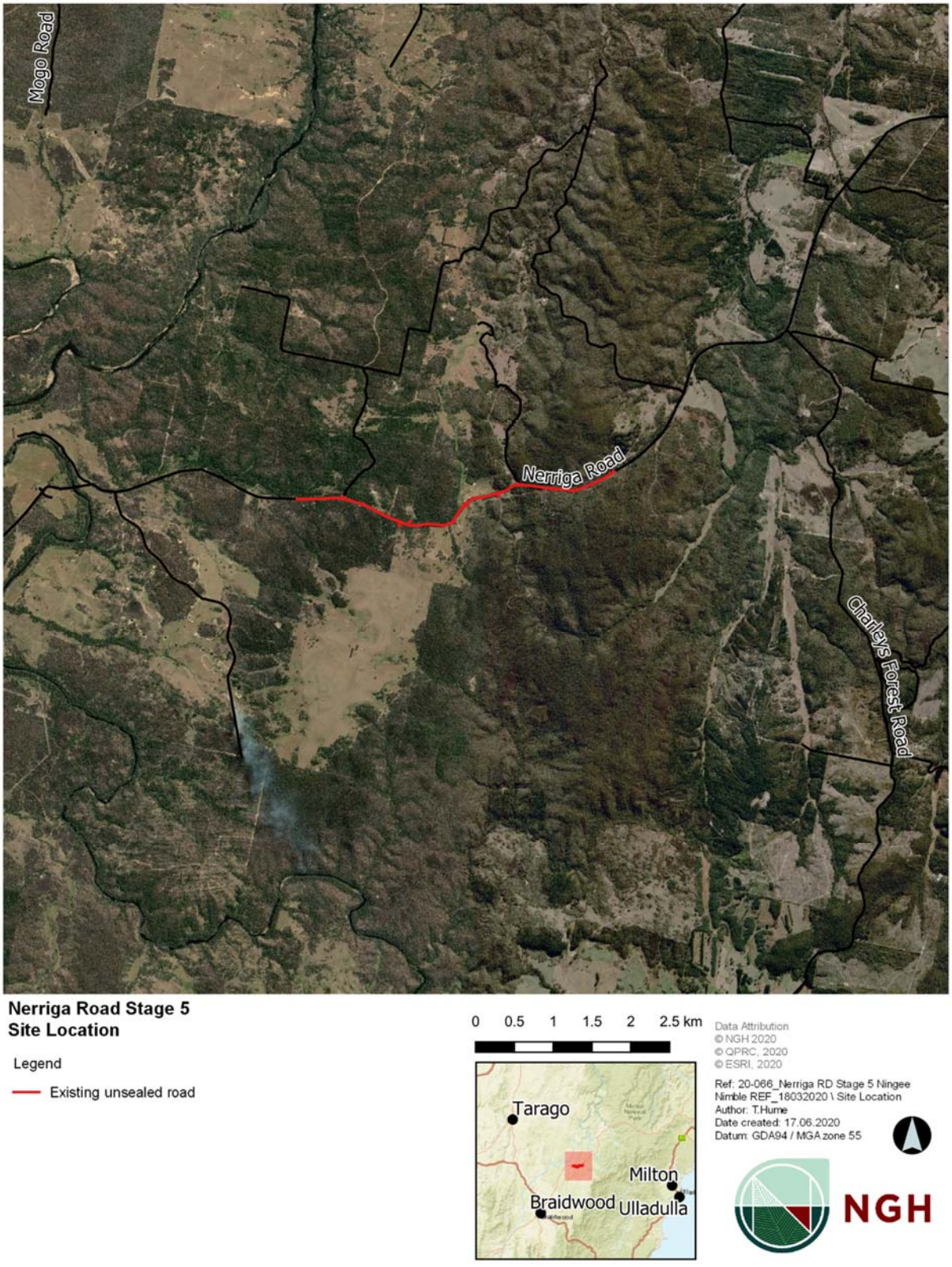

Figure 2-2 Location map; Stage 5 works.

2.3. OBJECTIVES AND CONSIDERATION OF ALTERNATIVES

2.3.1. Proposal objectives

The objectives of the Stage 5 proposal are consistent with the broader project. These include:

- Improve road safety and traffic efficiency for motorists using the road.
- Provide a sealed safe road for motorists travelling at 100km/hr
- Provide a road that would reduce air and water pollution
- Reduce ongoing maintenance costs of the road
- Improve freight connectivity
- Connect communities
- Improve the living conditions for nearby residencies
- Decrease traffic noise
- Minimise environmental impacts

2.3.2. Consideration of alternatives

Do nothing

Nerriga Road is used as a primary access route for commuters in rural towns between Braidwood and the Shoalhaven area towards the South Coast NSW. The do nothing option would not improve road safety or efficiency or address ongoing air and water pollution impacts of the unsealed route. Currently, the dust, created by motorists along the unsealed road causes an inconvenience to nearby residencies. The dust also has the potential create runoff into the Shoalhaven River Catchment along with any contaminants from vehicles that may leak onto the road surface. This option does not meet the objectives of the proposal.

Alternative 1 – Repair existing unsealed road

This option would involve a smaller scope of works; grading and repair of the unsealed road surface leaving it unsealed and on its current alignment. This option would improve the safety of the road for road users; however, it is not a long-term solution. It does not meet the current road standards of the needed tonnage allowance at a speed limit of 100km/hr for essential commute between Braidwood and the southern east coast of NSW and therefore does not address road efficiency. This option also does not address the issue of air quality of nearby residences and the water quality of the Sydney Water Catchment due to dust created by motorist using the unsealed road.

Alternative 2 – Sealing and widening of the road on the existing alignment

This option would include the sealing and widening of Nerriga Road along the current alignment. This option has potential to improve air and water quality that has an impact on private landholders and the Sydney Water Catchment. The upgrade of the current road alignment would reduce the amount of private land needed for the project. However, the current alignment and condition does not meet the current road standards of the needed tonnage allowance at a speed limit of 100km/hr, therefore this alternative does not meet the efficiency objective of the proposal and is not a preferred alternative.

Alternative 3 – Sealed, widen road with a new road alignment

This option involves sealing the existing road and widening in areas where the road width and reserve can be upgraded to meet the requirement for the 100 km/hr speed limit. In these areas the road would be widened and sealed.

The road section from Glenrea Creek to Ningee Nimble Creek would be realigned to the south. These areas are particularly rocky and would require extensive earthworks, blasting and vegetation removal. The second area to be realigned is the eastern section of Stage 5 on Nerriga Road. The new road alignment would be south of the existing road to eliminate the current bend in the current road alignment.

The proposed widening, sealing and realignment of the road is designed to meet the current road standards of the needed tonnage allowance at a speed limit of 100km/hr. This alternative meets the objectives of reducing the formation of dust produced by motorists using the unsealed road and to create a safe and reliable commute for heavy vehicles. It involves acquisition of land and would have greater levels of construction impacts but in the long term, best meets the proposal objectives and is the preferred option.

2.3.3. Selection of preferred option

Alternative 3, is the preferred option. This option is a viable long-term solution that will reduce maintenance costs in the future. It supports the current road standards and is considered to be most appropriate to safely enable heavy vehicles to travel at 100km/hr increasing freight connectivity. The upgrade of the road to accommodate heavy vehicles would provide a great alternative to travelling busy Kangaroo Valley and Macquarie Pass routes. The upgrade would also benefit commuting travellers and locals. Compared to other alternatives, this option would best reduce ongoing impacts of road dust on properties of nearby private landowners and waterways connecting to the Sydney Water Catchment.

2.4. DESCRIPTION OF THE ACTIVITY

QPRC propose to upgrade the single lane two-way unsealed road between Charleyong Bridge and Ningee Nimble Creek Road at Tomboye with a sealed road in a redesigned alignment that meets current road standards to support the commute of heavy vehicles at 100km/h. The proposal footprint is provided in Figure 2-3. The concept drawings are provided in Appendix A.

The construction of the proposal would include:

- Establish compound sites
- Establish sediment and erosion controls
- Vegetation clearing and grubbing
- Rock blasting
- Construction of road formation
- Construction of road drainage
- Construction of pavement including connection to 9 existing access tracks/driveways
- Construction of roadside furniture and safety devices
- Reinstatement of disturbed areas

The compound and stockpile sites would include amenities, storage, office and laydown area. The location would be negotiated with involved landowners. It would be located on already cleared and level land, more than 40m from any water course. No excavation would be undertaken, without further heritage assessment.

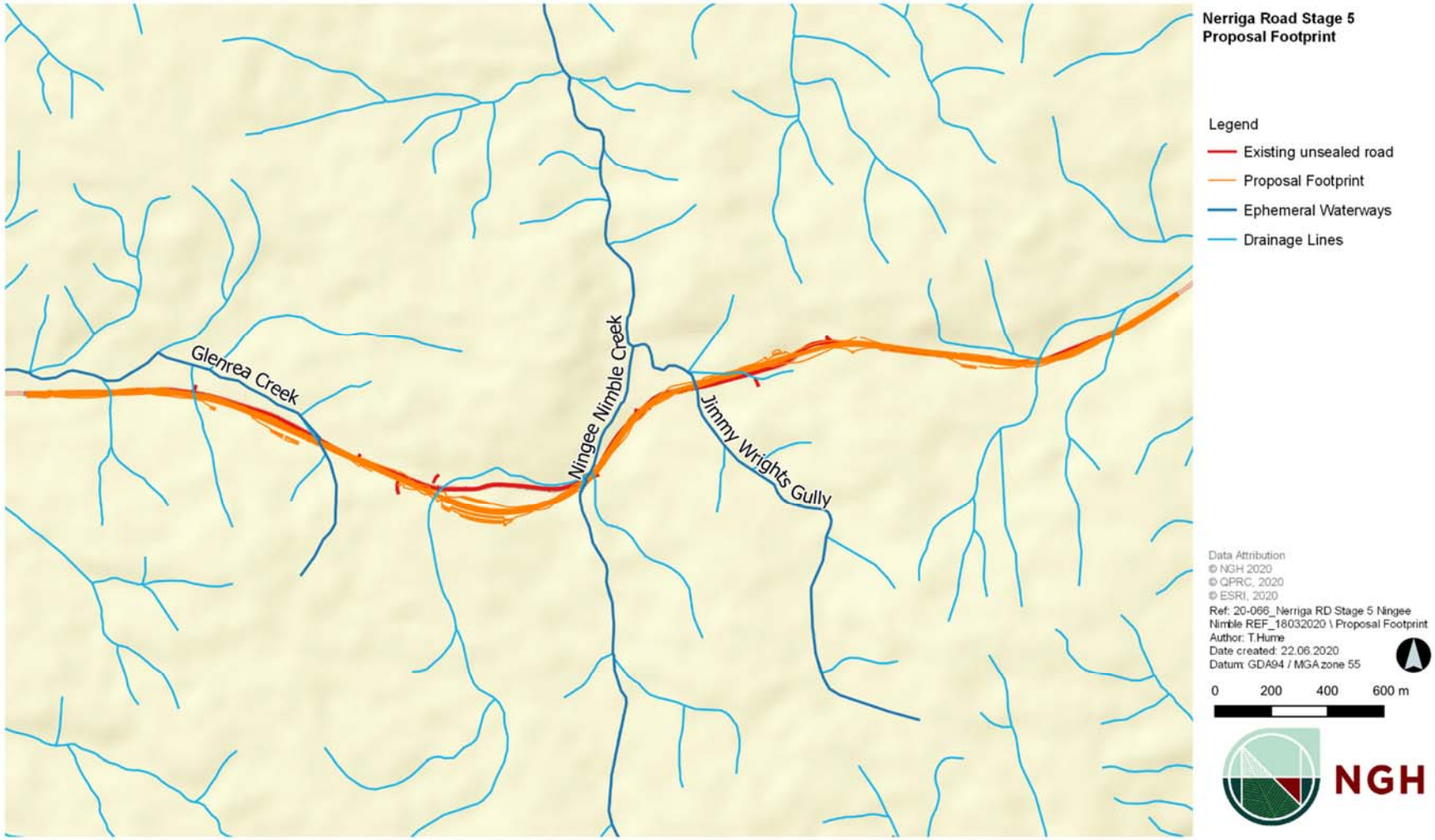

Figure 2-3. Proposal footprint in comparison to existing road alignment

2.4.1. Construction methods

Pre-construction requirements

- Development of Environmental Management Plan and Traffic Control Plan
- Obtain appropriate permits for works
- Acquire land

Site establishment

- Implementation of traffic controls
- Establishments of temporary compound and stockpile sites
- Clearing and grubbing of vegetation

Construction of road upgrade and approaches

- Road upgrade construction activities, which may include:
    - Cutting new road alignment
    - Widening parts of existing road that are being upgraded
    - Level new road
    - Sealing road
- Construction of new access roads to the new road alignment, including:
    - Cut and fill to achieve road approaches level with upgraded road
    - Road sealing

Post construction works

- Progressive stabilisation and rehabilitation of all areas disturbed during works.
- Site clean-up.
- Removal of traffic and erosion and sediment controls after stabilisation of disturbed areas.

2.4.2. Land acquisition

Sections of the current road is proposed to be realigned into private land and public land reserves. The Council would need to acquire sections of private and public land in sections where the road is proposed to be aligned. The Lot and DP of the private land included:

- Lot 1 DP755970
- Lot 2 DP830605
- Lot 5 DP755964
- Lot 6 DP755964
- Lot 7 DP755964
- Lot 12 DP755964
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- Lot 71 DP755964
- Lot 75 DP755964
- Lot 90 DP755964

The Lot and DP of the Crown Land included in the proposal include:

- Lot 7004 DP1033209
- Lot 7006 DP1033208

2.4.3. Proposed construction equipment

The equipment being used on site include:

- Hand tools
- Excavator 20 tonne
- Truck and dog trailer
- Utes and 4WDs
- Roller padfoot
- Roller smooth drum
- Concrete Pump
- Mobile crane
- Temporary scaffold
- Grader
- Water cart trucks
- Bitumen sprayer
- Generator
- Portable traffic signals

2.4.4. Proposed construction materials

The construction material being used on site include:

- Materials required for the work include:
- Fuels and oils required to operate plant, equipment and vehicles involved with construction.
- Concrete insitu
- Pre-stressed concrete elements
- Bitumen
- Road base (DGB/DGS)
- Excavated material, including soils and fill
- Culverts
- Road pavement markers/paint
- Signage
- Water for dust suppression.
- Geotextile fabric and other environmental control materials

2.4.5. Construction hours and timing

Construction is expected to take 6 months and it is expected to commence in June 2020 to be completed in December 2020. The proposed works would be undertaken during hours stated by QPRC as follows:

- Monday to Friday: 6:30am to 5:30pm
- Saturday: 6:30am to 2:00pm
- Sunday and Public Holidays: No work

3. LEGAL AND POLICY REQUIREMENTS

3.1. LEGAL PERMISSIBILITY

Table 3-1 Legal requirements for the proposal

Law, Policy or Regulation	Objective	Requirement for the proposal
State Law		
Environmental Planning and Assessment Act 1979	Provides for a co-ordinated approach to development ensuring the proper management, development and conservation of natural and cultural resources and promoting social and economic welfare and a better environment. Proposals which do not require development consent under a planning instrument may be approved by relevant government agencies under Part 5 of the Act. A Review of Environmental Factors is required to assess if significant impacts are likely. If significant impacts are likely, an Environmental Impact Statement (EIS) would be required.	This REF has been completed under Part 5 of the EP&A Act, and aims to address QPRC's duty in respect to considering the environmental impact of the proposed activities under Section 5.5 of the EP&A Act.
Environmental Planning and Assessment Regulation 2000 (EP&A Regulation)	This regulation details the assessment processes and information that must accompany development applications. Clause 228 (Part 14, environmental assessment under Part 5 of the Act) outlines the factors that must be taken into account concerning the impact of an activity on the environment.	A clause 228 checklist is included in this REF in Appendix B.
State Environmental Planning Policy (Infrastructure) 2007 (Infrastructure SEPP)	The object of the Infrastructure SEPP is to facilitate the effective and efficient delivery of infrastructure across the state. Clause 94 (1) states that development for the purpose of a road or road infrastructure facilities may be carried out by or on behalf of a public authority on any land without development consent. Clause 94 (2) (c) states that development for road infrastructure facilities includes alterations or additional to an existing road (such	This proposal is the upgrade of an existing road and would be carried out by QPRC. Pursuant to Clause 94(1) of the ISEPP, the proposal is development permitted without consent.

Law, Policy or Regulation	Objective	Requirement for the proposal
	as widening, duplication or reconstruction of lanes, changing the alignment or strengthening of the road). Clause 94 (2) (d) allows environmental management works to be undertaken without consent if the works are in or adjacent to a road corridor.	
State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011	The aims of this Policy are to provide for healthy water catchments that would deliver high quality water while permitting development that is compatible with that goal. The Policy provides that a consent authority must not grant consent to a proposed development unless it is satisfied that the proposed development would have a neutral or beneficial effect on water quality. The assessment criteria are set out in the *Neutral or Beneficial Effect on Water Quality Assessment Guideline 2015* (SCA 2015). The Policy also aims to support the maintenance or achievement of the water quality objectives for the Sydney drinking water catchment.	The proposal is located with the Sydney Drinking Water Catchment. An assessment of Neutral or Beneficial Effect on Water Quality (NoBE) is provided in Appendix C and concludes that the proposal would have a neutral effect on water quality.
Fisheries Management Act 1994 (FM Act)	The FM Act aims to protect fishery resources and marine species, and conserve habitats and diversity. The FM Act works in conjunction with the EP&A Act. If the following activities form part of a proposal, Section 201 of this Act requires a permit from DPI prior to works commencing: • Aquaculture. • Dredging or reclamation. • Harm marine vegetation (mangrove, seagrass, seaweed). • Obstruct free passage of fish.	It is proposed to undertake a road upgrade and re alignment across 3 waterways (Glenrea Creek, Ningee Nimble Creek, Jimmy Wrights Gully). This will involve dredging and reclamation work and blocking of fish passage. A fisheries permit would be required for these works.
Crown Land Management Act 2016	Approval under the Act is required to reside, erect a structure or graze or drive stock on Crown land, or clear, dig up or cultivate or enclose Crown land. The Act replaces the *Crown Lands Act 1989*.	The proposal includes Crown Land. QPRC would require approval from Crown Land to undertake the work.

Law, Policy or Regulation	Objective	Requirement for the proposal
National Parks & Wildlife Act 1974 (NPW Act)	The NPW Act establishes the fundamental functions of the NSW National Parks and Wildlife Service. These include the conservation of nature, objects, features, places and management of land reserved under the Act. The NPW Act also sets out to protect and preserve Aboriginal heritage values and is required to maintain a register of sites of archaeological and Aboriginal cultural significance (Schedule 14). Part 6 of this Act refers to Aboriginal objects and places and prevents persons from impacting on an Aboriginal place or relic, without consent or a permit. Office of Environment and Heritage (OEH, formerly DECCW) has released a Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW that when followed meets the requirements of due diligence under the Act (DECCW 2010). If works impact on an Aboriginal object or place, an Aboriginal Heritage Impact Permit would be required.	Section 5.3 and 5.7 of this REF addresses potential impacts to native flora and fauna and Aboriginal heritage respectively.
Biodiversity Conservation Act 2016	The BC Act establishes the new regulatory framework for assessing and offsetting the biodiversity impacts of proposals. The purpose of the Act is to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development. The Act contains provisions relating to flora and fauna protection (repealing parts of the *National Parks and Wildlife Act 1974*), threatened species and ecological communities listing and assessment (repealing the Threatened Species Conservation Act 1995 and section 5A of the EP&A Act), a Biodiversity Offsets Scheme (BOS), a single Biodiversity Assessment Method (BAM), calculation and retirement of biodiversity credits and biodiversity assessment and planning approvals. The Act is supported by the Biodiversity Conservation Regulation 2017.	Under Part 7 of the Act an assessment of the potential impacts of the proposed activity on threatened species, populations, ecological communities and critical habitat listed in the BC Act must be undertaken. This includes assessment of the potential for a significant impact under section 7.3 (5 part test) and whether an impact is likely on an area of Outstanding Biodiversity Value. An assessment has been undertaken in Section 0.

Law, Policy or Regulation	Objective	Requirement for the proposal
Heritage Act 1997	This Act aims to conserve heritage values. The Act defines 'environmental heritage' as those places, buildings, works, relics, moveable objects and precincts listed in the local or state heritage significance. A property is a heritage item if it is listed in the heritage schedule of the local Council's Local Environmental Plan or listed on the State Heritage Register, a register of places and items of particular importance to the people of NSW.	Heritage impacts are considered in Section 5.7.1 and Section 5.7.2 of this REF.
Water Management Act 2000 (WM Act)	Under the WM Act a controlled activity approval confers a right on its holder to carry out a specified controlled activity at a specified location in, on or under waterfront land (i.e. in or within 40 metres of a river, lake or estuary). Under the WM Act a controlled activity means: *(a) The erection of a building or the carrying out of a work (within the* *meaning of the Environmental Planning and Assessment Act 1979), or* *(b) The removal of material (whether or not extractive material) or* *vegetation from land, whether by way of excavation or otherwise, or* *(c) The deposition of material (whether or not extractive material) on* *land, whether by way of landfill operations or otherwise, or* *(d) The carrying out of any other activity that affects the quantity or flow of water in a water source.* It is an offence under Section 91E (1) of the WM Act to carry out controlled activity without, or otherwise than as authorised by, a controlled activity approval. However, QPRC is exempt from obtaining a controlled activity approval for works, pursuant to Clause 38 of the *Water Management (General) Regulation 2011*: *A public authority is exempt from section 91E (1) of the Act in relation to all controlled activities that it carries out in, on or under waterfront land.*	A controlled activity approval is not required to undertake the works. Impacts on water quality are considered in section 5.2 of this REF.

Law, Policy or Regulation	Objective	Requirement for the proposal
Protection of the Environment and Operations Act 1997 (POEO Act)	The POEO Act provides an integrated system of licensing for certain polluting activities within the objective of protecting the environment: • Section 148 of this Act requires notification of pollution incidents • Section 120 of this Act provides that it an offence to pollute waters Schedule 1 of the POEO Act describes activities for which an Environment Protection Licence (EPL) is required	QPRC must ensure that all stages of the proposal are managed to prevent pollution, including pollution of waters. The contractor and QPRC are obliged to notify the relevant authorities (e.g. Environment Protection Authority (EPA)) when a 'pollution incident' occurs that causes or threatens 'material harm' to the environment. The proposal does not conform with the definition of a scheduled activity under this Act, therefore an Environment Protection Licence would not be required.
Roads Act 1993	The Roads Act regulates the carrying out of various activities in, on and over public roads. Under section 138, the consent of the appropriate roads authority is required to: (a) erect a structure or carry out a work in, on or over a public road (b) dig up or disturb the surface of a public road (c) remove or interfere with a structure, work or tree on a public road (d) pump water into a public road from any land adjoining the road (e) connect a road (whether public or private) to a classified road. Consent in relation to a classified road requires the concurrence of TfNSW. Section 138 also applies to works undertaken by roads authorities. The council is the roads authority for all public roads within an LGA, other than any freeway, Crown road, or road for which some other public authority is declared to be the roads authority.	Council is the roads authority for these roads and the works are permitted under the Roads Act

Law, Policy or Regulation	Objective	Requirement for the proposal
	Section 71 of the Act states that a roads authority may carry out work on any public road for which it is the roads authority and on any other land under its control	
Waste Avoidance and Resource Recovery Act 2001	Waste management during the proposed works would be undertaken in accordance with the *Waste Avoidance and Resource Recovery Act 2001* (NSW) (WARR Act).	Waste minimisation and management is addressed in Section 5.9.1 of the REF.
Commonwealth Law		
Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	This Act provides for a Commonwealth assessment and approvals system for: Actions that have a significant impact on 'Matters of National Environmental Significance'; Actions that (indirectly or directly) have a significant environmental impact on Commonwealth land; and Actions carried out by the Commonwealth Government	The potential for the proposed activity to impact on 'Matters of National Environmental Significance' has been assessed in section 5.4 of this REF and it has been found that the proposal is not likely to impact on any matter of Commonwealth significance; therefore, preparation of a referral and consent from the Federal Environment Minister is not required.
Local Law		
Palerang Local Environmental Plan 2014	Generally, Local Environmental Plans (LEPs) establish the framework for future development within LGAs. Under the LEP the proposal is located in proximity to land that is zoned RU 1 Primary Production.	The road upgrade is located in RU1 and these works are permitted with consent. In addition, Clause 8 of the ISEPP serves to override the permissible development provisions of the LEP, the development restrictions of the LEP do not apply.

4. CONSULTATION

4.1. AGENCY CONSULTATION

No agency consultation has been undertaken to date however, it is noted that:

- The proposal would involve dredging and reclamation work and blocking of fish passage. Therefore, under Section 200 of *the Fisheries Management Act 1994*, the works would require a Fisheries Permit. This REF would be provided to DPI (Fisheries) as part of this process.
- The proposal includes Crown Land. QPRC would require approval from Crown Land to undertake the work.

4.2. COMMUNITY CONSULTATION

Consultation with adjoining landowners is currently being managed and undertaken by the Council.

4.3. ISEPP CONSULTATION

Clause 16 of the ISEPP states that a consent authority must not carry out any specific development without giving written notice to the specified authority and taken their responses into consideration. This is detailed in Table 4-1 below.

Table 4-1 ISEPP consultation checklist.

Is consultation with public authorities other than Councils required under clause 16 of the infrastructure SEPP?		
Are the works adjacent to a national park, nature reserve or other area reserved under the *National Parks and Wildlife Act 1974*, or on land acquired under that Act?	☐ Yes	☒ No
Are the works on land in Zone E1 National Parks and Nature Reserves or in a land use zone equivalent to that zone?	☐ Yes	☒ No
Are the works adjacent to an aquatic reserve or a marine park declared under the *Marine Estate Management Act 2014*?	☐ Yes	☒ No
Is the proposal in the Sydney Harbour Foreshore Area as defined by the *Sydney Harbour Foreshore Authority Act 1998*?	☐ Yes	☒ No
Does the development comprise of a fixed or floating structure in or over navigable waters?	☐ Yes	☒ No
Are the works for the purpose of residential development, an educational establishment, a health services facility, a correctional facility or group home in bush fire prone land?	☐ Yes	☒ No
Would the works increase the amount of artificial light in the night sky and that is on land within the dark sky region as identified on the dark sky region map? (Note: the dark sky region is within 200 kilometres of the Siding Spring Observatory)	☐ Yes	☒ No

Is consultation with public authorities other than Councils required under clause 16 of the infrastructure SEPP?		
Are the works on buffer land around the defence communications facility near Morundah? (Note: refer to Defence Communications Facility Buffer Map referred to in clause 5.15 of Lockhart LEP 2012, Narrandera LEP 2013 and Urana LEP 2011).	☐ Yes	☒ No
Are the works on land in a mine subsidence district within the meaning of the *Mine Subsidence Compensation Act 1961*?	☐ Yes	☒ No

5. ENVIRONMENTAL ASSESSMENT

5.1. TOPOGRAPHY GEOLOGY AND SOILS

5.1.1. Existing environment

The topography of the study area consists of gently undulating rolling low hills and flat to gently undulating floodplains and valley flats with streambeds and streambanks. Locally, the site is relatively flat with some small inclines in the landscape and is located at approximately 821m above sea level (ASL).

The Araluen 1:100 000 Geological Sheet (Wyborn and Owen, 1982) maps the geology at the proposal site. The underlying Geology of the site is Tomboye Basalt, Alluvium and Abercrombie Formation. The overall geology in the eastern section northern side of the road is described as buff to brown, grey, fawn to cream, thin to very thick-bedded, fine to course grained mica-quartz and feldspar sandstone, interbedded with laminated siltstone and mudstone; sand-stone beds. Other sections of the site include geology described as grey to black, fine to medium grained, olivine basalt and red to orange, pisolitic ironstone located east of the site; and unconsolidated alluvial gravel, sand, silt and clay with variable humic content located in the mid-section of the site southern side of the road.

The Soil Landscapes for the proposal site is predominantly Tarrawarra with East Fields Creek central of the site where Ningree Nimble Creek and Jimmy Wrights Gully are located. The soils are classified as Kurosols that have a strong texture contrast between surface (A) horizons and subsoil (B) horizons. They are a strong acid soils that can vary in clay compositions and have a shallow depth and low water retention, hence low agriculture value and vegetation needs high rainfall (CSIRO, 2020).

Contaminated land

A search of the NSW OEH Contaminated Sites register on the 24 April 2020 did not identify any sites listed within the proposal site (NSW Government, 2020).

5.1.2. Potential impacts

Construction

Generally, the potential sources of impact to soils and landscapes during construction would be from:

- Clearing and grubbing
- Excavation
- Rock blasting
- Compaction and vibration from heavy machinery use.
- The use of chemicals such as fuels and hydraulic oils.

The proposal would have a total disturbance area of 15-20 ha. The excavation works include clearing and grubbing of the new road alignment, widening parts of the existing road that is being retained as part of the new alignment, and rock blasting in areas where the new alignment intersects rocky outcrops. There may also be minor earthworks to accommodate for a compound site. Excavation works would involve removing vegetation that currently stabilises soils and would expose soils to weathering processes, increasing the risk of erosion and sedimentation. Removal of vegetation can expose the topsoil layer to erosive forces, including water and wind, which can induce erosion and subsequent loss of this valuable soil resource. Topsoil loss can reduce agricultural value and slow rehabilitation and the re-establishment of native ecosystems. The potential soil landscapes present at the site have moderate to very high erosion risk hazards.

The removal of current culverts over drainage lines and the construction of new culverts as part of the new road alignment has the potential to disturb sediment which may become suspended and be transported downstream.

Compaction of soils may occur as a result of machinery movement and parking, stockpiling of materials and soil (including imported fill). Compaction of soils can negatively alter the natural regeneration of ground cover and adversely affect soil stability.

Stockpiling of fill material or stripped topsoil could be susceptible to wind and water erosion, if not placed in appropriate locations (outside drainage lines) and appropriately stabilised (covered or seeded). They can also cause compaction of soil beneath the piles. Traffic movements to access the piles may also lead to compaction. Ancillary facilities would be located to minimise creating additional areas of disturbance.

During excavation works, there is potential to expose contaminated material which may further impede natural regeneration; roadsides and agricultural areas have a higher risk of buried contaminants.

The proposed works have the potential to introduce contaminants to soils via construction machinery. These include the following:

- Hydrocarbons, lubricants, oils or other chemical pollutants, particularly at the site compound where vehicle, machinery and other equipment may be stored.
- Spillage, dust or leachate from concrete or concrete wash, if it is used onsite during construction.
- Water containing biological contaminants such as nutrients and bacteria from site toilets and taps.

Overall, short term risks to soils would be high, but localised. Known (demonstrated to be effective on similar projects) mitigation strategies are considered highly likely to be able to adequately address these risks. Medium to long term impacts would be low provided stabilisation strategies are effectively implemented. Stabilisation and revegetation would act to resist soil erosion to the same extent that existing vegetation now functions.

Operation

The creating of a sealed road would result in reduced dust and sediment input into the drainage lines during rainfall events and floods and would be a long term benefit.

5.1.3. Safeguards and mitigation measures

The safeguards and mitigation measures should be included as part of this REF including the following:

- A Soil and Water Management Plan is to be prepared and implemented in accordance with the ‘Blue Book’ (Landcom 2004).
- Sediment erosion controls would be maintained during works and adapted if required to ensure the objectives of the Blue Book are met. They would be removed only when soils have been deemed stable (i.e. considering grade or surface treatment / success of revegetation).
- Stockpile sites would be managed in accordance with the Blue Book (Landcom 2004), including location:
- If refuelling is undertaken on site, it must be within a designated area and a spill management plan in needed.
- An Emergency Spill Management Plan would be developed for the project and would contain measures to avoid spillages of hydrocarbons onto any ground surfaces or into any waterways. Safeguards and measures would include, but not be limited to:
    - Impervious bunded storage facilities for hydrocarbons, away from drainage lines and areas at risk of flooding impacts.
    - Impervious bunded areas for refuelling, away from waterways and drainage lines.
    - Spill kits kept onsite and, on all machinery,
    - Training of staff in the response, notification, and management of hydrocarbon spills.

  - Requirements for spill kits will be kept on site during works using chemicals.
  - No chemicals stored onsite.
  - Emergency spill procedures.
- No concrete waste or excavated material is to be disposed of onsite or in adjacent waterways. Concrete waste includes excess concrete, concrete washout and similar.
- Construction works would not be carried out in periods of forecast heavy rains or strong/gale wind warnings.
- All areas disturbed by works would be rehabilitated progressively to ensure stable surfaces are obtained as soon as practical. Species selection would be appropriate to the area of works. Monitoring will be required. Follow up seeding and mulching may be required to ensure that surfaces are stabilised.
- If contaminated or suspicious material is encountered during works, a suitably qualified professional would be engaged to determine risks and management strategies.

5.2. HYDROLOGY, CATCHMENT VALUES AND WATER QUALITY

5.2.1. Existing environment

The proposal is located the Shoalhaven Catchment and Sydney Drinking Water Catchment. This area is administered by the South East LLS. There are three ephemeral creeks and seven drainage lines located within the proposal site (Figure 2-3). The three creeks include:

- Ningee Nimble Creek (3rd order stream)
- Glenrea Creek (2nd order stream)
- Jimmy Wrights Gully (2nd order stream)

All three waterways flow north to south through the proposal site and are tributaries of the Shoalhaven River. The Shoalhaven River is located approximately 4.5km north east of the proposal site along Nerriga Road.

These creeks, when filled with water including water runoff from the road, have the potential to deposit contaminants from the road into the Sydney Water Catchment. The banks of Ningee Niimble Creek were quite unstable and there was evidence of stream bank erosion. All three creeks have been affected by the recent bushfire and rainfall events. The road culverts contained sandy sediment from recent rainfall. It is likely ash has been washed into the creeks and tributaries. There is evidence of regeneration on creek banks and surrounding areas and this would stabilise over time. The ash carries nitrogen and phosphorus into the creeks which has the potential to cause algal blooms and fish kills in the Shoalhaven River, although there is no record of this. Parts of Jimmy Wrights Gully were unburnt and the banks retained vegetation and thus stable. Parts of the banks are cleared of trees.

Flood mapping available for this area, is restricted to the surrounding towns. The proposed works including the construction of the new road alignment and the sealing of the new road would occur on land that may be prone to flooding and there was evidence of localised flooding during the February/March rainfall events during the site inspection.

5.2.2. Potential impacts

Construction

Hydrology and drainage

During construction, guards would be put in place to prevent contaminants from construction entering the waterways by draining into existing culverts. The culverts are narrow and the temporary blockage may occur, increasing the potential risk of flooding during rainfall events during construction. The road side drainage

would not impact the local hydrology or drainage to a substantive degree. During works however, dredging and reclamation would be required in these waterways and fish passage may be blocked.

Flooding

Incidences of flooding during construction has the potential to impact water quality through erosion of disturbed areas and subsequent sedimentation of the creeks. Risks would be increased if flooding occurred during the realignment if the road around the creeks and drainage lines. Stockpiled soils and materials could potentially be transported into drainage lines and into waterways. Some of these materials could include contaminants and excess nutrients, which would adversely impact water quality. A Flood Contingency Plan would be developed to manage the potential impacts of flooding on the construction site.

Water quality

During construction there is potential for a wide range of pollutants to enter waterways, particularly during instream works and high rain events. These include:

- Sediment laden water and soil nutrients (including construction wastewater).
- Construction waste.
- Fuels spilled during refuelling of plant and equipment.
- Hydraulic and lubricating oil leaking from plant and equipment.
- Rinse water from plant washing.
- Asphalt.
- Potential concrete washouts, which could alter the pH of water if spilled into the waterway.
- Water containing biological contaminants such as nutrients and bacteria from site toilets and taps (compound site).

Introduction of the above pollutants from the proposal into the surrounding environment, if uncontrolled, could potentially have the following impacts on water quality:

- Increased sediment load and organic matter resulting in adverse impacts to aquatic fauna and flora found on the bed of rivers, creeks and other water bodies.
- Reduction in photosynthetic productivity of water bodies from increasing turbidity.
- Reduction in channel habitat from sediment deposition.
- Gross pollutants entering receiving creeks.
- Reduction in water quality due to influx in man-made substances resulting in adverse impacts to aquatic flora and fauna.
- Reduction of the quality of drinking water within the Sydney Drinking Water Catchment.

A neutral or beneficial effect on water quality assessment was undertaken for the proposed works (refer Appendix C). The assessment concluded that while there would be risks of water quality impacts during the construction of the proposal, the safeguards and mitigation measures described in section 5.1.3 and section 5.2.3 would contain water quality impacts to the site. The construction of the proposal would not lead to a long-term reduction in the quality of the water within the Sydney Water Catchment.

Impacts on water quality during construction can be minimised effectively with the diligent implementation of mitigation measures outlined in section 5.2.3.

Operation

Hydrology and drainage

New culverts would be installed to allow for drainage to prevent flooding during rainfall events. In operation, the road side drainage would not impact the local hydrology or drainage to a substantive degree.

Flooding

The proposal would improve safety and vehicle efficiency along Nerriga Road.

It is unlikely that the proposal would exacerbate flooding, given the proposed replacement of culverts allowing for the excess of water that can cause flooding to drain away from the area via the existing waterways.

Water quality

The potential for adverse water quality impacts during the operation of the upgraded sealed road would largely be as a result of accidental spills and leaks from vehicles using the upgraded road, however the risk would not be any higher than the what currently exist. The upgrade of the road would lead to the improvement of water quality long-term and reduce dirt runoff into the waterways.

The potential impact of a spill or leakage during operation is considered to be minor as the drainage system design for the proposal includes measures to capture and treat oil or chemical spills. Risks associated with erosion and sedimentation of the waterway and subsequent reduction in water quality would not increase as a result of the completion and operation of the proposal.

A neutral or beneficial effect on water quality assessment was undertaken for the proposed works (refer Appendix C). The outcome of the assessment was that the proposal would result in a neutral or beneficial impact on water quality following completion of the proposal.

5.2.3. Safeguards and mitigation measures

In addition to soil management, set out in Section 5.1.3, the following safeguards and mitigation measures are required to minimise water quality and hydrology related impacts from the proposed works:

- Prior to works, a Fisheries Permit for dredging and reclamation works would be obtained, and works would be undertaking in accordance with the permit.
- A flood contingency plan would be prepared to identify any potential flood threats and the evacuation procedure for dispersible materials, hazardous materials and equipment containing hazardous or dispersible materials. The flood contingency plan would include:
    - Detail who would be responsible for monitoring the flood threat and how is this to be done. It is expected that flood warning information would be sourced from the Bureau of Meteorology (BoM) website.
    - Regular consultation of the BoM website for weather forecasts and flood warnings.
    - A process for removing equipment and materials off site and out of flood risk areas quickly.

5.3. BIODIVERSITY

5.3.1. Approach

Background - database searches

The following database searches were undertaken on 08/04/2020 prior to the field work to determine the impacts of the proposal on any threatened entities that may have the potential to occur at the site. The background searches were:

- BioNet search for threatened flora, fauna and communities listed as threatened under the Biodiversity Conservation Act 2016 recorded within 10km of the site (OEH 2017).
- Nationally threatened flora, fauna, and communities under the *Environment Protection Biodiversity Conservation Act 1989* (*EPBC Act*) Protected Matters within a 10 km radius of the site.

Literature review

Documentation and literature relevant to this assessment was reviewed, including:

- Construction methodology and concept designs from QPRC's Project Manager.
- NSW Office of Environment and Heritage (OEH) Threatened Species Profiles.
- Department of the Environment (DoE) EPBC Act Species Profiles and Threats Database (SPRAT).
- NSW OEH Vegetation Information System (VIS) Map Catalogue and other existing vegetation mapping (Tozer et. al. 2010).
- Threatened species assessment guidelines: The assessment of significance (DECC 2007).
- Existing reports relevant to the proposal site
- Satellite imagery.

Field survey methodology

The field survey was completed by two NGH ecologists on April 16, 2020. The proposal footprint that was assessed is mapped on Figure 2-3. To facilitate an accurate assessment of the potential impacts, the study area also encompassed the entire road reserve and into the adjoining properties where the road re-alignment is proposed.

Flora survey method

The aims of the flora surveys were to:

- Determine the vegetation communities present within the study area and the surrounding location.
- Identify potential Endangered Ecological Communities (EECs) within the study area.
- Identify whether threatened flora species are present within the study area, and whether it is likely that any have the potential to occur within the habitats present.

The entire length of the study area and likely impact areas were surveyed using a random meander method (informal transects) according to Cropper (1993). All observed vascular plant species were identified to species level or otherwise as accurately as possible.

The random meander method provides comprehensiveness in terms of the number of species recorded and variation within vegetation types as opposed to other plot based survey methods. It is used to maximise the coverage of threatened species habitat and the encounter rate of different species. During the random meander dominant tree species, physical structure of the vegetation, and species composition were also recorded and used to identify vegetation types.

Vegetation communities in the study area have been categorised on the basis of their structure and formation in combination with vegetation community lists as per Tozer et. al. (2010) and the OEH VIS that reflect the floristic composition and physiognomic features of the site (OEH 2020). Botanical nomenclature follows Harden (1990-2002), with recent name changes provided by the Australian Plant Name Index of the Australian National Herbarium. The flora list is included in Appendix D.1.

Fauna survey method

The aims of the terrestrial fauna surveys were:

- Assess the fauna habitat types available and their quality and suitability as threatened species habitat (e.g. trees with hollows, ground cover, vegetation structural complexity).
- Determine which threatened fauna are present or likely to be present within the study area based on the habitats present.
- Collect incidental data on the habitat usage and abundance of fauna within the study area, in order to inform the assessment of the potential impacts of the proposal on threatened species.
- Determine the need for further targeted surveys.

Aquatic habitat survey method

The aims of the aquatic survey were to:

- Record any fauna sightings or identify calls observed during the site assessment
- Assessment of streambank habitat present at the site
- Further consideration of BioNet and MNES search results and likely impacts on threatened fish and amphibians found within 10kms of the site.

Limitations

Limitations for this survey were the timing, long term drought and the recent fires in 2019-20 that have affected existing habitat values. In terms of the timing, April is not considered optimum timing for flora surveys as most plant species are dormant in autumn and winter making accurate identification difficult due to a lack of flowering material. Although unburnt areas contained flowering plants due to the recent significant rainfall and a seasonally warm autumn. It is likely some forbs and grasses were not present at the time of the survey or lacking reproductive parts. The drought conditions over the last two years and the lack of soil moisture would also limit a plant's reproductive ability. With these drought conditions, fire severity was significant where many parts of the road reserve were still ash beds and the entire tree canopy was burnt. There was some natural regeneration with epicormic and lignotuber growth from Eucalypts and leaf material of herbs and grasses in the understorey. Many shrubs were killed by fire but identified where possible. The 4.4km study area was burnt except for the central area of Nerriga Road where there is a cluster of houses between Jimmy Wrights Gully and Ningee Nimble Creek. On the eastern edge of the study area of Nerriga Road, there were some unburnt forest areas. But the remining areas to the east and north of Jimmy Wrights Gully and west, south and north of Ningee Nimble Creek were burnt.

A species list has been compiled for what was present at the time but due to the timing, recent fires and lack of reproductive material, some species were identified to species if possible, if not than to genus. For the purposes of this REF, there was adequate plant material to determine the Plant Community Type (PCTs) in the study area but not all threatened flora, particularly shrubs that are known to occur in the area could be surveyed for. Therefore, a precautionary approach is required for threatened flora known to occur in the area and these have been assessed further.

There was sufficient data collected on site in unburnt areas to evaluate the potential for Endangered Ecological Communities (EECs).

No spotlighting, targeted aquatic or nocturnal fauna surveys were undertaken. Habitat assessment has been utilised to determine the likelihood of threatened fauna occurring at the site.

5.3.2. Field survey results

Flora

A total of 65 species were recorded during the flora surveys. A complete list of the species recorded is provided in Appendix D.1. No threatened species were identified.

Vegetation types - PCT determination

Based on the historic SELLS vegetation mapping, the PCTs present in the study area include:

- Broad-leaved Peppermint - Brittle Gum shrubby open forest on the eastern tablelands, South Eastern Highlands
- Dwarf She-oak closed heathland of escarpment ranges, South Eastern Highlands Bioregion
- Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion

The surrounding PCTs outside of the study area but in proximity include:

- Tableland swamp meadow on impeded drainage sites of the western Sydney Basin Bioregion and South Eastern Highlands Bioregion

- Silvertop Ash - Blue-leaved Stringybark shrubby open forest on ridges, north east South Eastern Highlands Bioregion
- Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands

Figure 5.1 shows the SELLS vegetation mapping and the habitat features.

These PCTs were used as part of the background research to assist in the PCT determination in absence of plant material due fires. Based upon the floristics determined on site and according to Bionet (2019), the description of plant community types that match this site are:

1. PCT 1100 - Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion in the centre of the site on Jimmy Wrights Gully and Ningee Nimble Creek
2. PCT 728 - Broad-leaved Peppermint - Brittle Gum shrubby open forest on the eastern tablelands, South Eastern Highlands Bioregion covers most of Nerriga Road on the north and south where there is remnant vegetation.
3. PCT 817 - Dwarf She-oak closed heathland of escarpment ranges, South Eastern Highlands Bioregion occurs in small patches in the western edge of the site. The boundary was difficult to determine as these areas were severely burnt.

The PCTs identified within the study area is listed in Table 5-1 to Table 5-3.

Table 5-1 PCT 1100 on the creek lines of Nerriga Road

Item	Result
IBRA Region	South East Highlands
IBRA Sub-region	Bungonia
PCT	PCT100-Ribbon Gum - Snow Gum grassy forest on damp flats, eastern South Eastern Highlands Bioregion
Vegetation Formation	Grassy Woodlands
Vegetation Class	Tableland Clay Grassy Woodland
Threatened Ecological Communities	Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions. Listed as Endangered. Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregions Listed as Endangered
Upper Stratum	Ribbon Gum (*Eucalyptus viminalis)*
Mid Stratum	Black wattle (*Acacia mearnsii)* Teatree *(Leptospermum myrtifolium)*
Lower Stratum	Weeping *Grass (Microlaena stipoides)* Bracken (*Pteridium esculentum*) Sheep's Burr (*Acaena ovina*) Blue Flax Lily (*Dianella revoluta var. revoluta*)

Item	Result
Images	 

Table 5-2 PCT 728 on Nerriga Road

Item	Result
IBRA Region	South East Highlands
IBRA Sub-region	Bungonia
PCTs	PCT 728 - Broad-leaved Peppermint - Brittle Gum shrubby open forest on the eastern tablelands, South Eastern Highlands Bioregion.
Vegetation Formation	Dry Sclerophyll Forests (Shrubby sub-formation)

Item	Result
Vegetation Class	Southern Tableland Dry Sclerophyll Forests
Threatened Ecological Communities	Not listed
Upper Stratum	Broad leaf Peppermint (*Eucalyptus dives*) Brittle Gum (*Eucalyptus mannifera)* Candlebark (*Eucalyptus rubida subsp. rubida)*
Mid Stratum	Teatree *(Leptospermum myrtifolium)* Small-fruited Hakea (*Hakea microcarpa)* Black Wattle (*Acacia mearnsii)*
Lower Stratum	Weeping Grass *(Microlaena stipoides)* Spiny-headed Mat-rush (*Lomandra longifolia*) Kangaroo Grass (*Themeda triandra*)
Images	 

Item	Result
	

Table 5-3. PCT 817 on the western edge of Nerriga Road

Item	Result
IBRA Region	South East Highlands
IBRA Sub-region	Bungonia
PCTs	817 - Dwarf She-oak closed heathland of escarpment ranges, South Eastern Highlands Bioregion
Vegetation Formation	Heathlands
Vegetation Class	Southern Montane Heaths
Threatened Ecological Communities	Not listed
Upper Stratum	*Allocasuarina spp.*
Mid Stratum	Teatree (*Leptospermum myrtifolium*) Black Wattle (*Acacia mearnsii*)
Images	

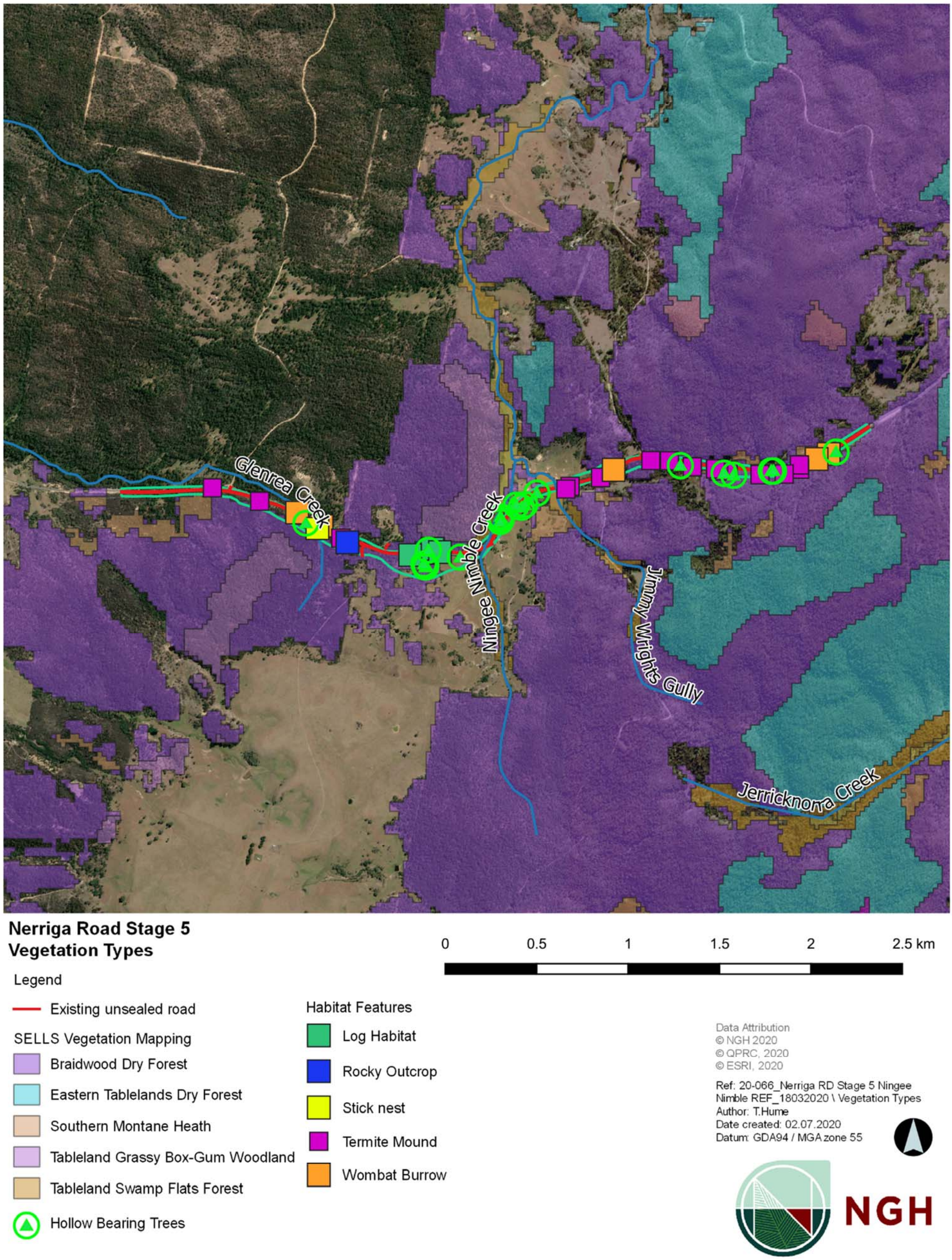

Figure 5-1 Vegetation types and the habitat features

Endangered Ecological Communities (EEC)

Two EECs are potentially associated with PCT 1100. These are:

- Tableland Basalt Forest in the Sydney Basin and the South East Highlands: BC Act only
- Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregions Listed as Endangered under the BC Act

No EPBC listed communities are relevant to the site.

As assessment of the presence of these EECs in the study area of Nerriga Road found neither occur onsite, as follows:

- The Tableland Basalt Forest in the Sydney Basin and the South East Highlands TEC occurs on volcanic basalt rock and soils and both PCTs present on site are found on sedimentary rock with alluvial sandy soils in the creek line. No further assessment is required for this endangered ecological community.
- Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregions. This vegetation community is not present on site. No further assessment is required for this endangered ecological community.

Threatened flora species

The were 24 threatened plants that have either been previously recorded within 10 kms of the study area or have the potential to occur on site. Ten of these species were determined to be outside of their known geographical range. These species can be found in Appendix F.

The remaining species were surveyed as part of the site assessment and determined to be absent. These species were:

- Austral Toadflax, *Thesium australe*
- Basalt Pepper-cress, Peppercress, Rubble Peppercress, Pepperweed *Lepidium hyssopifolium*
- Black Gum, *Eucalyptus aggregata*
- Budawangs Cliff-heath *Budawangia gnidioides*
- Budawangs Bush-pea *Pultenaea baeuerlenii*
- Cotoneaster Pomaderris *Pomaderris cotoneaster*
- Deane's Boronia *Boronia deanei*
- Dwarf Kerrawang *Commersonia prostrata*
- Hoary Sunray, *Leucochrysum albicans var. tricolor*
- Pale Pomaderris *Pomaderris pallida*
- Michelago Parrot-pea

Given the limitations set out in Section 5.3.1, as a precautionary approach, the following species are presumed present:

- Mongarlowe Mallee
- Nerriga Grevillea
- Thick-lipped Spider Orchid

Further targeted surveys are required for these three species.

The threatened species evaluation table is in Appendix E.

The flora species list is in Appendix D.1.

Fauna

Fauna species recorded

There was presence of six fauna species recorded during the surveys including two birds, four mammals (two native and two introduced).

Terrestrial Habitat

Incidental sightings of other fauna and their traces (e.g. scats, tracks, scratches, burrows) were made if observed. No nocturnal or other targeted surveys were undertaken.

Terrestrial fauna habitat within the study area included patches of PCT 1100, 728 and 817. PCT 728 and 1100 had patches of vegetation that were unburnt. The post fire tree works left some large logs in the road reserve. There were areas that contained large trees and some with hollows.

There were wombat burrows recorded on site and the wombat tracks shows their presence post fire. There were several termite mounds present on Nerriga Road reserve.

Figure 5.2 shows the habitat features on site.

Figure 5-2. Habitat features recorded on Nerriga Road

Aquatic and riparian habitat

Jimmy Wrights Gully, Ningee Nimble Creek and Glenrea Creek provide aquatic habitat for amphibians and foraging for reptiles and water birds as well as watering point for other birds and mammals. The creeks are ephemeral providing habitat for amphibians (Figure 5-3).

Figure 5-3 Riparian and aquatic habitat

Hollow-bearing tree inventory

There were twenty hollow bearing trees recorded within the proposed works footprint. All of these trees were fire affected and there was no indication of recent activity. There were trees with stick nests recorded in the study area. Figure 5-4 shows one of the hollows found in the study area.

Figure 5-4. Trunk hollow

Koala

No koalas were observed during the site assessment and two koala records have been recorded within 3 kms of the study area (OEH 2020).

The State Environmental Planning Policy (Koala Habitat Protection) 2019, which replaces and repeals the State Environmental Planning Policy No 44 – Koala Habitat Protection (SEPP 44), commenced on 1st March 2020.

Activities assessed under Part 5 of the EP&A Act are not subject to the Koala Habitat Protection SEPP. Koalas and their habitats are assessed under the BC Act.

State Environmental Planning Policy – (Koala Habitat Protection) 2019 (Koala Habitat Protection SEPP) encourages the conservation and management of natural vegetation that provides habitat for Koalas. Koalas are listed under the BC Act as a vulnerable species. The Koala Habitat Protection SEPP applies to each local government area listed in Schedule 1. The study area is located within the Queanbeyan Palerang Regional Council which is part of the Central and Southern Tablelands listed in Schedule 1.

Key to the application of the Koala Habitat Protection SEPP is determining "core Koala habitat". Core Koala habitat means:

> (a) an area of land where koalas are present, or
>
> (b) an area of land which has been assessed by a suitably qualified and experienced person in accordance with the Guideline as being highly suitable koala habitat, and where koalas have been recorded as being present in the previous 18 years.

As per schedule 2 of the Koala Habitat protection SEPP, Koala Tree species are listed by regions (Koala Management Areas). Under the Central and Southern Tablelands koala management area, Ribbon Gum and Snow Gum of the listed species were found within the study area.

The study area is identified on the Koala Development Application Map which forms part of the Koala Habitat Protection SEPP. This map identifies areas that have highly suitable Koala habitat.

Fauna habitat connectivity

The landscape in which the study area occurs is fragmented in places as a result of historic land clearing but the area provides good connectivity for fauna.

Threatened fauna species

No threatened fauna species were recorded during the survey. Based on the habitat evaluation in Appendix D, the following threatened fauna species are considered to be have some potential to occur within the study area due to suitable habitat on site are:

- Woodland birds - Diamond Firetail, Flame Robin, Dusky Woodswallow, Pink Robin
- Bats – Southern Myotis, Eastern Coastal Free-tailed Bat
- Giant Burrowing Frog
- Koala
- Yellow Bellied Glider
- Masked Owl
- Powerful Owl
- Southern Brown Bandicoot

No other species are considered likely to be directly impacted by the road works construction but may forage in the area.

Aquatic fauna

No amphibian calls were identified during the site assessment. The aquatic habitat on site with the presence of logs, slow flowing water and vegetation provides suitable habitat for aquatic species.

The Booroolong Frog (*Litoria booroolongensis*) has been recorded within 10 km of the study area but requires permanent water sources and the three creeks are ephemeral.

The Giant Burrowing Frog (*Heleioporus australiacus)* has not been recorded within 10 kms of the study area but it was recorded as part of the MNES search results.

No fish surveys were undertaken. The proposal should not substantively impact the three creeks. Therefore, these creeks can be managed with appropriate mitigation measures.

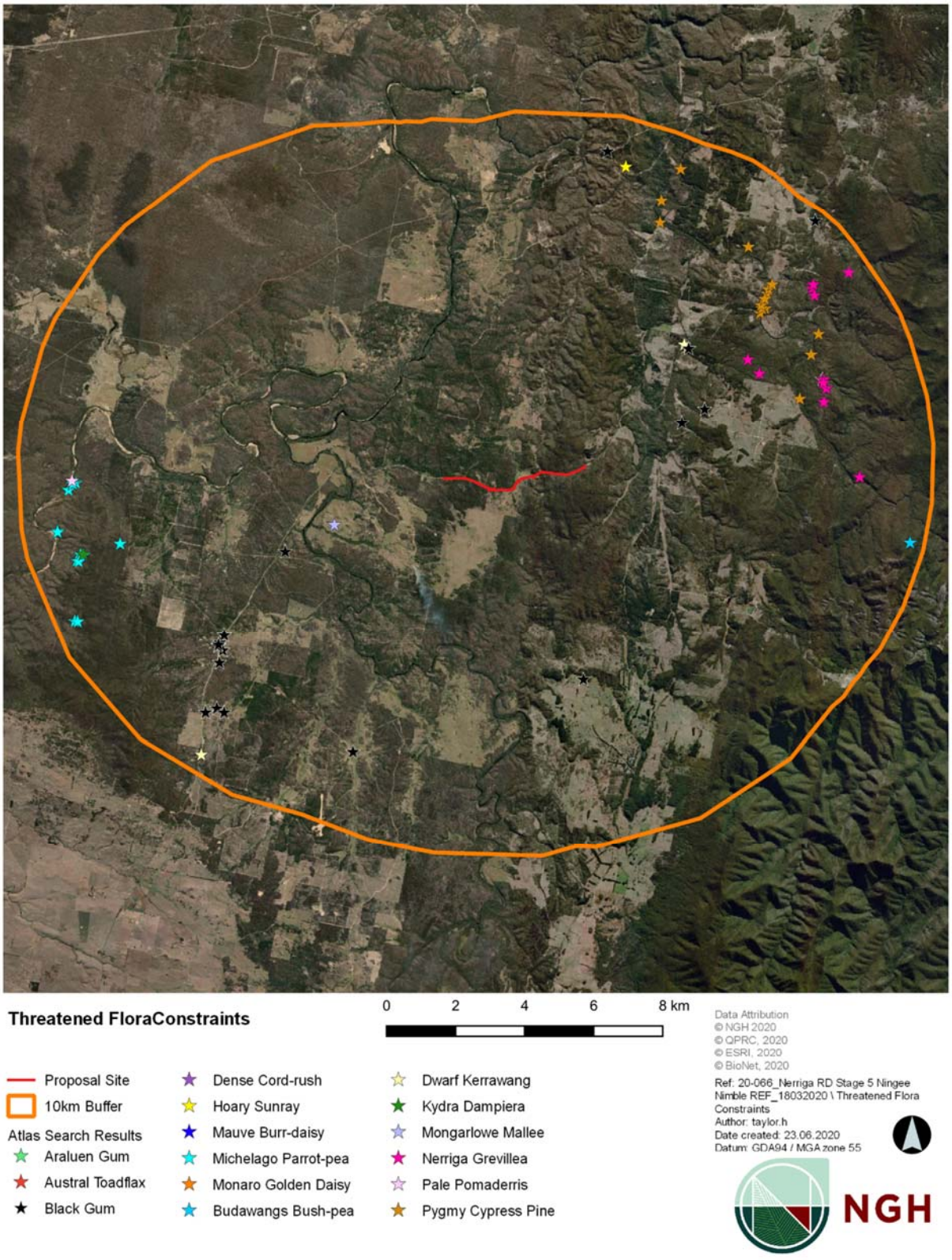

Figure 5-5 Threatened flora records within 10kms of the study area (Source: BioNet, 2020)

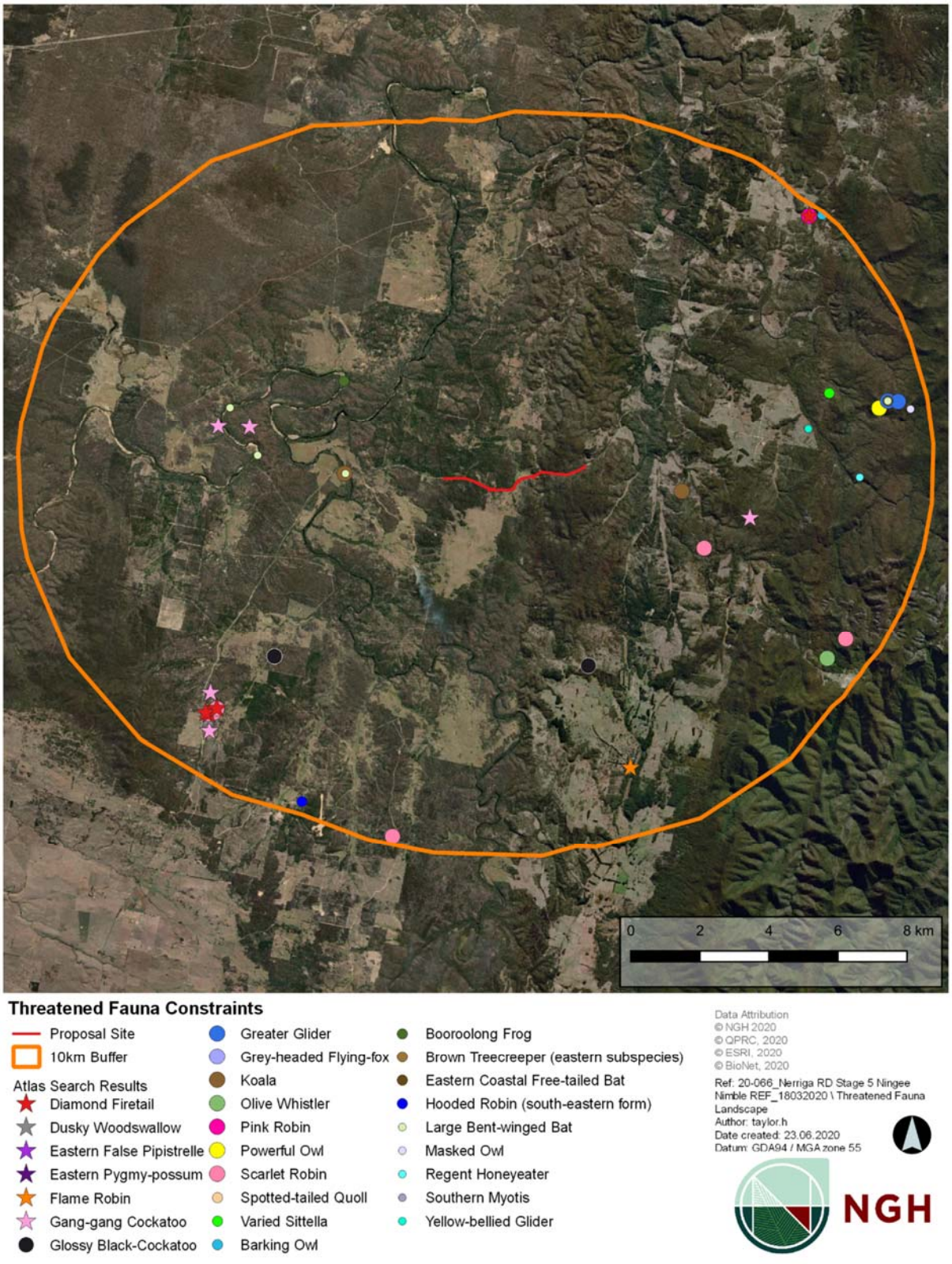

Figure 5-6 Threatened fauna records within 10kms of the study area (Source: BioNet, 2020)

5.3.3. Potential impacts

Direct and Indirect Impacts

The direct impacts, which all relate to construction activities, are:

- Loss of aquatic habitat and species through pollutants entering Glenrea Creek, Ningee Nimble Creek and Jimmy Wrights Gully
- Loss of habitat from vegetation clearing
- Loss of hollow bearing trees for mammals, birds and bats
- Loss of rocky outcrop areas
- Loss of termite mounds
- Loss of wombat burrows through excavation works
- Loss of habitat or injury to wildlife
- Soil disturbance in burnt areas leading to further tree fall in severely burnt areas
- Soil disturbance leading to further erosion post fire
- Post fire – erosion due to heavy rainfall events
- Trees continue to fall post fire

Indirect Impacts include:

- Reduced water quality through water carrying sediment into waterways
- Increased weed infestations through inappropriate weed management
- Spread of pathogens from machinery and equipment
- Relocating culverts impacts traffic flow of local fauna
- Displacing local fauna through destruction of burrows and removal of hollow bearing trees
- Contamination of waterways through water carrying sediment during excavation works
- Movement of topsoil and introduction of new soil introduces new weeds and pathogens within the site and from other sites.

The context of drought and bushfire have reduced the quality of the habitat to be impacted, but also its importance.

In operation, the water quality and reduced dust are likely to improve habitat for terrestrial and aquatic species.

Key Threatening Process (KTP)

The key threatening processes identified are relevant to the proposed works:

1. Bushrock removal
2. Clearing of native vegetation
3. Infection of frogs by amphibian chytrid causing chytridiomycosis
4. Infection of native plants by *Phytophthora cinnamomi*
5. Loss of hollow-bearing trees
6. Invasion of native plant communities by exotic perennial grasses
7. Removal of dead wood and dead trees

The largest KTP impact is clearing of native vegetation. In the current post bushfire context the site provides limited habitat but its importance is increased, given the habitat lost to the combination of drought and fire

. In operation, with good restoration practices, the remaining habitat should regenerate to provide additional resources to these currently onsite.

With mitigation, the proposal is not anticipated to exacerbate any of these processes to a substantive degree.

Weed and pathogens

The priority weeds are Blackberry, Spear Thistle and Briar Rose around waterways. To manage these weeds appropriately on site, these weeds require treatment and appropriate disposal methods if removed from site.

There is minimal works proposed around the three creeks but Chytrid fungus is spread mainly by transporting wet soil from one site to another and has the potential to be spread indirectly. Chytrid fungus is contagious for amphibians and prevention measures during construction avoid direct impacts on amphibian populations. The Giant Burrowing Frog inhabits 300 metres from waterways so if this species is present on site, it is possible this species may be impacted by Chytrid fungus if contaminated soil or equipment is used on site. Hygiene practices as part of any construction work can avoid indirect contact or impact on the local amphibian populations.

Phytophthora cinnamomi is spread by transporting contaminated soil from one location to another. Infection of native plants by *Phytophthora cinnamomi* is a KTP and appropriate hygiene methods previously mentioned should be adequate to address this issue.

Significant impacts to listed entities

Due to survey limitations, the following species were assumed to occur and a Test of significance (pursuant to the BC and EPBC Acts, as required) undertaken to verify if the works could cause a significant impact:

Nerriga Grevillea

Mongarlowe Mallee

Thick-lipped Spider Orchid

Diamond Firetail, Flame Robin, Dusky Woodswallow, Pink Robin

Bats – Southern Myotis, Eastern Coastal Free-tailed Bat

Giant Burrowing Frog

Yellow Bellied Glider

Masked Owl

Powerful Owl

Southern Brown Bandicoot

Koala

The Tests of significance are provided in Appendix F.1 (BC Act) and F.2 (EPBC Act). Presuming these species occur within the works areas, the works are considered unlikely to constitute a significant impact for any species. However, given that targeted surveys were not undertaken, several precautionary actions are recommended to ensure this result and to mitigate against the loss of important habitat resources, such as tree hollow.:

1. Mongarlowe Mallee: It is considered highly unlikely this species is present but if present, a significant impact could result. A targeted preclearance survey is required to provide further assurance that this species does not occur. If it is identified, given its important, exclusion zones would be recommended to protect remaining individuals.
2. Diamond Firetail, Flame Robin, Dusky Woodswallow, Pink Robin: Limit the works area to the minimum required and actively restore areas disturbed by the works.
3. Giant Burrowing Frog: A pathogen management protocol should also be prepared and implemented to minimise risks to this and other amphibians when moving soils from drainage lines or handling frogs, should they occur.
4. Hollow dependent fauna: Southern Myotis, Eastern Coastal Free-tailed Bat, Yellow Bellied Glider, Masked Owl, Powerful Owl: offsetting the loss of hollows is recommended (ie mounting felled hollow

limbs or nest boxes in adjacent non hollow bearing trees that will be protected from the works). Further, staged felling is recommended to reduce impacts to resident species, if present, during the construction works.

5. Southern Brown Bandicoot: Limit the works area to the minimum required and actively restore areas disturbed by the works.
6. Koala: unexpected finds protocol is required, in the event the species is identified onsite during works, to relocate the animal to a safe place in adjoining habitat.

It is recommended these actions above be undertaken as part of a biodiversity management plan during construction, including tool box talks to ensure that staff are familiar with these species.

Specific to the Koala, the Commonwealth tool was also applied. The EPBC Referral Guidelines for the Koala (DoE 2014) documents the 'Koala habitat assessment tool' to assist proponents in determining if a proposal may impact on habitat critical to the survival of the Koala. The tool is provided as Table 5-4 below as it applies to the proposal. Impact areas that score 5 or more using the habitat assessment tool contain habitat critical to the survival of the Koala. The assessment in Table 5-4 resulted in a score of 5 and as such habitat within the study area is considered to be critical to the survival of the Koala. Further assessment has been conducted within this report.

Table 5-4 Koala habitat assessment tool for inland areas (DoE 2014)

Attribute	Score	Inland	Applicable to the proposal?
Koala occurrence	+2 (high)	Evidence of one or more koalas within the last 5 years.	0
	+1 (medium)	Evidence of one or more koalas within 2 km of the edge of the impact area within the last 10 years.	0
	0 (low)	None of the above.	✓
Vegetation composition	+2 (high)	Has forest, woodland or shrubland with emerging trees with 2 or more known koala food tree species, **OR** 1 food tree species that alone accounts for >50% of the vegetation in the relevant strata.	
	+1 (medium)	Has forest, woodland or shrubland with emerging trees with only 1 species of known koala food tree present.	✓ Ribbon Gum *E. viminalis*
	0 (low)	None of the above.	
Habitat connectivity	+2 (high)	Area is part of a contiguous landscape ≥ 1000 ha.	✓ Nerriga Road is connected to a contiguous landscape
	+1 (medium)	Area is part of a **contiguous landscape** < 1000 ha, but ≥ 500 ha.	

Attribute	Score	Inland	Applicable to the proposal?
	0 (low)	None of the above.	
Key existing threats	+2 (high)	Little or no evidence of koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for koala occurrence. Areas which score 0 for koala occurrence and have no dog or vehicle threat present	
	+1 (medium)	Evidence of infrequent or irregular koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for koala occurrence, **OR** Areas which score 0 for koala occurrence and are likely to have some degree of dog or vehicle threat present.	✓ Area scored 0 for Koala occurrence. Vehicle and dog threat may be present, but the threat is unknown
	0 (low)	Evidence of frequent or regular koala mortality from vehicle strike or dog attack in the study area at present, **OR** Areas which score 0 for koala occurrence and have a significant dog or vehicle threat present.	
Recovery value	+2 (high)	Habitat is likely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.	
	+1 (medium)	Uncertain whether the habitat is important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.	✓ The proposal site is on the edge of a fragmented road reserve but the surrounding landscape is likely to be important habitat as per Table 1.
	0 (low)	Habitat is unlikely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.	
Total	**5**	**Habitat may be critical to the survival of the Koala—** **Further assessment required. An Assessment of Significance is included in Appendix F and has concluded significant impacts are unlikely.**	

Further surveys and assessment

A further survey has been recommended for the Mongarlowe Mallee, as it is the only species, if assumed to occur onsite, could be impacted by the proposed works to a population level extent. For all other species, while adverse impacts could result, a significant impact is considered unlikely.

A large factor in this decision is that the combination of drought and fire have reduced the current habitat values of the site. The exception to this is the western end of Ningee Nimble Creek on the Water NSW land. This area has a rocky outcrop, trees with hollows, the creek across the road and during construction it is proposed this area will be blasted. This area of if the highest value and minimisation of impacts in this location is recommended where possible.

If the Mongarlowe Mallee is absent (or is found and can be avoided), neither the Biodiversity Offset Scheme nor referral under the EPBC Act is considered to be required. However, strict mitigation will be required to manage impacts, in accordance with the measures developed in the Tests of Significance, Appendix F (set out below).

5.3.4. Safeguards and mitigation measures

The following additional safeguards and mitigation measures are recommended to minimise biodiversity impacts from the proposal:

Avoid impacts

- Mongarlowe Mallee: A targeted preclearance survey is required to provide further assurance that this species does not occur. If it is identified, given its important, exclusion zones would be recommended to protect remaining individuals.

Minimise impacts

- Prior to construction, a biodiversity management plan should be developed to guide construction, including tool box talks to ensure that staff are familiar with the following species and their mitigation strategies:
  - Diamond Firetail, Flame Robin, Dusky Woodswallow, Pink Robin: Limit the works area to the minimum required and actively restore areas disturbed by the works.
  - Giant Burrowing Frog: A pathogen management protocol should also be prepared and implemented to minimise risks to this and other amphibians when moving soils from drainage lines or handling frogs, should they occur.
  - Hollow dependent fauna: Southern Myotis, Eastern Coastal Free-tailed Bat, Yellow Bellied Glider, Masked Owl, Powerful Owl: offsetting the loss of hollows is recommended (ie mounting felled hollow limbs or nest boxes in adjacent non hollow bearing trees that will be protected from the works). Further, staged felling is recommended to reduce impacts to resident species, if present, during the construction works.
  - Southern Brown Bandicoot: Limit the works area to the minimum required and actively restore areas disturbed by the works.
  - Koala: unexpected finds protocol is required, in the event the species is identified onsite during works, to relocate the animal to a safe place in adjoining habitat.
  - Wombat burrows and termite mounds are avoided as much as possible as part of any excavation works and where this is not feasible, Wombat burrows are to be investigated further to determine if wombats are utilising these burrows.

Weeds and pathogens protocols would be developed and implemented:

- Prior to commencement of any construction work, weed control should be undertaken for any declared weeds found in areas that will be excavated.
- Follow up weed control may be required to prevent establishment of Blackberry, Briar Rose and Spear Thistle.

- To mitigate weed spread and re-infestation post construction, weed hygiene prevention measures ensure machinery and vehicles are be clean prior entering the site and prior to exiting the site to minimise the potential of introducing weed seeds.
- Any topsoil removed from site with noxious weed material or native vegetation should be disposed of at an appropriately licenced waste facility.
- If in the event that capture and relocation of amphibians is required due to sediment escaping during excavation works, an appropriate qualified aquatic specialist should be engaged for these works and appropriate Chytrid fungus PPE procedures are implemented.

Stabilisation and rehabilitation:

- A rehabilitation plan would be prepared for the proposal and would include the following measures:
    - Include monitoring to meet clear targets, regarding establishment.
    - Minimise disturbance of topsoil on the edges of the three creeks and in burnt areas. These areas will regenerate quickly and minimise sediment entering the creek.
    - Any areas with bare ground from excavation works will require reseeding with fast colonising species, appropriate to the area. Native Weeping Grass (*Microlaena stipoides*) may be a suitable groundstorey species.
    - If topsoil will be stored on site or reinstated, it must be stored in a location where no soil or material washes into Creeks.

5.4. MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

An EPBC Act Protected Matters Report was generated for a 10km radius around the proposed works on the 18 March 2020 to identify Matters of National Environmental Significance (MNES) that may be impacted by the proposed works. This report summarised below.

Table 5-5 Matters of National Environmental Significance

MNES searches	Items within 10km of site	Potential for impact
World Heritage Places	None	Nil
National Heritage Places	None	Nil
Wetlands of International Importance	None	Nil
Great Barrier Reef Marine Park	None	Nil
Commonwealth Marine Areas	None	Nil
Listed Threatened Ecological Communities	5	Assessed in Section 5.3.
Listed Threatened Species	46	Assessed in Appendix F
Listed Migratory Species	20	Assessed in Appendix F

The MNES report can be found in Appendix G.

An assessment of the likelihood of each threatened entity to be impacted by the proposed works are provided in Appendix E.

An Assessment of Significance was required for the following species:

- The threatened fauna most likely to be impacted by the proposed road works includes:
    - Koala
    - Giant Burrowing Frog
    - Southern Brown Bandicoot

- The threatened flora includes:
  - Thick lipped Spider Orchid
  - Mongarlowe Mallee

Potential impacts

Impacts have been assessed in Section 5.3.3.

Safeguards and mitigation measures

No additional safeguards are required for MNES.

5.5. PUBLIC AMENITY (NOISE, VISUAL)

5.5.1. Existing environment

The proposal would take place within a rural area. A number of rural properties are located nearby and the construction of parts of the new road alignment would be within private land. The dominant existing background noise at the proposal site would be from vehicles.

The closest receivers (R6, R5) likely to be impacted from the noise caused by the proposal are between 30 and 35m north and south of the proposal with little to no screening from the works. A third receiver (R4) is located approximately 90 m south of the works and is screened by sheds and vegetation. There are 4 receivers (R2, R2, R3, R7) between 166 and 315 m from the proposal site and 5 other identified receivers (R8 to R12) >1.2km from the proposal site, all these receivers have substantive existing vegetative screening from the proposal, likely to assist mitigate noise and other amenity impacts. Refer to Figure 5-7.

All these receivers are residential; no businesses are located nearby. Nerriga Post Office and Nerriga Hotel are located approximately 22km north of the Proposal site and a business centre located in Braidwood is approximately 30km drive south of the Proposal site.

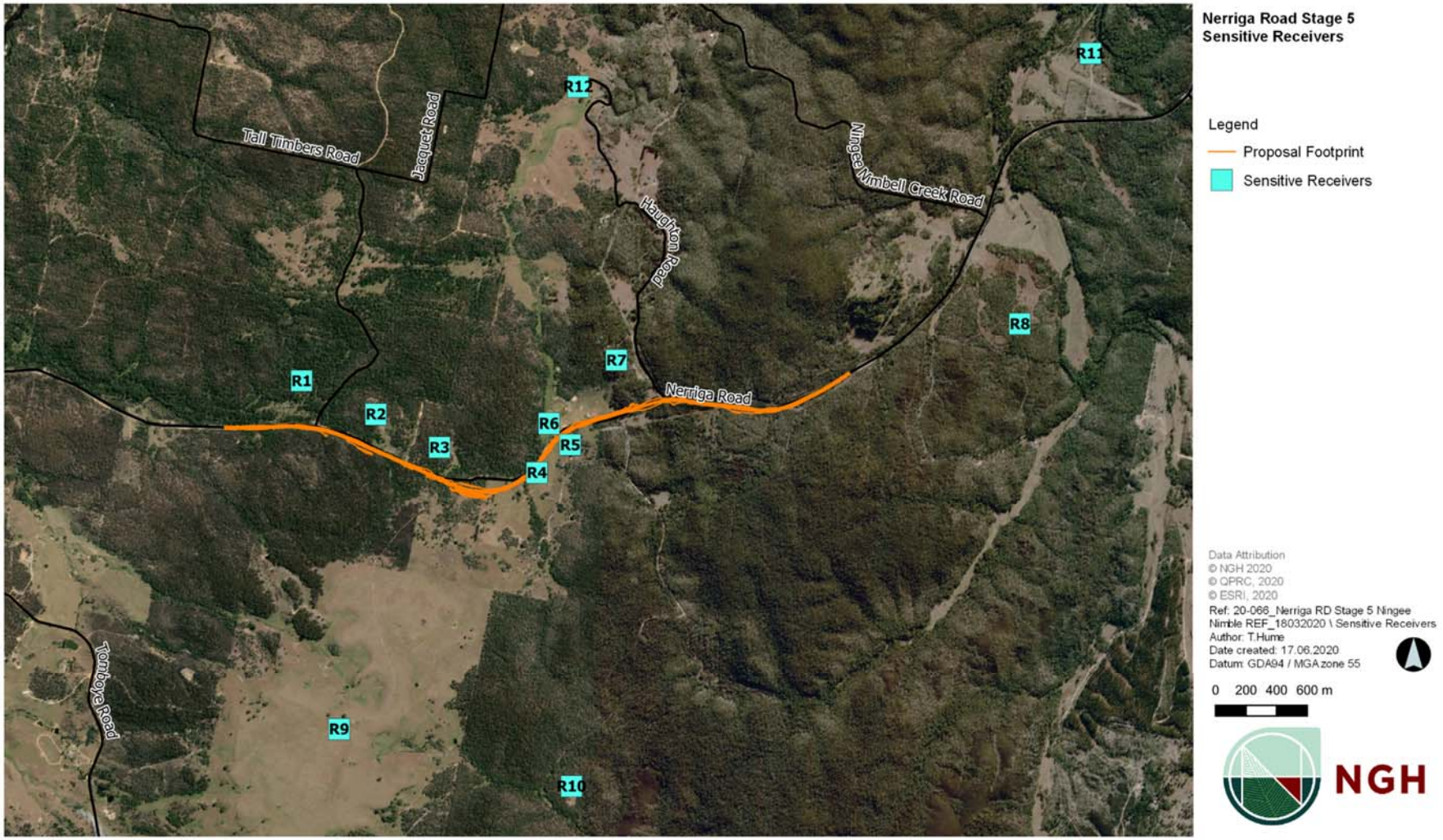

Figure 5-7. Sensitive Receivers

Additionally, receivers include through traffic. The roadside view for motorists is primarily natural landscape on a narrow road corridor which breaks into small open areas with a cluster of houses. The road corridor has been disturbed from past road works, as well as recent fire. The open areas in adjacent properties contain scatters of native vegetation and grassy vegetation. Road infrastructure such as signage and reflectors also form part of the roadside views.

The existing unsealed road creates a large amount of dust pollution caused by motorists travelling along the road.

5.5.2. Potential impacts

Construction

Reduced public amenity during construction could result primarily from vegetation clearing, excavation works and use of machinery during construction. This will create increased visual impact (loss of screening and amenity) as well as noise and dust and increased traffic hazards and delays (traffic impacts are considered separately in Section 5.6).

Noise associated with the operation of includes:

- heavy machinery such as excavators would be generated through use during construction.
- Clearing and grubbing of the vegetation
- Rock blasting

The construction would take approximately 6 months to complete. While unlikely to be conintuuous at any one location, the combination of reduced vegetation and increased machinery noise and movement will result in direct impacts for those seven residences closest to the works.

A qualitative noise assessment is recommended to assist manage noise levels and mitigation strategies, in accordance with ICNG. The closest receiver to the proposed works is not screened and would likely be the receiver experiencing the most impact from the construction works.

While the works would improve dust impacts particularly for nearby residents in operation, timing and duration of certain concurrent activities may need careful planning to ensure that receivers are not highly impacted.

Most receivers have vegetative screening from the works which will assist mitigate these impacts. Potential noise impacts are considered manageable with the short construction period, existing background noise and works to be conducted during standard working hours.

Visual impacts relate to the removal of vegetation, excavation works and presence of machinery and materials on site. During construction, there is also potential for visual amenity to be impacted through construction litter and untidy construction site. The presence of machinery and a construction site would be short term and temporary, confined to the construction period of the works. All disturbed areas would be rehabilitated, however visual amenity impacts would continue until vegetation re-establishes. This impact is considered short term to medium term.

Operation

The proposal may result in a slight increase in the volume of traffic along Nerriga Road. It is possible that additional higher mass limit vehicles may elect to start using Nerriga Road as a freight route, given the new alignment and 100km/hr speed limit. The new sealed road would reduce noise in comparison to the existing unsealed road, however, this upgrade has the potential to increase traffic which may increase noise levels.

In operation, the upgraded road would be a visual and air quality improvement on the existing unsealed road through reducing the amount of dust created by vehicles as well as improving the state road reserves within a mostly natural area for the public to enjoy during their commutes.

The new alignment would shift the road away from some residents in the area (R2 and R3; Figure 5-7). Other sections of the road would bring the road closer to residents (R9, R10, R12; Figure 5-7), though it isn't expected to have a substantive impact on these receivers due to the level of vegetation separating them from the proposal site.

5.5.3. Safeguards and mitigation measures

Safeguards and mitigation measures recommended to minimise public amenity related impacts from the proposed works include the following:

Noise

- Nearby receivers would be notified of the duration of works and justification and benefits of the project. A contact number should be provided for further information.
- A quantitative noise assessment should be undertaken in accordance with ICNG to assist manage the sequence of works and guide mitigation strategies.
- Standard construction hours would be adhered to.
- A complaints register should be maintained. All complaints should be responded to promptly.
- Machinery would be operated in a quiet and efficient manner, as far as practicable. Machinery that is not being used would be turned off.
- Machinery would be regularly maintained, and equipment repaired or replaced if it becomes noisy.

Visual

- Restore all access ways to the existing or better condition, in consultation with affected landowners.
- Work areas and the site compound would be left neat and tidy at the end of each day.
- Keep vegetation removal to a minimum.
- Rehabilitation works would take place as soon as possible following the completion of construction.
- Remove temporary erosion and sediment controls from the site once landforms have been assessed as stable.

5.6. TRAFFIC AND ACCESS

5.6.1. Existing environment

The proposal site is located along Nerriga Road (MR92), 28.5km north of Braidwood. Nerriga Road serves a link between ACT, south-western NSW and the south coast of NSW. The road attracts some tourists travelling to the coast, NSW but is mostly used by the local farming community, extensive extractive and forestry industries and residential populations.

At the proposal site Nerriga Road is a narrow two-lane unsealed road with a speed limit if 80km/hr between Charleyong Bridge and Ningee Nimble Creek Road, Tomboye. There are two hillcrests along this section of road and 9 driveways and access tracks that link up to the exiting road alignment.

5.6.2. Potential impacts

Construction

The existing unsealed road would remain in operation while the alignment and preparation of the upgraded road is being constructed. There would be some temporary traffic delays when areas of the existing road are

being widened and sealed. Traffic controls and reduced speed limits would be required during the construction period. No road closures are proposed as part of the works.

During construction, noise, dust and plant movements would create additional safety risks for motorists on Nerriga Road.

Access for the adjacent private residences would be maintained throughout construction.

Operation

The construction of the upgraded road would have positive impact for motorists including local and through traffic and school bus services. The road capability and efficiency for heavy vehicles and the freight connectivity between commercial centres would be improved. Currently the only routes for heavy vehicles are Kangaroo Valley and Macquarie Pass routes that are narrow and busy roads.

5.6.3. Safeguards and mitigation measures

Safeguards and mitigation measures are recommended to minimise traffic and access related impacts from the proposed works.

- A Traffic Management Plan would be prepared to provide for the safe passage of traffic at all times and to minimise delays and disruptions.
- Consultation would be undertaken with residents who would be directly affected by access disruptions.
- If any impacts occur to any private accesses including to the proposed ancillary site, the access tracks must be restored to prior condition, in consultation with the landowners.
- Notification to the local community of any changed traffic conditions (i.e. lane closures) in advance of the works commencing. A contact number would be provided for community queries in relation to the works.

5.7. INDIGENOUS HERITAGE

5.7.1. Introduction

A Due Diligence assessment for Aboriginal heritage sites was undertaken by qualified archaeologists for this proposal. It is summarised here and is provided in full in Appendix H.

5.7.2. Approach

The Aboriginal Due Diligence assessment was conducted in keeping with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW*. The Code of Practice provides a five-step approach to determine if an activity is likely to cause harm to an Aboriginal object, as defined by the *NSW National Parks and Wildlife Act* (1974).

The Code of Practice is aimed at providing an assessment of the potential for an activity to impact either a known Aboriginal object, or whether it is likely that unrecorded Aboriginal objects are present that may be impacted. The result of the process is aimed at providing the proponent with information about the likelihood that their activity will impact an Aboriginal object and whether an Aboriginal Heritage Impact Permit may be required.

5.7.3. Database searches

A search of the Aboriginal Heritage and Information Management System (AHIMS) database was undertaken on the 19th of February 2020 over an area approximately 19 km east-west x 19 km north-south which was centred on the proposed works area. There were 85 Aboriginal sites recorded within the search area and no declared Aboriginal Places. None of the previously registered AHIMS sites are within the proposal area although several are located close by.

5.7.4. Existing environment and potential impacts

Field inspection of the proposal site was undertaken by qualified archaeologists. The field survey was taken by inspecting and walking approximately 3.6 km of the proposed 4.4 km realignment area of Nerriga Road within the proposal area, focusing on archaeologically sensitive landforms and areas that appeared to be less disturbed. Visibility within the road reserve and across the proposal area was generally very good averaging 85% due to recent fires.

The proposed realignment of a section of Nerriga Road into relatively undisturbed land within Lot 7 DP 755964 and Lot 2 DP 830605 adjacent to the Ningee Nimble Creek was identified in the desktop assessment as an area of archaeological sensitivity. However, the field inspection of the proposed realignment of this section of Nerriga Road concluded that the proposed road realignment within Lot 2 DP 830605 was deemed to have low potential for Aboriginal objects due to the shallow deposits, extensive outcroppings and steepness of the slopes.

While no surface evidence of Aboriginal objects was identified during the visual inspection of the proposal area within Lot 7 DP 755964 an area of Potential Archaeological Deposit (PAD) was identified to have moderate archaeological sensitivity. The PAD was recorded along relatively flat ground in close proximity to Ningee Nimble Creek which would have been conducive for Aboriginal camping. Consequently, an area of PAD within the proposal area in Lot 7 DP 755964 was deemed to have potential to contain subsurface Aboriginal objects which would require subsurface testing to establish the archaeological potential and extent of sites along this landform.

The remaining sections of the proposal area which were in close proximity or intersected by water courses were also visually inspected. These areas, beyond the PAD recorded in Lot 7 DP 755964, were noted to be significantly eroded and highly disturbed by the construction and maintenance of the existing road corridor. No other Aboriginal objects or areas of archaeological potential were recorded within the proposal area.

Additionally, the past construction and maintenance works along the existing road corridor within the proposal area was noted to have resulted in the modification and significant disturbance of the existing Nerriga Road alignment which was determined to have low potential for Aboriginal objects.

The field assessment identified an area of PAD within the section of Nerriga Road proposed to be realigned through Lot 7 DP 755964. The area of PAD within Lot 7 DP 755964 (mapped in Appendix H) which is intersected by the proposed road realignment and upgrade works would require subsurface testing to establish the true archaeological potential, nature and extent of Aboriginal sites in this area if it cannot be avoided.

To negate the need to conduct further archaeological assessment of the PAD area Council would need to redesign the proposed road realignment to avoid the PAD within Lot 7 DP 755964 and stay within the area assessed in this report. Other works can proceed with caution.

5.7.5. Safeguards and mitigation measures

- To negate the need to conduct further archaeological assessment, Council would need to redesign the proposed road realignment to avoid the PAD within Lot 7 DP 755964 (mapped in Appendix H) and stay within the area assessed in this report.
- Other works can proceed with caution.

- If any items suspected of being Aboriginal in origin are discovered during the works, outside a valid AHIP area, all work in the immediate vicinity must stop and the Department of Planning, Industry and Environment (DPIE) notified. The find will need to be assessed and if found to be an Aboriginal object an AHIP may be required.
- Any activity proposed outside of the current assessment area should also be subject to an Aboriginal heritage assessment.
- In the unlikely event that human remains are identified during development works, all work must cease in the immediate vicinity and the area must be cordoned off. The proponent must contact the local NSW Police who will make an initial assessment as to whether the remains are part of crime scene or possible Aboriginal remains. If the remains are thought to be Aboriginal, DPIE must be notified by ringing the Enviroline (131 555).

If the PAD area within Lot 7 DP 755964 *cannot be avoided*, the following will be required:

- A programme of subsurface testing must be undertaken to establish the true archaeological potential and extent of archaeological sites within the works area by undertaking an Aboriginal Cultural Heritage Assessment (ACHA). All subsurface testing must comply with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW.* If Aboriginal objects are recovered during the testing programme an Aboriginal Heritage Impact Permit (AHIP) must be obtained from the DPIE.

5.8. NON-INDIGENOUS HERITAGE

5.8.1. Approach

A desktop assessment was undertaken to determine the heritage values of any objects or places within the proposal area, with a particular focus on the area of the proposed works in Tomboye and the Queanbeyan Palerang LGA.

5.8.2. Database Searches

While the proposal site is located within the recently amalgamated Queanbeyan Palerang LGA not all of the database searches recognise the amalgamated LGA and consequently the searches have been undertaken for the previous Palerang LGA as needed which encompasses the proposal site.

Heritage database searches were conducted on 14th of March 2020 and included:

- The NSW State Heritage Inventory (SHI) (for items listed on the State Heritage Register, Heritage and Conservation Registers of State Government agencies and local heritage items on the Palerang Shire Council Heritage Schedule).
- The Australian Heritage Database (for items listed on the National and Commonwealth Heritage Lists and World Heritage List).

The breakdown of results identified during the Heritage database searches is provided below in Table 5-6.

Table 5-6 Summary of heritage findings for the Heritage database searches.

Register	Search Area	Listings
Australian Heritage Database	Tomboye	0
State Heritage Register	Palerang LGA	12
Palerang LEP 2014 and State Government Agencies	Palerang LGA	375

The results of the Australian Heritage Database search indicated that there are no sites located in Tomboye.

The results of the NSW SHI database search indicated that there are:

- No previously recorded Aboriginal Places listed under the *National Parks and Wildlife Act* within the NSW State Heritage Inventory within the Palerang LGA.
- Twelve previously recorded heritage sites are listed under the *NSW Heritage Act* within the Palerang LGA however none of the sites are located within or adjacent to the proposal site.
- A total of 375 previously recorded heritage sites are listed by the Local and State Agencies within the Palerang LGA. One of the sites, the Tomboye Homestead and outbuildings (Item 355), located on Nerriga Road, Lot 7 DP 755964, is located within and adjacent to the proposal site.

5.8.3. Potential impacts

The proposed works would have a physical impact on Lot 7 DP 755964 which is listed as the curtilage for the LEP locally listed item Tomboye Homestead and outbuildings (I355). However, the homestead and outbuilding structures themselves are not within the proposed road realignment. The works are however likely to have visual impact on the setting of the LEP listed item. As such, further assessment would be required to determine how the site would be affected by the proposed works. Beyond the listed Tomboye Homestead and outbuildings item noted no other known previously recorded heritage sites or known possible heritage sites are located within or adjacent to the proposal area.

5.8.4. Safeguards and mitigation measures

Prior to any works commencing the follow safeguards are required:

- Advice should be sought from a heritage consultant and/or the Queanbeyan Palerang Council's heritage officer to determine if the values and/or significance of the locally listed item Tomboye Homestead and outbuildings (I355) would be affected by the proposed works.
- Pending the advice provided from a heritage consultant and/or the Queanbeyan Palerang Councils heritage officer a Statement of Heritage Impacts (SOHI) may be required prior to any works.
- If any items suspected of being of historic value are uncovered during the works, works must cease in the vicinity of the find and advice would be sought from a heritage consultant as to whether the Heritage Council is required to be notified in accordance with section 146 if the *NSW Heritage Act 1977*.

5.9. AIR QUALITY, RESOURCES AND WASTE

5.9.1. Polity setting

Air quality

Smoky emissions from construction plant and vehicles would be maintained to Australian Standards. The Protection of the Environment Operations Act 1997 (POEO Act) requires that no vehicle shall have continuous smoky emissions for more than 10 seconds.

Waste

Legal requirements for the management of waste are established under the *Protection of the Environment Operations Act 1997* and the *POEO (Waste) Regulation 2005*. Unlawful transportation and deposition of waste is an offence under section 143 of the POEO Act.

Waste management would be undertaken in accordance with the *Waste Avoidance and Resource Recovery Act 2001 (WARR Act).* The objectives of this Act are:

a) to encourage the most efficient use of resources and to reduce environmental harm in accordance with the principles of ecologically sustainable development,
b) to ensure that resource management options are considered against a hierarchy of the following order:
    i. avoidance of unnecessary resource consumption,
    ii. resource recovery (including reuse, reprocessing, recycling and energy recovery)
    iii. disposal,
a) to provide for the continual reduction in waste generation
b) to minimise the consumption of natural resources and the final disposal of waste by encouraging the avoidance of waste and the reuse and recycling of waste
c) to ensure that industry shares with the community the responsibility for reducing and dealing with waste,
d) to ensure the efficient funding of waste and resource management planning, programs and service delivery,
e) to achieve integrated waste and resource management planning, programs and service delivery on a State-wide basis
f) to assist in the achievement of the objectives of the Protection of the Environment Operations Act 1997

The order and exemption include conditions which generators, processors (the order) and consumers (the exemption) of waste must meet to supply or receive waste for land application. The order allows for certain materials that have been excavated during the construction and maintenance of council or RMS public roads and public road infrastructure facilities to be reused within the road corridor for public road related activities including road construction, maintenance and installation of road infrastructure facilities.

Materials appropriate for reuse include rock, soil, sand, bitumen, reclaimed asphalt pavement, gravel, slag from iron and steel manufacturing, fly and bottom ash, concrete, brick, ceramics and other materials that hold a resource recovery order for use in road making activities. Waste that contains coal tar or asbestos, or any waste that is classified as hazardous, restricted solid, special or liquid waste is excluded from these exemptions. Hazardous waste includes waste that has properties that make them hazardous or potentially to human health or the environment.

The exemption does not exempt those using them from complying with relevant planning consent requirements. For this proposal, appropriate material to be returned to the extraction pits, without the requirement for development consent, includes all-natural materials such as rock, soil and sand. All non-natural materials would require transport off site to an appropriate facility.

5.9.2. Existing environment

Air

The proposal site is located in a rural area surrounded by farmland and large properties. Emissions from motor vehicle dust along Nerriga Road and machinery used for agricultural and extractive activities would be the main sources of air pollutants at the proposal site. Emissions from agricultural activities within the area may periodically affect air quality (slashing, ploughing, harvesting). The impact of vehicle emissions and dust

would attenuate with distance from the road. The broader area is considered to have good air quality due to the low population density and relatively low traffic volumes.

5.9.3. Potential impacts

Construction

Currently, vehicles travelling along the unsealed road is creating a lot of dust pollution for nearby private landholders. The vehicles traveling along the newly sealed road would produce less air pollution therefore it is anticipated that the level of air pollution would be greatly reduced for the closest receivers.

Atmospheric pollutants created during the construction phase would include dust from the transport and operation of vehicles and excavators as well as exhaust emissions. Dust production can be increased during dry and windy days. High levels of dust can suppress vegetation growth and impact on houses near the works as well as inconvenience nearby receivers. These negative impacts would be restricted to the construction period.

Existing vegetation would act to mitigate the impacts of dust on nearby receivers. Given the short duration of works, negative air quality impacts from construction are likely to be low and manageable.

Possible waste streams generated during the construction would include:

- Surplus excavated soil and rocks, including topsoil.
- Green waste from vegetation removal.
- Concrete washout.
- Asphalt.
- Surplus construction materials (surplus erosion and sediment control materials, concrete, rock).
- Paper and office waste from project management.
- General waste from staff (lunch packaging, portable toilets etc.).

Waste that is not adequately managed can have a range of potential impacts, including:

- Loss of potentially recoverable resources.
- Contamination of the site and surrounding environment (including potential visual and ecological impacts).
- Offsite contamination due to inappropriate disposal or handling by unlicensed operators.

Impacts from waste would only occur during the construction phase.

There is a potential to reuse green waste on site as part of the proposed works.

Green waste that can be potentially reused on site includes the following:

- Reuse large logs in the road reserve for habitat purposes, avoid creating wood piles.
- Reuse of hollows removed from felled hollow bearing trees. These can be mounted on existing non-hollow bearing trees.
- Consider reusing mulch from cleared areas on site.
- Excavated rocks could be used for bank stabilisation.

Surplus vegetative matter, timber, steel and concrete would be disposed of at a facility able to accept the waste or at Council storage facility for later reuse.

The materials required during the proposed construction works are not currently restricted resources however, materials such as metals and fuels are considered non-renewable and should be used conservatively.

Where possible, all of the new and purchased materials to be used would be sourced within the Queanbeyan Palerang region, as close to the work site as practical to reduce transport costs, including fuel usage.

Operation

It is anticipated that the operation of the upgrade of Nerriga Road would reduce the amount dust generated in the locality. In the long term, the proposal would not require any additional input of resources. Maintenance requirements would be less. Natural resource impacts are considered to be minor.

5.9.4. Safeguards and mitigation measures

The following safeguards and mitigation measures are recommended to minimise resource and waste management related impacts from the proposed works:

- Dust controls would be implemented during construction, as required; for example, use of a water cart or cease construction activities to suppress dust generation.
- Cleared vegetation shall not be burnt at the site.
- Waste shall be managed in accordance with the *Protection of the Environment Operations Act 1997*.
  A Waste Management Plan shall be prepared for construction which includes the following:
    - Identify all potential waste streams associated with the works.
    - Identify opportunities to minimise the use of resources, and to reuse and recycle materials.
    - Outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities. Waste must be disposed of at a facility able to accept the waste.

  Recommendations for reusing green waste on site under guidance of a qualified Zoologist.
    - Reuse large logs in the road reserve for habitat purposes, avoid creating wood piles.
    - Reuse of hollows removed from felled hollow bearing trees. These can be mounted on existing non-hollow bearing trees.
    - Consider reusing mulch from cleared areas on site.
    - Excavated rocks could be used for bank stabilisation.
- Waste would be transported to an appropriate waste disposal facility.
- Working areas shall be maintained, free of rubbish and cleaned up at the end of each working shift.
- Toilets (e.g. portable toilets) would be provided for construction workers.

5.10. CUMULATIVE IMPACTS

5.10.1. Policy setting

There is a requirement under Clause 228(2) of the *Environmental Planning and Assessment Regulation 2000* to take into account any cumulative environmental impacts with other existing or likely future activities. Cumulative impacts of the proposed works include the combined effect of individual impacts associated with the proposal in addition to the impacts of other activities in the area. These may include current and future road works and local land development that could result in ongoing biodiversity, noise, air quality, visual, waste generation and traffic impacts.

5.10.2. Potential impacts

Key adverse cumulative impacts for the proposed works relate to the combined impact from proposed construction activities on the local environment. This is namely potential loss of a small area of an EEC and potential water quality risks to waterways and loss of topsoil through excavation activities. Additionally, there may be cumulative social impacts, related to traffic delays, noise and dusts, for users of Nerriga Road. The proposed works would coincide with existing extractive activities occurring within the area. The similar impacts of the proposed works would be temporary and limited to the construction period.

The positive cumulative impacts associated with the proposal would result in improved access for motorists and local residents. These benefits offset to some degree the environmental impacts of the works and therefore the cumulative impacts of this proposal on balance, are considered to be acceptable. Cumulative

impacts for local road users from the upgrades of Nerriga Road include an enjoyable commute to and from their properties, improved air quality, and reduced noise that is generated by the unsealed road.

5.10.3. Safeguards and mitigation measures

Adverse cumulative impacts relate to the construction phase of the proposed works. Cumulative impacts are considered to be best managed by dealing with each component individually. No additional safeguards are proposed.

5.11. PRINCIPLES OF ECOLOGICALLY SUSTAINABLE DEVELOPMENT

The *Protection of the Environment Administration Act 1991* outlines a number of principles of ecologically sustainable development (ESD). These are presented below and discussed in relation to the proposal.

5.11.1. The precautionary principle

According to the precautionary principle, if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be seen as a reason not to protect the environment. The use of the precautionary principle implies that proposals should be carefully evaluated to identify possible impacts and assess the risk of potential consequences.

The precautionary principle has been applied in assessing conservation values and environmental threats and impacts associated with works proposed throughout this REF. Assessments have been precautionary with respect to threatened entities and impacts to Aboriginal heritage. The development of mitigation measures and safeguards to manage impacts aims to reduce the risk of serious and irreversible impacts on the environment.

Generally, throughout this assessment, there has been found to be a low level of uncertainty in regard to all factors assessed.

5.11.2. Inter-generational equity

The principle of inter-generational equity requires the present generation to ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.

The impacts of the proposal are likely to be localised and temporary and would not significantly diminish resources and nature conservation values available for use by future generations.

5.11.3. Conservation of biological diversity and ecological integrity

Conservation of biological diversity and ecological integrity are a fundamental consideration of ESD.

An assessment of the existing local environment has been undertaken in order to identify and manage any potential impacts of the proposal on local biodiversity. The impacts of the proposal on local populations of threatened species, threatened communities and their habitats have been assessed. The proposal is not considered to have a significant impact on biological diversity and ecological integrity.

5.11.4. Appropriate valuation of environmental factors

This principle requires that “costs to the environment should be factored into the economic costs of a project”.

This REF has examined the environmental consequences of the proposal and identified mitigation measures for factors which have the potential to experience adverse impacts. Requirements imposed in terms of

implementation of these mitigation measures would increase both the capital and operating costs of the proposal. This signifies that environmental resources have been given appropriate valuation.

6. SUMMARY OF SAFEGUARDS

Table 6-1. Key environmental safeguards

Environmental Issue	Safeguard/Mitigation Measure
Topography, Geology and Soils	• A Soil and Water Management Plan is to be prepared and implemented in accordance with the 'Blue Book' (Landcom 2004). • Sediment erosion controls would be maintained during works and adapted if required to ensure the objectives of the Blue Book are met. They would be removed only when soils have been deemed stable (i.e. considering grade or surface treatment / success of revegetation). • Stockpile sites would be managed in accordance with the Blue Book (Landcom 2004), including location: • If refuelling is undertaken on site, it must be within a designated area and a spill management plan in needed. • An Emergency Spill Management Plan would be developed for the project and would contain measures to avoid spillages of hydrocarbons onto any ground surfaces or into any waterways. Safeguards and measures would include, but not be limited to: o Impervious bunded storage facilities for hydrocarbons, away from drainage lines and areas at risk of flooding impacts. o Impervious bunded areas for refuelling, away from waterways and drainage lines. o Spill kits kept onsite and, on all machinery, o Training of staff in the response, notification, and management of hydrocarbon spills. o Requirements for spill kits will be kept on site during works using chemicals. o No chemicals stored onsite. o Emergency spill procedures. • No concrete waste or excavated material is to be disposed of onsite or in adjacent waterways. Concrete waste includes excess concrete, concrete washout and similar. • Construction works would not be carried out in periods of forecast heavy rains or strong/gale wind warnings. • All areas disturbed by works would be rehabilitated progressively to ensure stable surfaces are obtained as soon as practical. Species selection would be appropriate to the area of works. Monitoring will be required. Follow up seeding and mulching may be required to ensure that surfaces are stabilised. If contaminated or suspicious material is encountered during works, a suitably qualified professional would be engaged to determine risks and management strategies

Environmental Issue	Safeguard/Mitigation Measure
Hydrology, Catchment Values and Water Quality	• Prior to works, a Fisheries Permit for dredging and reclamation works would be obtained, and works would be undertaking in accordance with the permit. • A flood contingency plan would be prepared to identify any potential flood threats and the evacuation procedure for dispersible materials, hazardous materials and equipment containing hazardous or dispersible materials. The flood contingency plan would include: o Detail who would be responsible for monitoring the flood threat and how is this to be done. It is expected that flood warning information would be sourced from the Bureau of Meteorology (BoM) website. o Regular consultation of the BoM website for weather forecasts and flood warnings. o A process for removing equipment and materials off site and out of flood risk areas quickly.
Biodiversity	Avoid impacts • Mongarlowe Mallee: A targeted preclearance survey is required to provide further assurance that this species does not occur. If it is identified, given its important, exclusion zones would be recommended to protect remaining individuals. Minimise impacts • Prior to construction, a biodiversity management plan should be developed to guide construction, including tool box talks to ensure that staff are familiar with the following species and their mitigation strategies: o Diamond Firetail, Flame Robin, Dusky Woodswallow, Pink Robin: Limit the works area to the minimum required and actively restore areas disturbed by the works. o Giant Burrowing Frog: A pathogen management protocol should also be prepared and implemented to minimise risks to this and other amphibians when moving soils from drainage lines or handling frogs, should they occur. o Hollow dependent fauna: Southern Myotis, Eastern Coastal Free-tailed Bat, Yellow Bellied Glider, Masked Owl, Powerful Owl: offsetting the loss of hollows is recommended (ie mounting felled hollow limbs or nest boxes in adjacent non hollow bearing trees that will be protected from the works). Further, staged felling is recommended to reduce impacts to resident species, if present, during the construction works. o Southern Brown Bandicoot: Limit the works area to the minimum required and actively restore areas disturbed by the works. o Koala: unexpected finds protocol is required, in the event the species is identified onsite during works, to relocate the animal to a safe place in adjoining habitat. o Wombat burrows and termite mounds are avoided as much as possible as part of any excavation works and where this is not feasible, Wombat

Environmental Issue	Safeguard/Mitigation Measure
	burrows are to be investigated further to determine if wombats are utilising these burrows. Weeds and pathogens protocols would be developed and implemented: • Prior to commencement of any construction work, weed control should be undertaken for any declared weeds found in areas that will be excavated. • Follow up weed control may be required to prevent establishment of Blackberry, Briar Rose and Spear Thistle. • To mitigate weed spread and re-infestation post construction, weed hygiene prevention measures ensure machinery and vehicles are be clean prior entering the site and prior to exiting the site to minimise the potential of introducing weed seeds. • Any topsoil removed from site with noxious weed material or native vegetation should be disposed of at an appropriately licenced waste facility. • If in the event that capture and relocation of amphibians is required due to sediment escaping during excavation works, an appropriate qualified aquatic specialist should be engaged for these works and appropriate Chytrid fungus PPE procedures are implemented. Stabilisation and rehabilitation: • A rehabilitation plan would be prepared for the proposal and would include the following measures: o Include monitoring to meet clear targets, regarding establishment. o Minimise disturbance of topsoil on the edges of the three creeks and in burnt areas. These areas will regenerate quickly and minimise sediment entering the creek. o Any areas with bare ground from excavation works will require reseeding with fast colonising species, appropriate to the area. Native Weeping Grass (*Microlaena stipoides*) may be a suitable groundstorey species. If topsoil will be stored on site or reinstated, it must be stored in a location where no soil or material washes into Creeks.
MNES	No additional safeguards are required for MNES.
Public Amenity (noise and visual)	**Noise** • Nearby receivers would be notified of the duration of works and justification and benefits of the project. A contact number should be provided for further information. • A quantitative noise assessment should be undertaken in accordance with ICNG to assist manage the sequence of works and guide mitigation strategies. • Standard construction hours would be adhered to. • A complaints register should be maintained. All complaints should be responded to promptly.

Environmental Issue	Safeguard/Mitigation Measure
	• Machinery would be operated in a quiet and efficient manner, as far as practicable. Machinery that is not being used would be turned off. • Machinery would be regularly maintained, and equipment repaired or replaced if it becomes noisy. **Visual** • Restore all access ways to the existing or better condition, in consultation with affected landowners. • Work areas and the site compound would be left neat and tidy at the end of each day. • Keep vegetation removal to a minimum. • Rehabilitation works would take place as soon as possible following the completion of construction. • Remove temporary erosion and sediment controls from the site once landforms have been assessed as stable.
Traffic and Access	• A Traffic Management Plan would be prepared to provide for the safe passage of traffic at all times and to minimise delays and disruptions. • Consultation would be undertaken with residents who would be directly affected by access disruptions. • If any impacts occur to any private accesses including to the proposed ancillary site, the access tracks must be restored to prior condition, in consultation with the landowners. • Notification to the local community of any changed traffic conditions (i.e. lane closures) in advance of the works commencing. A contact number would be provided for community queries in relation to the works.
Indigenous Heritage	• To negate the need to conduct further archaeological assessment, Council would need to redesign the proposed road realignment to avoid the PAD within Lot 7 DP 755964 (mapped in Appendix H) and stay within the area assessed in this report. • Other works can proceed with caution. • If any items suspected of being Aboriginal in origin are discovered during the works, outside a valid AHIP area, all work in the immediate vicinity must stop and the Department of Planning, Industry and Environment (DPIE) notified. The find will need to be assessed and if found to be an Aboriginal object an AHIP may be required. • Any activity proposed outside of the current assessment area should also be subject to an Aboriginal heritage assessment. • In the unlikely event that human remains are identified during development works, all work must cease in the immediate vicinity and the area must be cordoned off. The proponent must contact the local NSW Police who will make an initial assessment as to whether the remains are part of crime scene or possible Aboriginal remains. If the remains are thought to be Aboriginal, DPIE must be notified by ringing the Enviroline (131 555).

Environmental Issue	Safeguard/Mitigation Measure
	If the PAD area within Lot 7 DP 755964 *cannot be avoided*, the following will be required: • A programme of subsurface testing must be undertaken to establish the true archaeological potential and extent of archaeological sites within the works area by undertaking an Aboriginal Cultural Heritage Assessment (ACHA). All subsurface testing must comply with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW.* If Aboriginal objects are recovered during the testing programme an Aboriginal Heritage Impact Permit (AHIP) must be obtained from the DPIE.
Non-indigenous Heritage	• Advice should be sought from a heritage consultant and/or the Queanbeyan Palerang Council's heritage officer to determine if the values and/or significance of the locally listed item Tomboye Homestead and outbuildings (I355) would be affected by the proposed works. • Pending the advice provided from a heritage consultant and/or the Queanbeyan Palerang Councils heritage officer a Statement of Heritage Impacts (SOHI) may be required prior to any works. • If any items suspected of being of historic value are uncovered during the works, works must cease in the vicinity of the find and advice would be sought from a heritage consultant as to whether the Heritage Council is required to be notified in accordance with section 146 if the *NSW Heritage Act 1977*.
Air Quality, resources and waste	• Dust controls would be implemented during construction, as required; for example, use of a water cart or cease construction activities to suppress dust generation. • Cleared vegetation shall not be burnt at the site. • Waste shall be managed in accordance with the *Protection of the Environment Operations Act 1997*. A Waste Management Plan shall be prepared for construction which includes the following: o Identify all potential waste streams associated with the works. o Identify opportunities to minimise the use of resources, and to reuse and recycle materials. o Outline methods of disposal of waste that cannot be reused or recycled at appropriately licensed facilities. Waste must be disposed of at a facility able to accept the waste. Recommendations for reusing green waste on site under guidance of a qualified Zoologist. o Reuse large logs in the road reserve for habitat purposes, avoid creating wood piles. o Reuse of hollows removed from felled hollow bearing trees. These can be mounted on existing non-hollow bearing trees. o Consider reusing mulch from cleared areas on site. o Excavated rocks could be used for bank stabilisation.

Environmental Issue	Safeguard/Mitigation Measure
	• Waste would be transported to an appropriate waste disposal facility. • Working areas shall be maintained, free of rubbish and cleaned up at the end of each working shift. • Toilets (e.g. portable toilets) would be provided for construction workers.
Cumulative impacts	Adverse cumulative impacts relate to the construction phase of the proposed works. Cumulative impacts are considered to be best managed by dealing with each component individually. No additional safeguards are proposed.

7. CONCLUSION

This REF has been prepared for QPRC, to assess the construction and operational environmental impacts of a proposal to upgrade a 4.4km unsealed section of Nerriga Road between Charleyong Bridge and Ningee Nimble Creek Road, Tomboye. The road would be realigned, widened and sealed requiring 15-20 ha of native vegetation removal, instream works where waterways cross the route and a six-month construction program affecting sever nearby receivers.

In operation, the works would improve safety and traffic efficiency for all motorists using Nerriga Road. It would also reduce ongoing maintenance costs for QPRC associated with the unsealed road. It would improve freight productivity. It would reduce dust impacts for nearby receivers and would improve water quality by reducing sediment input into local catchments. The works are within the Sydney Drinking Water Catchment.

This REF has been prepared according to the requirements of Section 5.5 of the EP&A Act, specifying a "duty to consider environmental impact". It provides a full analysis of all environmental, economic, physical and social implications of the proposal.

A Fisheries Permit, Crown Land licence and private land acquisition are required prior to works. The key environmental risks of the works have been identified as biodiversity and heritage. Further surveys and avoidance measures are required. Additionally, rigorous controls will be required to manage soil and water impacts, public amenity impacts including noise and traffic safety in direct consultation with nearby receivers.

With the effective implementation of the safeguards listed in this REF the potential impacts of the proposal are considered acceptable and justified and unlikely to generate a significant adverse impact. The benefits of the project would be to local traffic, local receivers and the local environment, as well as broader positive traffic safety and efficiency outcomes.

REF APPROVED

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QPRC

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APPENDIX A CONCEPT DRAWINGS

NERRIGA ROAD-NINGEE NIMBLE RECONSTRUCTON

LOCALITY PLAN

DRAWING INDEX

TITLE / DESCRIPTION	SHEET No
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TYPICAL SECTIONS	
STANDARD DRAWINGS	
PLANS	2-13
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DATUM: AHD | ORIGIN: AUSPOS

COORD. SYSTEM: MGA

SURVEYED PHL DATE JUNE 2015

DESIGNED TCP DATE OCT 2017

DRAWN TCP DATE OCT 2017

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No	AMENDMENT	BY	DATE
R0	CONCEPT ALIGNMENT	TCP	OCT 17

QPRC

PROJECT: NINGEE NIMBLE RECONSTRUCTION

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PDF file: 17006 DESIGN R1 .PDF

JOB No. 17006 DESIGN R1

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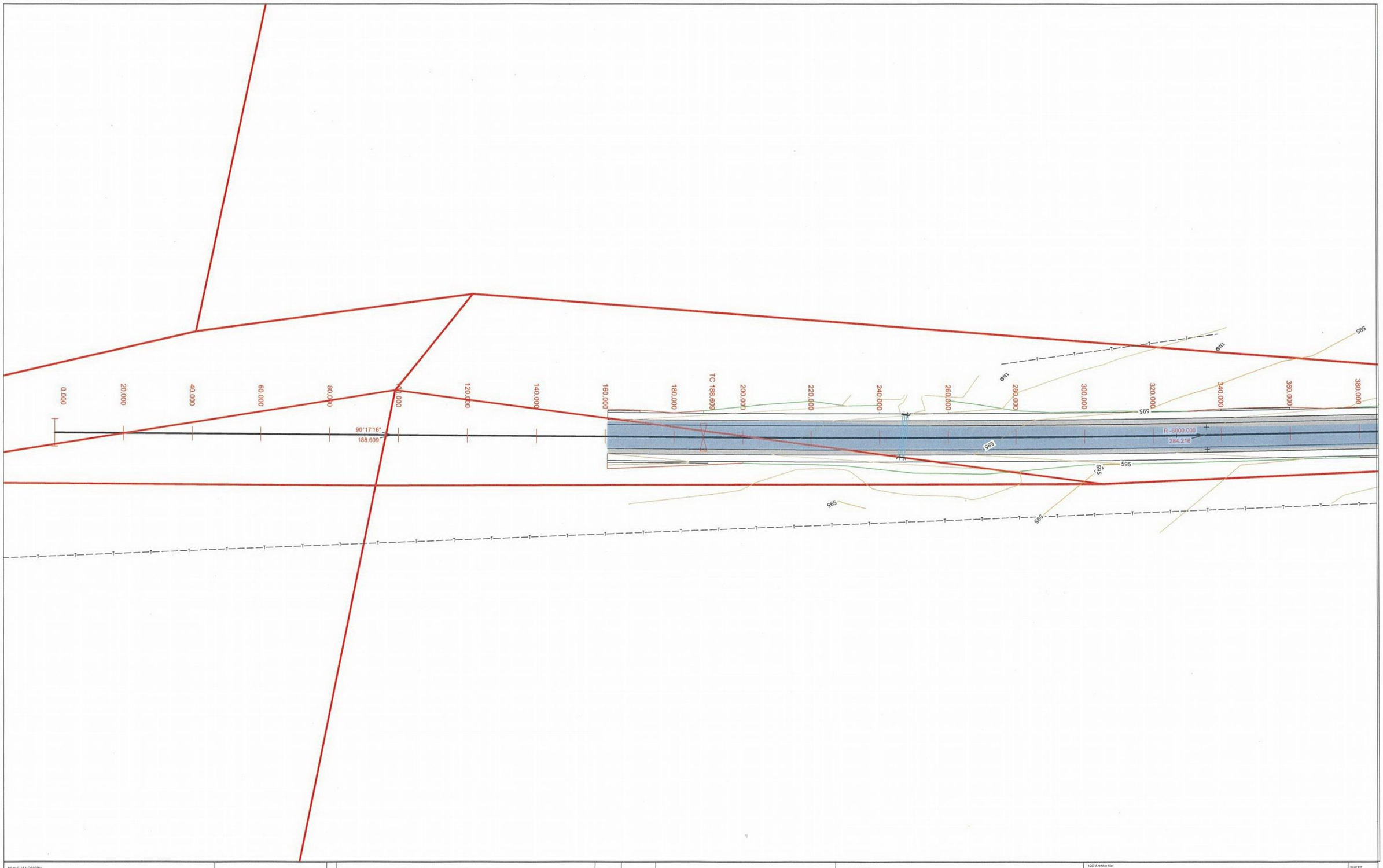
SHEET: 1/60

REV: RR0



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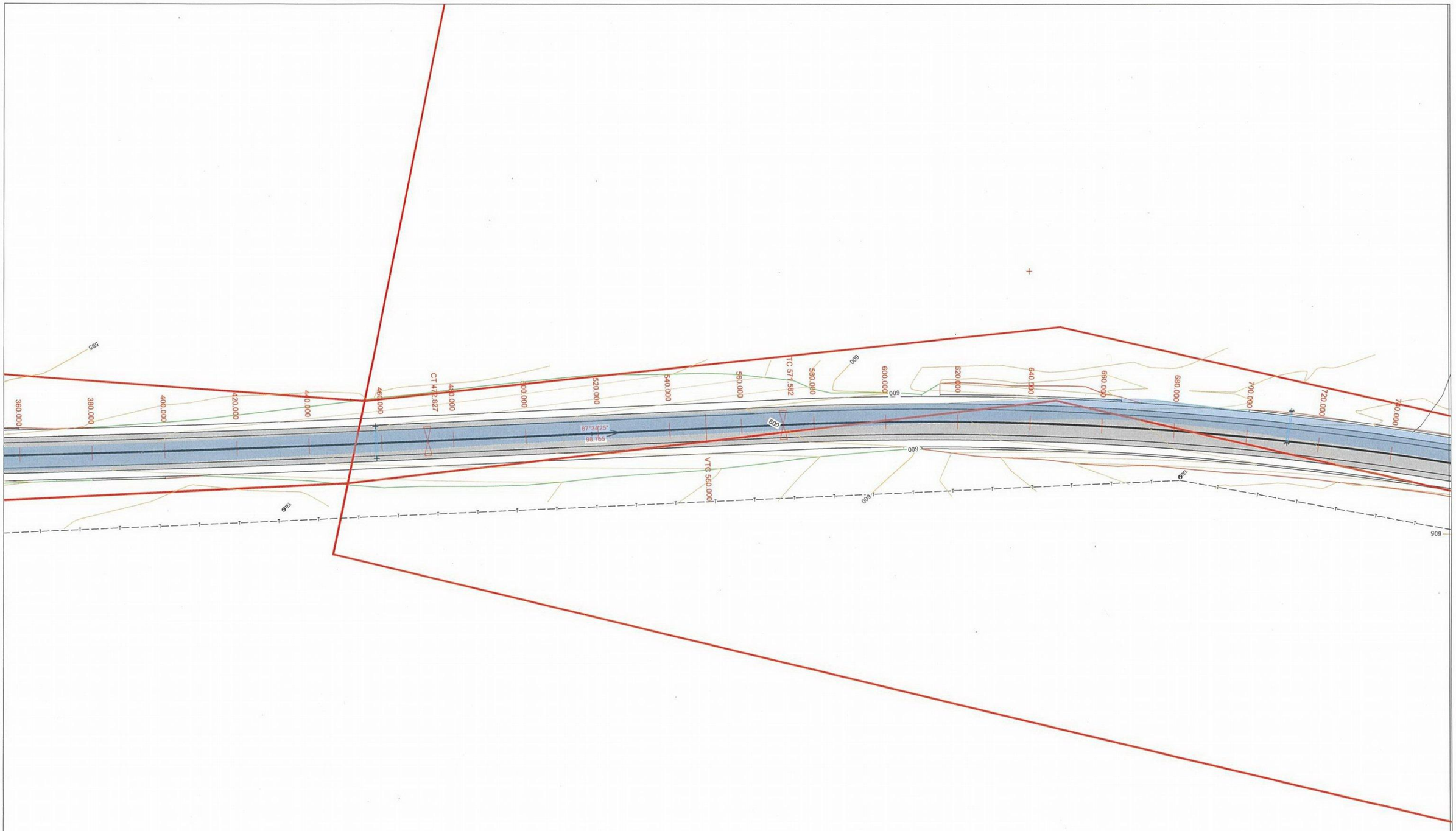

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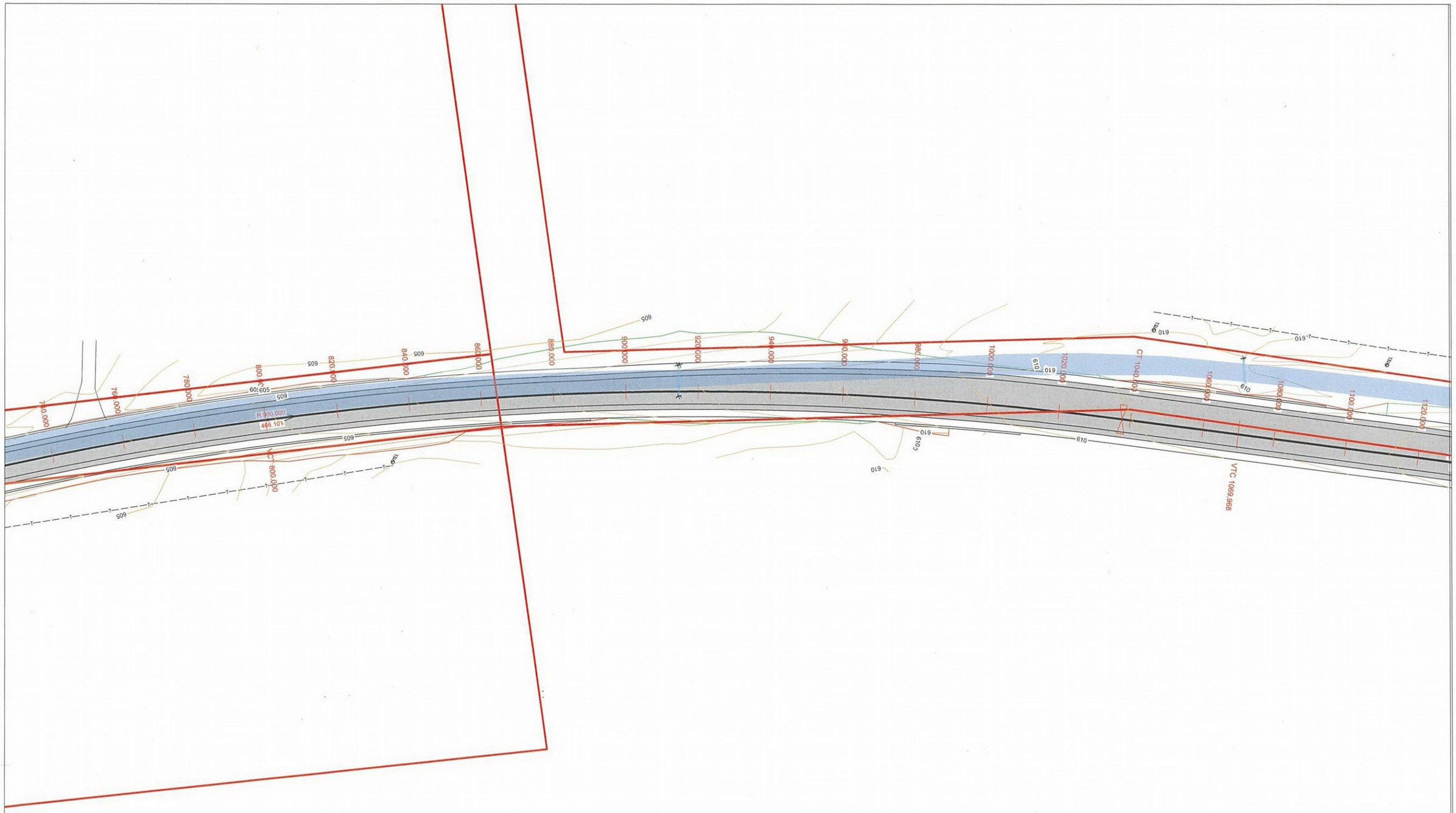

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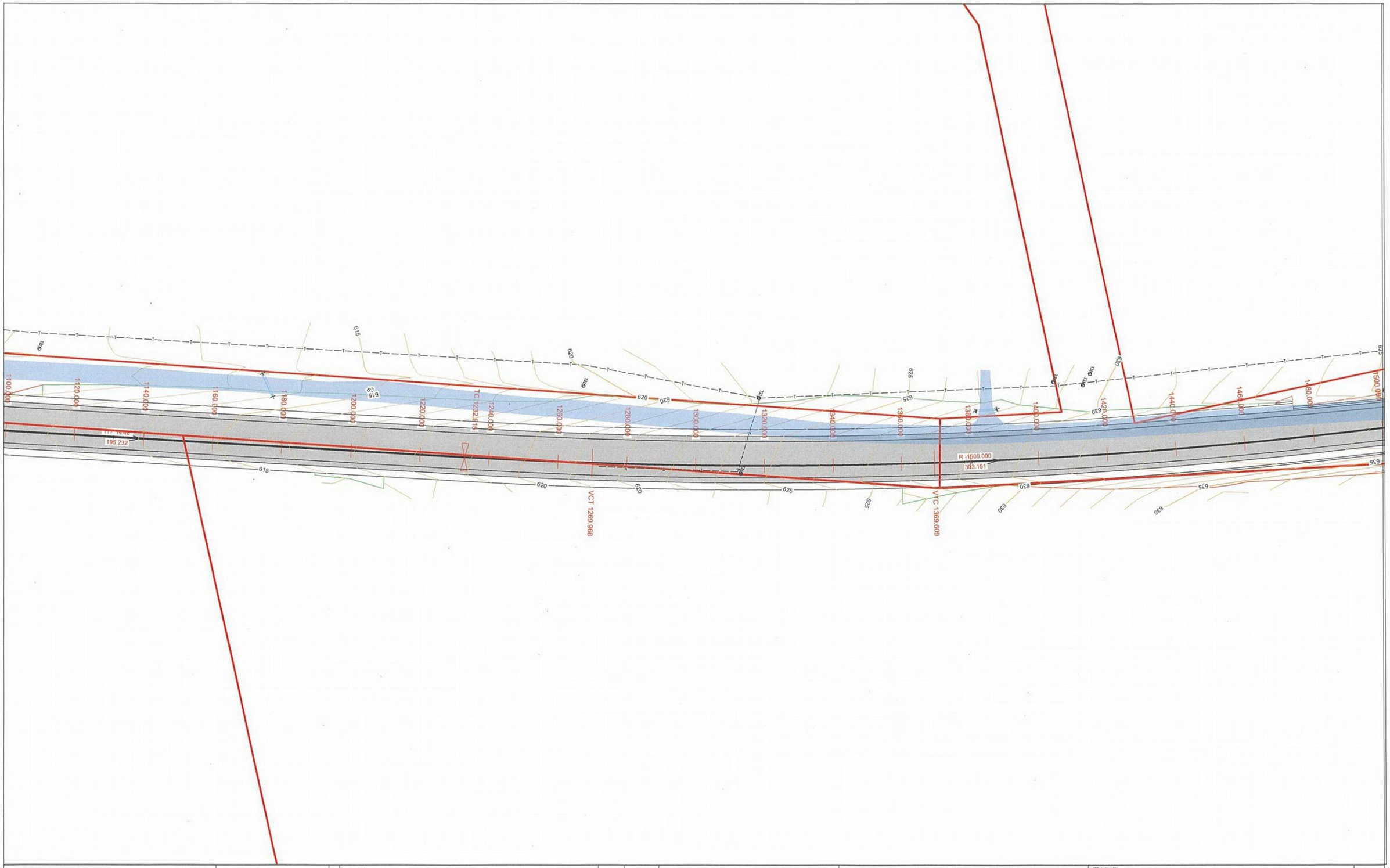

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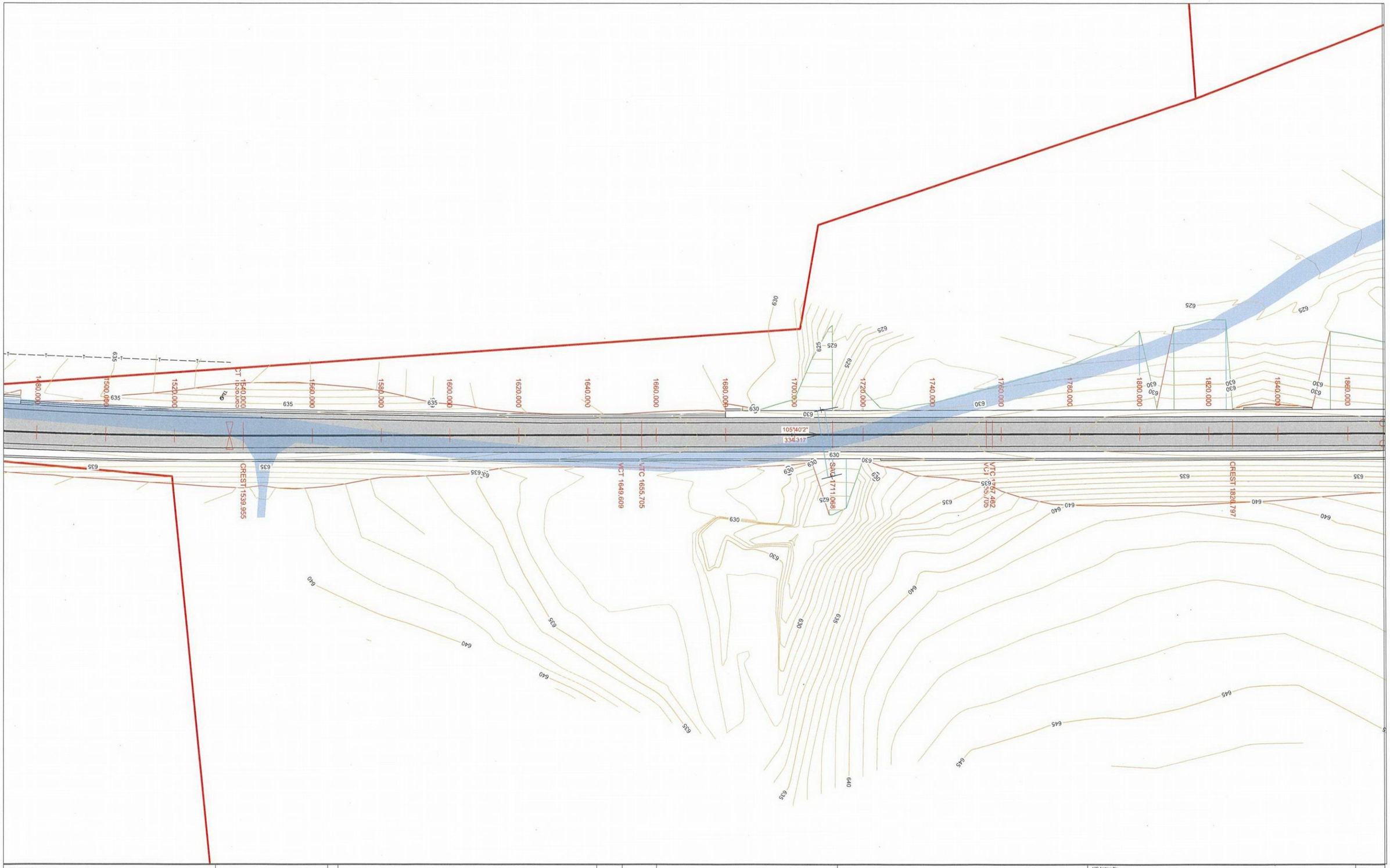

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PROJECT:

MR 92 NERRIGA ROAD
NINGEE NIMBLE

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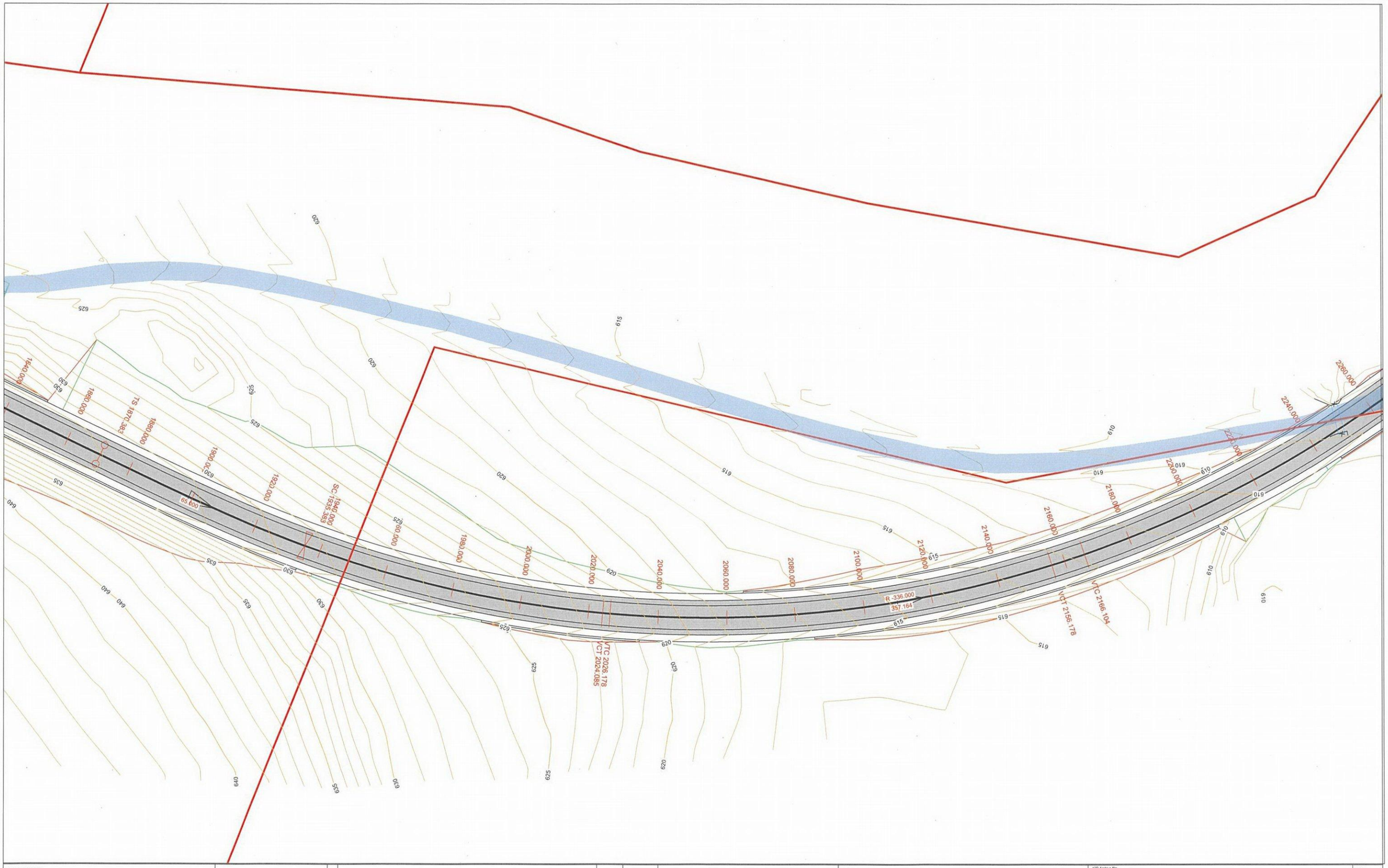

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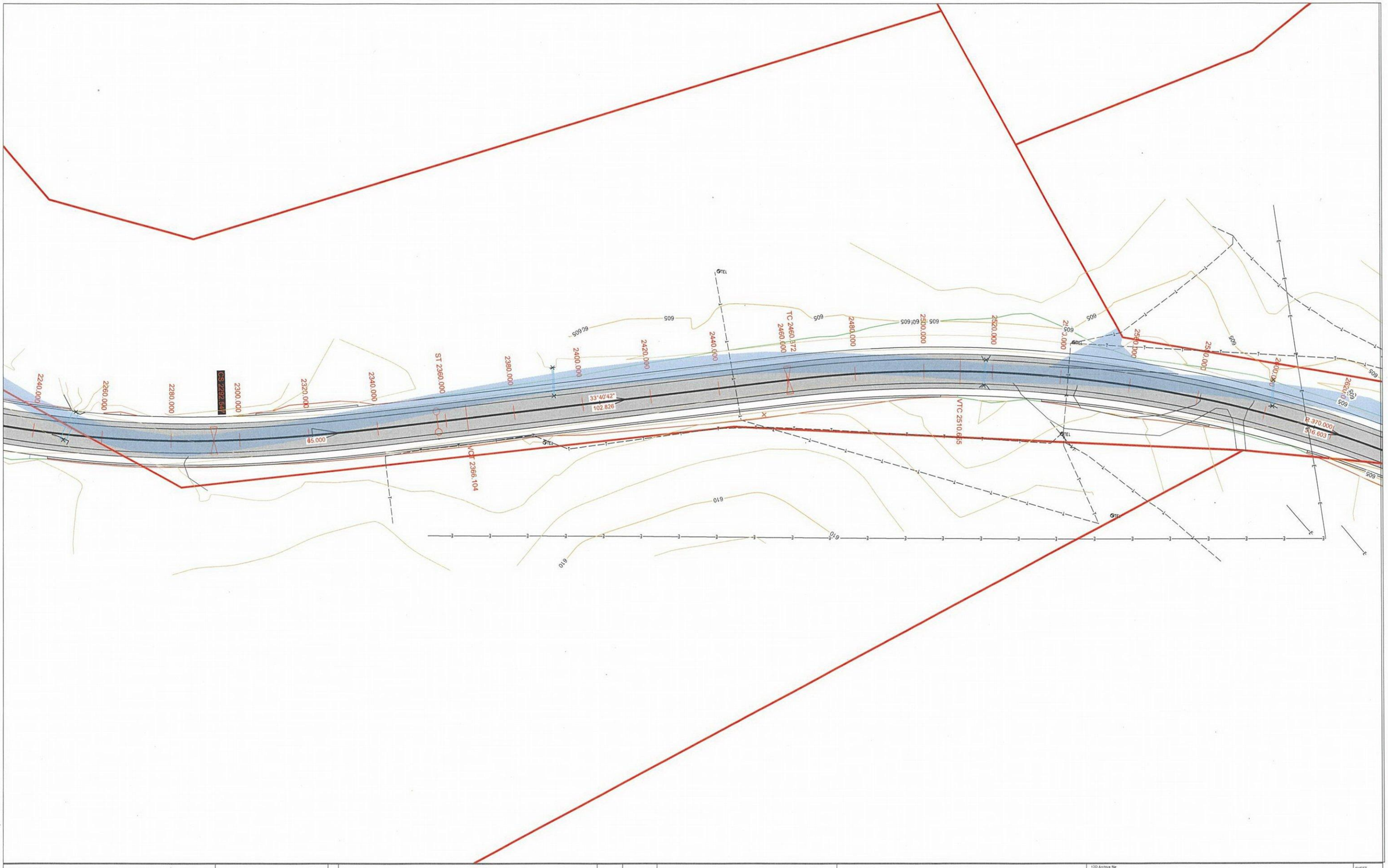

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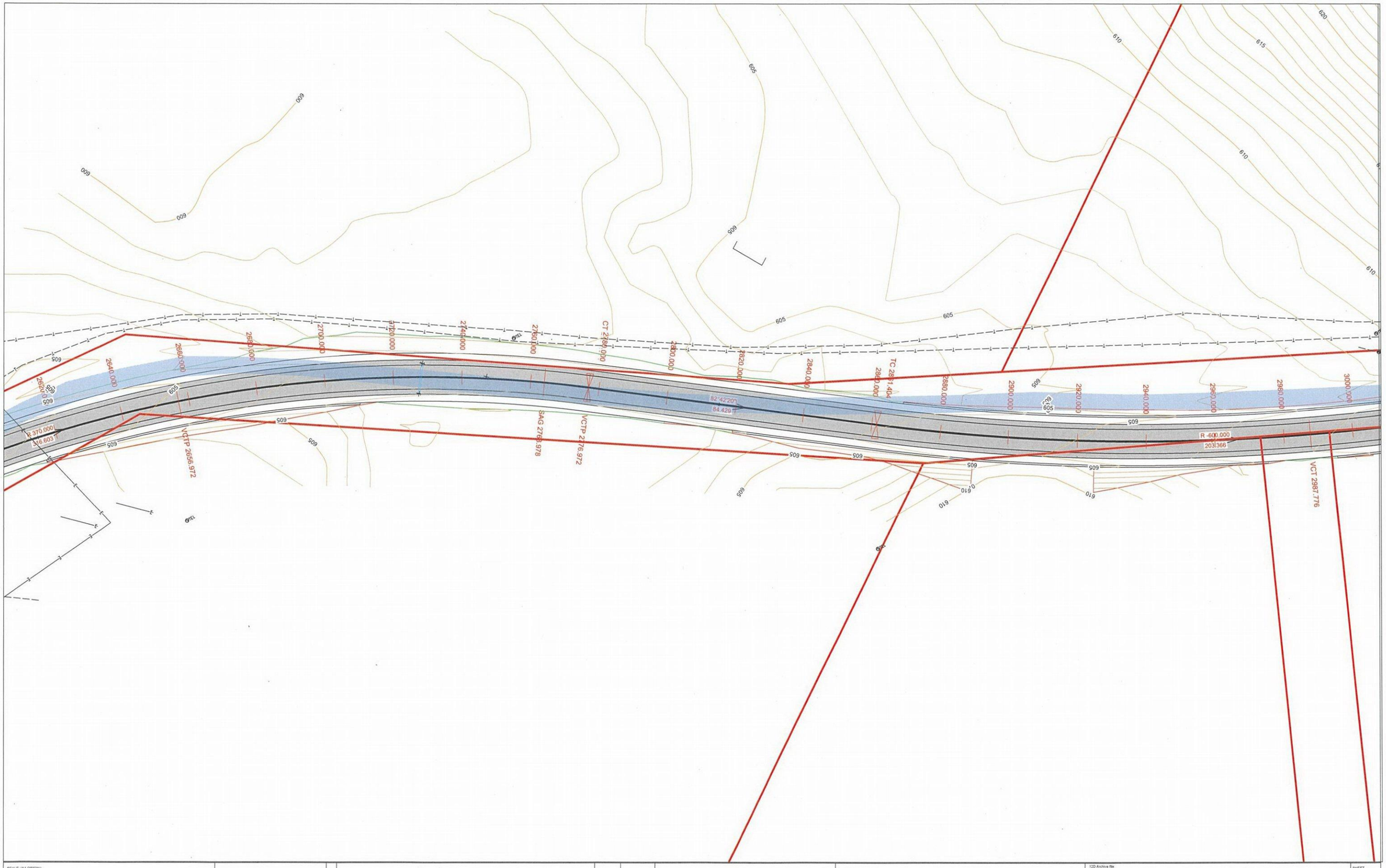

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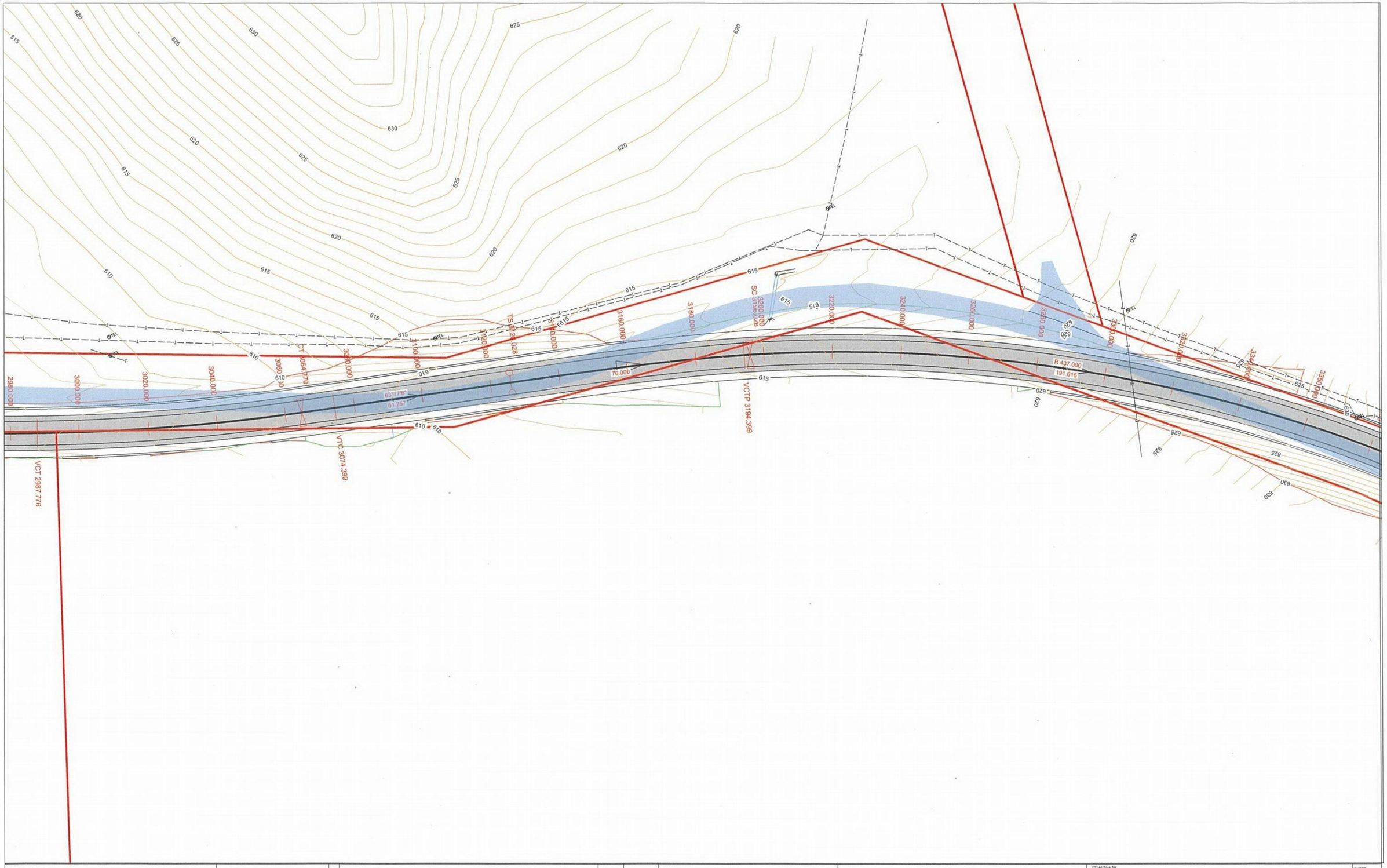

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PROJECT:
MR 92 NERRIGA ROAD
NINGEE NIMBLE

12D Archive file: 17006 DESIGN R1.12daz
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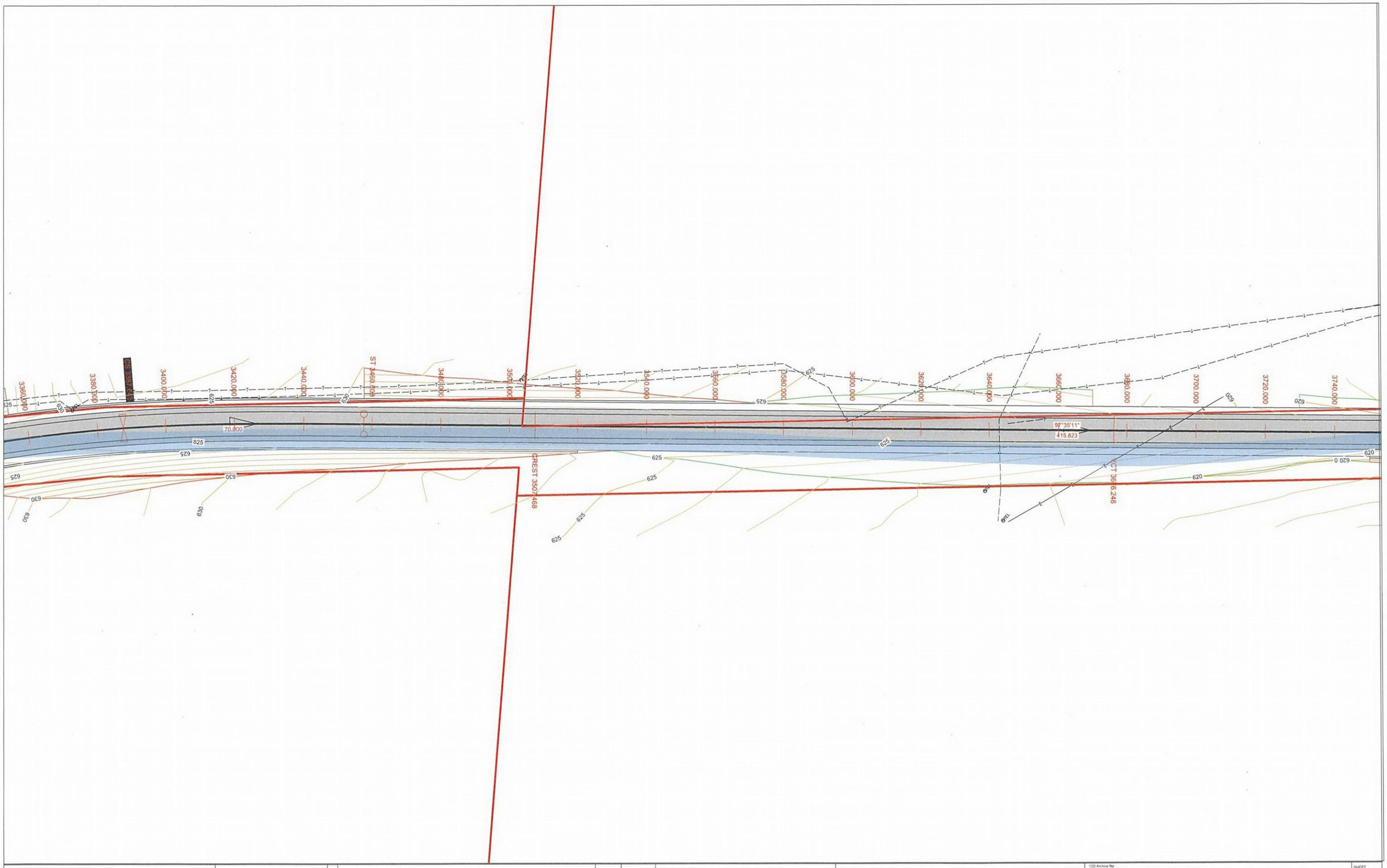

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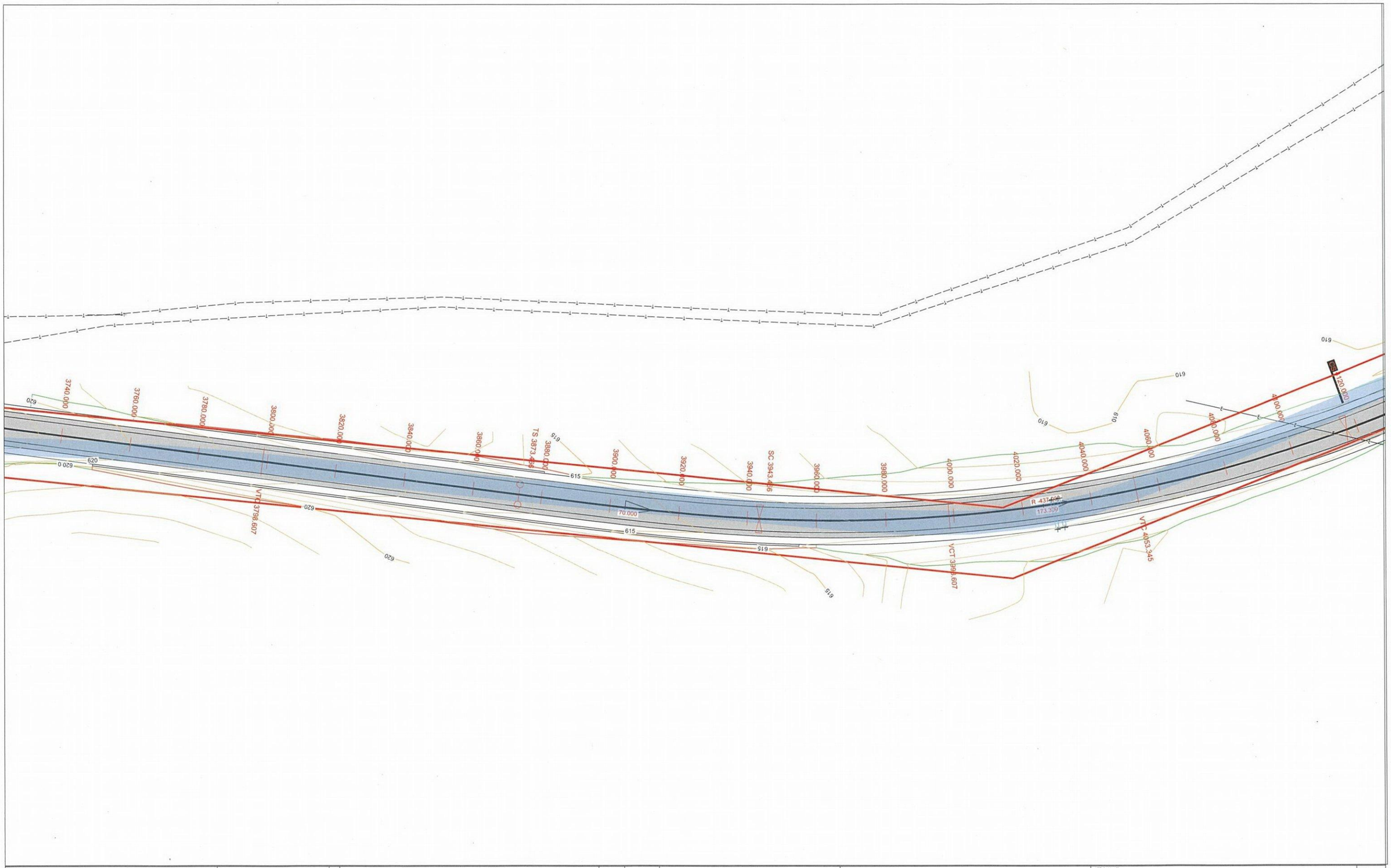

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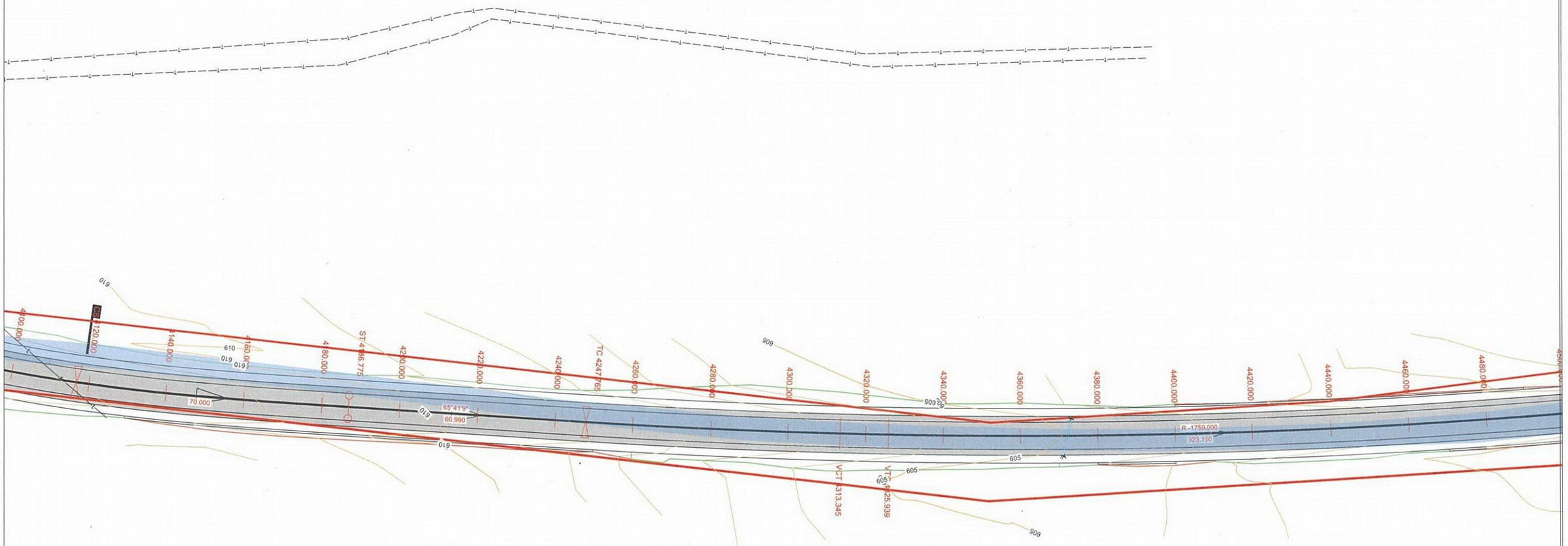

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APPENDIX B CLAUSE 228 CHECKLIST

A checklist of factors that should be considered in the assessment of impacts prior to its determination is included within Clause 228 of the Environmental Planning and Assessment Regulation 2000. This clause identifies sixteen issues that need to be addressed. The following text provides summary details of each of the issues, the majority of which have been addressed within the body of this document.

Factor	Impact
a. **Any environmental impact on a community?** The proposal has potential to impact on the environment surrounding Nerriga Road during construction. These are detailed in the REF and relate specifically to biodiversity and soil. These would be managed through safeguards summarised in Section 6. Reduced dust entering properties of the community. Reduced sediment entering waterways. The proposal would have long term positive impacts through the improved safety for motorists on Nerriga Road.	Negative, short term during construction Long term positive Long-term positive Long-term positive Long-term positive
b. **Any transformation of a locality?** The proposal would transformation the locality. The proposal would clear trees to make way from the new alignment of Nerriga road which could change the view of residents i.e. the use of the road will increase in frequency and noise and visual impacts will change.	Negligible
c. **Any environmental impact on the ecosystems of the locality?** The proposed works would result in the loss of habitat for native flora and fauna. Impact minimisation is possible, following the recommendations of this REF.	Minor negative
d. **Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?** Temporary impacts to aesthetic values would be confined to construction and would be short term. No substantive long-term impacts to the environment are anticipated.	Short term minor negative
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 works would not impact any of these features.	Nil.
f. **Any impact on the habitat of protected fauna (within the meaning of the *National Parks and Wildlife Act 1974*)?** The road upgrades are not within a national park and therefore will not have an impact.	Nil

g. **Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?** In addition to habitat loss, potential for injury to fauna has been identified as a risk of construction. Weed and pathogen introduction and spread has also been assessed. It is considered unlikely that the proposal will result in significant impacts with the effective implementation of the management measures specified in this REF. No species of animal, plant or other form of life, whether living on land, in water or in the air would become endangered as a result of the proposed works.	Nil
h. **Any long-term effects on the environment?** It is unlikely that the proposal would cause long-term effects on the environment. The works are not expected to have a long-term effect on species populations.	Negligible
i. **Any degradation of the quality of the environment?** The proposal would potentially degrade the quality of the environment in the short to medium-term through biodiversity, soil and water, air quality and traffic and access impacts. These impacts would be minimised with the implementation of the safeguards. In the longer-term, environmental benefits would result from treating weeds in the works area.	Short to medium-term negative
j. **Any risk to the safety of the environment?** The proposal would pose minimal risk to the safety of the environment. There would be a long-term improvement to road safety.	Short-term minor negative Long-term positive
k. **Any reduction in the range of beneficial uses of the environment?** There would be no reduction to the range of beneficial uses of the environment	Nil
l. **Any pollution of the environment?** Earthworks have the potential to impact air quality through dust generation and to impact water quality through the release of sediment laden run-off. These impacts are short-term and manageable and would not have an impact beyond the construction phase of the proposal.	Short-term minor negative
m. **Any environmental problems associated with the disposal of waste?** The proposal would generate waste associated with construction and vegetation clearing. These would be recycled on site or disposed of at a licence facility. Amounts are minimal and there are opportunities for reuse (mulching cleared vegetation and reuse rocks).	Short-term minor negative
n. **Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?** The proposal would require materials for construction. These materials are not likely to become in short supply.	Short-term minor negative
o. **Any cumulative environmental effect with other existing or likely future activities?** The only known cumulative environmental effect is the continual road upgrade of Nerriga Road. This project is Stage 5 and other stages area likely to be currently under construction or close to completion. The cumulative impacts include impacts on wildlife as a result of increased traffic and speed limit, and reduced habitat due to clearing for the upgraded sections of road.	Short-term minor negative

p. **Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?** Not applicable	Nil

APPENDIX C NEUTRAL OR BENEFICIAL EFFECT ON WATER QUALITY ASSESSMENT

State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011 relates to the use of land within the Sydney drinking water catchment. In accordance with Clause 12 of the SEPP, Roads and Maritime is required to consider whether or not an activity to which Part 5 of the Environmental Planning and Assessment Act applies will have a neutral or beneficial effect on water quality before carrying out the activity.

The following template must be used to establish whether the project will have a neutral or beneficial effect on water quality for activities within the Sydney drinking water catchment. This template has been filled out specific to the impacts of the construction and operation of the Nerriga Road upgrade.

Factor	Impact
Are there any identifiable potential impacts on water quality? **What pollutants are likely?** **During construction and/or post construction?**	**<u>Construction impacts</u>** During construction, there would be a range of potential risks to water quality. There are a range of pollutants that could potentially adversely affect water quality within intersecting drainage lines during construction, including: **Sediments (fine and coarse)** Sediment could be introduced to drainage lines through erosion and sedimentation. Activities that increase the potential for erosion and subsequent sedimentation of waterways include earthworks, movements of machinery and plant in disturbed areas, stockpiling of soils and fill. **Hydrocarbons (fuel, oils, lubricants)** Hydrocarbons will be stored in bunded areas inside the site compound. Plant and machinery will operate around the construction site, and there would be a risk of accidental spills of hydrocarbons which may impact on water quality, particularly if a spill occurred near a drainage line. **Concrete (and concrete wash)** Concrete may be required during construction. There would be risks associated with accidental spills of concrete and concrete wash that may reach the creek and drainage lines. No concrete washout would occur on site. **Hazardous chemicals** Hazardous chemicals will likely be stored at the construction compound. If not stored correctly, there would be risks associated with the accidental spills of hazardous chemicals which may subsequently be transported into drainage lines and waterways. **Biological contaminants (nutrients and bacteria)**

	There would be portable toilets at the site for use by construction staff throughout the duration of the construction of the proposal. Portable toilets are a source of potential biological contamination. **General construction waste** The proposal would result in the generation of general construction wastes including packaging, vegetative waste etc. **<u>Post-construction (operational) impacts</u>** Post-construction, there would be potential for the following pollutants to impact water quality in the Shoalhaven river through the intersecting drainage lines: **Sediments (fine and coarse)** Areas which were disturbed during construction of the proposal could be at risk of erosion and subsequent transport of sediments into drainage lines and the River. This includes areas where vegetation was removed, particularly along the banks of the creek. Loss of vegetation could potentially increase the potential for erosion and sedimentation of waterways. **Hydrocarbons (fuels, oils, lubricants)** Operation of the proposal has potential to marginally increase the volumes of traffic along Nerriga Road. HML vehicles would have access to the upgraded Nerriga Road. Increase volumes of traffic could potentially increase the rates of introduction of hydrocarbons to the area.
For each pollutant, list the safeguards needed to prevent or mitigate potential impacts on water quality *(these may be SCA endorsed current recommended practices and/or equally effective other practices)*	**<u>Construction</u>** **Sediments (fine and coarse)** A site-specific **Erosion and Sediment Control Plan** in accordance with Landcom (2004) would be developed and implemented. Erosion and sediment controls would be installed prior to construction to minimise erosion and capture any sediment laden water. Erosion and sediment controls will be monitored and maintained for the duration of the project. Additionally, the following would be implemented: • Works would not be undertaken in times of heavy rain or forecasted rain events. • Delineation of works areas, including access and compound areas, and fencing of 'no go' zones to stop unnecessary disturbance outside the works footprint. • Placement of compound areas away from drainage lines (more than 40m) on relatively flat ground already cleared of vegetation. **Hydrocarbons (fuels, oils, lubricants)** An **Emergency Spill Management Plan** would be developed for the project and would contain measures to avoid spillages of hydrocarbons onto any ground surfaces or into any waterways. Safeguards and measures would include, but not be limited to: • Impervious bunded storage facilities for hydrocarbons, away from drainage lines and areas at risk of flooding impacts.

- Impervious bunded areas for refuelling, away from waterways and drainage lines.
- Spill kits kept onsite and on all machinery
- Training of staff in the response, notification, and management of hydrocarbon spills.

Concrete (and concrete wash)

No concrete wash out on site.

Hazardous chemicals

The **Emergency Spill Management Plan** would contain safeguards and measures to avoid spillages of hazardous chemicals, including but not limited to:

- Impervious bunded storage facilities for all hazardous chemicals, away from watercourses and areas at risk of flooding impacts.
- Spill kits kept on site at all times.
- Training of staff in the response, notification, and management of chemical spills.
- Use of chemicals in accordance with SOP's

Biological contaminants (nutrients and bacteria)

The **Emergency Spill Management Plan** would contain safeguards and measures to avoid spillages of biological contaminants, including but not limited to

- Impervious bunded storage facilities for all potential sources of biological contaminants (eg. Portable site toilets) away from watercourses and areas at risk of flooding impacts.
- Spill kits kept on site at all times.
- Training of staff in the response, notification and management of biological contaminants.

General construction waste

Construction waste would be stored and disposed of in accordance with a **Waste Management Plan**. Litter from the road corridor is expected to be low given the low traffic volumes and the proposal's location in bushland. Working areas will be maintained, kept free of rubbish and cleaned up at the end of each working day.

Operation

Sediment (fine and coarse)

The proposal would be designed to incorporate appropriate roadside drainage structures.

A **rehabilitation plan** would be prepared for the proposal and would include the following measures:

- Ensure areas disturbed during construction (including laydown areas and ancillary sites) are stabilised progressively during construction and restored back to original condition or re-vegetated with appropriate species (native in native dominated areas) as soon as practical.

	• For impacted pasture paddocks, decompaction techniques such as aeration must be undertaken. • For impacted riparian areas, meet the requirements of the Guidelines for Controlled Activities on Waterfront Land; Guidelines for Riparian Corridors (where relevant), and any additional comments received from NSW Office of Water and Water NSW. This may include fencing stock out of riparian areas being rehabilitated. • Include monitoring to meet clear targets, regarding establishment. Appropriate bank stabilisation techniques would be employed, including use of gabion rock mattresses in areas that are at high risk of erosion.
Will the safeguards be adequate for the time required? How will they need to be maintained?	The safeguards outlined above will be adequate for the duration of the construction phase (and into the operation phase, as required). The ESCP would be designed to account for the full construction duration. All erosion and sediment controls would be regularly inspected and maintained in working order or replaced when required. Erosion and sediment controls would remain in use following the completion of construction, until disturbed areas have been stabilised and rehabilitated/revegetated. Rehabilitation and restoration/revegetation of disturbed areas would be undertaken in accordance with a **Rehabilitation Plan**. The rehabilitation plan would include a requirement for periodic post-construction monitoring to meet clear targets, regarding vegetation establishment.
Will all impacts on water quality be effectively contained on the site by the identified safeguards (above) and not reach any watercourse, waterbody or drainage depression? **Or will impacts on water quality be transferred outside the site for treatment? How? Why?**	The abovementioned safeguards would be implemented to contain water quality impacts on the site as far as possible, and to prevent pollutants from reaching any watercourse or drainage depression. Sediment laden water that is captured on site by environmental controls would be treated on site. Any impacts to water quality that involve contaminated materials would be captured, stored and transported off site for disposal at an appropriately licenced facility. Biological wastes would be transported from the site for disposal at an appropriately licences facility by an appropriately licenced contractor.
Is it likely that a neutral or beneficial effect on water quality will occur? Why?	The proposal is expected to have a neutral effect on the environment: • Erosion and sediment controls would be implemented to contain sediment onsite during construction. • The sealing and realignment of the road will take vehicles off the unsealed road eliminating a potential source of waste materials and pollutants into intersecting drainage lines.

APPENDIX D BIODIVERSITY SURVEY RESULTS

D.1 FLORA LIST

Scientific Name	Common Name
Acacia mearnsii	Black Wattle
Acaena ovina	Acaena
Allocasuarina spp.	Sheoak
Alternanthera denticulata	Lesser Joyweed
Aristida ramosa	Purple Wiregrass
Austrostipa scabra	Speargrass
Bothriochloa macra	Red Grass
Cassinia arcuata	Sifton Bush
Centaurium erythraea	Common Centaury
Chrysocephalum apiculatum	Common Everlasting
Cirsium vulgare	Spear Thistle
Convolvulus angustissimus	Bindweed
Conyza bonariensis	Flaxleaf Fleabane
Cynodon dactylon	Common Couch
Dianella revoluta var. revoluta	A Blue Flax Lily
Dichondra repens	Kidney Weed
Dysphania pumilio	Small Crumbweed
Echinopogon ovatus	Forest Hedgehog Grass
Einadia nutans	Climbing Saltbush
Enneapogon nigricans	Niggerheads
Eucalyptus dives	Broad-leaved Peppermint
Eucalyptus mannifera	Brittle Gum
Eucalyptus rubida	Candlebark
Eucalyptus viminalis	Ribbon Gum

Euchiton sphaericus	Star Cudweed
Exocarpos cupressiformis	Cherry Ballart
Geranium spp.	Geranium
Gonocarpus spp.	Raspwort
Gonocarpus tetragynus	Poverty Raspwort
Goodenia pinnatifida	Scrambles Eggs
Hakea microcarpa	Small-fruited Hakea
Hydrocotyle laxiflora	Stinking Pennywort
Hypericum gramineum	Small St John's Wort
Hypochaeris radicata	Catsear
Juncus usitatus	Rush
Leptorhynchos squamatus	Scaly Buttons
Leptospermum myrtifolium	Teatree
Lomandra filiformis	Wattle Matt-rush
Lomandra longifolia	Spiny-headed Mat-rush
Lysimachia arvensis	Scarlet Pimpernel
Microlaena stipoides	Weeping Grass
Oxalis incarnata	wood sorrel
Oxalis perennans	Wood sorrel
Paspalum dilatatum	Paspalum
Plantago coronopus	Buck's-horn Plaintain
Plantago lanceolata	Lamb's Tongues
Polygonum aviculare	Wireweed
Pteridium esculentum	Bracken
Rosa rubiginosa	Sweet Briar
Rubus anglocandicans	Blackberry
Rytidosperma erianthum	Wallaby Grass
Senecio spp.	Groundsel, Fireweed

Solanum nigrum	Black-berry Nightshade
Sonchus oleraceus	Common Sowthistle
Stellaria pungens	Prickly Starwort
Stylidium graminifolium	Grass Trigger plant
Themeda triandra	Kangaroo Grass
Tricoryne elatior	Yellow Autumn-lily
Trifolium repens	White Clover
Verbena bonariensis	Purple top
Veronica anagallis-aquatica	Blue Water-speedwell
Viola hederacea	Ivy-leaved Violet
Vittadinia cuneata	A Fuzzweed
Wahlenbergia spp.	Bluebell
Wurmbea dioica subsp. dioica	Early Nancy

D.2 FAUNA LIST

Species Name	Observed, evidence	Status
Wombat *Vombatus ursinus*	Scats, footprints	Native
Eastern Grey Kangaroo *Macropus giganteus*	Scats, footprints	Native
European Fox *Vulpes vulpes*	Scats, footprints	Introduced
Feral Cat *Felis catus*	Footprints	Introduced
Laughing Kookaburra *Dacelo novaeguineae*	Observed	Native

APPENDIX E THREATENED SPECIES EVALUATIONS

The tables in this appendix present the habitat evaluation for threatened species, ecological communities and endangered populations recorded within 10km of the proposal site in the Atlas of NSW Wildlife and those identified as potentially occurring in the area according to the Commonwealth EPBC Protected Matters Search Tool .

The likelihood of occurrence is based on presence of habitat, proximity of nearest records and mobility of the species (where relevant). The assessment of potential impact is based on the nature of the proposal, the ecology of the species and its likelihood of occurrence. The following classifications are used:

Presence of habitat:

Present: Potential or known habitat is present within the study area

Absent: No potential or known habitat is present within the study area

Likelihood of occurrence

Unlikely: Species known or predicted within the locality but unlikely to occur in the study area

Possible: Species could occur in the study area

Present: Species was recorded during the field investigations

Possible to be impacted

No: The proposal would not impact this species or its habitats. No Assessment of Significance (AoS) or five part test is necessary for this species

Yes: The proposal could impact this species or its habitats. An AoS or five part test has been applied to these entities.

Threatened Flora				
Scientific Name	**Presence of habitat**	**Likely to occur**	**Possible impact**	**Assessment of Significance/Five Part Test**
Austral Toadflax, *Thesium australe*	Absent	Unlikely	No	No
Basalt Pepper-cress, Peppercress, Rubble Peppercress, Pepperweed *Lepidium hyssopifolium*	Absent	Unlikely	No	No
Black Gum, *Eucalyptus aggregata*	Absent	Unlikely	No	No
Budawangs Cliff-heath *Budawangia gnidioides*	Absent	Unlikely	No	No
Budawangs Bush-pea *Pultenaea baeuerlenii*	Absent	Unlikely	No	No
Button Wrinklewort *Rutidosis leptorrhynchoides*	Outside geographical range	Unlikely	No	No
Cotoneaster Pomaderris [*Pomaderris cotoneaster*	Absent	Unlikely	No	No
Deane's Boronia *Boronia deanei*	Absent	Unlikely	No	No
Dwarf Kerrawang *Commersonia prostrata*	Absent	Unlikely	No	No
Hoary Sunray, *Leucochrysum albicans var. tricolor*	Absent	Unlikely	No	No
Knotweed, Tall Knotweed *Persicaria elatior*	Outside geographical range	Unlikely	No	No
Kydra Dampiera *Dampiera fusca*	Outside geographical range	Unlikely	No	No
Leafless Tongue-orchid *Cryptostylis hunteriana*	Outside geographical range	Unlikely	No	No
Mongarlowe Mallee *Eucalyptus recurva*	Possible	Possible	Yes	Yes

Threatened Flora				
Scientific Name	**Presence of habitat**	**Likely to occur**	**Possible impact**	**Assessment of Significance/Five Part Test**
Mauve Burr-daisy *Calotis glandulosa*	Outside geographical range	Unlikely	No	No
Michelago Parrot-pea *Dillwynia glaucula*	Present	Possible	No- killed by fire	No
Nerriga Grevillea *Grevillea renwickiana*	Present	Possible	Yes	Yes
Pale Pomaderris *Pomaderris pallida*	Absent	Unlikely	No	No
Pygmy Cypress-pine, Pigmy Cypress-pine, Dwarf Cypress-pine *Callitris oblonga*	Found on sandy soils in the Corang River Catchment	Unlikely – killed by fire	No	No
Swamp Everlasting, Swamp Paper Daisy *Xerochrysum palustre*	Outside geographical range	Unlikely	No	No
Thick-lipped Spider-orchid, Daddy Long-legs *Caladenia tessellata*	Present	Possible	Yes	Yes
Trailing Hop-bush *Dodonaea procumbens*	Outside geographical range	Unlikely	No	No
Wingless Raspwort, Square Raspwort *Haloragis exalata subsp. exalata*	Outside geographical range	Unlikely	No	No
Yellow Gnat-orchid *Genoplesium baueri*	Outside geographical range	Unlikely	No	No

Threatened Fauna				
Scientific Name	**Presence of habitat**	**Likelihood to occur**	**Possible impact**	**Assessment of Significance/Five Part Test**
Australasian Bittern *Botaurus poiciloptilus*	Absent	Unlikely	No	No
Australian Grayling *Prototroctes maraena*	Absent – outside the geographical range	Unlikely	No	No
Australian Painted Snipe *Rostratula australis*	Absent	Unlikely	No	No
Barking Owl *Ninox connivens*	Absent – needs 15 years without fires to inhabit an area	Unlikely	No	No
Black-eared Cuckoo *Chrysococcyx osculans*	Present	Unlikely	No	No
Black-faced Monarch *Monarcha melanopsis*	Absent	Unlikely	No	No
Booroolong Frog *Litoria booroolongensis*	Absent – needs permanent water sources	Unlikely	No	No
Brown Treecreeper (eastern subspecies) *Climacteris picumnus victoriae*	Present	Unlikely	No	No
Brush-tailed Rock-wallaby *Petrogale penicillata*	Absent	Unlikely	No	No
Cattle Egret *Ardea ibis*	Absent	Unlikely	No	No
Common Sandpiper *Actitis hypoleucos*	Absent	Unlikely	No	No
Curlew Sandpiper *Calidris ferruginea*	Absent	Unlikely	No	No
Diamond Firetail, *Stagonopleura guttata*	Present	Possible foraging	Yes	Yes
Dusky Woodswallow, *Artamus cyanopterus cyanopterus*	Present	Possible foraging	Yes	Yes
Eastern Bristlebird *Dasyornis brachypterus*	Outside geographical location	Unlikely	No	No

Threatened Fauna				
Scientific Name	**Presence of habitat**	**Likelihood to occur**	**Possible impact**	**Assessment of Significance/Five Part Test**
Eastern Coastal Free-tailed Bat *Micronomus norfolkensis*	Present	Possible	Yes	Yes
Eastern Curlew, Far Eastern Curlew *Numenius madagascariensis*	Absent	Unlikely	No	No
Flame Robin *Petroica phoenicea*	Present	Possible foraging	No if outside breeding period	Yes
Fork-tailed Swift *Apus pacificus*	Absent	Unlikely	No	No
Gang-gang Cockatoo, *Callocephalon fimbriatu*	Present	Possible foraging	No impact. Able to move throughout landscape	No
Giant Burrowing Frog *Heleioporus australiacus*	Present	Possible	Yes if works in creeks or 300m from a creek.	Yes
Glossy Black-Cockatoo, *Calyptorhynchus lathami*	Present	Possible foraging	No impact. Able to move throughout landscape	No
Greater Glider *Petauroides volans*	Present	Unlikely due to cleared areas surrounding the study area, fires and an absence of hollows	No	No
Golden Sun Moth *Synemon plana*	Absent	Unlikely	No	No
Grey-headed Flying-fox, *Pteropus poliocephalus*	No camps present in this location. Therefore absent	Unlikely but foraging likely	No	No
Hooded Robin (south-eastern form) *Melanodryas cucullata cucullata*	Yes	Unlikely	No	No

Threatened Fauna				
Scientific Name	**Presence of habitat**	**Likelihood to occur**	**Possible impact**	**Assessment of Significance/Five Part Test**
Koala, *Phascolarctos cinereus*	Yes feed trees present	Recorded within 10kms	Minimal impact	Yes
Large Bent-winged Bat *Miniopterus orianae oceanensis*	Caves absent	Unlikely	No	No
Large-eared Pied Bat, Large Pied Bat *Chalinolobus dwyeri*	Caves absent	Unlikely	No	No
Latham's Snipe, Japanese Snipe *Gallinago hardwickii*	Foraging habitat present	Unlikely	No	No
Littlejohn's Tree Frog, Heath Frog Litoria littlejohni	Predicted geographical range	Unlikely	No	No
Long-nosed Potoroo *Potorous tridactylus tridactylus*	Absent	Unlikely	No	No
Macquarie Perch *Macquaria australasica*	Absent	Unlikely	No	No
Masked Owl *Tyto novaehollandiae*	Present	Possible	Yes if removal of hollow bearing trees	Yes
New Holland Mouse, Pookila *Pseudomys novaehollandiae*	Outside geographical range	Unlikely	No	No
Olive Whistler, *Pachycephala olivacea*	Present	Unlikely	No	No
Oriental Cuckoo, Horsfield's Cuckoo *Cuculus optatus*	Present	Unlikely	No	No
Osprey *Pandion haliaetus*	Absent	Unlikely	No	No
Painted Honeyeater *Grantiella picta*	Present	Unlikely	No	No
Painted Snipe	Absent	Unlikely	No	No

Threatened Fauna				
Scientific Name	**Presence of habitat**	**Likelihood to occur**	**Possible impact**	**Assessment of Significance/Five Part Test**
Rostratula benghalensis (sensu lato)				
Pectoral Sandpiper *Calidris melanotos*	Absent	Unlikely	No	No
Pink Robin *Petroica rodinogaster*	Present	Possible	Removing dense vegetation between September and March	Yes
Pink-tailed Worm-lizard, Pink-tailed Legless Lizard *Aprasia parapulchella*	Absent	Unlikely	No	No
Powerful Owl *Ninox strenua*	Present	Possible	Yes if removing trees with significant hollows	Yes
Rainbow Bee-eater *Merops ornatus*	Absent	Unlikely	No	No
Regent Honeyeater *Anthochaera phrygia*	Present - surrounding vegetation provides habitat	Unlikely	No	No
Rufous Fantail *Rhipidura rufifrons*	Absent	Unlikely	No	No
Satin Flycatcher *Myiagra cyanoleuca*	Absent	Unlikely	No	No
Scarlet Robin *Petroica boodang*	Present - open grassy areas as well as a scattering of large trees mostly along the banks of the creek.	Possible foraging	No	No
Sharp-tailed Sandpiper *Calidris acuminata*	Absent	Unlikely	No	No
Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) *Isoodon obesulus obesulus*	Present	Possible	Yes	Yes

Threatened Fauna				
Scientific Name	**Presence of habitat**	**Likelihood to occur**	**Possible impact**	**Assessment of Significance/Five Part Test**
Southern Myotis *Myotis macropus*	Present	Possible	Yes	Yes
Spotted-tailed Quoll *Dasyurus maculatus*	Yes, presence of burrows. But area is too small.	Unlikely	No impact	No
Striped Legless Lizard, Striped Snake-lizard *Delma impar*	Absent	Unlikely	No	No
Stuttering Frog, Southern Barred Frog (in Victoria) *Mixophyes balbus*	Absent	Unlikely	No	No
Swift Parrot *Lathamus discolor*	Present	Unlikely	No	No
Varied Sittella, *Daphoenositta chrysoptera*	Present some eucalypts present are likely habitat	Unlikely	No	No
White-throated Needletail *Hirundapus caudacutus*	Aerial	Unlikely	No	No
Yellow Wagtail *Motacilla flava*	Absent	Unlikely	No	No
Yellow-bellied Glider *Petaurus australis*	Present some trees with hollows	Possible	Possible	Yes
White-bellied Sea-Eagle *Haliaeetus leucogaster*	Breeding areas absent but may be present for foraging	Unlikely	No	No

APPENDIX F THREATENED SPECIES ASSESSMENTS

F.1 TEST OF SIGNIFICANCE (BC ACT)

Biodiversity Conservation Act

Under the Biodiversity Conservation Act 2016, the threatened species 'test of significance' is used to determine if a development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. It is sometimes also referred to as the '5-part test'. A five-part test was carried out for the purposes of this assessment on the following:

Plants

- Mongarlowe Mallee
- Nerriga Grevillea
- Thick-lipped Spider Orchid

Fauna

- Woodland birds - Diamond Firetail, Flame Robin, Dusky Woodswallow, Pink Robin
- Bats – Southern Myotis, Eastern Coastal Free-tailed Bat
- Giant Burrowing Frog
- Koala
- Yellow Bellied Glider
- Masked Owl
- Powerful Owl
- Southern Brown Bandicoot

Mongarlowe Mallee

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

There was only one record of the Mongarlowe Mallee within 10kms of the study area. There are only three known locations for this species and five known individuals. Although it is unlikely this plant is present at Nerriga Road, the woodland community that covers most of this site is similar to the other locations where tis species is found. Therefore, if present onsite, any plants removed place this species at risk of local extinction.

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

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

N/A

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

N/A

(c) in relation to the habitat of a threatened species or ecological community:

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

It is unlikely this species is present on site, but if any specimens were found it is most likely where PCT 728 is present. This PCT is quite common in this location based on the SELLS vegetation mapping. Up to 15-20 ha may be removed by the project. If Mongarlowe Mallee was present; any removal of habitat where these plants are present is significant.

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

As previously mentioned, the Mongarlowe Mallee is only known in three locations and these are fragmented and isolated. It determined unlikely that these species to be present on site and therefore it is highly unlikely any individuals are present the proposed road works will not further fragment or isolate this species.

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

The five individuals of Mongarlowe Mallee are estimated to be hundreds of years old. Propagation and recruitment of this species is low (OEH 2018). The areas where these species are currently located are not at risk from the proposed road works. It is unlikely the proposed works will impact the long term survival of this species.

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

No areas of outstanding biodiversity value were present or would be impacted.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

The key threatening process relevant to the proposed work includes:

1. Clearing of native vegetation

Conclusion

Based on the assessment above, it is considered highly unlikely this species is present but if present, a significant impact could result. A targeted preclearance survey is required to provide further assurance that this species does not occur. If it is identified, given its important, exclusion zones would be recommended to protect remaining individuals.

Nerriga Grevillea

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

There were 14 records of this species recorded within 10km of the study area. The known population is northeast of the study area on Nettletons Creek/Corang River in a range of PCTs. It is unlikely this species occurs within the study area or that the proposed road works will place this species at the risk of extinction.

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

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

N/A

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

N/A

(c) in relation to the habitat of a threatened species or ecological community:

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

The Nerriga Grevillea population does not occur within the study area; therefore, it is highly unlikely the proposed works will remove habitat where this species is found.

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

The vegetation on Nerriga Road will become further fragmented as a result of the proposed road works but this will not impact the Nerriga Grevillea population. This population will not become further fragmented as a result of the proposed works.

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

The habitat to be removed is already modified and fragmented but this will not impact the long term survival of the Nerriga Grevillea.

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

No areas of outstanding biodiversity value were present or would be impacted.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

The key threatening process relevant to the proposed work includes:

1. Clearing of native vegetation
2. Infection of native plants by *Phytophthora cinnamomi*

Conclusion

Based on the assessment above, it is unlikely a significant impact would result for this species. Standard weed and pathogen measures will further reduce threats to this and other species.

Thick-lipped Spider Orchid

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

There were no records of the Thick lipped Spider Orchid in the Bionet Atlas results 10kms from the study area, but it is known to occur in the Bungonia IBRA sub-region. It is unlikely the proposed road works will impact this species but due to the fires it is difficult to determine if the species was present on site or if the habitat on site was suitable to support the species. Many areas on the road reserve have been significantly disturbed from previous road works in re-instating the road, culverts and drainage but the adjacent areas in private property were burnt and some areas appeared to have minimal disturbance. These are the areas to survey for the Thick lipped Spider Orchid. Given the distribution of this species, should it occur in the works area, the proposed works are highly unlikely to place this species at risk of local extinction.

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

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

N/A

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

N/A

(c) in relation to the habitat of a threatened species or ecological community:

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

It is estimated there is 15-20 hectares of native vegetation will be impacted by the proposed works. This study area of Nerriga Road will be further modified, and habitat removed which has been modified from previous road works and recent fires. It is unlikely the Thick Lipped Spider Orchid exists on site and the extent of habitat on site that support this species being removed should not impact habitat of this threatened species, but this is difficult to determine post fire and removal of habitat.

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

The habitat on Nerriga Road will become further fragmented as a result of the road realignment, widening and sealing and it will not further fragment known populations of the Thick Lipped Spider Orchid.

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

The Thick-lipped Spider Orchid has been recorded at the following locations in NSW, where it is reasonably secure from threats:

- Morton National Park
- Munmorah State Recreation Area
- Braidwood (private property)
- South Pacific Heathland Reserve
- Wyrrabalong National Park
- Porter Creek Wetland Reserve.

Should it occur onsite, the Nerriga Road reserve would not be considered an important or secure location, important to the longer term survival of this species.

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

No areas of outstanding biodiversity value were present or would be impacted.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

The key threatening process relevant to the proposed work includes:

1. Clearing of native vegetation

Conclusion

The Thick Lipped Spider Orchid is unlikely to exist at Nerriga Road and if present the site would not be identified as an important or secure location, in the context of protecting this species.

Koala Phascolarctos cinereus

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

There are two records of the koala within 10km of the study area. The feed tree species on site was *Eucalyptus viminalis*. These trees occur on Ningee Nimble Creek and Jimmy Wrights Gully in the flatter areas. Given the scale and pattern of works and the current condition of habitat onsite, it is unlikely that the proposed works will have an adverse effect on the lifecycle (for example, affecting foraging, moving through habitat, breeding) for the koala or place the species at risk of local extinction. Mitigation measures will be required in the event Koala's are observed onsite during works, for their relocation.

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

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

N/A

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

N/A

(c) in relation to the habitat of a threatened species or ecological community:

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

The Ribbon Gum (*Eucalyptus viminalis*) is found near Jimmy Wrights Creek and Ningee Nimble Creek. The tree cover between these two creeks is quite sparse and fragmented. The groundstorey vegetation is a mix of native and exotic vegetation. Removal of roadside trees at this location will be minimal (<0.2 hectares) and will only be required where the road needs widening or sealing.

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

The feed trees located in this area are unlikely to become further fragmented and isolated as a result of this proposed works. The habitat is already fragmented by the existing road and the works will not change the existing level of fragmentation.

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

The vegetation around the Jimmy Wrights Gully and Ningee Nimble Creek have feed trees present and some of these will be removed as part of the proposed works but these areas are already disturbed and fragmented by the existing road. The surrounding landscape is likely to provide adequate feed trees for the koala.

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

No areas of outstanding biodiversity value were present or would be impacted.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

The key threatening process relevant to the proposed work includes:

1. Clearing of native vegetation

Conclusion

Based on the assessment above, it is unlikely a significant impact would result for this species. To further minimise impacts of the works, prior to construction, the following measures would be implemented:

- Conduct a site induction to ensure all staff are aware of the presence and importance of the koalas at this location.
- If any koalas are observed during any works, particularly during tree removal; a qualified wildlife handler is available to relocate any animals away from the works area.

Woodland birds - Diamond Firetail, Flame Robin, Dusky Woodswallow, Pink Robin

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

All four of these species inhabit woodlands and forests, foraging close to the ground, feeding on insects.

Diamond Firetail breeds August to January. The species prefers woodlands into open areas typical of this area of South Eastern Highlands. Their distributed across most of NSW.

Flame Robin breeds late spring to summer in sheltered areas close to ground. Their distribution covers South Eastern Australia.

Dusky Woodswallow s breed in Spring. The NSW species population may stay in-situ or migrate to Queensland in May to September and the Tasmanian Dusky Woodswallow migrate to south east NSW in the same period.

Pink Robin breeds October to January. The mainland species may move further inland or north in winter months.

If carried out during their breeding season, the lifecycle of a breeding pair may be affected. Given this area has been significantly burnt, it is unlikely that much breeding habitat remains at this time. Further, it is

unlikely more than one breeding pair would be affected during works and therefore a significant impact on the local populations are not anticipated.

If the works were timed to avoid the breeding season this would further reduce risks to these species. It is understood from the project timeline, this is unlikely to be able to be accomplished.

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

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

N/A

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

N/A

(c) in relation to the habitat of a threatened species or ecological community:

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

The habitat on Nerriga Road reserve and adjoining properties within the study area will result in the removal of vegetation and the linear area will be modified. The extent of the vegetation removal is estimated to be 15-20 hectares, most of which provided limited habitat due to drought and fire.

The cumulative loss to habitat due to these factors is important. Remaining habitat becomes more important in this context. Limiting the works area to the minimum required and actively restoring areas disturbed by the works will address this to some extent.

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

As previously mentioned, the removal of the vegetation along Nerriga Road will further fragment the road reserve but this linear fragmentation is unlikely to isolate any of these woodland birds from other areas of habitat as they ca easily move through the landscape.

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

Unburnt areas woodlands and forest with open paddocks are likely to provide habitat and breeding cover for these species across the South Eastern Highlands IBRA Region over the next few years while burnt areas regenerate. These unburnt areas are important habitat in the short term for these woodland birds.

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

No areas of outstanding biodiversity value were present or would be impacted.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

The key threatening process relevant to the proposed work includes:

1. Clearing of native vegetation

Conclusion

It is unlikely vegetation removal for the proposed road works will have a significant impact on woodland birds such as the Diamond Firetail, Flame Robin, Dusky Woodswallow, Pink Robin as all four species are able to migrate to other areas.

To reduce risks further, and to take into account the additional pressures of drought and fire, it is recommended that:

- Limit the works area to the minimum required.
- Actively restore areas disturbed by the works.

Bats – Southern Myotis, Eastern Coastal Free-tailed Bat

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

There was only one record of the Southern Myotis (2017) and one record of the Eastern Coastal Free-tailed Bat (1998) within 10km of the study area. Removal of hollow bearing trees for both of these species is likely to affect breeding and individuals may be killed if they area present during felling. Twenty such trees would be removed. These species are usually solitary so the potential to impact a local population is considered unlikely in the removal of these tree hollows. Removal of a colonial roost site, for example, is not likely for these species.

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

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

N/A

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

N/A

(c) in relation to the habitat of a threatened species or ecological community:

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

There are 20 hollow bearing trees are scattered throughout 4.4 km of road reserve. About 15-20 ha of native vegetation, representing potential foraging habitat would be removed.

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

The rocky outcrop vegetation will be further fragmented from the creek vegetation. There is adequate habitat in adjacent vegetation to provide connectivity for these species. The vegetation removal will not isolate habitat from surrounding areas.

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

The habitat on Nerriga Road has not been identified as important habitat, given its current condition and location in a road reserve, subject to ongoing noise, vibration and dust impacts.

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

No areas of outstanding biodiversity value were present or would be impacted.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

The key threatening process relevant to the proposed work includes:

- Clearing of native vegetation
- Loss of hollow-bearing trees
- Removal of dead wood and dead trees

Conclusion

Removal of hollow bearing trees may impact the Southern Myotis and Eastern Coastal Free-tailed Bat however, population level impacts are not anticipated. However, staged felling is recommended to reduce impacts to resident bats (and other hollow dependant fauna) during the construction works.

Giant Burrowing Frog

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

There were no records of the Giant Burrowing Frog in the Bionet searches. This cryptic species is dependent on second order streams with permanent water for breeding after heavy rainfall. When this species is not breeding it is usually within 300 metres of the water source and burrowed under leaf litter and debris in the understorey vegetation. Excavation and compaction of burrows, if the species is present, could kill individuals. Given the pattern and scale of works, the impacts would be unlikely to place a viable local population at risk of extinction.

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

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

N/A

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

N/A

(c) in relation to the habitat of a threatened species or ecological community:

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

It is estimated that 1.5 hectares of creek line vegetation may be impacted from the proposed road widening works on Nerriga Road. This vegetation is fragmented with exotic and native groundstorey vegetation between trees and shrubs. These isolated patches of vegetation are unlikely to support suitable habitat for the Giant Burrowing Frog. The vegetation on the northern side of Ningee Nimble Creek which is parallel to Nerriga Road may provide suitable habitat. This area was burnt in the recent fires. There is currently no proposal to remove vegetation in this location.

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

The linear reserve of Nerriga Road is likely to become further fragmented but unlikely to impact on the habitat of the species.

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

Given the pattern and scale of works, the potential areas of habitat that would be impacted are not considered important habitat for the Giant Burrowing Frog in the locality.

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

No areas of outstanding biodiversity value were present or would be impacted.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

The key threatening process relevant to the proposed work includes:

1. Bushrock removal
2. Clearing of native vegetation
3. Infection of frogs by amphibian chytrid causing chytridiomycosis

Conclusion

While significant impacts are not anticipated, to reduce risks to this species, limit the works area to the minimum required and actively restore areas disturbed by the works. A pathogen management protocol should also be prepared and implemented to minimise risks to this and other amphibians when moving soils from drainage lines or handling frogs, should they occur.

Yellow Bellied Glider

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

Yellow Bellied Gliders utilise a number of hollows over a home range from 30-65 hectares (NRCMA 2004). The Yellow Bellied Gliders make a distinct V-shape in bark, this type of evidence on feed trees indicate species presence on site, this could not be determined at the study area due to the fires.

In the South Eastern Highlands, the Yellow Bellied Gliders are found in a wide range of forests and Woodland on the east cost of NSW. Therefore it is unlikely the limited habitat removal proposed would impact the life-cycle of this species and place a local population at risk of extinction.

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

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

N/A

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

N/A

a) in relation to the habitat of a threatened species or ecological community:

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

It is estimated 15-20 hectares of vegetation occurs in the study area including 20 hollow bearing trees.

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

The road reserve is fragmented, and the proposed works will fragment the road reserve further but it will not isolate other areas of habitat for the Yellow Bellied Gliders, which are highly mobile in this environment. The vegetation in this locality has good connectivity to the broader landscape.

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

Fire has affected the existing habitat, to such an extent that signs of use were not evident. Hollowing bearing trees are however an important and declining resource for this and many other species. It is considered unlikely the removal of these 20 hollow bearing trees over a 4.4km length or road will isolate any populations of the Yellow Bellied Gliders or affect the long term survival of the species in the locality.

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

No areas of outstanding biodiversity value were present or would be impacted.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

The key threatening process relevant to the proposed work includes:

- Clearing of native vegetation
- Loss of hollow-bearing trees
- Removal of dead wood and dead trees

Conclusion

Hollow bearing trees are an important and declining resource. While significant impacts are not anticipated as a consequence of this proposal, offsetting the loss of this resource is recommended (ie mounting felled hollow limbs or nest boxes in adjacent non hollow bearing trees that will be protected from the works. Further, staged felling is recommended to reduce impacts to resident species, if present, during the construction works.

Masked Owl

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

There was only one record of the Masked Owl (1998) within 10km of the study area. Masked Owl's home range is 500-1000 hectares. They prefer dry Eucalypt forests from the coast to 1100 m in elevation (OEH 2017). They are dependent on large hollows for breeding. Removal of hollow bearing trees and the recent fires are threats for the Masked Owl. The proposed works will remove trees with hollows mainly in the

location with the rocky outcrop and the road is proposed to be realigned. This area requires blasting and earthworks. The site observations did not locate any trees with large hollows suitable for the Masked Owl but further surveys prior to construction will assist in determining any changes in the site following the fires. It is expected that the proposed tree removal works will not place the Masked Owl at risk of extinction at this location.

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

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

N/A

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

N/A

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

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

There were 20 hollow bearing trees on the 4.4 kms of Nerriga Road. This project is one stage of upgrading and realigning Nerriga Road, where other hollows are also likely to be removed. The extent of vegetation removal that includes hollow bearing trees can have a cumulative impact over time. These are a declining and very slow to replace resource.

The recent fire events have also resulted in removal of trees directly and then subsequently as dangerous trees are felled to ensure road safety. As observed on site, there were many large logs and tree stumps where tree removal works had been undertaken. The risk of the ongoing Nerriga Road upgrade with vegetation removal of hollow bearing trees and the significant fires is the long term loss of hollow bearing trees. To reduce the extent of hollow bearing tree loss, mitigation measures can include: offsetting the loss of hollows (ie mounting felled hollow limbs or nest boxes in adjacent non hollow bearing trees that will be protected from the works).

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

Given the pattern and scale of the clearing proposed and the home range of the Masked Owl, it is highly unlikely the proposed road works will fragment or isolate Masked Owl habitat.

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

The habitat to be removed is already modified, fragmented and isolated, therefore the proposed works are will have a minimal impact on the hunting range of the Masked Owl. However removal of large trees or trees with hollows can impact the long term survival of the Masked Owl as there is already an absence of hollow bearing trees in the landscape particularly in fragmented areas. Mitigation measures for trees with hollows can minimise the loss.

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

No areas of outstanding biodiversity value were present or would be impacted.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

The key threatening process relevant to the proposed work includes:

1. Clearing of native vegetation
2. Loss of hollow-bearing trees
3. Removal of dead wood and dead trees

Conclusion

Based on the assessment above, it is unlikely a significant impact would result for this species. To reduce the extent of hollow bearing tree loss, mitigation measures can include: offsetting the loss of hollows (ie mounting felled hollow limbs or nest boxes in adjacent non hollow bearing trees that will be protected from the works).

Powerful Owl

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

The Powerful Owl has a home range from 400 hectares up to 4000 hectares based on food availability. Powerful Owl's require large hollows in Eucalypts. There were no records within 10km of the study area. The site contains small to medium size hollows but from the vegetation observed, the was an absence of large trees with hollows. It is unlikely the proposed works will interrupt the lifecycle of the Powerful Owls and place the local population as risk of extinction.

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

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

N/A

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

N/A

(c) in relation to the habitat of a threatened species or ecological community:

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

The extent of vegetation removal will modify native vegetation on adjacent land and the road reserve to re-align, seal and widen the road. The road reserve is already modified and the proposed removal will increase the extent of habitat removed but due to the home range of the Powerful Owl, it is unlikely to be impacted by the proposed road works.

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

As previously mentioned, the habitat for the Powerful Owl is unlikely to become fragmented from other areas of habitat as a result of the proposed development.

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

The habitat being removed is not assessed as important habitat for Powerful Owls. The hollows in the trees are quite small to medium size. Any Powerful Owl's present in this location are likely to be hunting possums and gliders but would not be using the area for breeding as the tree hollows are too small. Therefore, the proposed road re-alignment will not impact the long-term survival of the species in the locality.

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

No areas of outstanding biodiversity value were present or would be impacted.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

The key threatening process relevant to the proposed work includes:

1. Clearing of native vegetation
2. Loss of hollow-bearing trees
3. Removal of dead wood and dead trees

Conclusion

It is unlikely the site supports hollow bearing trees large enough for the Powerful Owl but as trees senesce over time, it is possible this location will provide large hollows. Therefore, the same mitigation measures for hollow dependent fauna should be followed.

Southern Brown Bandicoot

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

There are no records the Southern Brown Bandicoot in the Bionet results within 10km of the study area. The known populations are south and west of Eden in the south east corner (TSSC 2016) but the NSW species distribution modelling shows the Southern Brown Bandicoot may occur in this area (OEH 2017). It is possible the species is poorly surveyed in this location or due to the existing fragmentation the species range is reduced due to predation from foxes, cats, dogs and a lack of ground cover vegetation. Due to the recent fires, it was difficult to determine if the pre-fire habitat provided enough cover for Southern Brown Bandicoot. Currently the site does not provide this habitat and the proposal in not expected to put a local population at risk of extinction.

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

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

N/A

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

N/A

(c) in relation to the habitat of a threatened species or ecological community:

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

The only areas that provide adequate habitat for the Southern Brown Bandicoot are the unburnt areas with shrub cover in woodland areas or blackberry along creek lines. These areas can be fenced for the duration of the proposed works and staff inductions can incorporate species information. The burnt areas have modified the habitat for this species and it is unlikely the proposed vegetation removal for the road works will increase the extent of the already modified landscape.

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

The proposed vegetation removal will fragment the road reserve and adjoining properties but it will not isolate any population of the southern brown bandicoot population as the species will continue to move through the landscape.

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

The three PCTs observed on site are common in the locality (within 10kms). The vegetation removal for the proposed works will not fragment or isolate Southern Brown Bandicoot populations in this locality.

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

No areas of outstanding biodiversity value were present or would be impacted.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

The key threatening process relevant to the proposed work includes:

- Clearing of native vegetation

Conclusion

While it is not known from the locality, the fire event over 2019-20 is likely to substantively impacted Southern Brown Bandicoot populations. In its current state the site provides limited habitat for this species but remaining unburnt habitat is of increased importance and should be protected as much as possible for this and other species while other habitat regenerates. It is recommended to limit the works area to the minimum required and actively restore areas disturbed by the works.

F.2 EPBC ASSESSMENT OF SIGNIFICANCE

Attachment 4 Environment Protection and Biodiversity Conservation Act

The EPBC Act Administrative Guidelines on Significance set out 'Significant Impact Criteria' that are to be used to assist in determining whether a proposed action is likely to have a significant impact on matters of national environmental significance. Matters listed under the EPBC Act as being of national environmental significance include:

- World heritage properties
- National heritage places
- Wetlands of international importance (listed under the Ramsar Convention)
- Listed threatened species and ecological communities
- Migratory species protected under international agreements
- Nuclear actions (including uranium mines)
- Commonwealth marine areas
- The Great Barrier Reef Marine Park
- A water resource, in relation to coal seam gas development and large coal mining development.

Specific 'Significant Impact Criteria' are provided for each matter of national environmental significance except for threatened species and ecological communities in which case separate criteria are provided for communities and species listed as endangered and vulnerable under the EPBC Act.

- Koala
- Giant Burrowing Frog
- Southern Brown Bandicoot
- Thick lipped Spider Orchid
- Mongarlowe Mallee

Koala (*Phascolarctos cinereus)*

Assessments of significant impact have been completed for the koala. The koala was assessed under the BC Act five part test.

Koala Phascolarctos cinereus

This species has been assessed above according to the criteria under the BC Act. Information presented there will be summarised here.

(a) lead to a long-term decrease in the size of an important population

The Koala has recorded in two locations within 3 kms of the study area. According to the EPBC Act significant impact criteria, an 'important population for the Koala' would be defined as a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- key source populations either for breeding or dispersal
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species range.

The population of the koala within the study area does not meet any of the criteria to be considered an important population. In this area, the Koala is conserved part of the Central and Southern Tablelands, but post fires, the population requirements are unknown.

(b) reduce the area of occupancy of an important population

An important koala population does not occur within the study area, but a feed tree species Eucalyptus viminalis is present on site near Ningee Nimble Creek. There is sufficient abundance of this feed tree in the surrounding locality. There may be a loss of some feed trees as a result of the proposed road works.

(c) fragment an existing important population into two or more populations.

An important koala population is not known to occur within the study area. The area has some fragmentation but the proposal will not fragment two populations.

(d) adversely affect habitat critical to the survival of a species.

The proposal will not adversely affect habitat critical to the survival of the species.

(e) disrupt the breeding cycle of an important population.

An important koala population is not known to occur within the study area and will not interrupt breeding cycles.

(f) modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

The proposal will avoid impacts to feed trees outside of the proposed works areas as much as practical by implementing the following measures:

- Fencing off native vegetation to prevent any construction works from occurring in these areas
- Identify areas of native vegetation during the site induction to inform contractors that these areas are to be avoided.

(g) result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.

Invasive species such as blackberry are present on site. Mitigation measures include weed hygiene protocols and appropriate weed treatment and disposal methods need to be implemented as part of the site management.

(h) introduce disease that may cause the species to decline, or

No disease introduction is anticipated from the proposed works on the koala population.

(i) interfere substantially with the recovery of the species.

The proposed works are unlikely to interfere with the recovery of this species. Some feed trees may need to be removed but the proposed work does not interfere with the approved recovery plan for the koala.

Conclusion

Based on the assessment above, it is unlikely a significant impact would result for this species. To further minimise impacts of the works, prior to construction, the following measures would be implemented:

- Conduct a site induction to ensure all staff are aware of the presence and importance of the koalas at this location.
- If any koalas are observed during any works, particularly during tree removal; a qualified wildlife handler is available to relocate any animals away from the works area.

Giant Burrowing Frog

Assessments of significant impact have been completed for the Giant Burrowing Frog which has also been assessed under the BC Act five part test.

This species has been assessed above according to the criteria under the BC Act. Information presented there will be summarised here.

(a) lead to a long-term decrease in the size of an important population

No records of the Giant Burrowing Frog have been recorded in this location. Important populations for this species are unknown (DoE 2014). It is difficult to determine if the proposed works will lead to a long term decrease in the size of an important population at this information is currently unavailable in this location.

The Giant Burrowing Frog requires permanent water courses in second order streams for breeding. The species is usually found within 300 metres of a water course. Glenrea Creek and Jimmy Wrights Gully are second order streams and with the surrounding vegetation there may be suitable habitat for this species.

(b) reduce the area of occupancy of an important population

It is unknown if the proposed road works will reduce the area of occupancy of an important population without further surveys.

(c) fragment an existing important population into two or more populations.

It is unlikely that an important population will be fragmented in two or more from the proposed road works. The population, if existing at the site will still be connected via the existing streams but increased vehicle use on the road may impact this species during breeding periods.

(d) adversely affect habitat critical to the survival of a species.

The proposal will not adversely affect habitat critical to the survival of the species. Mitigation measures can be put in place to protect the waterways during the proposed works and no dewatering will occur.

(e) disrupt the breeding cycle of an important population.

It is unknown if an important population occurs at the site. Therefore, it is unknown if there will be a disruption to the breeding cycle of an important population.

(f) modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

The proposed road works will be able to avoid impacts to Glenrea Creek and Jimmy Wrights Gully through appropriate mitigation and planning.

(g) result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.

Invasive species such as blackberry are already present on site. Mitigation measures include weed hygiene protocols and appropriate weed treatment and disposal methods need to be implemented as part of the site management.

(h) introduce disease that may cause the species to decline, or

Chytrid fungus protocols will need to be implemented.

(i) interfere substantially with the recovery of the species.

The proposed works are unlikely to interfere with the recovery of this species.

Conclusion

While significant impacts are not anticipated, to reduce risks to this species, limit the works area to the minimum required and actively restore areas disturbed by the works. A pathogen management protocol should also be prepared and implemented to minimise risks to this and other amphibians when moving soils from drainage lines or handling frogs, should they occur.

Southern Brown Bandicoot

This species has been assessed above according to the criteria under the BC Act. Information presented there will be summarised here.

(a) lead to a long-term decrease in the size of an important population

NSW modelling shows the Southern Brown Bandicoot is known to occur in this area (OEH 2017) but the Conservation Advice states known population are south and west of Eden in the south east corner (TSSC 2016). It is possible the species range and presence is limited in this location due to the fragmentation leaving the species more open to predation from foxes. The recent fire events may have impacted this species in the Nerriga/Tomboye area, but this location is not an important population. Therefore, the proposal in unlikely to lead to a long term decrease in size of an important population.

(b) reduce the area of occupancy of an important population

The Nerriga/Tomboye location is not known as an important population. The proposed works are unlikely to reduce the area of occupancy of this species in the near future. The southern brown bandicoot requires a dense shrub layer for cover against predation. This area is significantly burnt limiting habitat and protection for this species. But as natural regeneration occurs post fire, the southern brown bandicoot may recolonise this area.

(c) fragment an existing important population into two or more populations.

This area is not important habitat for the Southern Brown Bandicoot so it is unlikely the proposed works will fragment an existing important population in two.

(d) adversely affect habitat critical to the survival of a species.

The proposal will not adversely affect habitat critical to the survival of the species much of the habitat requirements for this species was lost form recent fire events.

(e) disrupt the breeding cycle of an important population.

The proposed works will disrupt a breeding cycle of an important population.

(f) modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

The proposal will avoid impacts to surrounding vegetation that is regenerating post fires by limiting the works area to the minimum required and actively restoring areas disturbed by the works.

(g) result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.

Disturbed areas can encourage weed growth. While blackberries on site provide potential cover for the Southern Brown Bandicoot their removal will allow more native habitat to regenerate.

(h) introduce disease that may cause the species to decline, or

No disease introduction is anticipated from the proposed works on the population.

(i) interfere substantially with the recovery of the species.

The proposed works are unlikely to interfere with the recovery of this species.

Conclusion

While it is not known from the locality, the fire event over 2019-20 is likely to substantively impacted Southern Brown Bandicoot populations. In its current state the site provides limited habitat for this species but remaining unburnt habitat is of increased importance and should be protected as much as possible for this and other species while other habitat regenerates. It is recommended to limit the works area to the minimum required and actively restore areas disturbed by the works.

Thick lipped Spider Orchid

This species has been assessed above according to the criteria under the BC Act. Information presented there will be summarised here.

(a) lead to a long-term decrease in the size of an important population

The Thick-lipped Spider Orchid has been recorded at the following locations in NSW:

- Morton National Park
- Munmorah State Recreation Area
- Braidwood (private property)
- South Pacific Heathland Reserve
- Wyrrabalong National Park
- Porter Creek Wetland Reserve

No records of this plant have been recorded since 2001 (South Pacific Heathland Reserve). It is highly unlikely the species is found on Nerriga Road and the proposed works will lead to a long term decrease in the size of an important population.

(b) reduce the area of occupancy of an important population

Nerriga Road Stage 5 proposed works will not reduce the area of occupancy of an important population.

(c) fragment an existing important population into two or more populations.

An important Thick-lipped Spider Orchid population does not occur within the study area

(d) adversely affect habitat critical to the survival of a species.

The proposal will not adversely affect habitat critical to the survival of the species.

(e) disrupt the breeding cycle of an important population.

An important Thick-lipped Spider Orchid population does not occur within the study area

(f) modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

The proposed works should not impact the populations of the Thick-lipped Spider Orchid as it is assumed the species does not occur in the area. Therefore, it highly unlikely a population will be modified, destroyed or removed where the extent of the species is likely to continue to decline. does not occur within the study area. Duncan (2010) determined the Thick-lipped Spider Orchid population at Braidwood occurs in woodland dominated by Brittle Gum (*Eucalyptus mannifera)*, Scribbly Gum (*Eucalyptus rossii)* and Sheoak (*Allocasuarina sp.)*. the understorey is quote sparse. Due to the recent fires in this location, a precautionary approach has been applied to threatened plants that are likely to occur near the proposed road realignment to ensure no incidental removal of a threatened species but due to the timing of the site assessment and the lack of flowering material post fires, a survey for the Thick-lipped Spider Orchid should be undertaken.

(g) result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.

The blackberry and briar rose already present on site will be managed through appropriate mitigation measures such as weed hygiene protocols and appropriate weed treatment and disposal methods need to be implemented as part of the site management.

(h) introduce disease that may cause the species to decline, or

No disease introduction is anticipated from the proposed works on the koala population.

(i) interfere substantially with the recovery of the species.

The proposed works are unlikely to interfere with the recovery of this species.

Conclusion

The Thick Lipped Spider Orchid is unlikely to exist at Nerriga Road and if present the site would not be identified as an important or secure location, in the context of protecting this species.

Mongarlowe Mallee

This species has been assessed above according to the criteria under the BC Act. Information presented there will be summarised here.

(a) lead to a long-term decrease in the size of an important population

There are only five individual plants of this species known to exist in three locations. One of those locations is to the south west and within 10kms of the study area. If any individuals of this species were identified on site, it would contribute to the long term decrease in the size of an important population. This species only exists in the South Eastern Highlands and the five plants are in three locations. The species is found in woodlands dominated by Brittle Gum (*Eucalyptus mannifera*), Snow Gum (*E. pauciflora*), Candlebark (*E. rubida*) and Broad-leafed Peppermint (*E. dives*). These Eucalypts are found within the study area and this woodland community is common in this location. It is likely further surveys will not find this species within the study area but given the significance and geographical restriction of this species, a targeted survey should be undertaken.

(b) reduce the area of occupancy of an important population

The current known locations (three) and number of individuals is five, any new individual found is important for this population. Although the proposed works will not impact these locations and therefore may not reduce the area of occupancy, further surveys should be undertaken to ensure no individuals are found on Nerriga Road.

(c) fragment an existing important population into two or more populations.

The proposed works will not further fragment the three important populations.

(d) adversely affect habitat critical to the survival of a species.

The proposal will remove woodland areas similar to where this species has been found but further targeted surveys will determine of the species is present and therefore not impacting on critical habitat.

(e) disrupt the breeding cycle of an important population.

The proposed works will disrupt the breeding cycle of an important population.

(f) modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

A targeted survey is required. If the species is found on site, these areas will need to be protected and avoided for the duration of the construction.

(g) result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.

Blackberry is present on site. Mitigation measures include weed hygiene protocols and appropriate weed treatment and disposal methods.

(h) introduce disease that may cause the species to decline, or

No disease introduction is anticipated from the proposed works on the population.

(i) interfere substantially with the recovery of the species.

If the species is present on site, the proposed works will interfere substantially with the recovery of the species.

Conclusion

Based on the assessment above, it is considered highly unlikely this species is present but if present, a significant impact could result. A targeted preclearance survey is required to provide further assurance that this species does not occur. If it is identified, given its important, exclusion zones would be recommended to protect remaining individuals.

APPENDIX G MATTERS OF NATIONAL SIGNIFICANCE SEARCH RESULTS

Australian Government
Department of the Environment and Energy

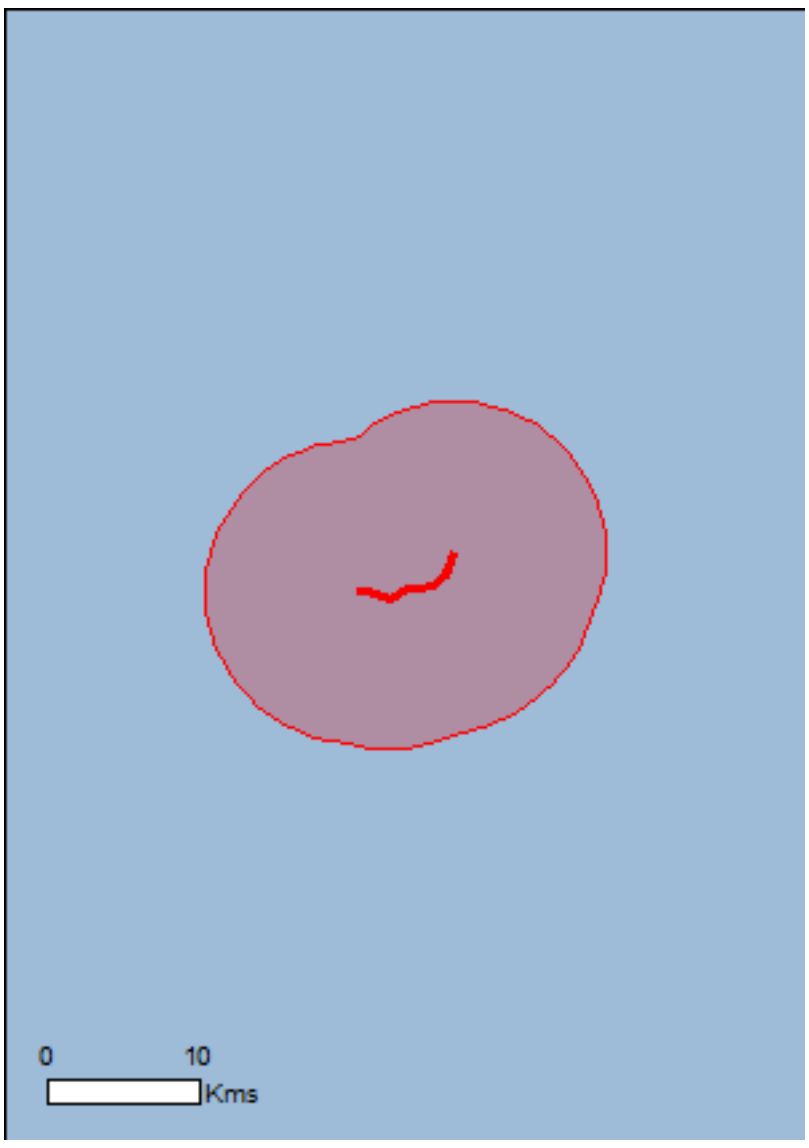
EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

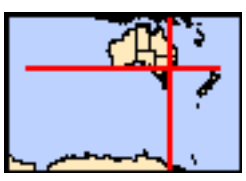
Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 02/03/20 13:22:08



Coordinates

Buffer: 10.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	46
Listed Migratory Species:	14

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	20
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	2
Regional Forest Agreements:	1
Invasive Species:	36
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Illawarra and south coast lowland forest and woodland ecological community	Critically Endangered	Community may occur within area
Lowland Grassy Woodland in the South East Corner Bioregion	Critically Endangered	Community may occur within area
Natural Temperate Grassland of the South Eastern Highlands	Critically Endangered	Community likely to occur within area
Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion	Endangered	Community may occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur

Name	Status	Type of Presence within area
Fish		
Macquaria australasica Macquarie Perch [66632]	Endangered	Translocated population known to occur within area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat may occur within area
Frogs		
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat may occur within area
Litoria littlejohni Littlejohn's Tree Frog, Heath Frog [64733]	Vulnerable	Species or species habitat likely to occur within area
Mixophyes balbus Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat likely to occur within area
Insects		
Synemon plana Golden Sun Moth [25234]	Critically Endangered	Species or species habitat may occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
Isoodon obesulus obesulus Southern Brown Bandicoot (eastern), Southern Brown Bandicoot (south-eastern) [68050]	Endangered	Species or species habitat likely to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat likely to occur within area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE Mainland) [66645]	Vulnerable	Species or species habitat may occur within area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Plants		
Boronia deanei Deane's Boronia [8397]	Vulnerable	Species or species habitat may occur within area
Budawangia gnidioides Budawangs Cliff-heath [55850]	Vulnerable	Species or species

Name	Status	Type of Presence
		habitat may occur within area
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area
Callitris oblonga Pygmy Cypress-pine, Pigmy Cypress-pine, Dwarf Cypress-pine [66687]	Vulnerable	Species or species habitat likely to occur within area
Calotis glandulosa Mauve Burr-daisy [7842]	Vulnerable	Species or species habitat may occur within area
Commersonia prostrata Dwarf Kerrawang [87152]	Endangered	Species or species habitat known to occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat likely to occur within area
Dodonaea procumbens Trailing Hop-bush [12149]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus aggregata Black Gum [20890]	Vulnerable	Species or species habitat known to occur within area
Eucalyptus recurva Mongarlowe Mallee [11004]	Critically Endangered	Species or species habitat may occur within area
Genoplesium baueri Yellow Gnat-orchid [7528]	Endangered	Species or species habitat may occur within area
Haloragis exalata subsp. exalata Wingless Raspwort, Square Raspwort [24636]	Vulnerable	Species or species habitat may occur within area
Lepidium hyssopifolium Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed [16542]	Endangered	Species or species habitat may occur within area
Leucochrysum albicans var. tricolor Hoary Sunray, Grassland Paper-daisy [56204]	Endangered	Species or species habitat known to occur within area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat may occur within area
Pomaderris cotoneaster Cotoneaster Pomaderris [2043]	Endangered	Species or species habitat likely to occur within area
Pomaderris pallida Pale Pomaderris [13684]	Vulnerable	Species or species habitat likely to occur within area
Rutidosis leptorrhynchoides Button Wrinklewort [7384]	Endangered	Species or species habitat may occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area
Xerochrysum palustre Swamp Everlasting, Swamp Paper Daisy [76215]	Vulnerable	Species or species habitat likely to occur

Name	Status	Type of Presence within area
Reptiles		
Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area
Delma impar Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within

Name	Threatened	Type of Presence area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Morton	NSW
Nadgigomar	NSW

Regional Forest Agreements	[Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
Southern RFA	New South Wales

Invasive Species	[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-35.252307 149.950944,-35.251746 149.958497,-35.255391 149.970513,-35.250344 149.9815,-35.250344 149.988023,-35.248942 149.996949,-35.243335 150.004502,-35.238007 150.006906,-35.23324 150.009309,-35.245297 150.003816

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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APPENDIX H DUE DILIGENCE REPORT

ABORIGINAL DUE DILIGENCE ASSESSMENT

Nerriga Road Stage 5 – Ningee Nimble Creek

June 2020

Project Number: 20-066

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DOCUMENT VERIFICATION

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Project Number:	20-066
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Revision	Date	Prepared by	Reviewed by	Approved by
Final	17/06/2020	Jasmine Tearle and Kirsten Bradley	Matthew Barber	Matthew Barber

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ACRONYMS AND ABBREVIATIONS

ACHA	Aboriginal Cultural Heritage Assessment
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
Council	Queanbeyan Palerang Regional Council
DPIE	Department of Planning, Industry and Environment (formally OEH)
Km	kilometres
LEP	Local Environmental Plan
M	Metres
NPW Act	National Parks And Wildlife Act 1974 (NSW)
NSW	New South Wales
OEH	Office of Environment and Heritage (now DPIE)
PAD	Potential Archaeological Deposit
Proposal Area	Area assessed in this report
SHI	State Heritage Inventory

EXECUTIVE SUMMARY

NGH Pty Ltd (NGH) was commissioned by the Queanbeyan Palerang Regional Council (Council) to undertake a Due Diligence assessment for Aboriginal heritage sites for the proposed upgrade to a portion of unsealed road on Nerriga Road (the proposal area) located between Charleyong Bridge and Ningee Creek Road at Tomboye, New South Wales (NSW). Nerriga Road is an unsealed road that has been slowly upgraded by Council in stages. The upgrade works to this section of the road aim to provide a more sustainable commute along Nerriga Road and include the proposed realignment of some sections to meet current road safety design standards.

BACKGROUND AND DESKTOP ASSESSMENT

An extensive search of the AHIMS database was undertaken over an area centred on the proposal area. There were 85 Aboriginal sites recorded within the AHIMS search area and no declared Aboriginal Places. None of the previously registered AHIMS sites are within the proposal area although several are located close by. The registered AHIMS sites in the region suggest the most likely site type within the proposal area will be low density artefact scatters and isolated stone artefacts.

Three water courses intersect and are within 200 m of the proposal area including Glenrea Creek, Ningee Nimble Creek and the Jimmy Wright Gully. In addition, the proposed realignment of a sections of the road, particularly the section within Lot 7 DP 755964 and Lot 2 DP 830605 adjacent to the Ningee Nimble Creek, would impact relatively undisturbed land that may contain Aboriginal objects. While the potential for Aboriginal objects is generally noted to have been removed in areas of significant prior disturbance along the existing Nerriga Road corridor the desktop assessment indicated that there are landscapes present within the proposal area that have the potential to contain Aboriginal sites.

FIELD ASSESSMENT

A visual inspection of the proposal area was undertaken in March 2020 by NGH archaeologists. Approximately 3.6 km of the proposed 4.4 km alignment was examined on foot focusing on archaeologically sensitive landforms and areas which appeared to be less disturbed. Visibility within the road reserve and across the proposal area was generally very good averaging 85% due to recent fires.

The proposed realignment of a section of Nerriga Road into relatively undisturbed land within Lot 7 DP 755964 and Lot 2 DP 830605 adjacent to the Ningee Nimble Creek was identified in the desktop assessment as an area of archaeological sensitivity. However, the field inspection of the proposed realignment of this section of Nerriga Road concluded that the proposed road realignment within Lot 2 DP 830605 was deemed to have low potential for Aboriginal objects due to the steepness of the slope near the escarpment adjacent to the creek, shallow deposit and extensive outcroppings. While no surface evidence of Aboriginal objects was identified during the visual inspection of the proposal area within Lot 7 DP 755964 an area of Potential Archaeological Deposit (PAD) was identified to have moderate archaeological sensitivity. The PAD was recorded along relatively flat ground in close proximity to Ningee Nimble Creek which would have been conducive for Aboriginal camping. Consequently, an area of PAD within the proposal area in Lot 7 DP 755964 was deemed to have potential to contain subsurface Aboriginal objects which would require subsurface testing to establish the archaeological potential and extent of sites along this landform.

The remaining sections of the proposal area which were in close proximity or intersected by water courses were also visually inspected. These areas, beyond the PAD recorded in Lot 7 DP 755964, were noted to be significantly eroded and highly disturbed by the construction and maintenance of the existing road corridor. No other Aboriginal objects or areas of archaeological potential were recorded within the proposal area.

Additionally, the past construction and maintenance works along the existing road corridor within the proposal area have resulted in the modification and significant disturbance of the existing Nerriga Road alignment which was determined to have low potential for Aboriginal objects.

IMPACT ASSESSMENT CONCLUSION

The field assessment identified an area of potential archaeological deposit (PAD) within the section of Nerriga Road proposed to be realigned through Lot 7 DP 755964. The area of PAD within Lot 7 DP 755964 which is intersected by the proposed road realignment and upgrade works would require subsurface testing to establish the true archaeological potential, nature and extent of Aboriginal sites in this area.

To negate the need to conduct further archaeological assessment of the PAD area Council would need to redesign the proposed road realignment to avoid the PAD within Lot 7 DP 755964 and stay within the area assessed in this report.

Works within the proposal area, as assessed in this report, which are outside the PAD do not require further heritage investigation and works can proceed with caution.

RECOMMENDATIONS

It is recommended that:

1. Works within the proposal area that are outside the PAD within Lot 7 DP 755964, can proceed with caution.
2. For works to proceed in the PAD area a programme of limited subsurface testing to establish the true archaeological potential and extent of archaeological sites within the works area is required by undertaking an Aboriginal Cultural Heritage Assessment (ACHA). All subsurface testing must comply with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW.* If Aboriginal objects were recovered during the testing programme an Aboriginal Heritage Impact Permit (AHIP) must be obtained from the Department of Planning, Industry and Environment (DPIE).
3. To negate the need to conduct further archaeological assessment of the PAD the Queanbeyan Palerang Council would need to redesign the proposed road realignment to avoid the PAD within Lot 7 DP 755964 and stay within the area assessed in this report.
4. Any activity proposed outside of the current assessment area should also be subject to an Aboriginal heritage assessment
5. If any items suspected of being Aboriginal in origin are discovered during the works, outside a valid AHIP area, all work in the immediate vicinity must stop and DPIE notified. The find will need to be assessed and if found to be an Aboriginal object an AHIP may be required.

Queanbeyan Palerang Council is reminded that it is an offence under the *NSW National Parks and Wildlife Act 1974* to disturb, damage or destroy and Aboriginal object without a valid Aboriginal Heritage Impact Permit.

1 INTRODUCTION

NGH Pty Ltd (NGH) was commissioned by the Queanbeyan Palerang Regional Council (Council) to undertake a Due Diligence assessment for Aboriginal heritage sites for the proposed upgrade to a 4.4 km portion of unsealed road on Nerriga Road (the proposal area) located between Charleyong Bridge and Ningee Creek Road at Tomboye, New South Wales (NSW).

Nerriga Road is a predominantly unsealed road that has been slowly upgraded by Council in stages over the years. The upgrade works to this section of the road aim to provide a more sustainable commute along Nerriga Road and include the proposed realignment of some sections to meet current road safety design standards.

1.1 SUBJECT SITE

The proposal area is comprised of a 4.4 km portion of unsealed road on Nerriga Road, between Charleyong Bridge and Ningee Creek Road at Tomboye (see **Error! Reference source not found.** and **Error! Reference source not found.**), approximately 25 km north east of Braidwood within the Queanbeyan Palerang Local Government Area (LGA). Some sections of the existing road are proposed to be realigned into private land and public road reserve land. The portions of land which may be impacted by the proposed road realignment which are outside the existing public road reserve lands are listed below.

- Lot 1 DP755970
- Lot 2 DP830605
- Lot 5 DP755964
- Lot 6 DP755964
- Lot 7 DP755964
- Lot 12 DP755964
- Lot 25 DP755964
- Lot 66 DP755964
- Lot 67 DP755964
- Lot 68 DP755964
- Lot 69 DP755964
- Lot 71 DP755964
- Lot 75 DP755964
- Lot 90 DP755964
- Lot 7004 DP1033209
- Lot 7006 DP1033208

Nerriga Road is approximately 50 km in length and is used as a vehicle route to travel between Braidwood and Nerriga. Nerriga Road is a predominantly unsealed road that has been slowly upgraded by Council in stages over the years. The upgrades completed to date along Nerriga Road consist of approximately 11.2 km and include the upgrade of the intersection between Nerriga Road and the Kings Highway near Braidwood and the road realignment and construction of a new bridge over the Mongarlowe River. The majority of the proposal area is located in the Parish of Tomboye, with the eastern most portion of the proposal area extending into the Parish of Wog Wog.

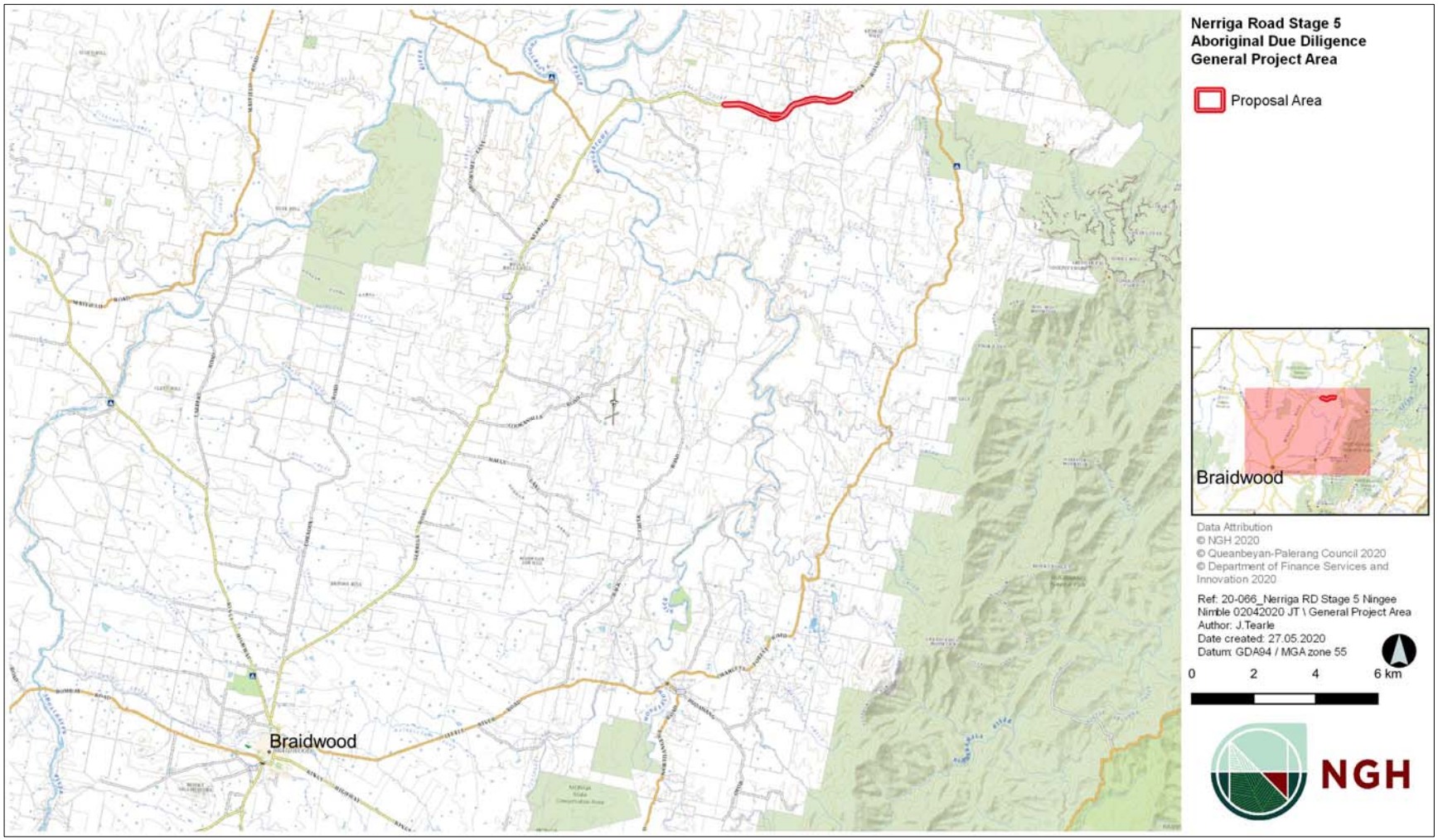

Figure 1-1 General Project Location

Figure 1-2 Proposal Area with proposed centre realignment

1.2 PROJECT PERSONNEL

The Due Diligence assessment was carried out by qualified archaeologists Kirsten Bradley and Jasmine Tearle of NGH who undertook the field inspection. Kirsten Bradley and Jasmine Tearle completed the background research, GIS and writing of this report. NGH Principal Heritage Consultant Matthew Barber reviewed the report for quality assurance purposes and approved the report for distribution.

The Due Diligence process does not formally require consultation with Aboriginal community groups. No Aboriginal groups were contacted for this due diligence level assessment. The proposal area is within the boundaries of the Ulladulla Local Aboriginal Land Council.

1.3 APPROACH AND FORMAT OFTHIS REPORT

This report has been drafted in keeping with the sequence of steps identified in the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (OEH 2010). The Code of Practice provides a five-step approach to determine if an activity is likely to cause harm to an Aboriginal object, as defined by the *NSW National Parks and Wildlife Act 1974*. The steps follow a logical sequence of questions, the answer to each question determines the need for the next step in the process.

The Due Diligence Code of Practice sets out the steps which the Proponent is required to take in order to:

- Identify whether Aboriginal objects are, or are likely to be, present in the proposal area.
- Determine whether or not their activities are likely to harm Aboriginal objects (if present) in the proposal area; and
- Determine whether an AHIP application is required.

Each section within this report follows the relevant step outlined in the Code of Practice as noted in **Error! Reference source not found.** below.

Table 1-1 Due Diligence Steps for this report

Due Diligence Steps
Step 1. Will the activity disturb the ground surface?
Step 2a. Search the AHIMS database and use any other sources of information of which you are already aware
Step 2b. Are activities proposed in areas where landscape features indicate the presence of Aboriginal objects?
Step 3. Can you avoid harm to the object or disturbance of the landscape feature?
Step 4. Undertake a desktop assessment and visual inspection. Is it likely that Aboriginal objects will be impacted by the proposed works?
Step 5. Further investigations and impact assessment

2 LEGISLATION

In NSW, Aboriginal heritage is principally protected by two legislative acts:

- The *National Parks and Wildlife Act 1974* (NSW) (NPW ACT); and
- The *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act).

2.1 THE NATIONAL PARKS AND WILDLIFE ACT 1974

Part 6 of the NPW Act concerns Aboriginal objects and places and various sections describe the offences, defences and requirements to harm an Aboriginal object or place. All Aboriginal material receives blanket protection under the NPW Act of NSW. The main offences under section 86 of the NPW Act are:

- A person must not harm or desecrate an object that the person knows is an Aboriginal object.
- A person must not harm an Aboriginal object.
- For the purposes of this section, "circumstances of aggravation" are:
    - that the offence was committed in the course of carrying out a commercial activity, or
    - that the offence was the second or subsequent occasion on which the offender was convicted of an offence under this section.
- A person must not harm or desecrate an Aboriginal place.

Under section 87 of the NPW Act, there are specified defences to prosecution including authorisation through an Aboriginal Heritage Impact Permit (AHIP) or through exercising due diligence or compliance through the regulation.

Section 89A of the Act also requires that a person who is aware of an Aboriginal object, must notify the Director-General in a prescribed manner. In effect, this section requires the completion of AHIMS site cards for all sites located during heritage surveys.

The strict liability offence of harming Aboriginal objects has a number of defences and include the statutory defence of Due Diligence through complying with an adopted industry code of practice, or compliance with the conditions of an AHIP.

2.2 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) is legislation for the management of development in NSW. It sets up a planning structure that requires developers (individuals or companies) to consider the environmental impacts of new projects. Under this Act, cultural heritage is considered to be a part of the environment. It provides for the identification, protection and management of heritage items through inclusion of these items into schedules off planning instruments, such as Local Environmental Plans (LEPs) or Regional Environmental Plans (REPs). This Act requires that Aboriginal cultural heritage and the possible impacts to Aboriginal heritage that development may have are formally considered in land-use planning and development approval processes.

2.2.1 Local Environmental Plan

The proposal area is located within the Queanbeyan Palerang LGA, which uses the Palerang Local Environmental Plan (LEP) 2014 and the Queanbeyan LEP 2012 as they have yet to be combined following the recent amalgamation of the areas. The proposal area is located within the Palerang LEP 2014. Schedule 5 of the Palerang LEP 2014 details the included environmental heritage items covered by the plan. No Aboriginal sites or Aboriginal places are identified within the proposal area in the Heritage items listed in Schedule 5 Part 1, Part 2 or Part 3 in the Palerang LEP 2014

3 GROUND DISTURBANCE

Step 1. Will the activity disturb the ground surface or any culturally modified trees?

Council proposes to upgrade a 4.4 km unsealed portion of Nerriga Road between Charleyong Bridge and Ningee Creek Road, Tomboye, to provide a more sustainable commute along Nerriga Road. The works may also include the of realignment of some sections to meet road design standards.

The proposed road upgrade works will include but are not limited to:

- Realignment of some sections of the road to meet road design standards.
- Clearing and grubbing of the new construction footprint.
- Earthworks to shape batters and road formation.
- Construction of drainage requirements such as culverts to protect the road from flooding events.
- Construction of the road pavement.
- Sealing of the road surface for waterproofing.
- Installing road furniture for safety requirements.

These proposed road upgrade activities would require the use of heavy machinery and would cause significant ground disturbance in any new sections of the proposed road realignment. Any Aboriginal sites within the disturbance footprint could therefore be subject to harm. The affirmation that ground disturbance will occur within the proposal area requires that the next step in the Due Diligence process occurs.

4 REGISTER SEARCH AND LANDSCAPE ASSESSMENT

Step 2a. Search the AHIMS Database and other information sources

A search of relevant heritage registers for Aboriginal sites and places provides an indication of the presence of previously recorded sites. A register search is not conclusive, however, as it requires that an area has been inspected and any sites are provided to the relevant body to add to the register. However, as a starting point, the search will indicate whether any sites are known within or adjacent to the investigation area. The Aboriginal Heritage Information Management System (AHIMS) provides a database of previously recorded Aboriginal heritage sites in NSW. A search provides basic information about any sites previously identified within a search area. The results of the search are valid for 12 months for the purposes of a Due Diligence level assessment.

On the 19th February 2020, a search of the AHIMS database was undertaken over a 19 km by 19 km area with a 50 m buffer centred on the proposal area. The AHIMS Client Service Number was 485022. There were 85 Aboriginal sites recorded within this search area and no declared Aboriginal Places. Table 4-1 below shows the breakdown of site types and the AHIMS sites in the search area.

None of the Aboriginal sites currently recorded on AHIMS are located within or directly adjacent to the proposal area, however, six sites occur within 600 m. The sites located within close proximity to the proposal area are summarised in Table 4-2 and shown in Figure 4-2.

Table 4-1 Breakdown of previously recorded Aboriginal sites in the region.

Site Type	Number
Artefact (1 or more)	84
Shelter with Art (pigment or engraved)	1
TOTAL	**85**

Table 4-2 Sites within close proximity of the proposal area.

Site Number #	Site Name	Site Type	Site Description	Distance to project (m)	Site Status
57-3-0355	Glenrea Creek 1	Artefact scatter	Scatter of four artefacts and associated area of Potential Archaeological Deposit (PAD). The site was initially recorded within a 2 m x 2 m erosion scour located on the eastern side of an ephemeral drainage line. The PAD extends from a spur slope to a flat elevated terrace. The artefacts were recorded to be manufactured from silcrete and quartz. Subsurface testing was also undertaken at this site. This site was subject to testing with a low density subsurface artefact assemblage recovered.	340 m west of the proposal area.	Valid
57-3-0387	Glenrea Creek 2	Artefact scatter	A number of subsurface artefacts recovered during the testing program of a PAD near Glenrea Creek 1. The artefacts were recorded from three pits on the western side of a drainage line on a terrace and elevated spur landform. The site was also subject to salvage excavation.	600 m west of the proposal area.	Valid
57-3-0400	Glenrea Creek 3	Artefact Scatter	Repositioned 159 artefacts from salvage excavation and surface collection which were scattered in an area outside the Nerriga Road realignment. All artefacts were scattered in a 5 m x 5 m area approximately 20 m south of the fence line for the new road alignment.	450 m west of the proposal area.	Valid
57-3-0389	Nerriga Road Braidwood	Artefact Scatter	Repositioned 99 artefacts recovered from the subsurface testing program from Glenrea Creek 1 and Glenrea Creek 2.	540 m north west of the proposal area.	Valid
57-3-0397	TSR 52/OS1	Artefact Scatter	Scatter of five artefacts.	300 m south of the proposal area.	Valid
57-3-0398	TSR 52/OS1	Artefact Scatter	Scatter of four artefacts.	600 m south of the proposal area.	Valid

4.1.1 Other Heritage Register Searches

Other heritage register searches were also undertaken to identify any items or places in proximity to the proposal area, with a focus on the proposal area and its immediate surrounding landscape. The following resources were used as part of this assessment:

- The NSW State Heritage Inventory (SHI), this includes items on the State Heritage Register and items listed by state agencies and local Government, to identify any items currently listed within or adjacent to the proposal site.
- The Australian Heritage Database, this includes items on the National and Commonwealth Heritage Lists, to identify any items that are currently listed within or adjacent to the proposal site.

The results of the Australian Heritage Database search indicated that there are no sites listed that are located within Tomboye.

While the proposal area is located within the recently amalgamated Queanbeyan Palerang LGA the NSW SHI database search is yet to recognise this amalgamated LGA and consequently the searches have been undertaken for the previous Palerang LGA which encompasses the proposal area. The results of the NSW SHI database search indicated that there is nil recorded Aboriginal Place, listed under the *National Parks and Wildlife Act* within the NSW State Heritage Inventory within the Palerang LGA.

The results of the NSW SHI database search indicated that 12 previously recorded heritage sites are listed under the *NSW Heritage Act* within the Palerang LGA. None of the sites are located within or adjacent to the proposal area.

The results of the NSW SHI database search indicated that 375 previously recorded heritage sites are listed by the Local and State Agencies within the Palerang LGA. One site previously recorded heritage site intersects the proposal area. The site is the Tomboye Homestead and outbuildings, located on Nerriga Road, Lot 7 DP 755964 as shown in Figure 4-3. The impact to this site by the proposed works is beyond the scope of this Aboriginal Due Diligence.

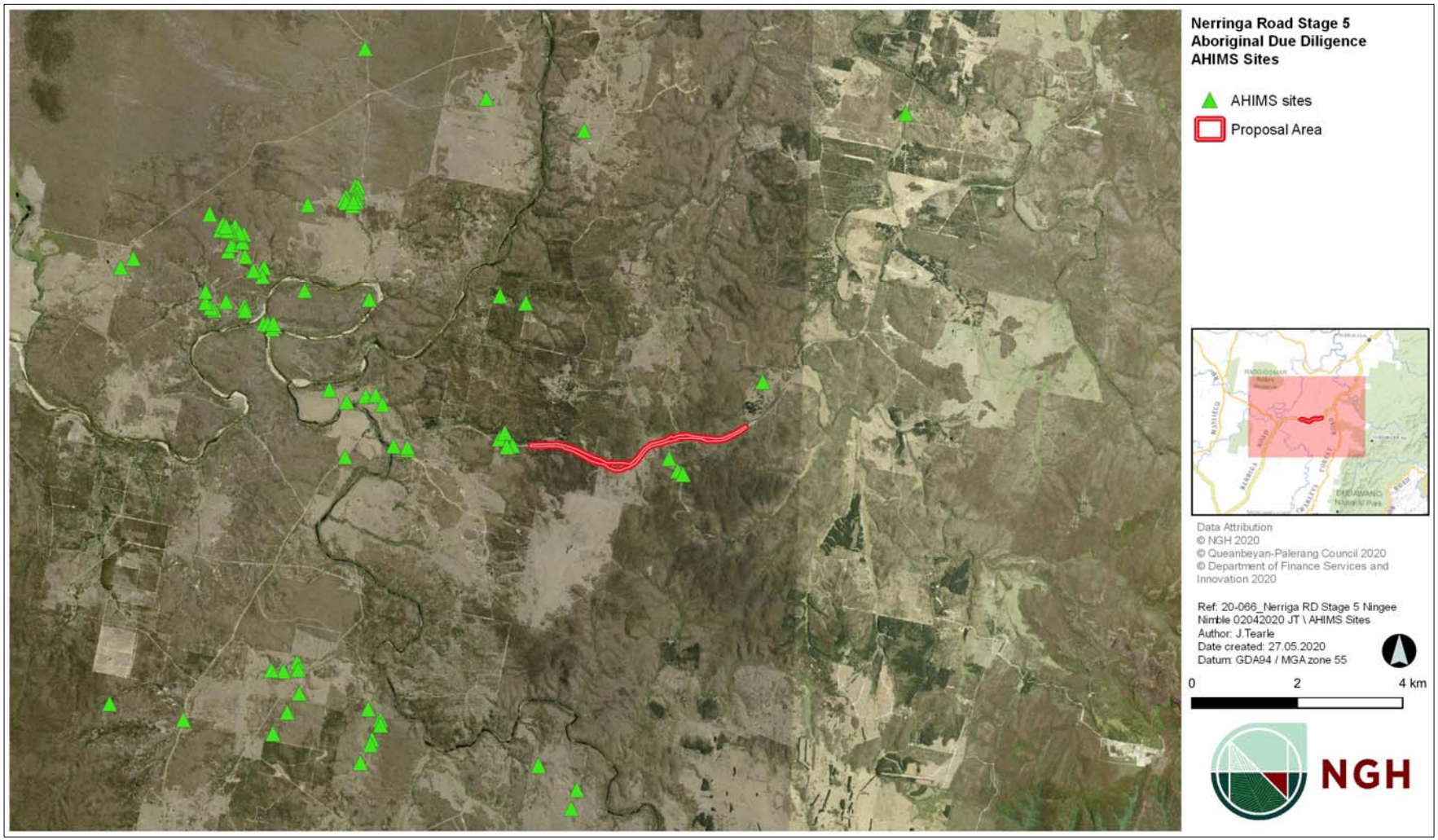

Figure 4-1 AHIMS sites surrounding the proposal area

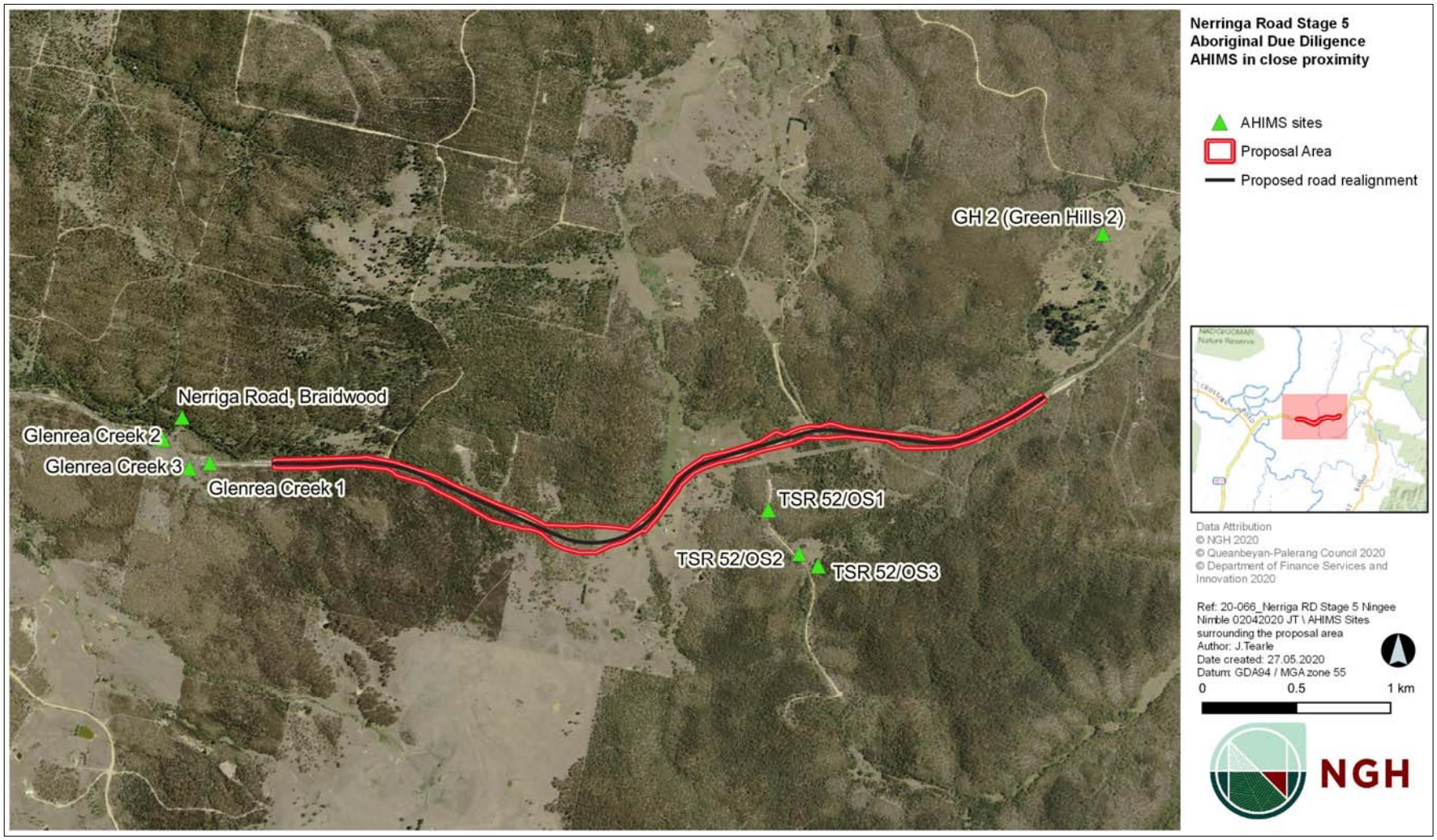

Figure 4-2 AHIMS sites near proposal area

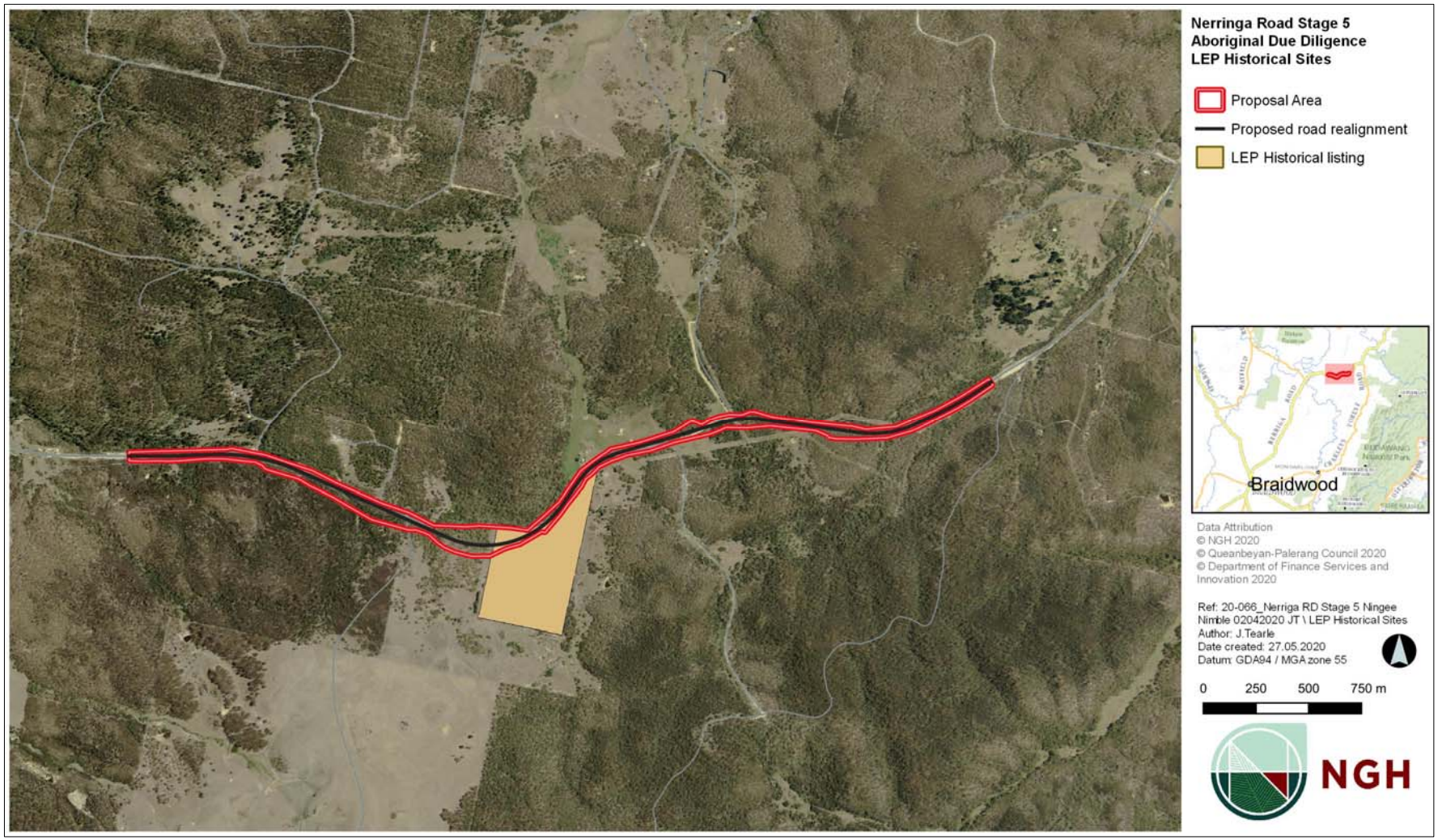

Figure 4-3 LEP Historical Listed Items which intersect the proposal area

4.2 ARCHAEOLOGICAL CONTEXT

4.2.1 Local Context

A number of archaeological surveys have been completed in close proximity to the proposal area that are summarised below.

In 1983 Attenbrow and Hughes completed preliminary investigations into Aboriginal archaeological sites for the Metropolitan Water Sewerage and Drainage Board's proposed Welcome Reef Dam construction on the upper reaches of the Shoalhaven River about 5 km downstream of its junction with the Mongarlowe River. Approximately 12% of the proposed inundation area was investigated via survey with a total of 117 sites and 56 isolated objects recorded. In total 124 of the sites recorded were within or immediately adjacent to the inundation area. The sites recorded included 114 artefact scatters, two shelter sites with archaeological deposits (including one which had paintings) and an archaeological deposit site with lenses of fresh-water mussel shell. The sites all had assemblages dominated by silcrete and quartz artefacts that were generally characterised by waste flakes and/or flaked pieces. All of the open sites identified during the survey for the Welcome Reef Dam were in areas where the ground surface had been exposed or there was limited vegetation obscuring visibility, such as along tracks. The majority of sites recorded were on gently sloping to flat land close to water on well drained soils. The small size and density of sites across the inundation area indicated that the area was occupied by small groups of people who exploited locally available resources camping in both small and large valleys systems across the area. It was suggested that the number of sites identified along the sides of small valleys may be reflective of people avoiding the cold air along the major rivers and creeks during the winter months. Attenbrow and Hughes noted that the land system of Charleyong, a rolling terrain, had the highest density of sites (16 per sq. km) within the survey area with over half the sites recorded on foot slopes adjacent to minor tributaries (Attenbrow and Hughes 1983: 120). Within the Charleyong land system a total of 58 sites were recorded including seven sites on the crests of low hills and upper slopes of rises, three on the crest of rises and plateaux, 14 on midslopes and 34 sites on the foot slopes and in colluvium areas. None of the sites recorded were adjacent to or within the current proposal area, with the closest site recorded during the study located approximately 16 km to the south of the current proposal area.

In 2000 Past Traces Archaeological Consultants (Past Traces) completed an archaeological survey for the Tallaganda Shire for the proposed upgrading and realignment of sections of Nerriga Road, that is adjacent to the boundary of the western extent of the current proposal area. A single site (Glenrea Creek 1) was identified, which comprises of an artefact scatter with an associated area of potential archaeological deposit (PAD). The artefact scatter and PAD was located on the eastern side of an ephemeral drainage line, with the PAD extending from the spur slopes to a flat elevated terrace. The surface artefacts recorded at the site Glenrea Creek 1 included a grey silcrete flaked piece, a pink silcrete flake, a grey quartz core and a grey silcrete flake. A second PAD was also located on the western side of the drainage line on a gentle spur slope and flat elevated terrace. It was recommended that subsurface testing be undertaken to determine the nature and extent of any subsurface deposits related to the site and PADs prior to works commencing (as cited in NOHC 2004).The area assessed by Past Traces is shown in Figure 4-4. All others areas for the road upgrades assessed by Past Traces along Nerriga Road and for road realignment were noted to be severely impacted by past construction, tree clearing and agricultural activities and where not considered to be landforms conducive to camping by Aboriginal people due to the gradient of slope and the low potential for subsurface deposits dues to the significant erosion which had occurred particularly in gullies and near watercourses.

In 2004 Navin Officer Heritage Consultants Pty Ltd (NOHC) undertook the archaeological subsurface testing program for the proposed Nerriga Road realignment, which is located adjacent to the western most extent of the current proposal area as recommended by the Past Traces study. The study area comprised of the section of road which required further archaeological investigation, which encompassed the site Glenrea Creek 1 and its associated PAD and an additional PAD area. Subsurface testing was undertaken through the area, from

west to east. A total of 12 test pits were excavated using a backhoe. The testing program focused on the spur crest west of the ephemeral drainage line, the associated terrace, flat ground and spur slopes adjacent to the site Glenrea Creek 1. The soils in the area were relatively consistent, generally comprising a top layer of light grey to brown loams with gravels and root matter, middle layer of lighter yellow or white silts with increasing gravels, and lower layer of orange clays of increasing clay content with depth. A total of 99 artefacts were identified from five of the test pits. The artefacts recovered comprised mostly of broken flakes with lesser numbers of flaked pieces and cores. Pits 1, 2 and 3 contained the majority of artefacts (97%), and pits 7 and 9 contained the remaining 3%. The dominant raw material recovered was silcrete (~88%) which was noted to likely have been derived from outcrop exposures in the region. Pits 1, 2 and 3 were located on the western side of the drainage line, on a terrace and elevated spur landform which was recorded as the site Glenrea Creek 2. Pits 7 and 9 were located on the eastern side of the drainage line on elevated flat ground. The material recovered from Pits 7 and 9 were considered an extension of the site Glenrea Creek 1. The upper levels of the deposits excavated were found to have the highest concentration of archaeological material, however, due to the unavoidable use of toothed bucket during excavation, vertical deposition was compromised and no conclusions were able to be established regarding the vertical deposition of artefacts from the sites. NOHC concluded that Glenrea Creek 1 had low scientific significance and Glenrea Creek 2 had medium scientific significance. It was recommended that Glenrea Creek 2 be subject to salvage excavation prior to the proposed realignment (NOHC 2004). The area subject to the subsurface testing programme by NOCH is shown n Figure 4-4.

In 2006 NOHC completed an archaeological salvage program for the site Glenrea Creek 2. Excavation and wet sieving were completed over two areas totalling 12 m^2 with a total of 146 artefacts recovered. The artefacts recovered were primarily manufactured from silcrete and quartz with a lesser number of tuff, quartzite, chalcedony and unidentified material recorded. A range of lithic types were recovered that were classified into flakes, flake fragments and flake portions (41.5%), indeterminate fragments (29%) and complete or fragments of microblades (19.5%). Cores and Core fragments were also recorded however they only represent a very small portion of the assemblage (3.2%). Bipolar flaking was also noted to have occurred at the site. The vertical distribution of artefacts recovered from the site was also able to be established with the majority of the cultural material recovered from the upper 30 cm of the deposits. It was concluded by NOHC that the site Glenrea Creek 2 was likely used intermittently over a period of time by Aboriginal people who stopped and camped in the area. While no dating was able to be undertaken the technological attributes of the assemblage were noted to suggest that the site was less than 4,000 years old. During the road realignment work monitoring by the Aboriginal community recovered 12 additional artefacts. The artefacts recovered from the salvage excavation and surface collection/monitoring were reburied in a vegetated area away from the new road alignment and the reburial location was recorded on AHIMS as the site Glenrea Creek 3. The area subject to the salvage excavation by NOCH is shown n Figure 4-4.

In 2016, NGH Environmental completed a Due Diligence assessment for NSW Roads and Maritime Services (RMS) for the proposed road realignment and replacement of the Charleyong timber bridge over the Mongarlowe River at Marlowe approximately 1.8 km west of the current proposal area. Four isolated artefacts (CB ISO 1, CB ISO 2, CB ISO 3 and CB ISO 4) were recorded on existing gravel roads or in exposed areas. The flat terraced area surrounding the site CB ISO 3, was considered to have potential to contain Aboriginal artefacts and an area of potential archaeological deposit (PAD) was also recorded on the north-eastern side of the bridge as CB PAD 1. CB PAD 1 was located on an elevated river terrace which extended to the base of a moderately steep hillslope. It was determined that the sites and PADs could be avoided by the proposed bridge replacement works and a 5 m buffer should be placed around the site CB ISO 4 during construction to ensure it remained undisturbed. These recommendations were based on the planned construction following a specified design corridor, however, if the design was altered and the sites and PADs were unable to be avoided then subsurface testing would be warranted and an Aboriginal Heritage Impact Permit (AHIP) required to impact the sites. The area assessed by NGH in 2016 is shown in Figure 4-4.

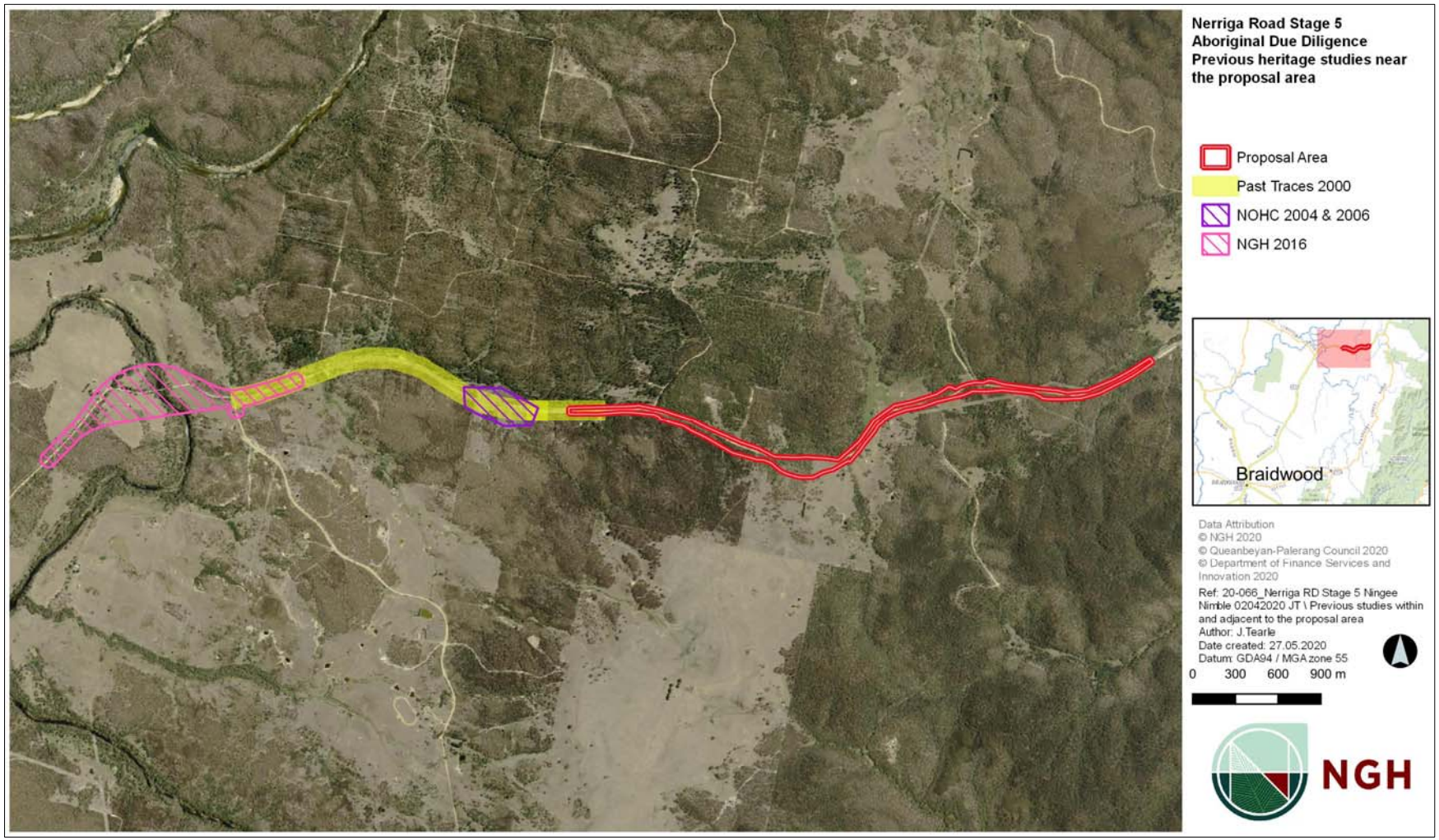

Figure 4-4 Previous heritage studies near the proposal area

4.3 LANDSCAPE ASSESSMENT

Step 2b. Are there undisturbed landscape features likely to contain Aboriginal objects?

The *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* outlines a range of landscape features that have higher potential to contain Aboriginal objects. It is also necessary to consider whether there are landscape features of undisturbed land that may contain Aboriginal objects within the proposal area. These landscape features of undisturbed land include land that is:

- within 200 m of water;
- located within a sand dune system;
- located on a ridge top, ridge line or headland;
- located within 200 m below or above a cliff face, or
- within 20 m of a cave, rock shelter or cave mouth.

Understanding the landscape context of the proposal area may also assist us to better understand the archaeological modelling of the area and assist to identify local resources which may have been utilised by Aboriginal people. This information can then potentially be used in predicting the nature of Aboriginal occupation across the landscapes within and adjacent to the proposal area. Factors that are typically used to inform the archaeological potential of landscapes include the presence or absence of resources that would have been utilised by Aboriginal people including water, animal and plant foods, stone and other resources.

4.3.1 Geology

The NSW 1:500,000 Simplified Surface Geology (State Government of NSW and DPIE 2009) shows that the proposal area contains Ordivician sedimentary rocks with dominantly interbedded quartz-rich sandstone, mudstone and siltstone with chert also commonly occurring. The central section of the proposal area has Cainozoic mafic volcanic rocks. Cainozoic mafic volcanic rocks are rocks rich in iron, magnesium and calcium that erupted from widespread volcanic activity through the eastern part of the NSW over the last 65 million years, with basalt lava flows a common example (State Government of NSW and DPIE 2009).

4.3.2 Topography

The topography of the area comprises of gentle slopes and rolling hills with valley flats associated with Ningee Nimble Creek. Several water sources also run through and adjacent to the proposal area including Ningee Nimble Creek, Jimmy Wrights Gully and Glenrea Creek. These three water sources are all within 200 m of the proposal area. In addition, the proposed realignment of a section of the road would impact relatively undisturbed land within Lot 7 DP 755964 and Lot 2 DP 830605 adjacent to the Ningee Nimble Creek.

4.3.3 Soils

The soil landscape within the proposal area is predominantly a type known as Tarrawarra, with portions of the area extending into the Eastfields Creek and Tomboye soil landscapes (espade v2.0). A subsurface testing and salvage excavation program that was undertaken approximately 600 m west of the western most extend of the proposal area within the Tarrawarra soil landscape at the site Glenrea Creek 2 by NOHC (2004, 2006) which noted that the upper soil horizons in the area were a brown to grey brown sandy loam with minor gravel, clay noodles and mottling that becomes a yellow silty sand with increasing gravels that overlies an orange gravelly clay.

4.3.4 Vegetation

The Nerriga Road corridor has been extensively cleared of vegetation with remnant dry sclerophyll forest bordering the road reserve. Recently the proposal area was heavily affected by recent fires which devastated the local area and burnt through the majority of the surrounding bushland. While the majority of the surrounding area has been burnt by the recent fire there is some potential, albeit low, for old growth native trees to be located in the proposal area outside the existing unsealed road corridor that may contain evidence of Aboriginal cultural modification. Any old growth isolated paddock trees or areas of remnant vegetation within the proposed section of road to be realigned also have potential to contain evidence of Aboriginal cultural modification.

4.3.5 Historic Land Use

The proposal area is primarily comprised of an unsealed road corridor and public road reserve with smaller local unsealed tracks and roads coming off it. Some of the lands surrounding the road reserve have been cleared and modified for pastoral use. However, a large portion still remains forested and relatively undisturbed. The potential for Aboriginal objects is however generally noted to have been removed in areas of significant prior disturbance along the existing Nerriga Road corridor. A significant amount of erosion has also occurred along the water courses and slopes. The area has been severely affected by recent fires which devastated the local area.

4.3.6 Aboriginal Site Prediction

Based on the assessment of information from the environmental context and results of previous archaeological studies in and around the area, several predictive modelling statements can be made. These are included in Table 4-3 below.

Table 4-3. Aboriginal Site Prediction Statements

Site Type	Site Description	Potential
Stone artefact scatters and isolated artefacts	Artefact scatter sites can range from high-density concentrations through to isolated finds.	High potential to occur in low to moderate densities particularly in on crests, spurs, elevated flat land associated with ephemeral drainage lines and terrace landforms.
Potential Archaeological Deposits (PADs)	Potential subsurface deposits of archaeological material	Potential to occur within proposal area in undisturbed areas of elevated flat land associated with ephemeral drainage lines and terrace landforms.
Modified trees	Trees that have undergone cultural modification.	Some potential to occur within the proposal area in areas where there are remnant mature native trees.

4.3.7 Landscape Assessment Summary

Based upon the initial desktop assessment, using satellite imagery and topographic data, it appears that there is low to moderate potential for sites of Aboriginal Cultural Heritage to occur within the proposal area. The registered AHIMS sites in the region suggest the most likely site type within the proposal area will be artefact scatters and isolated stone artefacts. Three water courses intersect and are within 200 m of the proposal area including Glenrea Creek, Ningee Nimble Creek and the Jimmy Wright Gully. In addition, the proposed realignment of a sections of the road, particularly the section within Lot 7 DP 755964 and Lot 2 DP 830605 adjacent to the Ningee Nimble Creek, would impact relatively undisturbed land that may contain Aboriginal objects. While the potential for Aboriginal objects is generally noted to have been removed in areas of significant prior disturbance along the existing Nerriga Road corridor the desktop assessment has indicated

that there are landscapes present within the proposal area that have the potential to contain Aboriginal sites with several Aboriginal sites previously recorded within close proximity of the proposal area. Given that the proposed works will involve varying levels of ground disturbance it is therefore important that a visual inspection be undertaken.

5 IMPACT AVOIDANCE

Step 3. Can any AHIMS listed objects, or landscape features be avoided?

The proposed area for the upgrade to this section of Nerriga Road is unlikely to be able to be revised to avoid landscape features such as the proximity to water due to the alignment of the existing road and the need to meet current road safety standards. Additionally, the proposed realignment of one section of the road, within Lot 7 DP 755964 and Lot 2 DP 830605 adjacent to the Ningee Nimble Creek, would impact relatively undisturbed land which has been noted to be required by Council to manage erosion control issues which are linked to the stability and safety of this section of the road. Consequently, there is limited potential to move the alignment of the road corridor from the current assessment area. The results of the visual inspection, however, should be taken into consideration where there is potential to realign the proposed road corridor to avoid any heritage sites or areas of potential archaeological deposit that may be identified. The desktop assessment alone is therefore not sufficient to conclusively appraise the archaeological potential of the landscape or the location of any additional sites within the proposal area. The next step in the process, a visual inspection, must be conducted to properly appraise the presence and potential for Aboriginal sites to occur within the proposal area.

6 DESKTOP ASSESSMENT AND VISUAL INSPECTION

Step 4. Does the desktop assessment confirm that there are likely to be Aboriginal objects present or below the ground surface?

The assessment process is primarily a desktop exercise, using available information such as the AHIMS search results and relevant archaeological reports that have been previously completed in the area. Visual inspection is also required where landscape features are present that may contain sites. A visual inspection of the proposal area was undertaken on the 16th of March 2020. The inspection was carried out by NGH qualified archaeologists, Kirsten Bradley and Jasmine Tearle. The following provides a summary of the landscape and proposal area in relation to the archaeological potential for Aboriginal objects to occur.

The proposal area consists primarily of the existing road reserve and a dirt road alignment of Nerriga Road. Approximately 3.6 km of the proposed 4.4 km alignment was examined on foot focusing on archaeologically sensitive landforms and areas which appeared to be less disturbed. Both sides of the existing road corridor which were examined on foot were inspected by two archaeologists, effectively doubling the survey surface coverage. Visibility within the road reserve and across the proposal area was generally very good averaging 85% due to recent fires which had burnt nearly all of the ground cover and vegetation in the area. The balance of the alignment was driven with no archaeologically sensitive landforms or mature native trees observed.

The existing road corridor was noted to be highly disturbed through road construction and maintenance activities, including the construction of culverts, regular grading, and the construction of table drains. Additional disturbances noted within and adjacent to the road reserve corridor included the construction of driveways and road intersections, fences, power poles and underground services. Sections of the existing road corridor have also been cut into the landscape. The cuttings were noted to generally occur where the existing road alignment crossed saddle or spur crest landforms. The ground either side of the cuttings within the proposal area was also disturbed through secondary cuttings to stabilise the banks and through the formation of drains. These

past construction and maintenance works along the existing road corridor within the proposal area have resulted in the modification and significant disturbance of the existing Nerriga Road alignment which is determined to have low potential for Aboriginal objects. No Aboriginal objects or sites were recorded within the existing disturbed road corridor within the proposal area.

Given the recent fires which devastated the surrounding area there were few mature trees remaining within the proposal area at the time of the site inspection. However, any mature trees that were observed to be fallen or standing within the proposal area were visually inspected. They revealed no scarring that was considered to be Aboriginal in origin. For a tree to have been a mature specimen suitable for bark extraction at the time Aboriginal people were last practicing tradition ways, the tree would have to be over 100 years old. The scarring noted on trees adjacent to the existing road was determined to be caused by heavy machinery during the construction and maintenance of the road corridor. The majority of trees were either too young or did not conform in any way to the standard scarring morphology accepted for Aboriginal modification (cf. Long 2005).

The proposed realignment of a section of Nerriga Road into relatively undisturbed land within Lot 7 DP 755964 and Lot 2 DP 830605 adjacent to the Ningee Nimble Creek was identified in the desktop assessment as an area of archaeological sensitivity. The field inspection of the proposed realignment of this section of Nerriga Road noted that the landforms included a spur which sloped gently down to the east from a hill crest with extensive outcropping towards the Ningee Nimble Creek. A very steep rocky escarpment was adjacent to the Ningee Nimble Creek on the western portion of Lot 2 DP 830605 where the proposed alignment detours from the existing road corridor. The very steep slope (45-70 degrees) of the escarpment and dense outcropping would not make the portion of the road to be realigned within Lot 2 DP 830605 conducive to camping by Aboriginal people however the area may have been used to source local stone material which appears to be a siltstone. Consequently, the outcroppings within the proposal area were visually inspected however no evidence of quarrying or Aboriginal objects were identified. Given the extensive outcropping of bedrock within the proposed road realignment within Lot 2 DP 830605 this area was deemed to have low potential for subsurface deposits.

Visibility within Lot 7 DP 755964 was notably less than the surrounding proposal area, averaging 10%, with a low dense grass cover that appeared to be relatively unaffected by the recent fires. The spur within Lot 7 DP 755964 was noted to slope gently down from the spur in an easterly direction towards the Ningee Nimble Creek at a gradient between 5-12 degrees. While no surface evidence of Aboriginal objects was identified during the visual inspection of the proposal area within Lot 7 DP 755964 an area of Potential Archaeological Deposit (PAD) was identified to have moderate archaeological sensitivity as shown in Figure 6-1. The PAD was recorded along relatively flat ground and along a low gradient slope of the spur in close proximity to Ningee Nimble Creek which was determined to likely have been conducive for Aboriginal camping. The inspection of the stratigraphic profile of the creek also showed an upper layer of up to 20 cm of a dark grey deposit with underlaying yellow orange clays. Consequently, an area of PAD within the proposal area in Lot 7 DP 755964 was deemed to have potential to contain subsurface Aboriginal objects which will require subsurface testing to establish the archaeological potential and extent of sites along this landform.

The remaining sections of the proposal area which were in close proximity or intersected by water courses were also visually inspected. These areas, beyond the PAD recorded in Lot 7 DP 755964, were noted to be significantly eroded and highly disturbed by the construction and maintenance of the existing road corridor. The other landforms within the proposal area, outside the existing road corridor, were noted to have very high visibility and generally be highly eroded. Due to the level of erosion in the area there was very little if any topsoil remaining across the majority of the proposal area with orange yellow clay soils noted throughout. The lack of topsoil across the majority of the proposal area outside the road corridor was noted to likely be the result of the recent fire destroying the vegetation cover and subsequent heavy rains washing down the previously thin and shallow soil deposits on the slopes. No Aboriginal objects or additional areas of potential for subsurface deposits were identified within the proposal area beyond the PAD recorded in Lot 7 DP 755964.

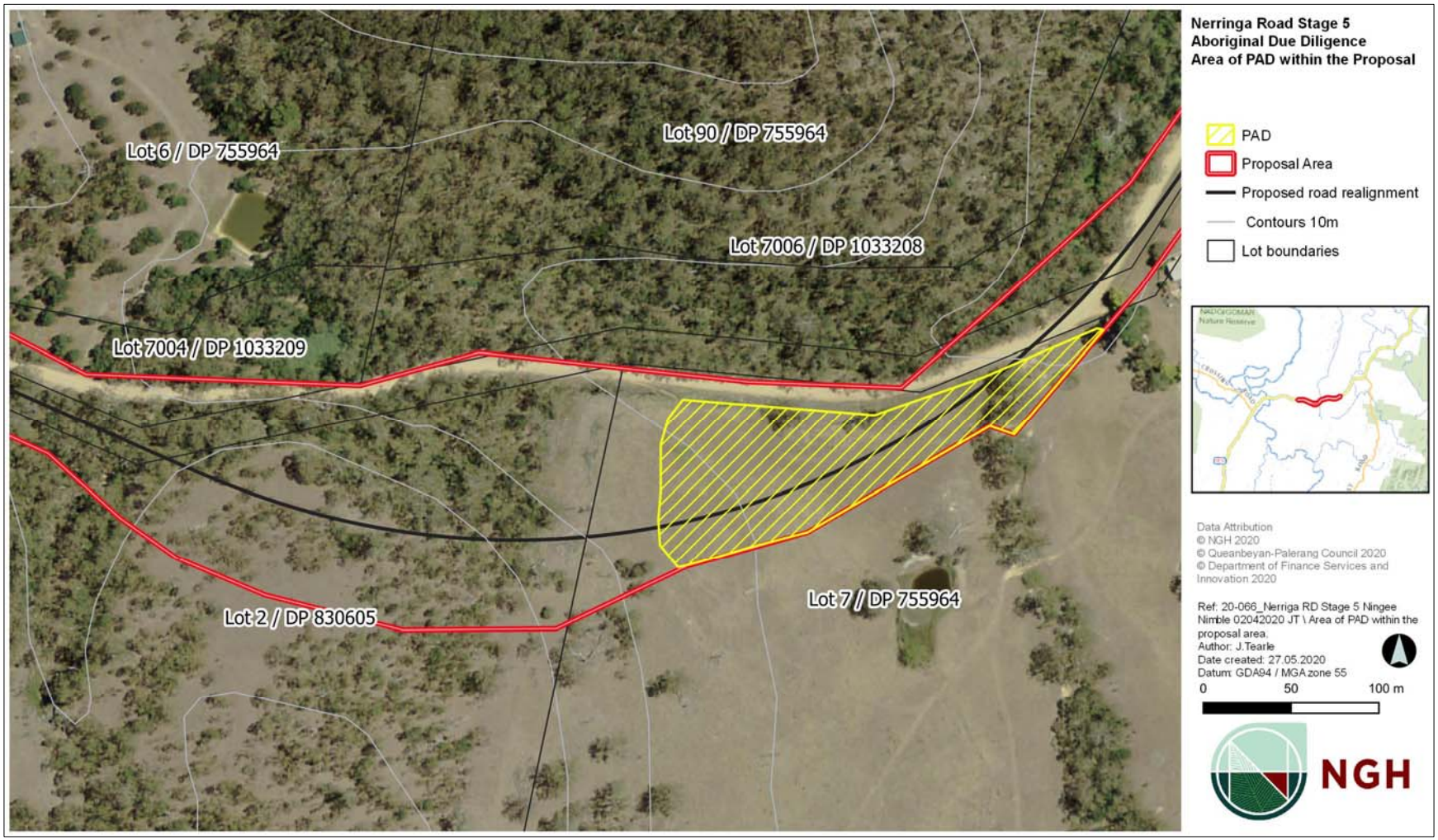

Figure 6-1 Area of PAD within the proposal area.

Plate 1. View of existing culverts along the road corridor with surrounding burnt sclerophyll forest.

Plate 2. View east from the intersection with Haughton Road with the cutting through crest in the background.

Plate 3. View south west along road corridor showing secondary cut into the slope for drainage and bank stabilisation within the road reserve.

Plate 4. View west along the road reserve showing high visibility due to burnt ground cover.

Plate 5. View east along the existing Nerriga Road showing grading and maintenance works, note the yellow underground Telstra services pole in the far left hand side in the background of the image.

Plate 6. View east of cutting into crest and highly disturbed road reserve.

Plate 7. View of north-east of existing culverts along the road corridor near Ningee Nimble Creek.

Plate 8. View east along the existing Nerriga Road in the western most portion of the proposal area showing existing grading and maintenance disturbance.

Plate 9. View north from the crest with outcropping in Lot 2 DP 830605 along the proposed road realignment showing steep slope down to the existing road corridor.

Plate 10. View east near the boundary lot between Lot 2 DP 830605 and Lot 7 DP 755964 looking down towards the creek from the outcroppings.

Plate 11. View east within Lot 7 DP 755964 down the spur towards Ningee Nimble Creek and the PAD area.

Plate 12. View west within the proposed realignment of Nerriga Road within Lot 7 DP 755964 in the PAD area.

Plate 13. View west within Lot 7 DP 755964 along the proposed realignment from Ningee Nimble Creek across to the PAD area.

Plate 14. View high visibilty in the propsoal area due to recent fire and lack of topsoil in the road reserve area from erosion.

Plate 15. View of slope and high visibilty in the propsoal area due to recent fire. Note the lack of topsoil from errosion.

Plate 16. View of alluvial soils in drainage depressions which have eroded down the slopes adjacent to the proposal area.

7 FURTHER ASSESSMENT

Step 5. Is further investigation or impact assessment required?

The Due Diligence Code of Practice states that if, after the desktop research and visual inspection is completed, it is evident that harm will occur to Aboriginal objects or heritage places then further and more detailed assessment is required. However, if the research and inspection conclude that there are no, or unlikely to be any objects impacted by the proposed activity, then the activity can proceed with caution.

The field assessment identified an area of potential archaeological deposit (PAD) within the section of Nerriga Road proposed to be realigned through Lot 7 DP 755964. The area of PAD within Lot 7 DP 755964 which is intersected by the proposed road realignment and upgrade works would require subsurface testing to establish the true archaeological potential, nature and extent of Aboriginal sites in this area. To conduct subsurface testing, an Aboriginal Cultural Heritage Assessment (ACHA) will be required to be completed in line with the Guides and Codes of practice provided by DPIE and include full Aboriginal consultation.

To negate the need to conduct further archaeological assessment of the PAD area as shown in Figure 6-1 Council would need to redesign the proposed road realignment to avoid the PAD within Lot 7 DP 755964 and stay within the area assessed in this report.

Works within the proposal area, as assessed in this report, which are outside the PAD do not require further heritage investigation and works can proceed with caution.

8 RECOMMENDATIONS

The following recommendations are based on a number of considerations including:

- Background research into the area;
- Landscape assessment;
- Field inspection;
- Consideration of the proposed works, and
- Legislative context.

It is recommended that:

1. Works within the proposal area that are outside the PAD within Lot 7 DP 755964, can proceed with caution.
2. For works to proceed in the PAD area a programme of limited subsurface testing to establish the true archaeological potential and extent of archaeological sites within the works area is required by undertaking an Aboriginal Cultural Heritage Assessment (ACHA). All subsurface testing must comply with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW.* If Aboriginal objects were recovered during the testing programme an Aboriginal Heritage Impact Permit (AHIP) must be obtained from the Department of Planning, Industry and Environment (DPIE).
3. To negate the need to conduct further archaeological assessment of the PAD the Queanbeyan Palerang Council would need to redesign the proposed road realignment to avoid the PAD within Lot 7 DP 755964 and stay within the area assessed in this report.
4. Any activity proposed outside of the current assessment area should also be subject to an Aboriginal heritage assessment
5. If any items suspected of being Aboriginal in origin are discovered during the works, outside a valid AHIP area, all work in the immediate vicinity must stop and DPIE notified. The find will need to be assessed and if found to be an Aboriginal object an AHIP may be required.
6. Queanbeyan Palerang Council is reminded that it is an offence under the *NSW National Parks and Wildlife Act 1974* to disturb, damage or destroy and Aboriginal object without a valid Aboriginal Heritage Impact Permit.

9 REFERENCES

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