# Review of Environmental Factors

## Freemantle Road Culvert Rectification

**Prepared for Keech Constructions**

**August 2023**

The Environmental Factor

# Review of Environmental Factors Freemantle Road Culvert Rectification, Eglinton

Document control:

| Revision | Author/s | Internal Review & QA | Date Submitted | Client Review and Approval | |
|---|---|---|---|---|---|
| | | | | Name | Date |
| **0.1** | B Perrott, K Farrell, A Muir | G Stirling, E Cotterill | 18/08/2023 | P Benson (BRC), B and A Keech (Keech Constructions Pty Ltd) | 23/08/2023 |
| **1.0** | E Cotterill | | 31/08/2023 | | |
| | | **Endorsed by CEnvP** | E Cotterill (522) | | |

**EnviroFact Pty Ltd, T/A The Environmental Factor**
**P.O. Box 268 Bathurst NSW 2795**
**ABN: 37 607 339 131**
www.envirofact.com.au

This Report has been prepared by The Environmental Factor (TEF) on behalf of Bathurst Regional Council (BRC or Council) to assess the matters affecting or likely to affect the environment by reason of the proposed rectification of the Freemantle Road Culvert in Eglinton, NSW. This document is not intended to be utilised or relied upon by any persons other than BRC, nor to be used for any purpose other than that articulated above. Accordingly, TEF accepts no responsibility in any way whatsoever for the use of this report by any other persons or for any other purpose.

The information, statements, recommendations, and commentary (together the "Information") contained in this report have been prepared by TEF from material provided by BRC and from material provided by the NSW Department of Planning and the Environment (DPE) and the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW), and through the assessment process.

This report has been developed in accordance with the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act), the *NSW Environmental Planning and Assessment Regulation 2021* (EP&A Regulation) and the Department of Planning and Environment's (DPE) Guidelines for Division 5.1 assessments (DPE Guidelines) and demonstrates how the environmental factors specified in clause 171(2) of the EP&A Regulation were taken into account when considering the likely impact of the proposed activity. TEF has not sought any independent confirmation of the reliability, accuracy, or completeness of this information. It should not be construed that TEF has carried out any form of audit of the information which has been relied upon.

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# Abbreviations

| Abbreviation | Description |
|---|---|
| **ADD** | Aboriginal Due Diligence |
| **AHIMS** | Aboriginal Heritage Information Management System |
| **AOBV** | Area of Outstanding Biodiversity Value |
| **ASS** | Acid Sulphate Soils |
| **Avg.** | Average |
| **BAM** | Biodiversity Assessment Method |
| **BC Act** | *Biodiversity Conservation Act 2016* |
| **BC Regulatory Act** | *Biodiversity Conservation Regulatory Act 2017* |
| **Biosecurity Act** | *NSW Biosecurity Act 2015* |
| **BOM** | Bureau of Meteorology |
| **BOS** | Biodiversity Offset Scheme |
| **BRC or Council** | Bathurst Regional Council |
| **BVM** | Biodiversity Values Map |
| **CEEC** | Critically Endangered Ecological Community |
| **CEMP** | Construction Environmental Management Plan |
| **CL Act** | *Crown Lands Act 1989* |
| **DA** | Development Application |
| **DAWE** | Department of Agriculture Water and the Environment (now DCCEEW) |
| **DCCEW** | Department of Climate Change, Energy, Environment and Water |
| **DECC** | Department of Energy and Climate Change |
| **DPI** | Department of Primary Industries |
| **DPE** | Department of Planning and Environment (formerly DPIE and OEH) |
| **EEC** | Endangered Ecological Community |
| **ECP** | Environmental Control Plan |
| **EIS** | Environmental Impact Statement |
| **EPA** | Environmental Protection Authority |
| **EPBC Act** | *Environmental Protection and Biodiversity Conservation Act 1999* |
| **EP&A Act** | *Environmental Planning and Assessment Act 1979* |
| **EP&A Regulation** | *Environmental Planning and Assessment Regulation 2021* |
| **ERSED** | Erosion and Sediment |
| **ESD** | Ecologically Sustainable Development |
| **FFA** | Flora and Fauna Assessment |
| **FM Act** | *Fisheries Management Act 1994* |
| **GBD** | General Biosecurity Duty |
| **GHG** | Greenhouse Gasses |
| **ha** | Hectare |

| Abbreviation | Description |
|---|---|
| **Heritage Act** | *Heritage Act 1997* |
| **IBRA** | Interim Biogeographic Region of Australia |
| **ICNG** | Interim Construction Noise Guidelines |
| **KFH** | Key Fish Habitat |
| **LALC** | Local Aboriginal Land Council |
| **LEP** | Local Environmental Plan |
| **LGA** | Local Government Area |
| **LLS** | Local Land Services |
| **LLS Act** | *Local Land Services Act 2016* |
| **LLSA Act** | *Local Land Services Amendment Act 2016* |
| **LOO** | Likelihood of Occurrence |
| **MNES** | Matters of National Environmental Significance |
| **NPW Act** | *National Parks and Wildlife Act 1974* |
| **NPWS** | National Parks and Wildlife Service |
| **NSW** | New South Wales |
| **NVR** | Transitional Native Vegetation Regulatory Map |
| **OEH** | Office of Environment and Heritage (now DPE) |
| **PAD** | Potential Archaeological Deposit |
| **POEO Act** | *Protection of the Environment Operations Act 1997* |
| **RCP** | Representative Concentration Pathway |
| **RF Act** | *Rural Fires Act 1997* |
| **RFS** | Rural Fire Service |
| **SAII** | Serious and Irreversible Impacts |
| **SEPP** | State Environmental Planning Policy |
| **SIC** | Significant Impact Criteria |
| **SIS** | Species Impact Statement |
| **SoHI** | Statement of Heritage Impact |
| **SWMP** | Soil and Water Management Plan |
| **TBC** | To be confirmed |
| **TEC** | Threatened Ecological Community |
| **TEF** | The Environmental Factor |
| **TfNSW** | Transport for NSW |
| **TMP** | Traffic Management Plan |
| **WM Act** | *Water Management Act 2000* |
| **WoNS** | Weed of National Significance |

# Executive Summary

This Review of Environmental Factors (REF) has been prepared by The Environmental Factor (TEF), on behalf of Bathurst Regional Council (BRC or Council) to present findings of the investigations undertaken into matters affecting or likely to affect the environment by reason of the proposed rectification of the Freemantle Road culvert in Eglinton, NSW (hereafter 'the Proposal'). Heavy rain and storms experienced in November 2022 led to the collapse of an approximately 100m section of road that crosses Kelloshiel Creek. Scouring and erosion from excessive flow of stormwater during the flooding event resulted in the collapse of the culvert and a section of the road surface such that the previous crossing point, a heritage listed stone bridge upstream of the damaged road, had to be resurfaced to act as a temporary detour over the waterway. The Proposal involves the construction of a retaining wall, backfilling with material to reestablish the previous road level, reconstruction of the culvert, deposition of large boulders to create an energy dissipating rock apron, reestablishment of a drivable road surface over Kelloshiel Creek and removal of the current diversion route. The works would occur within Council owned and managed road reserve and an adjacent private property (Lot 31 DP1147371) on the outskirts of Eglinton, NSW.

This report has considered to the fullest extent possible the environmental impacts with potential to arise from the Proposal within the framework of Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), and has considered:

- Impacts on Matters of National Environmental Significance (MNES) under the *Environmental Protection and Biodiversity Act 1999* (EPBC Act) (refer Section 4.7, Appendix B).
- Matters affecting or likely to affect the environment in accordance with s5.5 of the *Environmental Planning & Assessment Act 1979* (EP&A Act) and cl 171(2) of the *Environmental Planning and Assessment Regulation 2021* (EP&A Regulation) (refer Section 3.2.4).
- Impacts on threatened species in accordance with s7.8 of the *Biodiversity Conservation Act 2016* (BC Act) and Part 7A Division 12 of the *Fisheries Management Act 1994* (FM Act) (refer Sections 3.2.1, 3.2.5 and Appendix B).

This report identifies where proposed construction works and operation of the rectified culvert, retaining wall, road surface and rock apron could impact the surrounding environment. The works would occur in a diverse landscape, with surrounding land consisting of a combination of remnant native and exotic vegetation, a 3rd order named waterway (Kelloshiel Creek), rural properties, and agricultural land.

Given the requirement for excavation works within and immediately adjacent to a waterway, Apex Archaeology were employed to complete an Aboriginal Due Diligence (ADD) assessment. The Aboriginal Heritage Information Management System (AHIMS) database identified that no sites occurred within the study area or within 500m of the subject site. The ADD report concludes that Aboriginal objects or intact archaeological deposits are unlikely to be impacted by the Proposal and an Aboriginal Heritage Impact Permit (AHIP) is not required.

Local, Commonwealth and NSW State historic heritage registers were consulted as part of preparation of the REF. The Bathurst Local Environmental Plan (LEP) identified one (1) item, the Kelloshiel Creek Stone Bridge within the study area and one (1) item, 'Kelloshiel' located 300m to the south-east of the subject site. Following closure of the damaged section of Freemantle Road, the heritage listed Kelloshiel Creek Stone Bridge was temporarily sealed with bitumen and is now currently being used as a detour around the damaged section of road. The bridge is located outside of the subject site and will be delineated from the direct impact area with

erection of fencing and flagging. All construction workers will be inducted on-site to ensure they are aware of the necessary precautions required to work within the vicinity of this heritage item. Once the road is reopened, the temporary bitumen surface will be removed, and the heritage item will be returned to its previous condition with no permanent modifications or upgrades to the bridge included in the Proposal. No specialised assessment of the potential impact on heritage listed items was completed as part of preparing this REF. Council may consider recruiting a heritage specialist to prepare a Statement of Heritage Impact (SoHI) to give further consideration to the potential for impacts on this local heritage item. If the construction methodology or assessed impact footprint (subject site) are amended, re-assessment of the potential impacts to heritage items would be required.

Kelloshiel Creek, which is mapped as supporting Key Fish Habitat (KFH) occurs within the subject site. A roadside drainage line along the southern side of Freemantle Road enters Kelloshiel Creek from the west; the drainage line along with the creek and its tributaries form an ephemeral catchment which was subject to significant waterflows and erosion during the November flooding event. Fish passage through the culvert towards the upper catchment area is currently blocked due to erosion and scouring of the creek bed, which has resulted in an approximately 1.2m drop from the base of the culvert to the waterway below. The construction of the rock apron below the culvert is expected to reestablish fish passage during high flow events only. The Proposal includes dredging and reclamation works within a waterway mapped as containing KFH and as such a Part 7 permit from DPI - Fisheries must be obtained prior to commencement.

The subject site supports limited native fauna habitat due to its location situated in a highly disturbed and heavily cleared agricultural landscape; vegetation in the study area is dominated by exotic flora and environmental weeds. Fauna observed during surveys were limited to highly mobile bird species and common disturbance tolerant frog species. Minimal native flora was identified during surveys due to the invasion and dominance of exotic weed species. It has been determined within the project Flora and Fauna Assessment (FFA) (Appendix B) and Section 4.7 of this report, that no threatened species, ecological communities, populations or their habitats listed under either the EPBC Act or the BC Act are considered likely to be significantly impacted by the Proposal.

The Proposal is located approximately 1.6 km north of the Macquarie River - Wambuul, which is part of the larger Macquarie-Darwon catchment within the Murray-Darling basin. There are a number of relevant water quality objectives that require consideration, including but not limited to: aquatic ecosystems; visual amenity; livestock water supply; homestead water supply; irrigation water supply; and drinking water at point of supply. Potential impacts to downstream surface waters during construction relate directly to potential erosion and increased sedimentation during construction works. Environmental Safeguards to reduce the risk of release of sediment into the waterway are provided in this REF.

All work will be completed under the guidance of a Construction Environmental Management Plan (CEMP) to manage potential environmental impacts associated with the work. Once operational, the Proposal is not expected to cause any significant environmental or community impacts. The Proposal is anticipated to have positive socio-economic benefits for the local community, through the rectification to a road used to access rural properties on the outskirts of Bathurst.

Given the nature, scale, and extent of impacts, and assuming strict implementation of the measures outlined in this REF, the Proposal is **unlikely to have a significant adverse impact** on the environment. It is considered that all matters affecting or likely to affect the environment by reason of the Proposal have been considered as required by s5.5 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

# 1 Introduction

The Environmental Factor (TEF) has been engaged by *Keech Constructions on behalf of* Bathurst Regional Council (BRC or Council) to present findings of the investigations undertaken into matters affecting or likely to affect the environment by reason of the proposed rectification to the Freemantle Road culvert in Eglinton, NSW (hereafter 'the Proposal'). The works would occur within Council owned and managed road reserve and an adjacent private property (Lot 31 DP1147371) on the outskirts of Eglinton, NSW in the Bathurst Regional Council Local Government Area (LGA). The Proposal involves the rectification of a section of Freemantle Road where it crosses Kelloshiel Creek after heavy rain and flooding in November 2022 resulted in the collapse of the culvert and the road surface above.

The following chapters describe the project background, as well as the overarching objectives and principles that have guided the Proposal. A detailed Proposal Description is provided in Section 2. Concept design plans have been provided to display the location of the proposed construction area and works methodology (Appendix A).

## 1.1 Proposal Background

Freemantle Road is a Council managed road that provides the only practical access into Bathurst from rural areas such as Mount Rankin and Billywillinga. Heavy rain and flooding experienced on the 14th of November 2022 led to a culvert failure and subsequent collapse of the road surface above. Scouring and erosion from excessive turbulent water flows led to the collapse of the concrete pipe culvert leading to subsidence of the road surface above, which then washed into the waterway below. To maintain access along the road following the incident, Council constructed a temporary detour across the Kelloshiel Creek Stone Bridge, which until 2010 when the current waterway crossing was constructed, served as the only crossing point for road users. The temporary diversion has reduced the road section to a single lane with a reduced speed limit and traffic lights, which has resulted in inconvenience to road users and an ongoing safety concern, particularly during foggy mornings when poor visibility makes driving across a single lane bridge precarious. In addition, Kelloshiel Stone Creek bridge is a listed heritage item on the Bathurst LEP; the detour currently presents a risk of damage to the bridge from regular vehicle crossings.

The Proposal involves the construction of a retaining wall, backfilling with material to reestablish the previous road level, reconstruction of the culvert, deposition of large boulders to create an energy dissipating rock apron, reestablishment of a drivable road surface over Kelloshiel Creek and removal of the current diversion route over the heritage listed bridge.

The proposed works are planned to commence in October 2023 with the construction time estimated to be approximately 12-14 weeks.

### *1.1.1 Proposal objectives*

The primary objective of the Proposal is to restore the road to its existing alignment through the rectification of the culvert and road surface such that the existing 2-lane, 100 kmph speed limit road section over Kelloshiel Creek is restored to its original specifications.

The secondary objective is to achieve this primary goal with minimal impact to the surrounding natural and built environment and with minimal disruption to surrounding residents and businesses.

Project objectives will be achieved thorough delivery of a comprehensive community consultation and stakeholder engagement plan, pre-commencement impact boundary delineation and careful design and construction methodology to minimise potential impacts to the surrounding community and natural environment. Council will complete ongoing engagement and communications with residents and businesses adjacent to the construction area, pre-clearing survey and site inductions for work personnel, in combination with implementation of the Environmental Safeguards provided in this report.

## 1.2 Terms and definitions

The terms used throughout this report are outlined in Table 1 below.

**Table 1 Terms and definitions**

| Term | Definition |
|---|---|
| **Subject Site** | The maximum area to be directly affected by the Proposal, including earthworks, vegetation clearing, instream works and any proximal areas that could be directly impacted by the Proposal. This equates to a direct impact area of 0.46 ha (Figure 2).<br><br>Note: a total direct impact footprint of maximum 30 m width has been assigned, to account for the temporary holding pool and works area within the existing road corridor (which includes stockpile area, site office and vehicle washdown facilities). This forms a construction corridor along a 200m section of Freemantle Road. Details of this are shown in Figure 2. |
| **Study Area** | Includes the subject site (as described above) and any proximal areas that could be potentially indirectly impacted by the Proposal (assumed to be restricted to a 50 m buffer surrounding the Subject Site) and an extended buffer downstream of 100m. This equals a total impact area (direct and indirect) of **2.87 ha**. |
| **The Locality** | The area within 10 kilometres of the Subject site |

# 2 Proposal Description

The Proposal, as assessed herein, consists of rectification to the Freemantle Road culvert following flood damage in November 2022. The following sections provide further detail on relevant aspects of the Proposal including design development, options selection and proposed construction and operation activities as they apply to the Proposal.

Civil engineering drawings have been included as Appendix A.

**Table 2 Site details**

| Site details | Description |
|---|---|
| **Lot and DP** | Lot 31 / DP 1147371<br>Lot 1 / DP1074494<br>Lot 21 / DP1165391<br>Lot 114 / DP1216809<br>Lot 1 / DP634117<br>Lot 1 / DP633355 |
| **Closest crossroad(s)** | Freemantle Road<br>Mill Lane (east)<br>Mt Rankin Road (west) |
| **Land zoning** | RU1 – Primary Production<br>R5 – Large Lot Residential |
| **IBRA region** | South Eastern Highlands |
| **IBRA sub region** | Bathurst |

## 2.1 Design principles

The core principles for the design and operation of the Proposal are to restore the damaged section of road as per its original alignment such that it complies with all applicable Council and State road regulations and guidelines.

## 2.2 Justification for the proposed works

Heavy rain and storms experienced on the 14th of November 2022 led to the collapse of an approximately 100m section of Freemantle Road where it crosses Kelloshiel Creek. Following 70mm of rainfall in a short period, scouring and erosion from excessive flow of stormwater resulted in the collapse of the culvert and a portion of the road surface above.

In response, Bathurst Regional Council diverted traffic over the Kelloshiel Creek Stone Bridge which is currently providing a single lane of traffic flow controlled by traffic lights. This diversion is providing a single lane, reduced speed limit crossing point over the creek for residences and businesses, which has resulted in inconvenience to road users and an ongoing safety concern, particularly during foggy mornings when poor visibility makes driving across a single lane bridge precarious. In addition, the use of a heritage listed bridge as a diversion route is not considered a long-term option as it presents a risk of vehicle collision and damage to an important local heritage item.

## 2.3 Options considered

Council considered the following options for these works:

1) Rectify the existing road alignment, as detailed in Appendix A
2) Construct a new road adjacent to the existing alignment, or
3) Do nothing and leave the road in its current condition.

Council elected to proceed with Option 1, to repair the culvert and rectify the road to its existing alignment thus improving safety for road users and removing the current single lane diversion. Option 2 was rejected as it would require considerable cost, a greater level of environmental impact and likely require acquisition of private property to expand the existing road corridor, which would take more time to achieve stated project objectives and result in inconvenience to both Council, adjacent properties and road users. The road is an important piece of infrastructure for the local community, therefore proceeding with option 3 - allowing it to remain impassable and maintaining the current diversion route - is not considered a viable option. Thus, Option 1 was considered the safest, most practical and economic option for the community, Council and its ratepayers.

## 2.4 Construction and Operation

The following sub-chapters describe the intended construction and operation methodologies that will be implemented as part of the Proposal.

### *2.4.1 Description of construction works*

Council is proposing the following works:

- Site delineation including marking out setbacks for the Kelloshiel Creek Stone Bridge heritage item.
- Establishment of a site office, stockpile area, vehicle washdown facility and erection of security fencing.
- Installation of all Erosion and Sediment (ERSED) control structures.
- Debris removal including the removal of concrete pipe from within the waterway.
- Establish of a dry works area to allow construction of retaining wall, which would include:
    - Installation of sheet piling to block flow of waterway upstream of the works area.
    - Creation of a temporary holding dam between the diversion crossing and the existing culvert
    - Installation of a pumping system to allow water to be pumped from the temporary holding dam back into the creek downstream of the dry works area, thus maintaining waterway flows for the duration of works.
- Excavation of the creek bed down to the required design levels.
- Deposition of material including DGB 20 and 150 rock to bring the site up to design height.
- Installation of new form reinforced footings for headwall and retaining walls.
- Installation of new pipes to reinstate the culvert.
- Installation of fiberglass reinforced polymer (FRP) retaining wall – approximately 104 m in length.
- Deposition of large boulders of DN 1000 (mm) directly downstream of the newly installed culvert to create a energy dissipating rock apron to dissipate flow velocities and reduce risk of erosion and undercutting during future flooding events. Smaller diameter rocks to be placed over the top and in gaps to solidify the rock armouring apron as needed.
- Backfill the retaining wall to reinstate desired road surface level

- Resurface the road as per State and Council requirements and install safety barriers and signage.
- Removal of all ERSED controls, temporary fencing, waste material and vehicle washdown area and site compound.
- Site stabilisation/restoration works as required.
- Removal of sheet piling, temporary holding dam and pump equipment to reinstate natural flows within the creek.

Machinery proposed to be utilised for the works will include:

- Work vehicles
- Backhoe
- Rollers
- Compactors
- Concrete trucks
- Line marking vehicles
- Grader
- Dump truck
- Water tanker
- Vibrating rollers
- Bitumen sprayer

### *2.4.2 Operation of the Proposal*

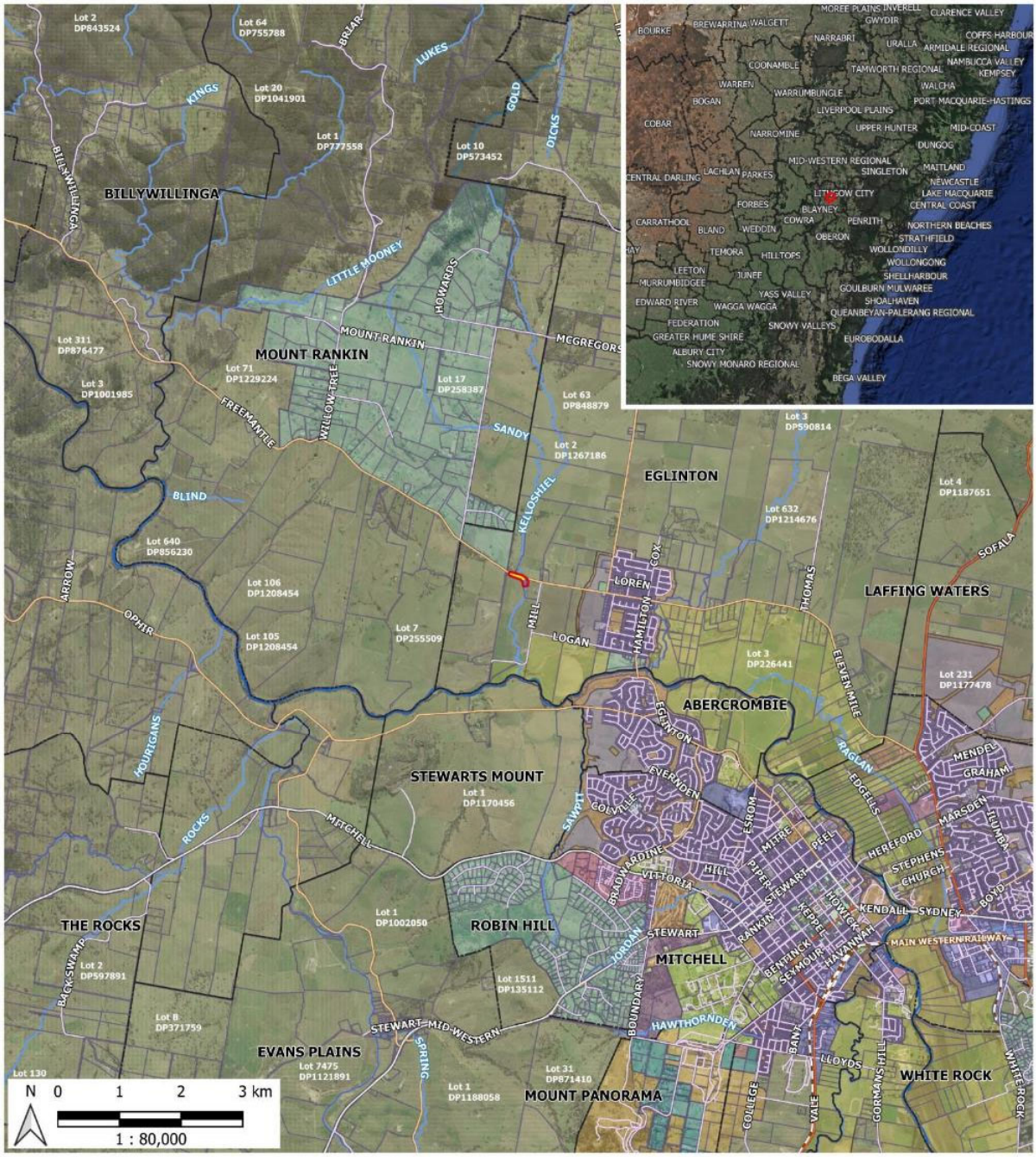
The operational phase of the Proposal, considered as part of this REF, includes assessment of impacts associated with use of the rectified section of road once construction and site stabilisation/restoration works are complete including culvert, resurfaced road and any cumulative impacts the Proposal is likely to have on renewable and finite resources in terms of sustainability, ecology, climate change and community.

## 2.5 Environmental safeguards

Throughout the environmental impact assessment undertaken in relation to the above Proposal, potential impacts on the environment were identified in relation to the following environmental 'categories':

- Applicable Acts and legislation
- Soils and Erosion
- Waterways
- Noise and Vibration
- Air Quality and Odour
- Non-Aboriginal Heritage
- Aboriginal Heritage
- Biodiversity
- Traffic and Transport
- Socio-economic Considerations
- Waste and Resource Use
- Visual Amenity
- Climate Change

Environmental Safeguards were then developed to address each of the identified impacts, to ensure that the residual impact upon the environment would not be significant. These Safeguards act as 'conditions of consent' for the Proposal and must be implemented as part of Proposal delivery (summary of which is provided in Section 5 of this report). With these environmental protection measures, the Proposal does not have the potential to result in significant impacts within the above categories, which would have environmental, social and economic consequences for Council, as the consent authority for these works.




**Keech Constructions Freemantle Road Culvert, Eglington, NSW - Study Area**

**Legend**

- Study Area
- Subject Site
- Suburb Boundary
- Lot Boundary

**Roads**

- Arterial Road
- Local Road
- Primary Road
- Sub Arterial Road

**Waterways**

- Creek
- River
- 1st & 2nd order; unnamed waterways

**Land Zoning**

- B1 - Neighbourhood Centre
- B3 - Commercial Core
- B5 - Business Development
- E2 - Environmental Conservation
- IN1 - General Industrial
- R1 - General Residential
- R2 - Low Density Residential
- R5 - Large Lot Residential
- RE1 - Public Recreation
- RE2 - Private Recreation
- RU1 - Primary Production
- RU2 - Rural Landscape
- RU4 - Primary Production Small Lots
- SP1 - Special Activities
- SP2 - Infrastructure
- SP3 - Tourist
- W2 - Recreational Waterways



**Figure 1 Regional context and land zoning**


**Figure 2 Study area and subject site**

# 3 Legislative Context

The following legislation, policies and guidelines applicable to the REF have been reviewed, and the implications have been assessed accordingly as part of this REF.

## 3.1 Commonwealth (Federal) Legislation

### *3.1.1 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*

The EPBC Act ensures that actions likely to cause a significant impact on Matters of National Environmental Significance (MNES) undergo an assessment and approval process. Under the EPBC Act, an action includes a Proposal, undertaking or activity. An action that 'has, will have or is likely to have a significant impact on a matter of national environmental significance' is deemed to be a 'controlled action' and may not be undertaken without prior approval from the Australian Government Minister for the Environment (the 'Minister').

MNES include:

- World Heritage properties
- National Heritage places
- Wetlands of international importance
- Listed threatened species and ecological communities
- Listed migratory species
- Commonwealth marine areas
- Nuclear actions
- A water resource, in relation to coal seam gas development and large coal mining development.

The EPBC Act has been addressed in the current assessment through:

- Desktop review to determine the MNES that are predicted to occur within the locality of the proposed scheme and hence could occur, subject to the habitats present.
- General field surveys for threatened biota and migratory species listed under the Act.
- Identification of suitable impact mitigation and environmental management measures for threatened biota, where required.
- Assessment of potential impacts on MNES, if appropriate.

Potential impacts on relevant MNES must be subject to Tests of Significance pursuant to the EPBC Act Significant Impact Guidelines (DEWHA 2009). If a significant impact is considered likely, a referral under the EPBC Act must be submitted to the Commonwealth Minister for Environment.

Where applicable, Significant Impact Criteria Assessments were completed for EPBC Act listed biota considered at risk of impact as part of the Proposal (See Flora and Fauna Assessment, Appendix B).

This REF addresses the likelihood of MNES occurring within the locality of the proposed activity, and their potential to be impacted by the proposed activity (refer Section 4.7 and Appendix B). No MNES are likely to be significantly impacted by the Proposal.

## 3.2 State (NSW) Legislation, Policies and Guidelines

### *3.2.1 Biodiversity Conservation Act 2016 (BC Act)*

Section 7.2 and 7.8 of the Biodiversity Conservation Act 2016 (BC Act) states that the determining authority must consider the effect of an activity on:

- Areas of Outstanding Biodiversity Value (AOBV), and/or
- Species, populations or ecological communities, or their habitats and whether there is likely to be a 'significant effect' on those species, populations or ecological communities.

The BC Act provides legal status for biota of conservation significance in NSW. It provides a framework for the Biodiversity Assessment Method (BAM) and the calculation of offset requirements for Proposals participating in the Biodiversity Offset Scheme (BOS).

The BC Act aims to:

- Conserve biological diversity on a bioregional and state scale,
- Lists Areas of Outstanding Biodiversity Value (AOBV),
- Assess the extinction risk of species and ecological communities,
- Identify Key Threatening Processes,
- Slow the rate of biodiversity loss, and
- Conserve threatened species.

Section 4.7 and Appendix B of this REF addresses potential impacts to threatened species and Threatened Ecological Communities (TEC) covered under the BC Act.

### *3.2.2 Biodiversity Conservation Regulatory Act 2017 (BC Regulatory Act)*

The *Biodiversity Conservation Regulation 2017* provides a number of considerations and practices to be implemented as part of the BC Act, as follows:

- Identifies clearing thresholds and the Biodiversity Values Map for the application of the Biodiversity Offsets Scheme (BOS),
- Outlines principles for serious and irreversible impacts (SAII) to biodiversity,
- Rules for meeting biodiversity offset obligations, and
- Biodiversity certification criteria.

The project is being assessed under Division 5.1 of the EP&A Act, consequently Council is exempt from compulsory participation and can elect to voluntarily participate in the Biodiversity Offset Scheme if desirable.

The following list describes the other triggers which may warrant participation in the BOS, additional to the trigger of the assessment pathway:

1. Biodiversity Values Map- the subject site is within an area mapped as containing biodiversity values (search date 01/08/2023 – see Appendix B).
2. Area Criteria Threshold, and / or
3. Significant impact to threatened species or ecological communities.

Native vegetation clearing thresholds as outlined in Part 7 of the *Biodiversity Conservation Regulation 2017* (Table 3) indicates when a project would need to enter the BOS. According to the below minimum lot sizes and the corresponding native clearing thresholds.

**Table 3 Area criteria - Biodiversity Offset Scheme threshold**

| Minimum lot size | Threshold for clearing (ha) to enter BOS |
|---|---|
| <1 ha | >0.25 |
| 1 ha < 40 ha | >0.5 |
| 40 ha – 1000 ha | >1 |
| >1000 ha | >2 |

As the Proposal is being assessed under Division 5.1 of the EP&A Act, the clearing thresholds for native vegetation are not relevant to this Proposal. However, significant impacts to threatened species may require participation in the BOS with offset credit calculations required. No significant impacts to threatened species or Threatened Ecological Communities are considered likely as a result of the Proposal (Appendix B).

**Areas of Outstanding Biodiversity Value**

The presence of listed Areas of Outstanding Biodiversity Value (BC Act) on site would require participation in the BOS. No listed AOBV occur on site.

### *3.2.3 Crown Land Management Act 2016*

The objectives of the Crown Land Management Act 2016 are:

a) To provide for the ownership, use and management of the Crown Land of NSW, and
b) To provide clarity concerning the law applicable to Crown Land, and
c) To require environmental, social, cultural heritage and economic considerations to be taken into account in decision-making about Crown Land, and
d) To provide for the consistent, efficient, fair and transparent management of Crown Land for the benefit of the people of New South Wales, and
e) To facilitate the use of Crown land by the Aboriginal people of New South Wales because of the spiritual, social, cultural and economic importance of land to Aboriginal people and, where appropriate, to enable the co-management of dedicated or reserved Crown land, and
f) To provide for the management of Crown land having regard to the principles of Crown land management.

Where Crown land is utilised as part of the proposed works, the Proposal proponent must, within 12 months of proposal approval, obtain a license or lease of easement over Crown land in accordance with the CL Act.

No Crown Land has been identified as part of or adjacent to the subject site.

### *3.2.4 Environmental Planning and Assessment Act 1979 (EP&A Act) and Environmental Planning and Assessment 2021 (EP&A Regulation 2021)*

The Environmental Planning and Assessment Act 1979 (EP&A Act) forms the legal and policy platform for the assessment and approval of works in NSW and aims to ensure that public authorities examine and take into

account to the fullest extent possible all matters affecting or likely to affect the environment before they undertake or approve activities that do not require development consent.

All development in NSW is assessed in accordance with the provisions of the EP&A Act and the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation).

The Proposal is being assessed under Division 5.1 of the EP&A Act, as outlined above. In accordance with s 5.5 of the EP&A Act, an REF examines and takes into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the Proposal. In considering the likely impact of the Proposal on the environment, the REF must consider the factors set out in cl 171(2) of the EP&A Regulation.

Section 110 of the EP&A Act defines 'determining authority' as follows:

*'determining authority means a Minister or public authority and, in relation to any activity, means the Minister or public authority by or on whose behalf the activity is or is to be carried out or any Minister or public authority whose approval is required in order to enable the activity to be carried out.'*

The EP&A Act's definition of 'public authority' (section 4) includes: *'(a) a public or local authority constituted by or under an Act'.*

For the purposes of the Proposal, Council is the determining authority in accordance with the EP&A Act.

The duties of the determining authority are set out in section 5.5 of the EP&A Act. Section 5.5 requires that a determining authority *'…examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity.'*

Section 112 provides that a determining authority shall not approve or carry out an activity that is likely to significantly affect the environment or threatened species, populations or ecological communities, or their habitats, unless it has considered an environmental impact statement in respect of the activity. In addition, if the Proposal was to be carried out on an area of outstanding biodiversity value (AOBV), or if the determining authority decides the Proposal would be likely to significantly affect a threatened species, population or ecological community or its habitat, then it must obtain and consider a species impact statement.

This REF has been prepared to consider whether the Proposal would have a significant impact on the environment under Section 5.5 of the EP&A Act. Factors that need to be taken into account when considering the likely impact of an activity on the environment are outlined in clause 228 of the EP&A Regulation.

This REF has identified that the Proposal is not likely to significantly affect the environment (Section 6); as such, Council will not need to obtain and consider an Environmental Impact Statement before it carries out the project (s 5.7 of the EP&A Act).

### *3.2.5 Fisheries Management Act 1994 (FM Act)*

The Fisheries Management Act 1994 (FM Act) aims to conserve threatened species, populations and ecological communities of fish and marine vegetation native to NSW and to promote ecologically sustainable development, including the conservation of biological diversity. It also aims to reduce the threats faced by native fish and marine vegetation in NSW.

Section 220ZZ of the FM Act states that the determining authority must consider the effect of an activity on:

- Areas of Outstanding Biodiversity Value (AOBV) as defined by the BC Act, and

- Species, populations or ecological communities, or their habitats as listed under the FM Act, and whether there is likely to be a 'significant effect' on those species, populations or ecological communities.

The FM Act requires an assessment of whether threatened species of fish and aquatic vegetation, populations or ecological communities are likely to be affected by the Proposal. If a significant impact on a threatened species, population or ecological community is likely, a species impact statement must be completed and consultation with the NSW Department of Primary Industries (Fishing and Aquaculture) is required.

If proposed works are within or adjacent to a waterway that fits the definition of Key Fish Habitat and / or is mapped as Key Fish Habitat, a permit for dredging, reclamation, and / or obstruction of fish passage is required under the FM Act. A permit for work is required under s200 of Part 7 of the FM Act for any work that involves:

- Activities involving dredging and reclamation work (Part 7 permit)
- Activities temporarily or permanently obstructing fish passage (Part 7 permit)
- Using explosives, electrical devices or other dangerous substances in a waterway (Part 2 permit)
- Harming marine vegetation

Permits are required for works within a third order (or higher) streams (based on the Strahler system of stream order classification), and first and second order streams that are known or likely to be habitat for listed threatened species, populations or communities.

The Proposal includes dredging and reclamation works within a 3rd order waterway that is mapped as containing KFH (Figure 7). As such, a Part 7 permit from Fisheries will be required.

### *3.2.6 Heritage Act 1997 (Heritage Act)*

The Heritage Act seeks to identify and protect items of cultural heritage value. The Heritage Council of NSW makes decisions about the care and protection of heritage places and items that have been identified as being significant to the people of NSW.

Automatic protection is afforded to 'relics' under the Heritage Act, defined as 'any deposit or material evidence relating to the settlement of the area that comprised New South Wales, not being Aboriginal settlement, and which holds State or Local significance'. Formerly the Act protected any 'relic' that was more than 50 years old. Now the age determination has been dropped from the Act and relics are protected according to their heritage significance assessment rather than purely on their age.

Excavation of land on which it is known or where there is reasonable cause to suspect that 'relics' will be exposed, moved, destroyed, discovered or damaged is prohibited unless ordered under an excavation permit.

Local, and NSW State historic heritage registers were consulted as part of preparation of this REF document (Section 4.5); two (2) listed heritage sites were found in proximity to the study area including Item No. I121 – Kelloshiel Stone Bridge, and Item No. I124 – Kelloshiel (residential building). Consideration for the potential impact on these items is included in Section 4.5.

### *3.2.7 National Parks and Wildlife Act 1974 (NPW Act)*

The NPW Act provides for the statutory protection of Aboriginal cultural heritage places, objects and features. This legislation aims to protect and preserve Aboriginal heritage values.

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.

Appendix C and Section 4.6 of this REF further addresses potential impacts and assessment undertaken on Aboriginal Heritage associated with the proposed works.

### *3.2.8 NSW Biosecurity Act 2015 (Biosecurity Act)*

The NSW Biosecurity Act 2015 (Biosecurity Act) outlines mandatory measures that persons are to take with respect to biosecurity matters including the management of weeds (Part 2, Division 8 including Weeds of National Significance (WoNS)). Under the Biosecurity Act, the responsibilities for weed management by public and private landholders are consistent, reflecting that weed management is a shared community responsibility. The Act introduces the legally enforceable concept of a General Biosecurity Duty (GBD). Priority weeds are listed within Regional Strategic Weed Management Plans, however the GBD is not restricted to listed weeds.

The Biosecurity Act is administered by NSW Department of Primary Industries (DPI) which determines the weed species covered by regulatory tools including Prohibited Matters, Control Orders and Biosecurity Zones. Existing Local Control Authorities (Councils) continue to be responsible for enforcing weed legislation.

Priority weeds observed on site are described in Appendix B. Council should be aware of, and follow, the requirements outlined in the Central Tablelands Regional Strategic Weed Management Plan 2023 – 2027 (Central Tablelands Local Land Services, 2022).

### *3.2.9 NSW Guidelines for Controlled Activities on Waterfront Land (NSW DPI 2012)*

Any works proposed within the defined riparian zone of a creek are to be carried out in accordance with the WM Act. Works undertaken on waterfront land (i.e., near a river, lake or estuary) require a controlled activity approval under Section 91 of the WM Act, unless defined as exempt.

The subject site is within the defined riparian zone of Kelloshiel Creek, a tributary of the Macquarie River, and impacts within this zone are anticipated. However pursuant to clause 41 of the WM Regulation, Councils, as a public authority, are exempt from section 91E(1) of the WM Act in relation to all controlled activities that it carries out in, on or under waterfront land. While exempt, it is still recommended that Council be aware of and adhere to these guidelines.

### *3.2.10 Protection of the Environment Operations Act 1997 (POEO Act)*

The Protection of the Environment Operations Act 1997 (POEO Act) is administered by the Environment Protection Authority (EPA), which is an independent statutory authority and the primary environmental regulator for NSW. The POEO Act regulates and requires licensing for environmental protection, including for waste generation and disposal, and for water, air, land and noise pollution.

The objects of this Act are as follows—

a) to protect, restore and enhance the quality of the environment in New South Wales, having regard to the need to maintain ecologically sustainable development,
b) to provide increased opportunities for public involvement and participation in environment protection,

c) to ensure that the community has access to relevant and meaningful information about pollution,
d) to reduce risks to human health and prevent the degradation of the environment by the use of mechanisms that promote the following—
    i. pollution prevention and cleaner production,
    ii. the reduction to harmless levels of the discharge of substances likely to cause harm to the environment,
    iii. the elimination of harmful wastes,
    iv. the reduction in the use of materials and the re-use, recovery or recycling of materials,
    v. the making of progressive environmental improvements, including the reduction of pollution at source,
    vi. the monitoring and reporting of environmental quality on a regular basis,
e) to rationalise, simplify and strengthen the regulatory framework for environment protection,
f) to improve the efficiency of administration of the environment protection legislation,
g) to assist in the achievement of the objectives of the Waste Avoidance and Resource Recovery Act 2001.

The Proposal does not constitute activities that are likely to generate significant pollution; however, consideration for the prevention of water, air, land and noise pollution is provided herein (refer Sections 4.2, 4.3, 4.4 and 4.10).

### *3.2.11 Roads Act 1993*

The Roads Act regulates the use and management of public roads. Section 138 of the Roads Act requires that consent of the appropriate Roads Authority is obtained for certain work undertaken in, on or over a public road. Under Section 138 of the Roads Act:

1. A person must not—
    a. Erect a structure or carry out a work in, on or over a public road, or
    b. Dig up or disturb the surface of a public road, or
    c. Remove or interfere with a structure, work or tree on a public road, or
    d. Pump water into a public road from any land adjoining the road, or
    e. Connect a road (whether public or private) to a classified road,

Otherwise, than with the consent of the appropriate roads authority.

2. A consent may not be given with respect to a classified road except with the concurrence of Transport for New South Wales (TfNSW).

Pertaining to the above, Council is the appropriate Roads authority for the road section within the Proposal site and will provide the necessary permits to the contractors prior to work commencing, as required.

Freemantle Road is identified as an unclassified road as per the TfNSW Schedule of Classified Roads and Unclassified Regional Roads. Therefore, no TfNSW roads will be impacted as part of this Proposal.

### *3.2.12 Rural Fires Act 1997 (RF Act)*

The RF Act came into force in 1997 to establish the NSW RFS and define its functions; to make provisions for the prevention, mitigation and suppression of rural fires; to repeal the Bush Fires Act 1949; to amend certain other Acts; and for other purposes. The objectives of this Act are to provide:

a) For the prevention, mitigation and suppression of bush and other fires in local government areas and other parts of the State.
b) For the co-ordination of bush firefighting and bush fire prevention throughout the State, and
c) For the protection of persons from injury or death, and property from damage, arising from fires, and
d) For the protection of infrastructure and environmental, economic, cultural, agricultural and community assets from damage arising from fires, and
e) For the protection of the environment by requiring certain activities referred to in paragraphs (a)–(c1) to be carried out having regard to the principles of ecologically sustainable development described in section 6 (2) of the Protection of the Environment Administration Act 1991.

Section 63(1) and 63(2) of the RF Act stipulate it is the duty of a public authority to take all practicable steps to prevent the occurrence of bush fires on, and to minimise the danger of the spread of a bushfire on or from any land vested in or under its control or management.

There are no bushfire prone land requirements as a result of the Proposal, as the Proposal relates to road infrastructure and there is no bushfire prone land surrounding the Proposal.

### *3.2.13 State Environmental Planning Policy (Transport and Infrastructure) (Transport and Infrastructure SEPP) 2021*

The Transport and Infrastructure SEPP consolidates and repeals the provisions of 4 SEPPS, which includes the previous Infrastructure SEPP (ISEPP) 2007. The SEPP consolidation is administrative, and no policy changes have been made. It has been undertaken in accordance with section 3.22 of the Environmental Planning and Assessment Act 1979. As with the previous version, the Transport and Infrastructure SEPP aims to facilitate the effective delivery of infrastructure across the State, including for:

- Flood mitigation work (Division 7, Clause 2.56)
- Parks and other public reserves (Division 12, Clause 2.73)
- Roads and road infrastructure facilities (Division 17, Clause 2.108)
- Sewerage systems (Division 18, Clause 2.125)
- Soil conservation works (Division 19, Clause 2.132)
- Stormwater management systems (Division 20, Clause 2.136)
- Water supply systems (Division 24, Clause 2.158)
- Waterway or foreshore management activities (Division 25, Clause 2.164)

Each clause of the SEPP provides for development that is permitted without consent.

The Transport and Infrastructure SEPP aims to facilitate the effective delivery of infrastructure across the State. Clause 2.108 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 without consent on any land.*

As the proposed works are appropriately characterised as development under the Transport and Infrastructure SEPP, the provisions of the Transport and Infrastructure SEPP apply. The proposed works can be carried out as activities under Division 5.1 of the EP&A Act. Development consent from Council is not required.

The Proposal is not located on land reserved under the National Parks and Wildlife Act 1974 and does not affect land or development regulated by the Coastal Management Act 2016, State Environmental Planning Policy (Coastal Management) 2018 (which repealed State Environmental Planning Policy No. 14 – Coastal Wetlands, State Environmental Planning Policy No 71 – Coastal Protection and State Environmental Planning Policy No. 26 – Littoral Rainforests) or State Environmental Planning Policy (State Significant Precincts) 2005 (formerly known as State Environmental Planning Policy (Major Proposals) 2005).

### *3.2.14 Water Management Act 2000 (WM Act)*

The Water Management Act 2000 (WM Act), administered by the Water division of NSW Department of Industry - Lands and Water, aims to ensure that water resources are conserved and properly managed for sustainable use benefiting both present and future generations. It provides formal means for the protection and enhancement of the environmental qualities of waterways and their in-stream uses as well as to provide for protection of catchment conditions.

Council is exempt from s 91E(1) under the WM Act for Proposals approved under Division 5.1 of the EP&A Act, in relation to all controlled activities that it carries out in, on or under waterfront land (cl 41 Water Management (General) Regulation 2018). While exempt, it is still recommended that Council be aware of the WM Act and adhere to the associated guidelines.

## 3.3 Community and agency consultation

### *3.3.1 Stakeholder consultation*

Council will liaise with its agency stakeholders and members of the wider community throughout delivery of the construction and operational phases of the Proposal where required. Specifically, BRC will ensure all interested and affected parties including businesses, government agencies, farming enterprises, landowners and residents within the impacted area are notified of the works at least fourteen (14) days prior to the commencement of work, and regular door to door verbal notifications will be given to affected landowners prior to works proceeding adjacent to their property.

### *3.3.2 Private landowner consent*

One (1) freehold property Lot 31 DP1147371 is identified within the subject site and works are to be completed within this private property (refer Figure 9). Appropriate consultation with the landholder will be taken by Council.

Notification should be provided to residents within the local area to alert them to planned construction activities and subsequent potential indirect impacts and disturbances in the area.

It is noted in Section 3.2.13 of this REF that as the proposed works are appropriately characterised as development under the Transport and Infrastructure SEPP, the provisions of TISEPP apply. Therefore, the Proposal can be undertaken as an activity under Division 5.1 of Part 5 of the EP&A Act, through provision of this REF and subsequent determination by Council and does not require further consent.

As the rectified road alignment will remain in the existing Council owned and managed road corridor, there is no requirement to seek consent from private landowners for the acquisition of land. However, Council intends to liaise with any landholders with potential to be impacted by the works to ensure adequate engagement is

undertaken, and, where needed, permission is sought to enter private land and rectification works are completed.

### 3.3.3 Mitigation of impacts during construction and operation

The assessment completed within this REF has concluded that socio-economic impacts are expected to be minimal, confined to the construction phase, and are not likely to significantly negatively affect residents in proximity to the Proposal. Several residents will be indirectly affected by the Proposal during construction works, however it is not anticipated that road access will be prevented at any given time; rather, a single lane of traffic will remain operable over the Kelloshiel Creek Stone Bridge as per the current diversion.

As noted in the Executive Summary, Section 2 'Proposal Description', Section 6 'Certification' and in the Environmental Safeguards developed for the Proposal (Section 5), all work will be completed under the guidance of a CEMP to manage and minimise potential environmental impacts associated with the work. Additionally, once operational, the Proposal is not anticipated to result in any additional ongoing significant environmental or community impacts.

Given this conclusion, the likely impacts on surrounding residents are anticipated to be short in duration and limited to the construction period. The CEMP will list the responsibility of BRC and the appointed Contractor(s) to develop and distribute notification to local residents before, during and after the construction period. The adequate notification period for residents is fourteen (14) days prior to works commencement.

**Table 4 Proposed local resident notifications**

| Impact/mitigation | Stakeholder | Notifications |
|---|---|---|
| **Noise, dust** | Adjacent rural & residential landowners | • Notifications to adjacent landowners; traffic management plans, noise monitoring protocols, working hours.<br>• Person to person contact to notify rural landowners and business owners of any dust anticipated to settle in adjacent farm dams. |
| **Traffic and access** | Local traffic accessing properties in the area | • Advertisement in local papers (The Western Advocate) advising of changed traffic conditions and delivery of construction loads.<br>• Person to person contact to notify residents and other road users who may experience delays.<br>• Traffic management and signage advising of changed traffic conditions and potential hazards. |
| **Working hours** | Local residents | • Letterbox drop of notification listing working hours, and measures to manage local impacts; lighting, truck deliveries and noise onsite. |

Section 4 of this REF describes the site-specific environmental impacts and proposed environmental safeguards required to manage potential impacts during construction. These are also to be included in the CEMP.

### 3.3.4 Agency consultation and concurrent requirements

It is understood that Council will be undertaking all stakeholder engagement and community consultation activities internally, as per their community consultation plan. Discussions have been held with DPI Fisheries to confirm that a Part 7 Fisheries permit will be required before works can proceed.

### 3.3.5 Requirement to publicly display REF

As per the EP&A Regulations, determining authorities must keep the REF documentation including any appendices or addenda and make available for public access once a determination has been made. The EP&A Regulation Clause 171(4) requires the REF to be published on the determining authority's website or the NSW Planning Portal for an activity with:

- A capital investment value of more than $5 million or,
- An approval or permit for activity that requires approval under:
    - FM Act sections 144, 201, 205 or 219, or
    - *Heritage Act 1977* section 57, or
    - *National Parks and Wildlife Act 1974* section 90 or
    - *Protection of the Environment Operations Act 1997* sections 47-49 or 122, or
- If the determining authority considers it to be in the public interest.

There are allowances for exceptional circumstances where publication is not required; this is at the Planning Secretary's discretion. If the REF is to be published, the determining authority must place all relevant information on the determining authority's website or the NSW Planning Portal prior to the commencement of works.

Certain parts of the REF document may be sensitive, such as threatened species maps, sensitive cultural information requested to be redacted by Aboriginal parties or cyber security impacts and mitigation measures. In these instances, the REF document content can be redacted where required. The REF document (excluding sensitive information) needs to be available online.

# 4 Environmental Assessment

This chapter describes the potential key environmental impacts associated with the Proposal during both construction and operation and the site-specific Environmental Safeguards which are to be implemented as part of the Proposal to ameliorate any potential impacts identified. A summary of the Environmental Safeguards has been provided in Section 5.

## 4.1 Soils and Erosion

### *4.1.1 Existing environment*

The rainfall event on 14 November 2022 resulted in heavy erosion along the banks of both sides of Kelloshiel Creek below the culvert; debris such as concrete pipe, foundation rubble, fencing material and an exposed telephone cable were deposited within the riparian zone. Additionally, there is evidence of livestock accessing Kelloshiel Creek within the study area resulting in erosion and further degradation of the banks of the waterway.

Outside of the waterway, vegetation cover over soils was generally good, and subsequently soils were identified as stable and intact. Large stands of native and exotic vegetation occur in the wider study area, particularly within the road reserve along Freemantle Road and adjacent roads, lanes and driveways.

The following soil types are mapped as occurring across the study area and broader locality:

**NSW (Mitchell) Landscape Soils**

The study area is identified as occurring in the **Bathurst Granites** NSW Landscape identified in the DECC NSW 'Descriptions for NSW (Mitchell) Landscapes' (Version 2) (Figure 3) publication as:

"Undulating to steep hills on Carboniferous granites and granodiorite. Tors and rock outcrop common on the margins of the pluton that is surrounded by a distinctive contact ridge with steep slopes, general elevation 650 to 1000m, local relief 250m. Shallow red earths or siliceous sands occur on ridges, gritty texture-contrast soils with yellow clay subsoils on the slopes with deep coarse sands along streamlines and dense black clays in small swamps. Woodland to open forest of; yellow box (*Eucalyptus melliodora*), broad-leaved peppermint (*Eucalyptus dives*), red stringybark (*Eucalyptus macrorhyncha*) and white box (*Eucalyptus albens*) on ridges and slopes, manna gum (*Eucalyptus viminalis*) and river oak (*Casuarina cunninghamiana*) in valleys. Patches of black cypress pine (*Callitris endlicheri*) in rocky outcrops, grasslands with patchy snow gum (*Eucalyptus pauciflora*) woodlands in cold air drainage hollows".

**Acid Sulphate Soils**

Cq(p4) sulphidic materials soils (ASS) are mapped as occurring throughout the study area (Figure 4). Cq(p4) – has an extremely low probability of occurrence based on mapped soil types and geological formations but with little actual data to support this (very low confidence in the data). This ASS is associated with inland lakes, waterways, wetlands and riparian zones.

Acid sulphate soils (ASS) are generally only considered a problem along the coastal areas of NSW where ASL <10 m and around wetlands of inland NSW. Inland acid sulphate soils have also been associated with discharging saline groundwater; however, their occurrence is limited.

**Australian Soil Classification**

The Australian Soil Classification (ASC, 2020) within 5 km of the study area is shown in Figure 5. Sodosols make up the entire study area. Sodosols are identified in the NSW Soils Near Me publication as follows:

"Sodosols are soils with a strong increase in clay content between topsoil and subsoil, and subsoils that are not strongly acidic and have high sodium content. Such 'sodic' soils tend to have poor structure which limits or prevents water infiltration and impedes drainage, and which tend to be highly dispersive and vulnerable to soil erosion. They can be acidic, neutral or alkaline and may also be highly saline (containing hazardous amounts of salt, inhibiting plant growth and productivity). Sodosols are only found in poorly drained sites with rainfall between 50–1100 mm. Generally, they have very low agricultural potential where high sodicity leads to high erodibility, poor structure and low permeability. These soils have low to moderate chemical fertility and can be associated with soil salinity" (NSW-SoilsNearMe, 2023).

### *4.1.2 Potential Soils and Erosion Impacts – Construction*

Disturbance to the bed and banks of Kelloshiel Creek during the construction phase of the Proposal temporarily increases the risk of erosion and sediment migration throughout the riparian zone and waterway. The duration and intensity of rainfall during and after works will greatly influence the potential impacts to soils and contingency planning and preparation will be required to ensure these risks are minimised.

High winds have the potential to create dust/sedimentation/deposition issues during the construction phase. There is potential for erosion if work sites are left exposed for long periods of time without adequate safety measures to prevent runoff/wind erosion.

The use of fuels and chemicals, concrete, construction materials and wastes has the potential to pollute soils on site.

### *4.1.3 Potential Soils and Erosion Impacts – Operation*

There is the potential for any surface disturbance to increase ongoing risks to soils caused by erosion and sediment runoff following construction, therefore immediately following the completion of construction works and throughout the operation of the Proposal, regular checks would be required to ensure site stabilisation works have been effective and erosion and sediment controls (including drainage) are holding. Where sediment runoff is noted, this must be ameliorated immediately. The Environmental Safeguards listed in Section 4.1.4 must be adhered to throughout the operational phase of the Proposal to minimise ongoing environmental impact.

It is expected that the proposed works will reduce the likelihood and severity of erosion and sedimentation from the construction of the retaining wall and the installation of the rock apron downstream, which would support flow velocity dissipation and reduce the likelihood of future severe erosion events and scouring of the creek bed.

**Table 5 Summary of soil and erosion impacts**

| Description | Y | N | Comments |
|---|---|---|---|
| Are there any known occurrences of salinity or acid sulfate soils in the area? | X | | Yes, refer Figure 5. The study area is mapped as Cn(p4) – Extremely Low probability of occurrence. |

| Description | Y | N | Comments |
|---|---|---|---|
| Does the Proposal involve the disturbance of large areas (e.g. >2 ha) for earthworks? | | X | The Proposal would result in <2ha of soil disturbance. |
| Does the site have constraints for erosion and sedimentation controls such as steep gradients, narrow corridors or is located on private property? | X | | The subject site includes some steep eroded creek banks, a waterway, and a small section of private property. |

### *4.1.4 Environmental Safeguards – Soil and Erosion*

The Environmental Safeguards for Soils and Erosion are considered part of the Proposal and must be implemented. Safeguards include:

***Construction***

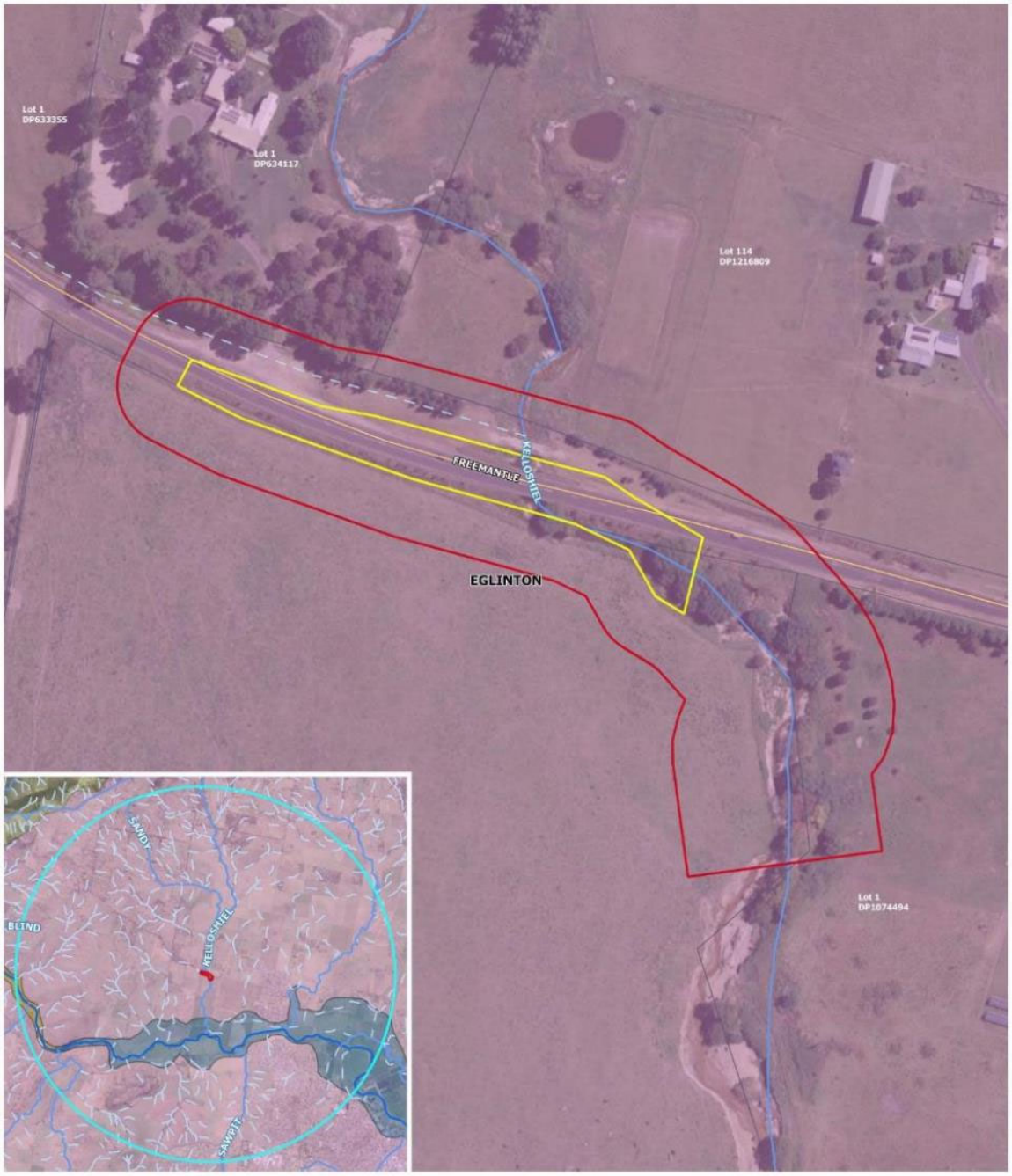
- No vegetation outside the approved direct impact footprint is to be impacted or removed; vegetation that is not approved for clearance is to be protected to ensure soils are not exposed unnecessarily.
- Minimize the length of time that soils are exposed by stabilising as soon as practical by seeding, spreading mulch or installing erosion control blanket as appropriate.
- All areas where groundcovers/vegetation are required to be removed will require careful management during construction due to the higher erosion risks, including:
    - Erosion and sediment (ERSED) control measures are to be implemented and maintained to:
        - prevent sediment moving off-site and sediment laden water entering any drainage lines, drain inlets, or dams; and
        - reduce water velocity and capture sediment on site.
    - ERSED controls are to be installed prior to the commencement of works and checked and maintained on a regular basis (including clearing of sediment from behind barriers).
    - ERSED control measures are not to be removed until the works are complete, and areas are stabilised.
- Monitoring and response actions with regard to ERSED controls will be incorporated within the Construction Environmental Management Plan (CEMP) for the Proposal, to be enforced by the appointed Contractor.
- The maintenance of established stockpile sites during construction is to be in accordance with the Landcom/Department of Housing Managing Urban Stormwater, Soils and Construction Guidelines (the Blue Book) (Landcom 2004), including:
    - Stockpiles are recommended to be formed in accordance with the Blue Book Standard Drawing 4-1, and offsite/away from waterbodies wherever practical.
    - Topsoil and subsoil are to be separated and protected from degradation, erosion or mixing with fill or waste. Materials are to be reused onsite where appropriate for infilling works, including re-spreading of topsoil as appropriate to enable rapid rehabilitation. Where onsite reuse cannot be accommodated, soil materials should be put to beneficial reuse elsewhere.
- If contaminated soils are encountered during construction, a site assessment is to be completed in accordance with Schedule A 'Recommended general process for assessment of site contamination' (NEPM 1999).

- If contaminated soils are encountered, they will be managed (and if necessary excavated, contained, treated and disposed of) in accordance with the law and relevant EPA and Council guidance.
- All chemical usage and storage during construction is to be in line with legislated requirements, to prevent Pollution of Land, which is prohibited under Section 142 A of the POEO Act.

***Operation***

- Monitoring of the site is to be undertaken to ensure ERSED controls remain in place until the site is re-stabilised, and to ensure no sediment is washed into any waterways following construction and before site stabilisation works are completed.
- Maintenance of vegetative cover on all exposed surfaces (not to be covered by road base/seal) to be undertaken to ensure the stability of soils on site into the future.
- Infill planting or additional spreading of appropriate native grass mixture and/or groundcover species to be undertaken until the entire site is stabilised.

**Given the outlined environmental safeguards for Soils and Erosion will be implemented and maintained, it is not anticipated that the Proposal would result in significant impacts to Soil and Erosion.**




**Keech Constructions Freemantle Road Culvert, Eglington, NSW - NSW (Mitchell) Landscapes within 5km of the Proposal**

**Legend**

- Study Area
- 5km Radius
- Subject Site
- Suburb Boundary
- Lot Boundary

**Roads**

- Arterial Road
- Local Road
- Primary Road
- Sub Arterial Road
- 1st & 2nd order; unnamed waterways

**Waterways**

- Creek
- River

**NSW (Mitchell) Landscapes**

- Bathurst Granites
- Macquarie - Turon Gorges
- Upper Macquarie Channels and Floodplains

N 0 25 50 75 m

1 : 2,000



**Figure 3 NSW (Mitchell) Landscapes occurring within 5km of the study area**


**Keech Constructions Freemantle Road Culvert, Eglington, NSW - Acid Sulfate Soils within 5km of the Proposal**

**Legend**

- Study Area
- 5km Radius
- Subject Site
- Suburb Boundary
- Lot Boundary

**Roads**

- Arterial Road
- Local Road
- Primary Road
- Sub Arterial Road

**Waterways**

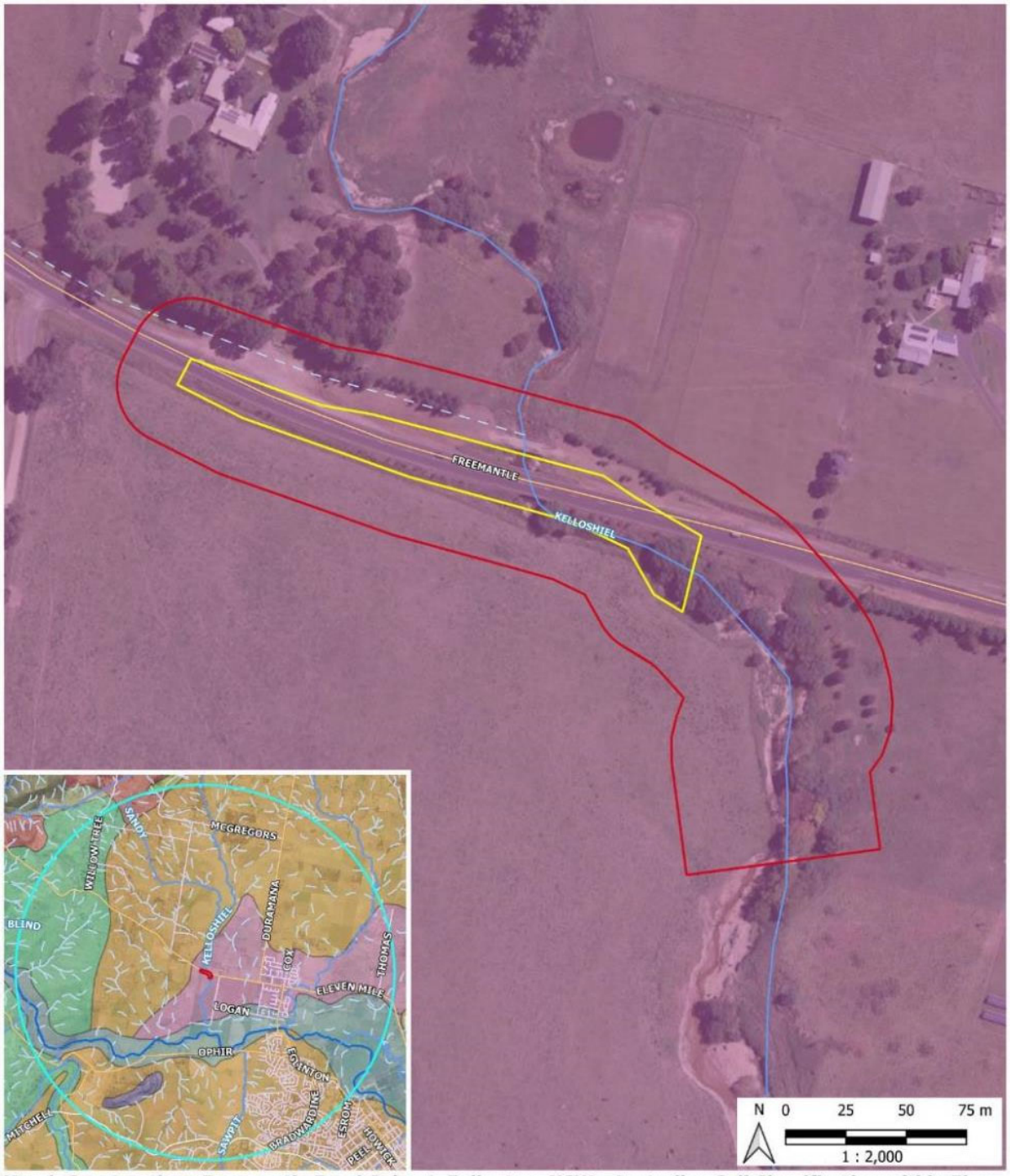
- Creek
- River
- 1st & 2nd order; unnamed waterways

**Acid Sulfate Soils**

- An (p4) - High Probability of occurrence >70% chance in Subaqueous materials in lakes
- Bn (p4) - Low Probability of occurrence 6-70% chance generally in upper 1m in wet/riparian areas with Sodosols
- Cn (p4) - Extremely Low Probability of occurrence 1-5% chance generally in upper 1m in wet/riparian areas



**Figure 4 Acid Sulfate Soils potential mapped as occurring within 5 km of the study area**




**Keech Constructions Freemantle Road Culvert, Eglington, NSW - Australian Soil Classification within 5km of the Proposal**

**Legend**

- Study Area
- 5km Radius
- Subject Site
- Suburb Boundary
- Lot Boundary

**Roads**

- Arterial Road
- Local Road
- Primary Road
- Sub Arterial Road

**Waterways**

- Creek
- River
- 1st & 2nd order; unnamed waterways

**Australian Soil Classification**

- CH - Chromosols
- DE - Dermosols
- FE - Ferrosols
- KUn - Kurosols, Natric
- RU - Rudosols
- RU_TE - Rudosols and Tenosols
- SO - Sodosols



**Figure 5 Australian Soil Classifications within 5 km radius of study area**

## 4.2 Surface and Groundwater

### *4.2.1 Existing environment*

The study area occurs along Kelloshiel Creek within the catchment of the Macquarie River - Wambuul, which is. mapped as supporting Key Fish Habitat (KFH) (Figure 7). A roadside drainage line along the southern side of Freemantle Road enters Kelloshiel Creek from the west (Plate 5); the drainage line along with Kelloshiel Creek and its tributaries form an ephemeral catchment which was subject to significant waterflows and erosion during an extreme rain weather event in November 2022 (Plate 1 and **Error! Reference source not found.**). During the site assessment, it was identified that the drainage line adjacent to the road was dry (Plate 5), and Kelloshiel Creek had a shallow and narrow clear flow of water. Fish passage through the culvert towards the upper catchment area is currently blocked due to erosion and scouring of the creek bed, which has resulted in an approximately 1.2m drop from the bottom of the culvert to the waterway below (Plate 3 and Plate 4). Pools of clear water were noted between Kelloshiel Creek Stone bridge immediately upstream of the Kelloshiel Creek culvert (Plate 6).

The study area is largely flat and there are no wetlands and no property dams mapped as occurring within the study area. The study area and surrounds are not mapped as containing shallow groundwater resources that could be sensitive to trenching and easily contaminated, refer Figure 7.

The Proposal is located within the Macquarie-Bogan River Catchment (Figure 6) and is approximately 1.6 km north of the Macquarie River – Wambuul. There are a number of relevant water quality objectives that require consideration, including but not limited to: aquatic ecosystems; visual amenity; livestock water supply; homestead water supply; irrigation water supply; and drinking water at point of supply – groundwater (Figure 8).

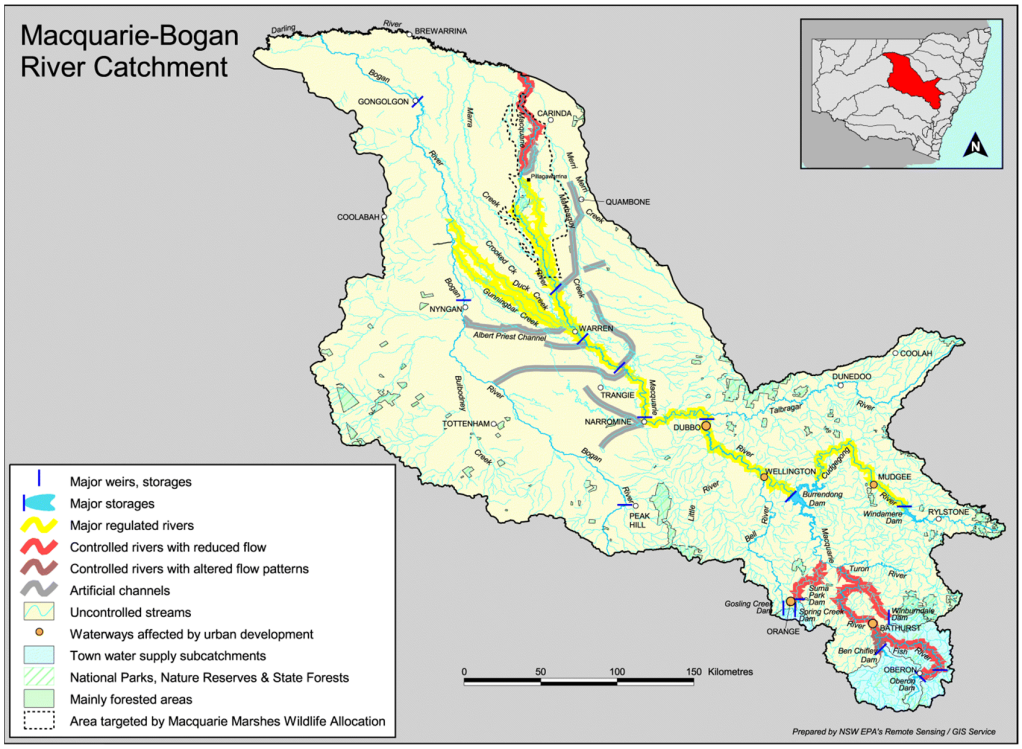



**Figure 6 Macquarie-Bogan River Catchment**

Plate 1 Eroded creek banks and creek bed containing rubble within the subject site

Plate 2 Eroded creek bank along the southern edge of Freemantle Road

Plate 3 Eroded creek bank along the southern bank of Kelloshiel creek

Plate 4 Clear waterflows from Kelloshiel Creek culvert were noted during surveys

Plate 5 Dry drainage line entering Kelloshiel Creek at the western end of the subject site

Plate 6 Pooling water between Kelloshiel Creek Stone Bridge and the culvert

### 4.2.2 Potential Surface and Groundwater Impacts – Construction

Potential impacts to downstream surface waters during construction relate directly to potential erosion and increased sedimentation during establishment of the instream machinery works pad and construction of the retaining wall, culvert and rock apron, which would occur directly within the waterway. This could result in impacts to the water quality within Kelloshiel Creek and the Macquarie River - Wambuul.

Potential impacts arising as a result of the Proposal include:

- Release of sediment and soil into waterways as a result of instream works that includes dredging of the creek bed and banks and deposition of stabilsing materials using heavy machinery.
- Potential for spills of fuels, concrete and other contaminants arising from plant and machinery, which could enter surface waters during any works completed in proximity to drainage lines and waterways.

To reduce the likelihood and severity of impacts to waterways, a dry works area will be established to allow works to proceed without the flow of water directly adjacent to activities such as creek bed excavation and the pouring of concrete.

Where ERSED control measures and best practice design principles are adhered to (particularly with regard to the establishment and maintenance of a secure and stable dry works area), impacts to waterways as part of the construction of the Freemantle Road Kelloshiel Creek culvert are not anticipated to be significant.

### 4.2.3 Potential Surface and Groundwater Impacts – Operation

The operation of the Proposal is anticipated to have a net positive impact on current site conditions. The Proposal includes the construction of an energy dissipating rock apron directly below the culvert. It is anticipated that this will provide rock armouring to promote flow dissipation and reduce the likelihood of future erosion events, scouring of the creek bed and release of sediment into the waterway.

If ERSED measures and best practice design principles are adhered to, and the site is fully stabilised following construction works, impacts to waterways as part of operation of the Proposal are not anticipated to be significant.

**Table 6 Waterways impacts summary (adapted from Div 1 (2.13) TISEPP 'Consultation Requirements')**

| Description | Y | N | Comments |
|---|---|---|---|
| **Are the works located within or adjacent to a waterbody or wetland?** Waters are defined under Protection of the Environment Operations Act 1997 and water land and wetlands under section 198A of the Fisheries Management Act 1994 and include rivers, streams, lakes, lagoons and constructed waterways, and dams. | X | | Kelloshiel Creek is directly within the subject site. |
| **Is a Fisheries Permit required?** Part 7 Fisheries Permits are automatically required for any third order (or higher) stream under the Fisheries Management Act 1994 (FM Act). | X | | The Proposal includes dredging and reclamation works within a waterway mapped as containing KFH (Figure 7). As such, a Part 7 permit from Fisheries will be required. |
| **Will the proposed works be undertaken on a bridge?** | X | | Works will be completed on a section of Freemantle Road that crosses Kelloshiel Creek and the removal of a temporary diversion that currently utilises Kelloshiel Creek Stone Bridge. No modification works are proposed on the stone bridge, however works do include a waterway crossing/culvert. |
| **Are the works likely to require the extraction of water from a local water source (not mains)?** | | X | A water cart may be required to dampen soils during construction activities and vehicle washdown area would require the use of water. Water would be transported to site from an approved Council source. |
| **Is the site identified as High or Moderate Groundwater Vulnerability?** | | X | The site is not mapped as having high groundwater vulnerability that could be sensitive to earthworks and easily contaminated. Assuming the adherence to safeguards outlined in Section 4.2.4, it is unlikely that groundwater would be at risk from the Proposal. |
| **Are the proposed works likely to have an effect on the surrounding water quality?** This can include sediment migration, dust, and potential risks of fuel or chemical spills, to both surface and ground waters. | X | | There is potential for sediment migration off-site, particularly if rain events occur during the period of the works and upon re-establishment of water flows through the subject site following completion of construction works. Implementation of Environmental Safeguards identified in Section 4.2.4 would reduce the risk of this occurring. |
| **Does the Proposal involve connection to, and use of a substantial volume of water from, any part of a water supply system owned by a Council?** | | X | It is anticipated that water will be required for dust suppression (if required) and for the operation of vehicle washdown areas. The Proposal is not expected to utilise a substantial volume of water. |

| Description | Y | N | Comments |
|---|---|---|---|
| **Does the Proposal involve the connection to, and a substantial impact on the capacity of, any part of a sewerage system owned by Council** | | X | No works on a sewerage system are included in this Proposal. |
| **Is the Proposal likely to have a substantial impact on stormwater management services provided by Council** | | X | No, the study area occurs outside of any urban areas and runoff from the site will not enter a Council managed stormwater system. |
| **Are the works being carried out on flood liable land?** (Written notification to the State Emergency Service may be required if the activity is a relevant provision under Division 1 (2.13) of the Transport and Infrastructure SEPP) | | X | The study area is not mapped as flood liable land. |
| **Is the Proposal being carried out on land that is within a coastal vulnerability area and is inconsistent with a certified coastal management program?** | | X | Works are not being carried out on land within a coastal vulnerability area. |

### *4.2.4 Environmental Safeguards – Surface and Groundwater*

The Environmental Safeguards for Surface and Groundwater are considered part of the Proposal and must be implemented. Safeguards include:

***Construction***

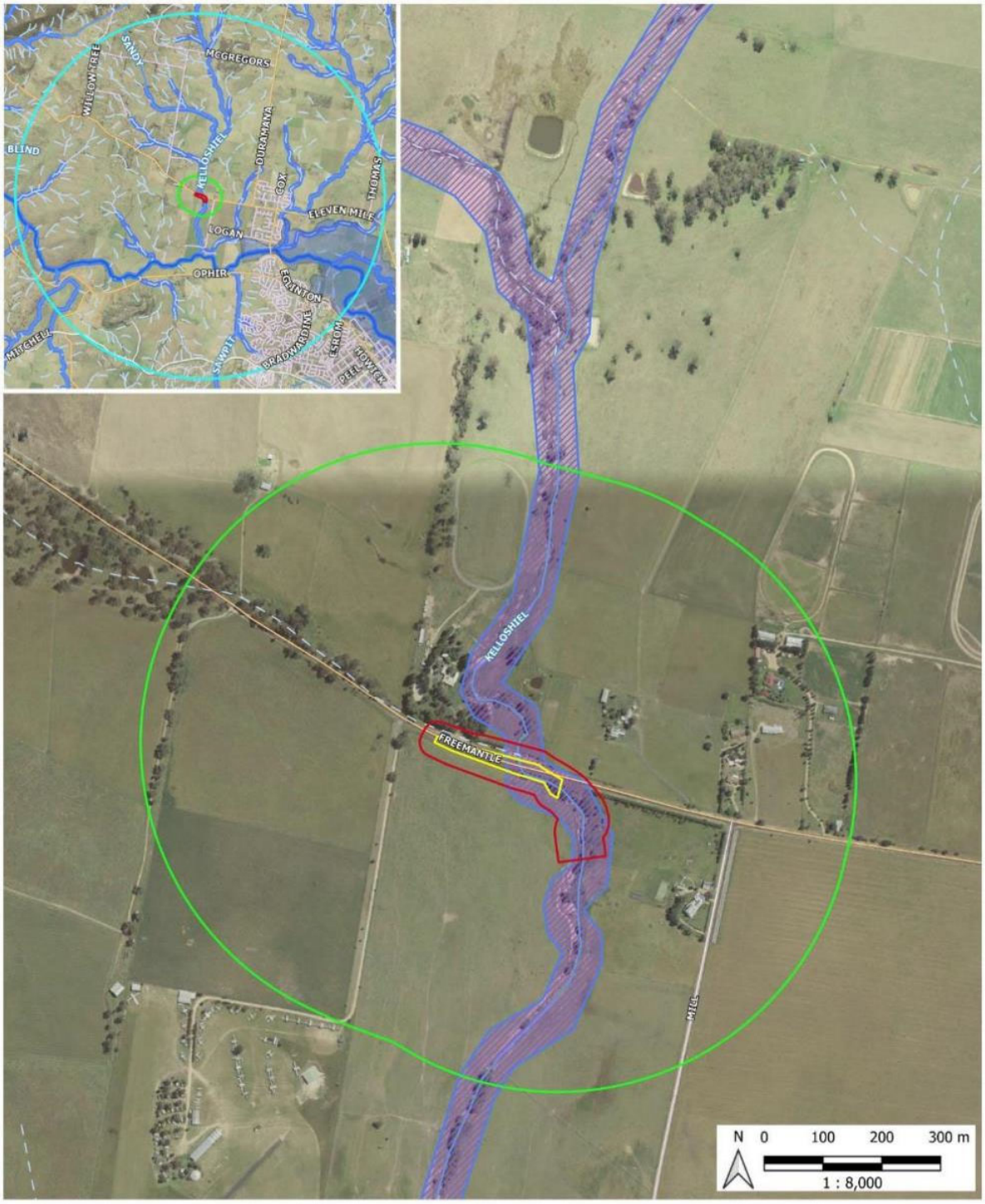
- All construction works are to be completed in accordance with the FM Act permit once it has been issued.
- If 'dirty' site water is collected from within the direct impact footprint, it is to be redirected to filtration devices to trap sediments and other pollutants, and dissipate flow velocities, prior to discharging to the surrounding environment. Drainage and runoff should be controlled in such a way that no foreign substrates or materials leave the site.
- 'Clean' water from outside the study area is to be diverted around the site, to avoid contamination and to prevent scour/erosion of the site during rainfall events during construction.
- Works to be completed in dry times (i.e. times of no current or predicted rainfall) to reduce the risk of pollutants and sediments being washed into nearby waterways or other surface waters.
- Appropriate erosion and sediment (ERSED) controls are to be installed and maintained during construction, to ensure sediment and pollutant laden surface water runoff does not enter adjacent waterways/drainage lines.
- All litter, including cigarette butts and food wrappers, is to be collected in a suitable receptacle and disposed of appropriately throughout the construction phase to ensure these do not end up polluting waters of aquatic environments.
- Re-fuelling of plant and equipment is to occur offsite, or in impervious bunded areas located a minimum of 40 metres from the waterway.
- Vehicle wash-down and/or cement truck washout (if required) is to occur offsite unless it forms part of sediment control, where it is to occur in a suitably bunded area with controlled run-off and located a minimum of 40 metres from the waterway.

- Monitoring of water quality is to be undertaken within culverts/waterways downstream of the site during and immediately following rainfall events, to identify if ERSED controls are functioning as intended. Visual inspections should be undertaken by an appropriately qualified person/s to determine if water is turbid, or if there is evidence of petrochemicals or other pollutants present as a consequence of construction activities.
- Segregate and stockpile topsoil removed from the area a minimum of 40 m from any waterway and on a flat, stable area. Use measures such as silt fences and holding ponds to prevent stockpile runoff from entering waterways.
- Biosecurity and water health protection measures should be implemented throughout the construction phase, including:
    - Machinery should arrive on site in a clean, washed condition, free of fluid leaks, pests and/or weeds/spores;
    - Regular weed control should be undertaken in disturbed areas throughout the construction period to prevent weed spread into waterways, if notifiable/listed weed material is present; and
    - Ensure all pesticide/herbicides used are registered for use within a waterway, as per NSW DPI guidelines. Alternatively, opt to remove weeds mechanically where possible.
- Spill response protocols for plant, equipment and chemicals used or stored on site during construction are to be available and accessible at all times to prevent and minimise potential for Pollution of Waters (s120 POEO Act).
- A Soil and Water Management Plan will be developed as part of the CEMP for the Proposal, detailing:
    - Water quality parameters to be adhered to (e.g., turbidity)
    - Appropriate monitoring locations and frequency
    - Location and types of ERSED controls
    - Proposed revegetation and stabilisation measures to be undertaken.

***Operation***

- Continue to undertake a water quality monitoring program in line with Council's requirements until the site is completely stabilised; monitoring should include details of proposed baseline and downstream water quality following any heavy rainfall.
- Subject site rehabilitation/stabilisation, including removal of weeds and revegetation using appropriate native species is recommended to be undertaken to ensure soil stability and prevention of sediment runoff from the site into the future.

**Given the outlined environmental safeguards for Surface and Groundwater will be implemented and maintained, it is not anticipated that the Proposal would result in significant impacts to Surface and Groundwater.**




**Keech Constructions Freemantle Road Culvert, Eglington, NSW - Ground and Surface Water**

**Legend**

Study Area
Subject Site
500m Radius
5km Radius
Suburb Boundary
Lot Boundary
**Roads**
Arterial Road
Local Road
Primary Road
Sub Arterial Road
**Waterways**
River
Creek
1st & 2nd order; unnamed waterways
Key Fish Habitat
Flood Risk



**Figure 7 Waterways, surface and groundwater vulnerability within 500 m of the subject site**

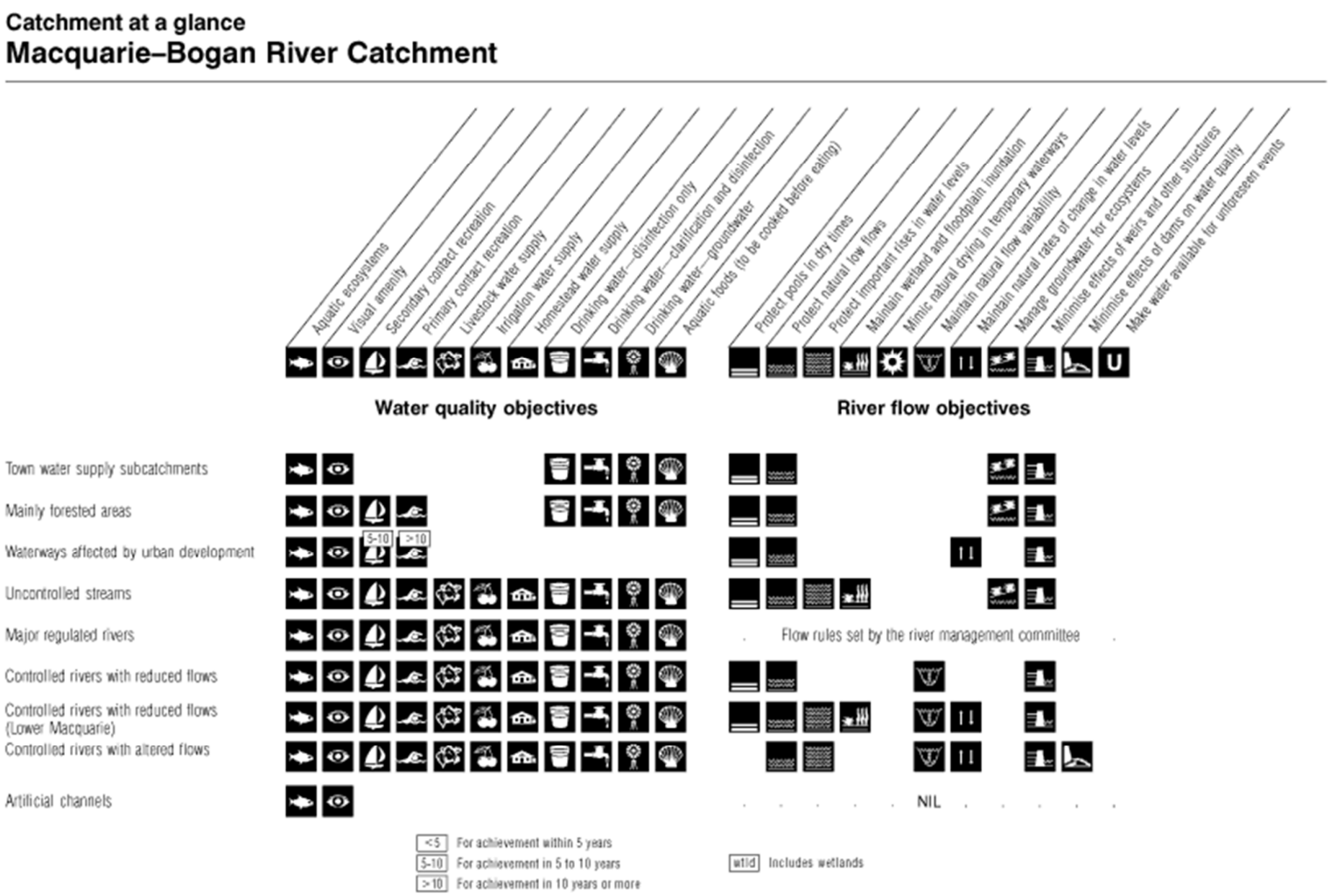



**Figure 8 WQOs for the Macquarie-Bogan River Catchment**

## 4.3 Noise and vibration

### *4.3.1 Existing environment*

The study area occurs in a rural area, with background noise levels typically arising from farming machinery and activities, local traffic, anthropogenic noises, livestock, wildlife and inclement meteorological conditions (rain and wind). The nearest residence is located approximately 150 metres north-east of the subject site with two (2) other residences located within 300m north-west and south east of the subject site. The study area is predominantly mapped as RU1 – Primary Production, with an area zoned as R5 - Large Lot Residential occurring around 250m west of the subject site. Properties located in proximity to the subject site are

identified in


**Keech Constructions Freemantle Road Culvert, Eglington, NSW - Sensitive Receivers**

**Legend**

- 50m Buffer
- 100m Buffer
- 200m Buffer
- 500m Radius
- Study Area
- Subject Site
- Suburb Boundary
- Lot Boundary

**Roads**

- Sub Arterial Road
- Local Road
- Primary Road
- 1st & 2nd order; unnamed waterways

**Waterways**

- Creek

**POIs**

- Airport
- Homestead
- Landing Ground
- Private Residence

Figure 9. Most of the land adjacent to the Proposal is dedicated to grazing and cropping and is therefore vacant of houses and other sensitive receivers such as churches, schools, or places of business. Cars and trucks travelling along Freemantle Road were observed to cause the main noise disturbance on site during the July 2023 site visit; however, noise observations made were anecdotal / qualitative only, as no formal/specialised noise surveys were completed as part of this REF.

### *4.3.2 Potential noise and vibration impacts – Construction*

Noise impacts during construction are anticipated to arise from increased heavy vehicle and plant movements; excavation works; pouring of concrete rollers and other mechanical equipment including general engine noise and reverse alert beepers are expected as part of the construction phase. The residences noted in Section 4.3.1 and identified in Figure 9 may experience temporary noise disturbances, however these are anticipated to be short in duration and confined to the construction phase of the Proposal. Assuming the mitigation measures outlined in Section 4.3.4 are adhered to and early and effective community consultation is carried out, the Proposal is unlikely to cause significant disruption or constitute intrusive noise.

### *4.3.3 Potential noise and vibration impacts – Operation*

The Proposal is not anticipated to generate significant additional noise or vibration during the operational phase. Ongoing maintenance activities and any future repair work do have the potential to generate noise as part of operations, however this is not anticipated to be significant.

**Table 7 Summary of Noise and Vibration impacts**

| Description | Y | N | Comments |
|---|---|---|---|
| **Are there any noise sensitive areas near the location of the proposed works? i.e., < 500m at nearest point, that may be affected by the works e.g. church, school, hospital, residences** | X | | The nearest residence is located approximately 150 m north-east of the subject site. Two (2) other residences are located between 200-300m north west and south east of the subject site |
| **Are the proposed works going to be undertaken during standard working hours detailed below?**<br>**Monday – Friday: 7:00am to 6:00pm**<br>**Saturday: 8:00am to 1:00pm**<br>**Sunday and Public Holidays: No work** | X | | Proposed construction hours are as follows:<br>• **Normal construction**<br>□ Monday – Friday 7:00 am to 6:00 pm<br>□ Saturday – 8:00 am to 1:00 pm<br>□ Sundays and Public Holidays – No work |
| **Is any explosive blasting required for the proposed works?** | | X | No need for blasting or rock breaking has been identified prior to the preparation of this REF. Some large rocks may be encountered; however it is expected that these will be removed by large heavy machinery. |
| **Is there potential for ongoing operational noise to be generated post completion of works?** | | X | The Proposal is not anticipated to generate any ongoing noise as part of operations beyond general maintenance and any future repair works. |

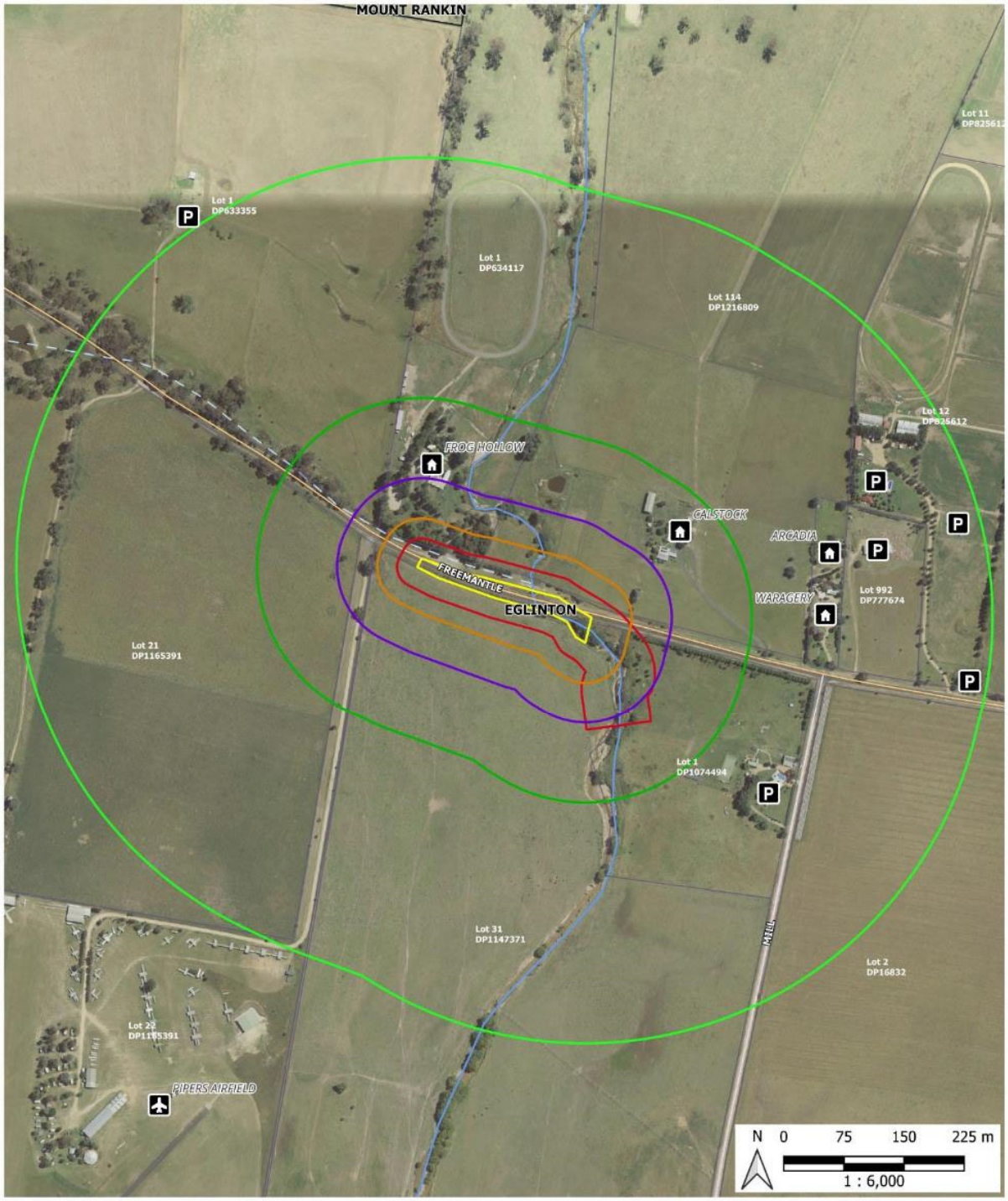
### *4.3.4 Environmental safeguards – Noise and Vibration*

The Environmental Safeguards for Noise and Vibration are considered part of the Proposal and must be implemented. Safeguards include:

***Construction:***

- Noise emissions should be considered in terms of the Interim Construction Noise Guideline (ICNG) (Department of Energy and Climate Change (DECC) 2009).
- Noise impacts to the local community will be limited to recommended standard working hours as detailed in the Interim Construction Noise Guideline 2009 (ICNG). All activities and Proposal works, including the arrival and departure of vehicles delivering or removing materials to or from the site, shall be carried out between the hours of:
    - 7:00am to 6:00pm Monday to Friday,
    - 8:00am to 1:00pm Saturdays, and
    - No work Sunday and Public Holiday
- Communication of intentions and timeframes to neighbouring properties will be undertaken in order to minimise misconceptions, uncertainty and negative reactions to noise. The site supervisor should supply a Council contact number to aid in community liaison.
- All noise and vibration complaints are to be handled in a timely manner in accordance with requirements under the POEO Act.
- The appointed contractor will incorporate Noise and Vibration Management strategies in the CEMP, and suitably induct all staff operating machinery on the site to ensure the standard working hours are adhered to, and that machinery movement (revving, reverse beepers) is kept to a minimum. This management plan must include the general noise and vibration management practices (AS 2436-2010).
- Plant deliveries and site access will occur quietly and efficiently, with parking allowed only within designated areas located away from nearby sensitive receivers.
- Simultaneous operation of high-level noise generating machinery should be avoided by operating at contrasting times or increasing the distance between the plant and the nearest identified receiver.
- High noise generating activities, such as jack hammering, should be carried out in continuous blocks, not exceeding three (3) hours with a minimum respite period between blocks of one (1) hour.
- Low-pitch tonal beepers should be installed where possible and reversing minimised on site.
- All engine covers are to be closed and machines that are not in use, shut down.
- Where possible, high noise generating activities such as loading and unloading and material dumps should be located as far as possible from the nearest receptors.

**Given the outlined environmental safeguards will be implemented and maintained, it is not anticipated that the Proposal would result in significant impacts to Noise and Vibration.**




**Keech Constructions Freemantle Road Culvert, Eglington, NSW - Sensitive Receivers**

**Legend**

- 50m Buffer
- 100m Buffer
- 200m Buffer
- 500m Radius
- Study Area
- Subject Site
- Suburb Boundary
- Lot Boundary

**Roads**

- Sub Arterial Road
- Local Road
- Primary Road

**Waterways**

- Creek

- 1st & 2nd order; unnamed waterways

**POIs**

- Airport
- Homestead
- Landing Ground
- Private Residence



**Figure 9 Sensitive receivers within a 1 km radius of the Proposal**

## 4.4 Air quality

### *4.4.1 Existing environment*

The Bathurst region generally enjoys clean air; a lack of heavy industry and relatively low concentration of vehicles resulting in relatively low air pollutant levels. The primary air pollution emission sources that contribute to ambient air quality in the area are expected to include:

- Wind generated dust from exposed areas within the locality.
- Dust emissions from agricultural activities.
- Dust entrainment due to vehicle movements along unsealed and sealed town and rural roads with high silt loadings.
- Diesel and petrol fuel combustion emissions from road and non-road sources.
- Seasonal emissions from household wood burning.
- Episodic emissions from dust storms and vegetation fires (local and regional).

Real-time air quality monitoring is conducted at the Bathurst Air Quality Monitoring Station, which is located off Morrisset Street in Bathurst, approximately 5.7 km south-east of the subject site, and is managed by the NSW Environmental Protection Authority (EPA). At the time of field survey, the station monitored Ozone, Nitrogen dioxide, and particulate matter (PM2.5), with air quality noted as Good in all parameters for which data can be reliably collected. The air quality was also rated good for the period of 17 to 24 of July 2023 apart from 1 hourly reading of PM2.5 which was fair.

Long-term meteorological data for the surrounding area is available from the Bureau of Meteorology (BoM) operated weather station at Bathurst Agricultural Station (Site No. 063005). The Bathurst Agricultural Station is located approximately 17 km south-east of the subject site and records observations of a range of meteorological data including temperature, humidity and rainfall, wind speed and wind direction.

Temperature data recorded at the Bathurst Agricultural Station indicates that January is the hottest month of the year, with a mean maximum temperature of 28.1°C. July is the coolest month with a mean daily minimum temperature of 0.6°C. January is the wettest month with an average rainfall of 68.4 mm falling, and according to long-term records a mean annual rainfall of approximately 639.4 mm. The Bathurst region experiences a cool temperate climate with, on average, 32 days above 30$^{o}$ C / annum. Bathurst also experiences a daily mean evaporation of 3.7 mm with summer reaching the highest mean daily evaporation of 6.3 mm. The high number of hot days throughout key months has the potential to result in a moisture deficit at certain periods throughout the year. The increased risk of moisture deficit of the hotter months increases the dust erosion potentials of exposed areas and therefore has important implications for fugitive dust control during the construction phase.

Weather conditions onsite on 20 July 2023 were cool all day, reaching maximum temperature of 13.6$^{o}$C throughout the afternoon, with calm to no wind recorded (Table 8).

**Table 8 Weather conditions preceding and during field survey (weather station: Bathurst Airport AWS 063291, Bureau of Meteorology 2023).**

| Date | Temperature(˚C) | | Total Rain (mm) | Max Wind Speed 9am km/hr | Wind direction |
|---|---|---|---|---|---|
| | Minimum | Maximum | | | |
| **14/07/2023** | -3.0 | 16.5 | 0 | 35 | WNW |
| **15/07/2023** | 1.9 | 17.4 | 0.2 | **43** | NW |
| **16/07/20232** | 7.8 | 13.6 | 0 | 19 | ENE |
| **17/07/2023** | 0.3 | **16.5** | 0.8 | 22 | NNW |
| **18/07/2023** | 1.7 | 14.3 | 0.2 | 28 | SW |
| **19/07/2023** | 0.6 | 13.2 | **1.4** | 20 | WSW |
| **20/07/2023** | **-5.5** | 13.6 | 0.2 | 28 | NNW |

### *4.4.2 Potential Air Quality impacts – Construction*

Air pollution can vary rapidly over short distances, even from street to street. In addition, air quality can change rapidly, depending on meteorological conditions and topography.

Potential impacts to air quality may arise from airborne dust particles generated during earthworks, stockpiling and managing topsoil, transport and handling of soils and equipment, as well as the use of construction vehicles emitting exhaust fumes or other particulate matter. The extent of air pollution generated during construction depends on a number of factors, including the type of machinery used, construction techniques, weather conditions and the cumulative effect of other activities in the near vicinity (e.g. agricultural activities).

The impacts are anticipated to be of short duration and minor in nature and are not expected to have a large or prolonged impact on air quality in the area.

### *4.4.3 Potential Air Quality impacts – Operation*

Assuming the site is rehabilitated/stabilised following construction works, operation of the Proposal is unlikely to cause any additional negative impact to air quality; it is anticipated the site will return to pre-construction conditions with negligible negative differences to air quality from routine operation and maintenance of the area.

**Table 9 Summary of Air Quality impacts**

| Description | Y | N | Comments |
|---|---|---|---|
| **Are the proposed works likely to result in large areas (>2ha) of exposed soils?** | | X | The Proposal will expose only small areas of soil that is expected to be less than 2 hectares. |
| **Are there any dust sensitive receivers located within the vicinity of the proposed works (<500m away at nearest point) during the construction period (i.e., church, school, hospital, residences)?** | X | | The nearest residence is located approximately 150 m north-east of the subject site. Two (2) other residences located between 200-300m north-west and south-east of the subject site (Figure 9). |

| Description | Y | N | Comments |
|---|---|---|---|
| **Is there likely to be an emission to air of dust, smoke, steam or vehicle emissions?** | X | | Yes, the study area and locality contain fine, friable soils likely to result in dust emissions once disturbed. These may be mitigated by use of a water cart or other dust suppressants, and through use of appropriately maintained machinery and vehicles that meet emissions standards. |

### *4.4.4 Environmental safeguards – air quality*

The Environmental Safeguards for Air Quality are considered part of the Proposal and must be implemented. Safeguards include:

***Construction***

- Daily visual construction dust monitoring should occur, with works to cease if dust plumes are occurring that have potential to impact areas outside the direct impact footprint.
- Speed limits of 40 km / hr or slower are to be enforced on access tracks and across the site during dry weather to keep dust to a minimum.
- An adequate water supply is to be provided on the construction site for effective dust/particulate matter suppression/mitigation. If synthetic dust suppressants are used, they must be biodegradable in nature and non-toxic for waterways.
- Earthworks and exposed areas/soil stockpiles are to be revegetated using appropriate native species to stabilise surfaces as soon as practicable to reduce risk of dust emissions from wind erosion.
- Only vegetation that has been approved for removal may be removed or otherwise impacted; intact vegetation stabilises soils and keeps dust to a minimum.
- Vegetation and other materials are not to be burnt on site, unless the vegetation material is a weed that prohibits transportation and disposal by other means.
- Vehicles transporting waste or other materials that may produce odours or dust are to be covered during transit.
- Tracking of machinery carrying soil/spoil through nearby townships is to be avoided where possible.
- Stockpiles or areas that may generate dust are to be managed to suppress dust emissions.
- Dampening of exposed soils will be undertaken during weather conditions conducive to visible dust formation.
- Construction plant and equipment will be maintained in a good working condition in order to limit impacts on air quality through vehicle emissions.
- Fuel operated plant and equipment will not be left idle when not in use.
- Regular site inspections will be undertaken as part of air quality monitoring, and inspection results recorded by Council's Principal Contractor.
- Any dust complaints received during construction will be duly investigated in accordance with Council's requirements under the POEO Act.
- Any exceptional incidents that cause dust and/or air emissions, either on or off site, will be recorded, and the action taken to resolve the situation recorded in the site management logbook.

***Operation***

- Council is to conduct regular road maintenance activities to ensure the road surface doesn't deteriorate, resulting in emissions to air.
- Any exposed areas revegetated during construction are to be monitored and maintained until the areas are fully stabilised to reduce risk of erosion and dust emissions, as well as dust settling on nearby native vegetation.

**Given the outlined environmental safeguards for Air Quality will be implemented and maintained, it is not anticipated that the Proposal would result in significant impacts to Air Quality.**

## 4.5 Non-Aboriginal heritage

### *4.5.1 Existing environment*

Bathurst has a rich history, including a number of heritage-listed sites, historic buildings and houses. Local, Commonwealth and NSW State historic heritage registers were consulted as part of preparation of the REF. The Bathurst LEP identified one (1) item, the Kelloshiel Creek Stone Bridge within the study area and one (1) item, 'Kelloshiel' located 300m to the south-east of the subject site.

The Kelloshiel Creek Stone Bridge is currently providing a detour option for the damaged section of Freemantle Road. It is being used as a single lane crossing over the creek with traffic light controls in place. Upon the closure of the damaged section of Freemantle Road and the subsequent diversion across the Kelloshiel Creek Stone Bridge, the surface of the heritage listed bridge was temporarily sealed with bitumen to protect the bridge surface from degradation while in use and provide a suitable driving surface for road users.

The Kelloshiel heritage building ('Kelloshiel') is well outside of the study area and is not expected to be directly impacted by the Proposal. No works are proposed in proximity to this item.

### *4.5.2 Potential impacts to Non-Aboriginal Heritage – Construction*

Construction works as part of the Proposal have the potential to impact on the Kelloshiel Creek Stone Bridge heritage item. Works are being undertaken in close proximity to this item and there is the potential for damage to the bridge structures if strict mitigation measures are not adhered to, particularly related to potential collision with heavy machinery and through vibration doses caused by nearby excavation activities. The heritage item is known and mapped (Figure 10) and demolition or modification to the bridge is not included in the Proposal.

It is advised that Council create and maintain photographic records of the external condition of the bridge structure. These can be used to monitor for any signs of visual damage for the duration of the project.

In addition, it is noted that the bridge be delineated from the impact area with erection of fencing and flagging. All construction workers will be inducted on-site to ensure they are aware of the sensitivity of this heritage item and the precautions necessary to protect the item from unintended damage.

The use of the bridge as a single lane road under traffic signals will continue throughout the construction phase of the Proposal. Upon completion of the Proposal, Freemantle Road will be re-opened to the public and the diversion route removed; this would include the removal of the temporary bitumen surface and return the stone bridge surface to its previous condition. The Proposal is expected to have a positive impact on the heritage listed bridge as it will remove the current risk of damage from vehicle collision.

No specialised assessment of the potential impact on heritage listed items was completed as part of preparing this REF. Council may consider recruiting a heritage specialist to prepare a Statement of Heritage Impact (SoHI) as per the Guidelines for preparing a statement of heritage impact (DPE, 2023). If the construction methodology or assessed impact footprint (subject site) are amended, re-assessment of the potential impacts to heritage items would be required.

### 4.5.3 Potential impacts to Non-Aboriginal Heritage - Operation

Upon completion of the proposed works, traffic will cease to utilise the Kelloshiel Creek Stone Bridge and thereby be of benefit to this heritage item, as it will no longer be supporting intermittent traffic loads that pose a risk of collision. Additionally, the temporary bitumen surface will be removed, restoring the heritage bridge to its former condition.

**Table 10 Non-Aboriginal Heritage impacts summary**

| Description | Y | N | Comments |
|---|---|---|---|
| Are there any items of non-Aboriginal heritage located within the vicinity (1km) of the proposed works? | X | | Two items of non-Aboriginal heritage are located within the vicinity of the Proposal:<br>• Kelloshiel Creek Stone Bridge which is located within the study area; and<br>• Kelloshiel heritage building which is approximately 300 m to the south-east of the subject site. |
| If yes, list the item(s) and their heritage significance (i.e., s170 register, Council Register, State Heritage Register, National Heritage Register). | X | | Two local heritage items are listed in Schedule 5 of the Bathurst Regional Local Environmental Plan and are:<br>• Item No. I121 – Kelloshiel Creek Stone Bridge<br>• Item No. I124 – Kelloshiel. |
| Is the development on, or reasonably likely to have an impact on, a part of the Willandra Lakes Region World Heritage Property (if so, consultation is required with the World Heritage Advisory Committee and Heritage NSW), | | X | Proposal is not located in proximity to the Willandra Lakes Region World Heritage Property |
| Is the Proposal likely to affect the heritage significance of a local heritage item, or of a heritage conservation area, that is not also a State heritage item, in a way that is more than minor or inconsequential? | | X | The Proposal has the potential to impact on a local heritage listed item. Assuming the safeguards listed in Section 4.5.4 are implemented and maintained, the heritage significance of the item is not anticipated to be affected in a way that is more than minor or inconsequential. |
| Is further assessment of the potential impact on a listed heritage item required? And has this assessment been provided along with written notification to the local Council for the area in which the heritage item is located? | | X | Council is the Proposal proponent and so has been notified of the proposed works. |

### 4.5.4 Environmental safeguards – Non-Aboriginal Heritage

The Environmental Safeguards for non-Aboriginal Heritage are considered part of the Proposal and must be implemented. Safeguards include:

- The proposed works must be contained to the subject site area assessed during the construction. If the proposed location is amended, further heritage assessment may be necessary to determine if the proposed works will impact on heritage items(s).

- It is recommended that Council create and maintain photographic records of the external condition of the Kelloshiel Creek Stone Bridge structure to be used to monitor for any signs of visual damage for the duration of the Proposal.
- If archaeological remains or items defined as relics under the NSW Heritage Act 1977 are uncovered during the works, all works must cease in the vicinity of the material/find and Council's Manager Strategic Planning and Environmental Officer are to be contacted immediately.
- Council's workers and all staff must be made aware of the heritage sites and places that occur within the area and all care must be taken to avoid interference with and damage to these sites.
- The Kelloshiel Creek Stone Bridge must be clearly fenced and flagged with removable flagging or other temporary means to delineate its presence and to prevent the item being harmed during the construction process.
- Any movement of heavy machinery within 5m of the Kelloshiel Creek Stone Bridge must be supervised by a trained signaller.

**Given the outlined environmental safeguards for non-Aboriginal heritage will be implemented and maintained, it is not anticipated that the Proposal would result in significant impacts to non-Aboriginal heritage.**

## 4.6 Aboriginal heritage

### *4.6.1 Existing environment*

The study area is located in the suburb of Eglington along Freemantle Road, in the Bathurst Regional Local Government Area (LGA). According to Tindale (1974), the study area is located within the Wiradjuri tribal and linguistic territory. The Wiradjuri first nations people are known as the people of three rivers, the Wambuul, Kalari, and Murrrumbidjeri. These First Nations people were known to have permanently inhabited the areas along the Wambuul for more than 40,000 years, with the waterway forming a significant cultural feature. Wiradjuri people traditionally signposted their land with tree carvings, and many stone monuments are recognised to represent key meeting and ceremonial sites across the Bathurst Region.

Apex Archaeology was engaged to conduct a full Aboriginal Due Diligence (ADD) assessment in accordance with the 2010 Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales (the Due Diligence Code of Practice). The full ADD is provided as Appendix C.

The ADD undertaken by Apex Archaeology identified that a section of the study area is located within an area of "moderate Archaeological Potential as defined on the Predictive model of Aboriginal heritage sensitivity within the Bathurst Regional LGA Figure 12 (Extent 2017)". No previously registered archaeological sites are located within the study area or within 500 m of the subject site and no newly identified archaeological material was identified during the site assessment completed in July 2023. Notwithstanding the rich Aboriginal heritage in the locality, the ADD determined that the study area was highly disturbed with no potential for sub surface archaeological deposits to occur (Apex Archaeology, 2023).

### *4.6.2 Potential Aboriginal Heritage Impacts – Construction*

The ADD process concluded that the proposed works will have an impact on the ground surface, however, no Aboriginal objects or intact archaeological deposits are likely to be harmed by the Proposal. An Aboriginal Heritage Impact Permit (AHIP) application is therefore not necessary. Given the proximity to a water source, there is always the possibility of encountering unanticipated archaeological material. Potential impacts include disturbance of unknown archaeological material during excavation works, particularly on the riparian zone and road verge (however this has been determined as being unlikely). All personnel working on the site are to remain vigilant and aware of the potential presence of unexpected sub-surface artefacts and all Safeguards outlined in Section 4.6.4 are to be strictly adhered to.

### *4.6.3 Potential Aboriginal Heritage Impacts – Operation*

No impacts to places, artefacts or Aboriginal Heritage sites are expected during use/operation of the Proposal.

**Table 11 Aboriginal Heritage impacts summary**

| Description | Y | N | Comments |
|---|---|---|---|
| Are the works likely to disturb previously undisturbed areas of the landscape? Check for good camping sites (flat, near water, availability of bush foods), mountain ridges, spurs or vantage points or rocky outcrops that may have ceremonial significance, and the presence of stone tools, shells or other evidence of human occupation. | | X | The subject site has undergone significant previous disturbance through clearing, development of roads and agriculture. |

| Description | Y | N | Comments |
|---|---|---|---|
| Has an AHIMS register search been conducted? | X | | Yes – refer Appendix C |
| Are there any known items of Aboriginal Heritage near the works area (< 1km)? | | X | No known items of Aboriginal Heritage occur within 1km of the subject site. |
| Is consultation with stakeholders required? E.g., the Local Aboriginal Land Council | | X | No – The ADD assessment determined that no harm to Aboriginal Heritage is anticipated and has not recommended requirements for community consultation unless Aboriginal heritage items are discovered during the proposed works. |
| Is a National Parks and Wildlife Act Section 90 Permit (Aboriginal Heritage Impact Permit – AHIP) required for Aboriginal items potentially impacted by the works? | | X | No known Aboriginal Heritage items occur in the subject site. Aboriginal Heritage Impact Permit (AHIP) application not necessary. Proceed with caution. If any Aboriginal objects are found, stop work, and notify Heritage NSW. |

### *4.6.4 Environmental Safeguards – Aboriginal Heritage*

The Environmental Safeguards Aboriginal Heritage are considered part of the Proposal and must be implemented. Safeguards include:

***Construction***

- All land ground disturbance activities must be confined to within the study area, as this will eliminate the risk of harm to potential Aboriginal objects in adjacent landforms. Should the parameters of the Proposal extend beyond the assessed area shown in Figure 2, then further archaeological assessment will be required before works can proceed.
- All staff and contractors involved in the proposed work should be made aware of the legislative protection requirements for all Aboriginal sites and objects.
- Should unanticipated archaeological material be encountered during site works, all work must cease and an archaeologist contacted to make an assessment of the find. Further archaeological assessment and Aboriginal community consultation may be required prior to the recommencement of works. Any objects confirmed to be Aboriginal in origin must be reported to Heritage NSW.
- If any human remains are found, all works should stop immediately, the site should be secured and NSW police contacted immediately.
- The information in the ADD meets the requirements of the Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales. It should be retained as shelf documentation for five(5) years as it may be used to support a defence against prosecution in the event of unanticipated harm to Aboriginal objects.

***Operation***

No other safeguards were deemed necessary for the operational phase of the Proposal.

**Given the outlined environmental safeguards for Aboriginal heritage will be implemented and maintained, it is not anticipated that the Proposal would result in significant impacts to Aboriginal heritage.**

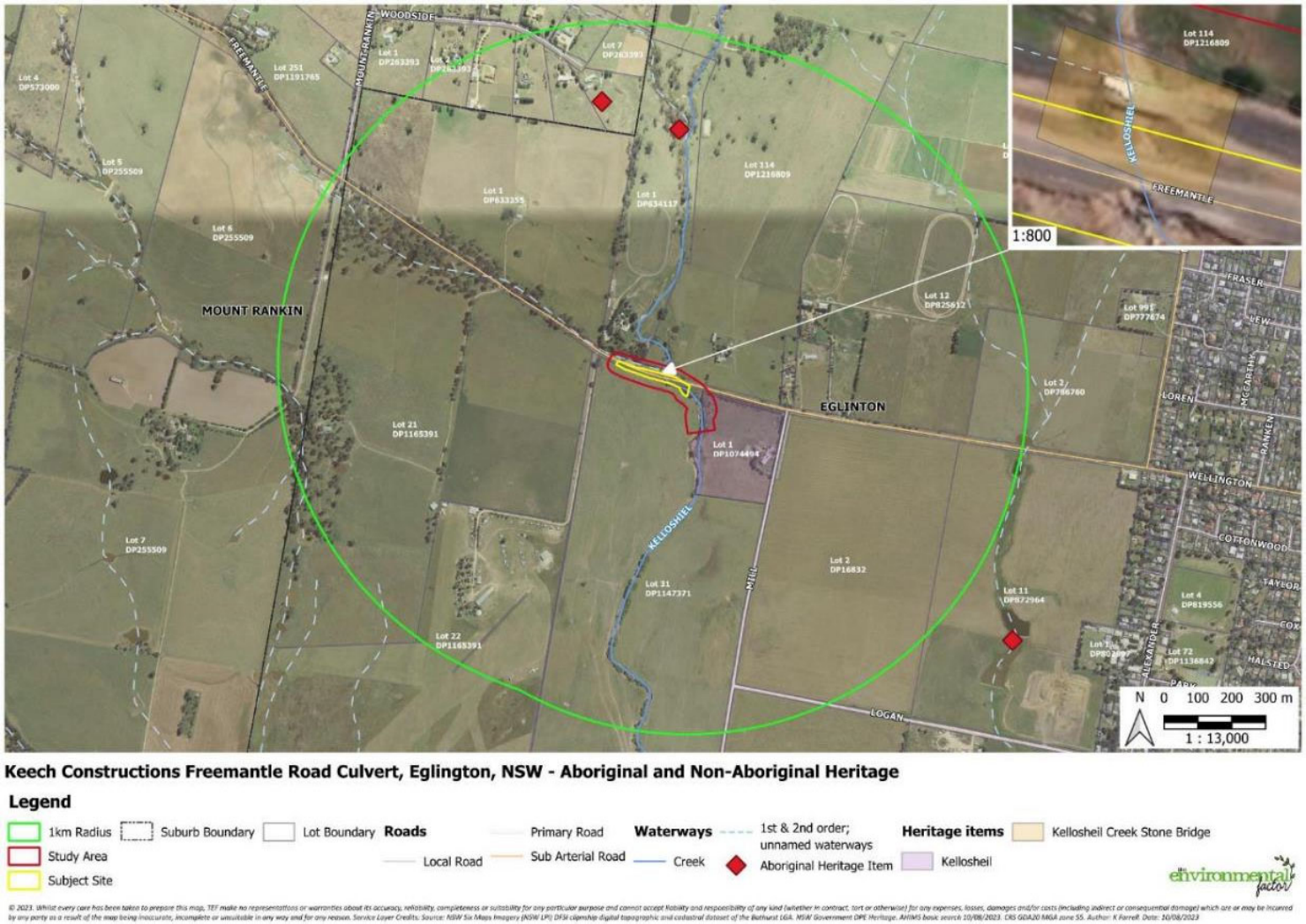



**Figure 10 Aboriginal and non-Aboriginal heritage items in proximity to the subject site**

## 4.7 Biodiversity

A comprehensive Flora and Fauna Assessment (FFA) was undertaken for the Proposal, with detailed ecological investigation and reporting undertaken. The below provide a summary of this work, with the project FFA included as Appendix B.

### *4.7.1 Existing environment*

The study area sits on the edge of a peri-urban environment with both the town of Eglinton and the regional centre of Bathurst situated within the broader locality. Limited remnant native vegetation and connectivity remains within the locality due to extensive historical clearing undertaken to facilitate modern European agriculture within the region. The study area includes those areas surrounding the immediate subject site including Kelloshiel Creek which bisects the subject site and is a tributary of the Macquarie River - Wambuul, both of which are mapped as KFH.

The subject site occurs in an agricultural landscape which has been historically cleared of canopy and now dominated by exotic vegetation under grazing and pasture management (Plate 10 and **Plate 12**). The roadside vegetation has a small number of juvenile planted locally occurring River Sheoak (Casuarina cunninghamiana) trees (Plate 14), and some minor occurrences of native ground cover species.

The subject site is bisected by Kelloshiel Creek which has been subject to historic and current erosion and environmental weed invasion leaving it in a significantly degraded state (Plate 10). Major erosion has resulted in road collapse and undercutting of creek banks with subsequent rubble and road debris scattered across the creek bed below the culvert (Plate 15). Kelloshiel Creek is a 3rd Order stream which is mapped as Key Fish Habitat (KFH) and was observed to have running clear water flowing during surveys. However, the damage caused during the collapse of the culvert has resulted in a disconnect in fish passage as the culvert is now suspended around 1.2 m above the creek bed (Plate 13). This has subsequently disconnected potential fish passage from the lower sections of Kelloshiel Creek and the Macquarie River - Wambuul, to higher parts of Kelloshiel Creek and its tributary Sandy Creek. In addition to KFH, Kelloshiel Creek contains good quality frog habitat features with some aquatic and fringing semi-aquatic vegetation (Plate 9). It is predicted that this creek will maintain running water year-round outside of drought periods.

The majority of the vegetation within the subject site has been subject to high levels of anthropogenic disturbance including historical clearing, agriculture and livestock grazing, road and infrastructure construction, and both historical and recent erosion and sedimentation. These disturbances have led to the introduction of many common exotic annual weeds and environmental weeds spreading throughout the subject site (**Plate 12**). No native plant community types (PCT's) were identified during surveys, and the vegetation present was overwhelmingly dominated by exotic species cover and abundance. Minor occurrences of native grasses and forbs are present, along with a small number of juvenile planted River Sheoak (*Casuarina cunninghamiana*) along the southern roadside shoulder above Kelloshiel Creek (Plate 14). The study area contains a small number of planted Eucalyptus sp. which are outside of the subject site and will not be impacted by the Proposal. No threatened flora species were recorded as occurring on the site, however targeted seasonal surveys were not undertaken as part of this assessment.

Two (2) Weeds of National Significance (WoNS) with Prohibition of Certain Dealings, including a large Blackberry (*Rubus fruticosus*) thickets and many mature Willows (*Salix sp.*) (**Plate 11** and Plate 7), and two (2)

are listed as Priority Weeds with Regional Recommended Measures within the Central Tablelands of NSW (see Table 12 WoNS and NSW Priority Listed Weeds recorded within the study area site.

**Table 12 WoNS and NSW Priority Listed Weeds recorded within the study area**

| Scientific name | Common name | Control Category |
|---|---|---|
| *Ligustrum lucidum* | Large-leaved Privet | **Priority Weed with Regional Recommended Measure – Central Tablelands** |
| *Rubus fruticosus species aggregate* | Blackberry | **WoNS**<br>**Prohibition of Certain Dealings – All of NSW**<br>**Priority Weed with Regional Recommended Measure – Central Tablelands** |
| *Salix sp.* | Willow | **WoNS**<br>**Prohibition of Certain Dealings – All of NSW**<br>**General Biosecurity Duty – All of NSW** |

Fauna recording was limited to incidental observation only. A small range of avian and amphibian fauna species were either seen or heard across the study area during surveys. A full list of species recorded on site can be found in the project Flora and Fauna Assessment (FFA) Appendix B.

The study area supports a limited range of habitat for native wildlife as the vegetation is isolated from other larger tracts of vegetation within the broader locality. This has resulted in limited native fauna biodiversity which is predominantly restricted to more mobile bird species such as Australian Raven (*Corvus coronoides*), Crimson Rosellas (*Platycercus elegans*) and Wedge-tailed Eagle (*Aquila audax*), or bird species able to persist in small patches of highly disturbed vegetation such as Superb Fairy-wrens (*Malurus cyaneus*).

Kelloshiel Creek provides amphibian habitat suitable for many frog species to persist within the subject site (Plate 16), such as Spotted March Frog (*Limnodynastes tasmaniensis*) and Common Eastern Froglet *Crinia signifera*). Although threatened amphibian species Booroolong Frog (*Litoria booroolongensis*) occurs within the Bathurst region, known populations are within the Macquarie River - Wambuul, upstream of the confluence of the Macquarie River - Wambuul and Kelloshiel Creek, and it is unlikely that this species could occur and persist within the study area, due to the ephemeral nature of this creek, lack of cobbles and pools, recent sedimentation and erosion events, and limited fringing vegetation.

Plate 7 Fallen Willow providing foraging and potential nesting habitat for native birds.

Plate 8 Fallen Willow creating a pool and vegetative cover.

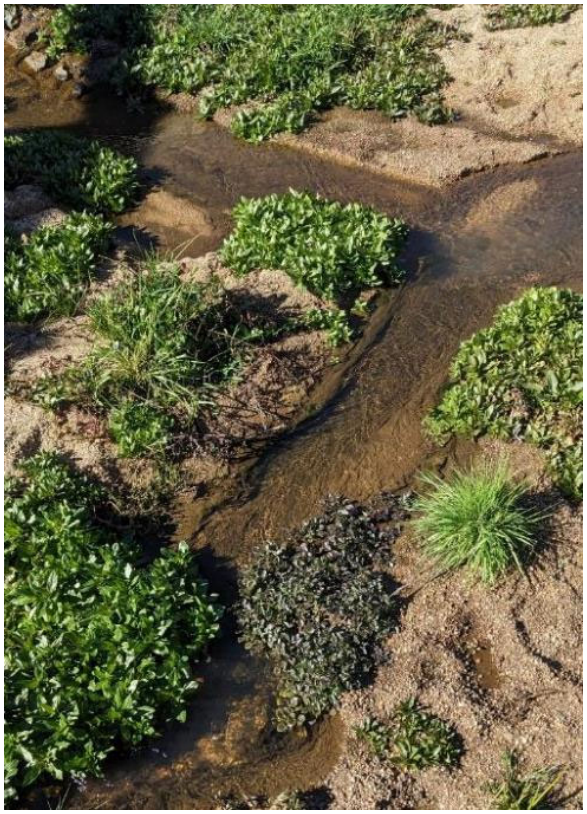


Plate 9 Clear shallow water flows with fringing vegetation providing frog habitat.

Plate 10 Bird and frog foraging habitat in Kelloshiel

Plate 11 Nesting and foraging habitat within dense weedy vegetation

Plate 12 Foraging habitat within exotic dominated ground cover vegetation

Plate 13 Existing culvert provides potential habitat to mud nesting bird species.

Plate 14 Juvenile River Sheoak provides foraging habitat for native bird species.

Plate 15 Rubble and rocks within creek bed providing habitat for frogs and reptiles.

Plate 16 Pooling water within Kelloshiel Creek. Site of the temporary dry work holding pool.

### *4.7.2 Potential biodiversity impacts – Construction*

Council have advised that they intend to take a conservative approach and keep the construction subject site as confined as possible. A dry works area will need to be established to enable reconstruction of the culvert, construction of the new proposed retaining wall, and deposition of boulders to create the rock apron below the newly installed culvert. Flows from the upper sections of Kelloshiel creek will be contained in a temporary holding pool immediately upstream of the culvert and pumped back into Kelloshiel Creek <100m downstream. Vegetation clearing will be limited to shrubby weedy vegetation, up to four (4) juvenile River Sheoak (*Casuarina cunninghaminana subsp. cunninghamiana*), and exotic dominated ground cover vegetation to facilitate construction works. Native fauna such as the Superb Fairy-wren (*Malurus cyaneus*) were observed to be present during surveys and are likely to be breeding/nesting within dense weedy vegetation at the time of works commencing in September.

Additionally, the project FFA identified the potential for introduction and spread of amphibian chytrid causing the disease chytridiomycosis, a Key Threatening Process (KTP) under both BC Act and EPBC Act. Chytridiomycosis, caused by the bacteria chytrid Batrachochytrium dendrobatidis, is a global epidemic which is potentially fatal to all native species of amphibian. This disease and KTP are unlikely to be spread into this waterway as a result of construction works where mitigation measures are adhered to.

The key mitigation measures are proposed to reduce further harm on biodiversity values present within the study area:

- Staged dry works area introduction required to allow amphibian fauna opportunity to relocate prior to instream pad establishment, clearing and commencement of reclamation works.
- Pre-clearing fauna surveys of dense weedy vegetation such as Blackberry (*Rubus fruticosus*) and Willows (*Salix sp.*) is to be undertaken by a qualified individual to ensure nesting native fauna is not harmed and can be safely relocated prior to clearing.
- Retention of fauna habitat (i.e rocks, logs) where practical within the subject site.
- Active control and management of NSW Priority Weeds and WoNS, including significant infestations of Blackberry (*Rubus fruticosus*), Briar Rose (*Rosa rubiginosa*), Bridal Creeper (*Asparagus asparagoides*), Privet (*Ligustrum sp.*), Willow (*Salix sp.*) within both planted native areas and heavily cleared open areas.
- All machinery should be clean and free of soil and plant matter which can spread disease and pathogens into waterways.

### *4.7.3 Potential Biodiversity Impacts – Operation*

The Proposal is not anticipated to result in any operational impacts on biodiversity beyond the current operational scenario.

Additionally, it is anticipated that impacts to biodiversity will reduce under the operation due to the reduction and control of WoNS weeds, stabilisation of creek bed and banks with subsequent reduced sedimentation and erosion, and the restoration of fish passage during high flow conditions.

**Table 13 Biodiversity impacts summary**

| Description | Y | N | Comments |
|---|---|---|---|
| Are the proposed works likely to involve the removal, pruning or damage to any vegetation including, grass cover, shrubs, trees or Endangered Ecological Communities? | X | | Vegetation removal is required to facilitate reconstruction of both the culvert and the retaining wall associated with the Proposal. Negligible planted native vegetation will be removed, with most vegetation clearing limited to heavily degraded weed dominated vegetation. |
| Please list the number of trees and/or hollows to be removed as part of the proposed works. | | X | Tree removal will be limited to the removal of large Willows (*Salix sp.*) which are required to be removed as a WoNS weed, and up to four (4) juvenile planted River Sheoak (*Casuarina cunninghamiana subsp. Cunninghamiana*) with a diameter at breast height (DBH) of around 15cm. |

| Description | Y | N | Comments |
|---|---|---|---|
| Are the works taking place in a roadside area designated as high or medium conservation value vegetation? | | X | Roadside vegetation within the subject site is heavily degraded, exotic dominated, and not mapped as high conservation value. |
| Are there any threatened, endangered, or native flora and/or fauna located within the vicinity of the proposed works? | | X | Surveys and desktop assessments have concluded there to be no potential impacts to threatened biota as a result of the Proposal. No threatened species or TEC's were recorded during site surveys. |

### *4.7.4 Environmental safeguards - Biodiversity*

The Environmental Safeguards for Biodiversity are considered part of the Proposal and must be implemented. Safeguards include:

***General***

- Ensure construction workers are provided with an environmental induction prior to the commencement of works to outline key biodiversity features of the site (Shrubby vegetation and waterway), and the management measures in place to protect biodiversity during construction.
- Vehicles and machinery to work from the existing road wherever possible and are not to extend beyond the subject site.
- Site is to be kept tidy and free from rubbish at all times, to prevent wastes being blown into adjacent areas of native vegetation or waterways.
- Where additional vegetation removal is proposed, this must first be assessed to consider any additional or cumulative impacts against the approved clearance footprint, and if appropriate, supervised by a qualified ecologist.
- Any required revegetation activities will be undertaken using native species sourced from local seed wherever possible. Areas to be re-seeded may be marked in the CEMP or Management Plan as a record of rehabilitation efforts made. Vegetation cover should be returned to the site within a reasonably practicable timeframe post-clearing to reduce soil exposure and loss.

***Loss of flora species and vegetation communities***

- Clearly delineate vegetation to be removed/retained and induct all site personnel as to the approved process and extent of clearing.
- Where possible, heavy vehicles are not to be parked under tree drip lines/ leaf canopy to avoid compaction of soil, which is damaging to mature native trees and can cause dieback or tree mortality. Existing cleared areas and roadways are to be used for parking as a first priority.

***Loss of fauna habitat resources and impacts to aquatic fauna***

- Prior to commencement of works, a site survey should be undertaken including inspection for native fauna, threatened species and habitat features (i.e nests, rock pools) to confirm occupation by fauna. Care should be taken to identify nests and/or roosting sites. If fauna habitat is present, the appointed contractor would contact the project ecologist for further advice prior to clearing.
- Consultation with NSW DPI – Fisheries must be undertaken to obtain a Part 7 permit which is required for the proposed instream works.

- The introduction of an upstream dam and subsequent diversion of water flows to establish a dry works area, must be carried out at a minimum of 48hrs prior to entering the waterway and beginning construction of the instream pad, to allow adequate time for aquatic fauna to relocate up or downstream.
- Sedimentation, erosion and contamination controls (as defined below) should be in place for the duration of the proposed construction works.

***Invasion and spread of weeds and pests***

- Develop and implement an active weed and pest management plan prior to construction commencing, to reduce the risk of weed spread and safety issues arising from pest and weed presence (e.g. WoNS and NSW Priority Weeds).
- Declared weeds within the subject site must be managed according to requirements under the *Biosecurity Act 2015*. It is recommended that all Weeds of National Significance and NSW Priority Weeds should be controlled, and where possible, eradicated to reduce the risk of further spread.
- Strict hygiene protocols must be followed. If weeds are accidentally transported to site, or identified during construction activities, all weed material should be immediately contained and removed from site.
- All machinery and vehicles are to be clean and inspected prior to arriving on-site to reduce the spread of weeds and disease (e.g. *Phytophthora cinnamomi*) to the site.

**Given the outlined environmental safeguards for Biodiversity will be implemented and maintained, it is not anticipated that the Proposal would result in significant impacts to Biodiversity.**

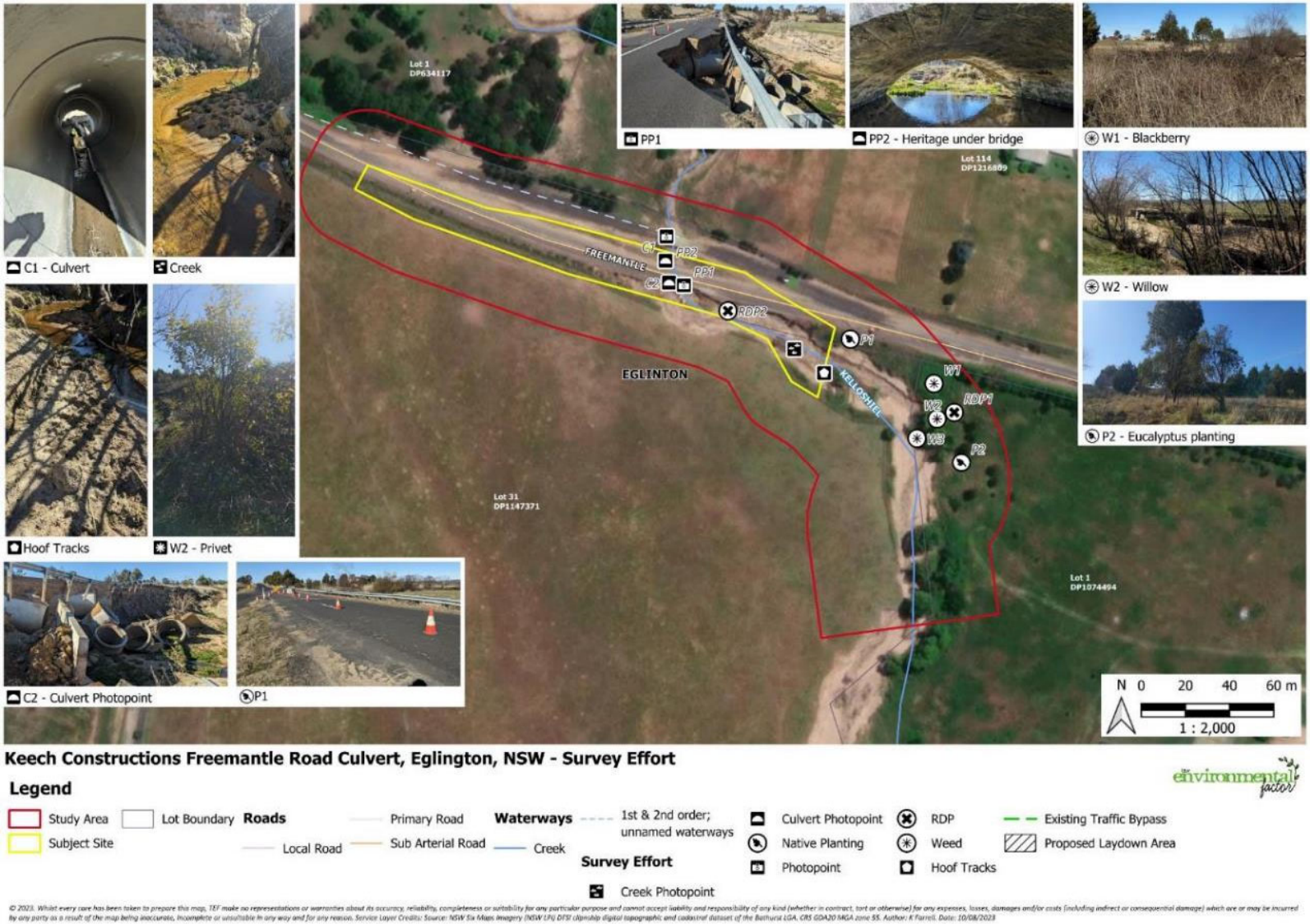





**Figure 11 Biodiversity survey effort**

## 4.8 Traffic and Transport

### 4.8.1 Existing environment

The subject site occurs along a section of Freemantle Road at the crossing of Kelloshiel Creek. In 2010, Freemantle Road was realigned, and a new culvert was installed to facilitate a two way crossing of Kelloshiel Creek away from the single lane heritage listed Kelloshiel Creek Stone Bridge.

The road within the subject site experiences local traffic by rural residents and minor, irregular thoroughfare of farm machinery, trucks and heavy vehicles. During the site inspection, cars, trucks and heavy vehicles were observed travelling along Freemantle Rd. There are no private access driveways present in the subject site.

### 4.8.2 Potential traffic and transport impacts – Construction

During construction, road users will continue to use the existing temporary traffic diversion arrangements over the Kelloshiel Creek Stone Bridge under a single lane controlled by traffic lights.

During phases of construction work if / when minor road closure is required, traffic control will be utilised to facilitate the movement of traffic (including pedestrian, bike and vehicular) and allow for safe thoroughfare on the affected section of road. A Traffic Control Plan (TCP) is required to be developed as part of the CEMP, to ensure that vehicular, pedestrian and bicycle movements are safely managed whilst construction is in progress. Increased road use during construction, particularly following rainfall, may deteriorate road condition and there is a potential for mud and concrete to be tracked onto sealed roads from adjacent stockpiling locations and unsealed access roads which could create a temporary safety issue for local road users.

Impacts to traffic also has implications in relation to socio-economic factors, as discussed in Section 4.9. The Proposal would generate a number of medium to heavy vehicle movements through the transport of machinery, fuel, general provisions and materials across the duration of the project which are likely to have a minor increase in traffic pressure for the duration of the Proposal. Light vehicles would be required to transport staff to and from the subject site and would also be used in various roles on site. Light and heavy vehicles are expected to enter the proposed site compound and stockpile site location via specific locations to be detailed in the CEMP.

### 4.8.3 Potential traffic and transport impacts – Operation

Upon completion of the proposed works, the dual carriageway access into and from Eglington will be restored which will achieve minimum service levels expected by the public for Freemantle Road. Operation of the Proposal is anticipated to positively impact traffic and transport through the rectification of an important rural road used by property owners and businesses.

**Table 14 Impacts to Traffic and Transport summary**

| Description | Y | N | Comments |
|---|---|---|---|
| Are the proposed works likely to result in major detours or disruptions to traffic flow (vehicular, cycle and pedestrian) or access to properties or businesses? | | X | Traffic will continue to be diverted over the Kelloshiel Creek Stone Bridge which currently provides a single lane of traffic controlled by traffic lights. This is not considered a major detour. |

| Description | Y | N | Comments |
|---|---|---|---|
| Will there be any permanent major detours made as a consequence of the works? | | X | Upon completion of the proposed works, traffic will utilise the rectified road section and culvert crossing of Kelloshiel Creek on Freemantle Road. The temporary diversion will then be removed. No permanent major detours are anticipated. |
| Does the Proposal involve excavation that is not minor or inconsequential of the surface of, or a footpath adjacent to, a road for which a council is the roads authority under the Roads Act 1993 (if the public authority that is carrying out the development, or on whose behalf it is being carried out, is not responsible for the maintenance of the road or footpath). (if so, consultation with Council will be required) | X | | The Proposal does not include excavation of any footpaths. |
| Involves the installation of a temporary structure on, or the enclosing of, a public place that is under a council's management or control that is likely to cause a disruption to pedestrian or vehicular traffic that is not minor or inconsequential (if so, consultation with Council will be required) | | X | A temporary site office will be installed on the road reserve for the duration of the construction works in an area unlikely to cause disruption to pedestrian or vehicular traffic. |
| Is the Proposal likely to generate traffic that will strain the capacity of the road system in an LGA (if so, consultation with Council will be required) | | X | Proposal is anticipated to result in additional movement of construction vehicles during the construction works. This is anticipated to be minor and confined to the construction phase. |

### *4.8.4 Environmental safeguards - traffic and transport*

The Environmental Safeguards Traffic and Transport are considered part of the Proposal and must be implemented. Safeguards include:

***Construction***

- Prior notice shall be given to landowners along Freemantle Road to notify residents of the works to be completed, their timing and duration.
- Consider the location of designated parking areas, stockpile locations, construction laydown sites, site offices, and access routes carefully such that unnecessary inconveniences to local residents are avoided.
- Works are to minimise impacts to residents/landholders by maintaining vehicular access along Freemantle Road using a temporary diversion and traffic control as appropriate.
- A Traffic Control Plan (TCP) is to be developed in accordance with Australian Standards (AS 1742.3 – Traffic Control Devices for Works on Roads) and Roads and Maritime Traffic Control at Worksites manual to identify appropriate signage (and location) to advise motorist of upcoming changes in the road network. Any variation to the layout of the TCP on site is to be recorded and certified by accredited Roads and Maritime personnel.

- All road signs and marking will be in accordance with the TfNSW Guide to Signs and Markings; Australian Standards AS1742 and AS1743; and the Australian Roads Guide to Traffic Management.
- Traffic and transport complaints are to be monitored and addressed promptly where practicable.

**Given the outlined environmental safeguards will be implemented and maintained, it is not anticipated that the Proposal would result in significant impacts to Traffic and Transport.**

## 4.9 Socio-economic considerations

### *4.9.1 Existing environment*

Eglington is a suburb of Bathurst with a population of approximately 3,012 people. At the 2021 Census, of the 3,012 people in Eglington, 48.3% were male and 51.7% were female. The median age of people in Eglington was cited as 34 years, and the average number of people per household was 2.9. There were 1,585 people who reported being in the labour force. Of these 63% were employed full time, 29% part time, and 3.0% were unemployed. The largest industry of employment were hospitals and state government administration with 4.3% each of the labour population employed in this industry.

The surrounding area of the Proposal is predominantly low-density rural housing and farms. There are no private driveways located within the subject site.

### *4.9.2 Potential socio-economic impacts- Construction*

During construction there would be increased traffic on the road surrounding the subject site due to use by construction vehicles, machinery and personnel. There would also be increased noise disruption from the operation of machinery, as well as the potential for the generation of dust and other air pollutants. However, this disruption would be limited to the construction phase and the anticipated inconvenience for residents and business owners is not expected to be substantial.

During the construction phase of the project, it is expected that local contractors will be employed, with numbers and duration yet to be specified. It is also expected that any additional workers coming from further afield will provide income to local cafes, businesses and accommodation providers during their stay.

The proposal is anticipated to have a positive impact on residents and businesses through the rectification of an important rural road that connects an expanding area of the Bathurst LGA with the suburb of Eglinton and the Bathurst CBD.

### *4.9.3 Potential socio-economic impacts – Operation*

Upon completion of the proposed works, the two-way road access along Freemantle Road will be restored which will achieve minimum service levels expected by the public for Freemantle Road. It will also improve travel times in the area by the removal of the traffic light controls associated with the current single lane temporary diversion across Kelloshiel Creek Stone Bridge.

**Table 15 Socio-economic impacts summary**

| Description | Y | N | Comments |
|---|---|---|---|
| Are the proposed works likely to impact on local business, require any property acquisition, or alter any access or parking arrangements for properties (either temporarily or permanently)? | | X | A number of sensitive receivers are present within 500 m of the subject site and may be temporarily indirectly impacted. Mitigation measures to manage impacts to sensitive receivers are summarised in Section 5. No property acquisition or alteration to property entrances is anticipated. |

| Description | Y | N | Comments |
|---|---|---|---|
| Is the development adjacent to land reserved under the National Parks and Wildlife Act 1974 or to land acquired under Part 11 of that Act—( if so, consultation is required with the Office of Environment and Heritage), | | X | Proposal is not adjacent to any land managed by National Parks. |
| Is the development on land in Zone C1 National Parks and Nature Reserves or in a land use zone that is equivalent to that zone, other than land reserved under the (if so, consultation is required with National Parks and Wildlife Act 1974the Office of Environment and Heritage), | | X | Proposal is not being completed on any land zoned C1. |
| Does the development comprise a fixed or floating structure in or over navigable waters—(if so, consultation will be required with Transport for NSW), | | X | Proposal does not involve any fixed or floating structures in or over navigable waters. |
| Is the development located on defence communications facility buffer land within the meaning of clause 5.15 of the Standard Instrument— (if so, consultation is required with the Secretary of the Commonwealth Department of Defence,<br>Note—<br>Defence communications facility buffer land is located around the defence communications facility near Morundah. See the Defence Communications Facility Buffer Map referred to in clause 5.15 of Lockhart Local Environmental Plan 2012, Narrandera Local Environmental Plan 2013 and Urana Local Environmental Plan 2011. | | X | Proposal is not being carried out on defence communications facility buffer land. |
| Is the development on land in a mine subsidence district within the meaning of the Mine Subsidence Compensation Act 1961—(if so, consultation is required with the Mine Subsidence Board), | | X | Proposal is not being carried out within a mapped mine subsidence district within the meaning of the *Mine Subsidence Compensation Act 1961.* |
| Is the development within a Western City operational area specified in the Western Parkland City Authority Act 2018, Schedule 2 with a capital investment value of $30 million or more—(if so, consultation is required with the Western Parkland City Authority constituted under that Act). | | X | Proposal is not being carried out within the Western City operational area. |

### *4.9.4 Environmental safeguards – socio-economic considerations*

The Environmental Safeguards for Socio-economic impacts are considered part of the Proposal and must be implemented. Safeguards include:

- Considerate construction practices are to be implemented at all times during works, including that the construction site is to be left in a clean and tidy manner at the end of each workday, and noise, air quality and visual amenity impacts are to be kept to a minimum.
- All materials purchased for the Proposal are to be of highest quality and most sustainable as possible, as per NSW Local Government Sustainable Procurement Policy, to reduce impacts to community and ratepayers through replacement of low-quality or faulty equipment in the future.
- Quality assurance is to be applied to all aspects of the Proposal, including design and construction to ensure best value for the local community.
- Disruption of traffic/private property access is to be minimised wherever possible and clear communication and planning between construction crew and landowners is to be undertaken.
- Community engagement is to be undertaken to obtain feedback on concerns, and address issues as they arise.
- Construction machinery and work vehicles to be discretely parked when not in use to reduce visual impact and ensure safe pullover is available where possible.

**Given the outlined environmental safeguards will be implemented and maintained, it is not anticipated that the Proposal would result in significant impacts to socio-economic considerations.**

## 4.10 Waste and resource use

### *4.10.1 Existing environment*

The study area includes predominantly cleared land dominated by exotic ground cover vegetation and pasture, interspersed with small occurrences of juvenile planted native canopy species. Highly disturbed cleared areas within the subject site are in a degraded condition with high levels of high threat woody weeds and common agricultural weeds. Disturbance levels within the study area are high, due to extensive anthropogenic activity, including high vehicle use of the area and exposure to intensive agriculture and flash flooding events. Some discarded waste was observed on site, in the form of litter discarded by road users. Rubble and materials from the collapsed culvert and flood debris has been deposited within the Kelloshiel Creek bed south of Freemantle Road.

### *4.10.2 Potential waste and resource use – Construction*

The Proposal is not anticipated to generate a significant amount of waste, with a net import of construction materials.

The existing infrastructure would be used in the construction of the new road and culverts where possible, with waste to be minimised through the following initiatives:

- Topsoil removed from the road edges, creek bed, culvert foundations and stockpile site should be windrowed and reused to rehabilitate/stabilise the site once construction works are complete.

Waste products generated by the construction phase of the project may include but are not limited to:

- Soil and spoil and, excess civil construction materials.
- Debris removal including concrete, steel and bitumen road surface.
- Cleared vegetation.
- Packaging.
- Domestic and general waste.
- Chemical wastes

During construction a small number of light vehicles and plant will be required to convey personnel to site and undertake the works (e.g. excavation, lifting/movement of equipment and materials). Where possible, local contractors will be engaged, and construction materials sourced from nearby fill and/or locally. Pollution and greenhouse gas (GHG) emissions from construction machinery/vehicles operating on site must also be reduced wherever possible to minimise cumulative impacts on climate and air quality.

Other than rock/fill materials and vegetative waste, most of the materials utilised in the works will be non-renewable, finite resources. Their use would diminish the availability of some resources for future use and contribute to pollution and greenhouse gas emissions through both direct use of fuels and the embodied energy used in their production, and in association with the disposal of related waste products. The use of fossil fuels would also contribute to impacts on climate and air quality.

Construction works would likely require:

- DGB 20 and DGB 150 rock

- Concrete
- Bitumen aggregates
- Select fill (where spoil is not suitable for reuse)
- Fiberglass reinforced polymer (FRP) retaining walls
- Water (likely to be drawn from local Council resources or potable water carted to site).
- Large boulders for the installation of the energy dissipating rock apron below the culvert.

Any additional material that may be required would be sourced from legally operating commercial suppliers and manufacturers within the local area and surrounding towns. Where feasible, material with recycled content will be sourced.

Energy consumption associated with the proposed works would include electricity and petroleum based fossil fuels. Electricity would be required to power site compounds and/or portable traffic lights and would be supplied from a portable generator. Fuel would also be required to power construction plant and other vehicles.

Any construction wastes/ contaminated materials will need to be handled carefully so as not to impact upon any sensitive environmental areas within the study area, and to ensure Council undertakes its responsibilities as environmental custodians and to care for the health and safety of their employees, contractors and constituents. All wastes will be managed in accordance with the POEO Act and in accordance with EPA and Council guidelines.

In order to achieve higher levels of landfill diversion, it is critical to identify what materials can be recycled and where, so that appropriate arrangements can be made with service providers – other construction wastes may need to be transported farther afield to be recycled and avoid landfill. Regional collaboration amongst Council waste authorities and other industry partners may be required in order to maximise recycling and resource recovery efforts for the Proposal.

### *4.10.3 Potential waste and resource use – Operation*

No waste products will be generated as part of operation of the Proposal

**Table 16 Waste Impacts summary**

| Description | Y | N | Comments |
|---|---|---|---|
| Are the proposed works likely to generate >200 tonnes of waste material (contaminated and /or non-contaminated material)? | X | | Yes. Removal and disposal of the damaged concrete pipe and other debris has the potential to be in excess of 200 tonnes of non-contaminated waste material. This material would be disposed of appropriately at a licensed facility; materials would be recycled wherever possible. |
| Are the proposed works likely to require a Licence from NSW EPA for waste? | | X | No; the works do not and will not require significant ongoing discharges of waste to the environment. |
| Will the ongoing operation of the site post completion of works generate significant amount of waste? | | X | No additional ongoing waste is expected to be generated post construction. |

### *4.10.4 Environmental safeguards – Waste and Resource Use*

The Environmental Safeguards for Waste and Resource use are considered part of the Proposal and must be implemented. Safeguards include:

- Resource management hierarchy principles are to be followed; namely, the avoidance, reduction, reuse and recycling of resources.
- If stockpile or laydown sites are required in locations that have not been considered as occurring within the impact footprint as part of this REF, additional approval/assessment may need to be sought prior to any vegetation clearing taking place.
- Requirements under the Landcom (2004) stockpile management procedure must be observed, including correct placement of earth banks (with sedimentation ponds) to divert water around stockpiles if placed on a slope, and/or filter fences erected below stockpiles to capture any sediment moving offsite.
- Bulk project waste (e.g. clean virgin excavated natural material or clean fill) sent to a site not owned by Council (excluding DPE licensed landfills) for land disposal is to have prior formal written approval from the landowner.
- Waste is not to be burnt on site and all general waste will be contained and disposed of at suitable waste facilities.
- Where possible, materials with recycled content will be sourced, and minimum quantities ordered to reduce wastage.
- If contamination is encountered during construction, a site assessment must be undertaken in accordance with the *Protection of the Environment Operations Act 1997* (POEO Act).
- Toilets will be provided for construction workers for the duration of the works to prevent human wastes entering the waterway.
- Waste management for construction projects should be undertaken in accordance with the NSW Waste Avoidance and Resource Recovery Act 2001. The objectives of the Act are:
    - To encourage the most efficient use of resources and to reduce environmental harm in accordance with the principles of Ecologically Sustainable Development (ESD),
    - To ensure that resource management options are considered against a hierarchy of the following order: Avoidance of unnecessary resource consumption, Resource recovery (including reuse, reprocessing, recycling and energy recovery), Disposal.
    - To provide for the continual reduction in waste generation,
    - 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,
    - To ensure that industry shares with the community the responsibility for reducing and dealing with waste,
    - To ensure the efficient funding of waste and resource management planning, programs and service delivery,
    - To achieve integrated waste and resource management planning, programs and service delivery on a State-wide basis,
    - To assist in the achievement of the objectives of the Protection of the Environment Operations Act 1997.

- Don't over-order – ensure quantities are carefully calculated and ordered so as to minimise waste. Where construction materials are leftover, these are to be beneficially used on other projects, or stored by Council until such a need arises.

**Given the outlined environmental safeguards will be implemented and maintained, it is not anticipated that the Proposal would result in significant impacts to Waste and Resource Use.**

## 4.11 Visual amenity

### *4.11.1 Existing environment*

Freemantle Road is a dual lane local road that provides access into and from the suburbs of Eglington and Bathurst to rural areas such as Mount Rankin and Billywillinga.

This subject site and study area are dominated by a rural landscape predominantly cleared of canopy to facilitate agriculture (Plate 25). The surrounding locality contains some remnant native vegetation in road reserves and also occurring as isolated stands and paddock trees. Kelloshiel Creek forms a large proportion of the subject site and is a tributary of the Macquarie River - Wambuul. This creek and its associated riparian zone is in a heavily degraded state, dominated by exotic vegetation including Blackberry (*Rubus fruticosus sp. agg.*) and Willows (*Salix sp.*) which are a significant weed of waterways and are nationally listed as a WoNS (Plate 21 and Plate 26).

The current visual amenity of the study area is influenced by the temporary diversion of Freemantle Road away from the damaged road and culvert. This diversion crosses the Kelloshiel Creek Stone Bridge, a heritage item which adds aesthetically pleasing heritage visual amenity to the study area (Plate 19). The temporary diversion has resulted in the sealing of the heritage bridge road surface which has detracted from the visual amenity of the study area (Plate 20). Additionally, the collapsed culvert and eroded creek and road edge also detract from visual amenity within the subject site (Plate 17, Plate 18, Plate 22, Plate 23 and Plate 24).

**Plate 17 Collapsed Freemantle Road Kelloshiel Creek culvert**

**Plate 18 Under cut and eroded southern road edge**

**Plate 19 Heritage listed Kelloshiel Creek Stone Bridge**

**Plate 20 Temporary Freemantle Road diversion across the Kelloshiel Creek Stone Bridge**

Plate 21 Dense weeds along southern road edge and riparian corridor of Kelloshiel Creek

Plate 22 Closed section of Freemantle Road

Plate 23 Collapsed culvert and road edge along southern section of Freemantle Road

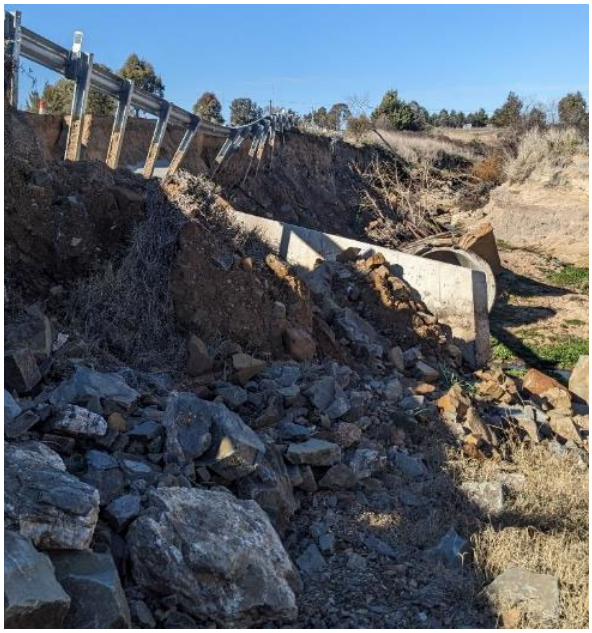


Plate 24 Collapsed culvert headwall and rubble within Kelloshiel Creek

Plate 25 Rural landscape predominantly cleared of canopy under intensive agriculture

Plate 26 Willows (*Salix sp.*) fallen into Kelloshiel Creek and actively growing

### 4.11.2 Potential impacts to visual amenity- Construction

The visual amenity of the study area will be temporarily affected as works are undertaken. Short-term impacts to visual amenity during construction may include the presence of earthworks, removal of vegetation, the presence of construction machinery and equipment, and stockpile and compound sites. Increased large vehicle traffic, temporary infrastructure works and installation of any safety rails and security fencing will also detract from the existing visual environment. Due to the low density of dwellings occurring in the study area, potential visual amenity impacts during construction are considered to be generally low.

### 4.11.3 Potential impacts to visual amenity – Operation

Post construction, visual amenity will be overall improved, through the rectification of the Freemantle Road culvert, restoration of two-way traffic, removal of temporary traffic signals, and subsequent improved safety and improved road visibility. Additionally, the heritage listed Kelloshiel Creek Stone Bridge will be restored to its previous condition including removal of road surface bitumen sealing and the sealed approaches to the bridge. Temporary, visually unappealing barriers and signs would be removed post construction, with all exposed soils re-stabilised with ERSED controls and revegetation where appropriate. Overall, the proposed road and culvert rectification is expected to improve visual amenity compared with its current condition.

**Table 17 Visual Amenity impacts summary**

| Description | Y | N | Comments |
|---|---|---|---|
| Are the proposed works likely to have an impact on the visual amenity of the surrounding area? (i.e. removal of vegetation, stockpile sites, road widening etc.) | X | | Temporary construction presence only. Improvement on existing site conditions anticipated through the rectification of the Freemantle Road culvert over Kelloshiel Creek, removal and management of environmental weeds, stabilisation of erosion, and the restoration of the Kelloshiel Creek Stone Bridge to its original condition. |
| Will the development 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 land within 200 km of the Siding Spring Observatory | | X | Proposal will not increase the amount of artificial light in the sky. Floodlights are proposed to be installed within the site compound for security, however these lights are only temporary and are unlikely to significantly increase the amount of artificial light in the night sky. The study area is not mapped to be within any areas of the dark sky region map. |

### 4.11.4 Environmental safeguards – visual amenity

The Environmental Safeguards for Visual Amenity impacts are considered part of the Proposal and must be implemented. Safeguards include:

- Considerate construction practices are to be implemented at all times, to ensure the works areas are neat and visually not offensive, including to be kept free from rubbish, and stockpile sites actively managed.
- No additional, unauthorized clearing or destruction of vegetation is to occur.

- Vehicles are to be parked in designated areas only.
- Cleared, bare patches of ground that form part of the works are to be revegetated and restored following cessation of works.
- Obvious and intrusive signs/machinery/equipment are to be removed from the site at the first opportunity.
- Appropriate consultation will continue to be undertaken to inform businesses and residents of planned works, timing, and potential visual impacts.
- Any complaints received regarding visual amenity at the site are to be dealt with and rectified as soon as possible.

***Operation***

- Any impacts to property entrances, driveways or fencing that occur as a result of the Proposal are to be rectified in collaboration with the landholder/s as soon as possible, post completion of works in the vicinity.

**Given the outlined environmental safeguards will be implemented and maintained, it is not anticipated that the Proposal would result in significant impacts to Visual Amenity.**

## 4.12 Climate Change

### *4.12.1 Existing environment*

Long-term meteorological data for the surrounding area is available from the Bureau of Meteorology (BoM) operated weather station at Bathurst Agricultural Station (Site No. 063005). The Bathurst Agricultural Station is located approximately 11 km south-east of the subject site. Temperature data collected since 1908 indicates that January is the hottest month of the year, with a mean maximum temperature of 28.1°C. July is the coolest month with a mean daily maximum temperature of 11.3°C. January is the wettest month with an average rainfall of 68.4 mm falling, and according to long-term records a mean annual rainfall of approximately 639.4 mm.

The Bureau of Meteorology Climate Change Analogue Tool provides Australian climate change modelling predictions. Based on a worst-case scenario of a future with little curbing of emissions and carbon dioxide concentrations continuing to rapidly rise, the 2030 projection for the Bathurst region, expects temperatures to be around 0.5°C to 1.5°C higher and rainfall to change between a range of less than 5% to greater than 5% compared to the 1986 to 2005 average. Climate change projections are presented for emission scenarios that will impact the degree to which the climate is altered in future; each of these is referred to as a 'representative concentration pathway' (RCP) and is representative of the concentration of global greenhouse gas (GHG) emissions in the atmosphere under different emissions scenarios.

### *4.12.2 Potential impacts to climate change- Construction*

Throughout the construction phase of the Proposal there will be use of in-demand materials. Use of these materials diminishes the availability of some resources for future use and contributes to pollution and GHG emissions through both direct use of fuels and the embodied energy used in the production of construction materials, and in association with the disposal of related waste products. The use of fossil fuels would also contribute to impacts on climate and air quality. While these impacts would be negligible on global or national scales, efficient resource use should be adopted as a general operating principle, including use of locally sourced materials and locally based construction crews to reduce 'carbon miles' and increase efficiencies.

### *4.12.3 Potential impacts to climate change - Operation*

The current diversion route includes two (2) sets of traffic lights that run on diesel generators 24 hours per day. The operation of the Proposal and the removal of the diversion route and traffic lights would have a positive impact on climate change through removal of two diesel generators that are currently generating GHG emissions 24 hours per day, 7 days a week.

### *4.12.4 Environmental safeguards – Climate Change*

The environmental safeguards for climate change impacts are considered part of the Proposal and must be implemented. Safeguards include:

***Construction***

- Resource management hierarchy principles are to be followed:
    - Avoid unnecessary resource consumption as a priority.

    - Avoidance is followed by resource recovery (including reuse of materials, reprocessing, recycling and energy recovery); and
    - Disposal is undertaken as a last resort (in accordance with the Waste Avoidance & Resource Recovery Act 2001).
- Council may elect to make a contribution to an accredited carbon offset program to offset greenhouse gas emissions.
- Quality assurance and life cycle of materials are to be considered when purchasing, to ensure the newly built infrastructure is resilient and structurally sound.
- Local resources are to be used wherever possible, to reduce waste and increase efficiencies and to encourage local economies with fewer 'carbon miles'.

***Operation***

- Road and culvert upgrades to be monitored and maintained per Council's routine road management strategy, to ensure lifecycle of upgraded road features extended and to reduce wastage from neglect / inadequate maintenance.

**Given the outlined environmental safeguards will be implemented and maintained, it is not anticipated that the Proposal would result in significant impacts to Climate Change.**

# 5 Summary of Environmental Safeguards

A summary of Environmental Safeguards from each environmental assessment chapter is provided in Table 18.

**Table 18 Summary of environmental safeguards**

| Environmental Section | Category | Mitigation measures | Responsibility and timing |
|---|---|---|---|
| **Soils and Erosion** | Construction | • No vegetation outside the approved direct impact footprint is to be impacted or removed; vegetation that is not approved for clearance is to be protected to ensure soils are not exposed unnecessarily.<br>• Minimize the length of time that soils are exposed by stabilising as soon as practical by seeding, spreading mulch or installing erosion control blanket as appropriate.<br>• All areas where groundcovers/vegetation are required to be removed will require careful management during construction due to the higher erosion risks, including:<br>• Erosion and sediment (ERSED) control measures are to be implemented and maintained to:<br>• prevent sediment moving off-site and sediment laden water entering any drainage lines, drain inlets, or dams; and<br>• reduce water velocity and capture sediment on site.<br>• ERSED controls are to be installed prior to the commencement of works and checked and maintained on a regular basis (including clearing of sediment from behind barriers).<br>• ERSED control measures are not to be removed until the works are complete, and areas are stabilised.<br>• Monitoring and response actions with regard to ERSED controls will be incorporated within the Construction Environmental Management Plan (CEMP) for the Proposal, to be enforced by the appointed Contractor.<br>• The maintenance of established stockpile sites during construction is to be in accordance with the Landcom/Department of Housing Managing Urban Stormwater, Soils and Construction Guidelines (the Blue Book) (Landcom 2004), including:<br>• Stockpiles are recommended to be formed in accordance with the Blue Book Standard Drawing 4-1, and offsite/away from waterbodies wherever practical. | Council and nominated contractor<br><br>Pre-construction Construction |

| Environmental Section | Category | Mitigation measures | Responsibility and timing |
|---|---|---|---|
| | | • Topsoil and subsoil are to be separated and protected from degradation, erosion or mixing with fill or waste. Materials are to be reused onsite where appropriate for infilling works, including re-spreading of topsoil as appropriate to enable rapid rehabilitation. Where onsite reuse cannot be accommodated, soil materials should be put to beneficial reuse elsewhere.<br>• If contaminated soils are encountered during construction, a site assessment is to be completed in accordance with Schedule A 'Recommended general process for assessment of site contamination' (NEPM 1999).<br>• If contaminated soils are encountered, they will be managed (and if necessary excavated, contained, treated and disposed of) in accordance with the law and relevant EPA and Council guidance.<br>• All chemical usage and storage during construction is to be in line with legislated requirements, to prevent Pollution of Land, which is prohibited under Section 142 A of the POEO Act. | |
| | Operational | • Monitoring of the site is to be undertaken to ensure ERSED controls remain in place until the site is re-stabilised, and to ensure no sediment is washed into any waterways following construction and before site stabilisation works are completed.<br>• Maintenance of vegetative cover on all exposed surfaces (not to be covered by road base/seal) to be undertaken to ensure the stability of soils on site into the future.<br>• Infill planting or additional spreading of appropriate native grass mixture and/or groundcover species to be undertaken until the entire site is stabilised. | Council and nominated contractor<br><br>Post-construction |
| **Surface and Groundwater** | General | • All construction works are to be completed in accordance with the FM Act permit once it has been issued.<br>• If 'dirty' site water is collected from within the direct impact footprint, it is to be redirected to filtration devices to trap sediments and other pollutants, and dissipate flow velocities, prior to discharging to the surrounding environment. Drainage and runoff should be controlled in such a way that no foreign substrates or materials leave the site. | Council and nominated contractor<br><br>Pre-construction<br>Construction |

| Environmental Section | Category | Mitigation measures | Responsibility and timing |
|---|---|---|---|
| | | • 'Clean' water from outside the study area is to be diverted around the site, to avoid contamination and to prevent scour/erosion of the site during rainfall events during construction.<br>• Works to be completed in dry times (i.e. times of no current or predicted rainfall) to reduce the risk of pollutants and sediments being washed into nearby waterways or other surface waters.<br>• Appropriate erosion and sediment (ERSED) controls are to be installed and maintained during construction, to ensure sediment and pollutant laden surface water runoff does not enter adjacent waterways/drainage lines.<br>• All litter, including cigarette butts and food wrappers, is to be collected in a suitable receptacle and disposed of appropriately throughout the construction phase to ensure these do not end up polluting waters of aquatic environments.<br>• Re-fuelling of plant and equipment is to occur offsite, or in impervious bunded areas located a minimum of 40 metres from the waterway.<br>• Vehicle wash-down and/or cement truck washout (if required) is to occur offsite unless it forms part of sediment control, where it is to occur in a suitably bunded area with controlled run-off and located a minimum of 40 metres from the waterway.<br>• Monitoring of water quality is to be undertaken within culverts/waterways downstream of the site during and immediately following rainfall events, to identify if ERSED controls are functioning as intended. Visual inspections should be undertaken by an appropriately qualified person/s to determine if water is turbid, or if there is evidence of petrochemicals or other pollutants present as a consequence of construction activities.<br>• Segregate and stockpile topsoil removed from the area a minimum of 40 m from any waterway and on a flat, stable area. Use measures such as silt fences and holding ponds to prevent stockpile runoff from entering waterways.<br>• Biosecurity and water health protection measures should be implemented throughout the construction phase, including:<br>• Machinery should arrive on site in a clean, washed condition, free of fluid leaks, pests and/or weeds/spores; | |

| Environmental Section | Category | Mitigation measures | Responsibility and timing |
|---|---|---|---|
| | | • Regular weed control should be undertaken in disturbed areas throughout the construction period to prevent weed spread into waterways, if notifiable/listed weed material is present; and<br>• Ensure all pesticide/herbicides used are registered for use within a waterway, as per NSW DPI guidelines. Alternatively, opt to remove weeds mechanically where possible.<br>• Spill response protocols for plant, equipment and chemicals used or stored on site during construction are to be available and accessible at all times to prevent and minimise potential for Pollution of Waters (s120 POEO Act).<br>• A Soil and Water Management Plan will be developed as part of the CEMP for the Proposal, detailing:<br>• Water quality parameters to be adhered to (e.g., turbidity)<br>• Appropriate monitoring locations and frequency<br>• Location and types of ERSED controls<br>• Proposed revegetation and stabilisation measures to be undertaken. | |
| | Operation | • Continue to undertake a water quality monitoring program in line with Council's requirements until the site is completely stabilised; monitoring should include details of proposed baseline and downstream water quality following any heavy rainfall.<br>• Subject site rehabilitation/stabilisation, including removal of weeds and revegetation using appropriate native species is recommended to be undertaken to ensure soil stability and prevention of sediment runoff from the site into the future. | Council and nominated contractor<br><br>Post-construction |
| **Noise and vibration** | Construction | • Noise emissions should be considered in terms of the Interim Construction Noise Guideline (ICNG) (Department of Energy and Climate Change (DECC) 2009).<br>• Noise impacts to the local community will be limited to recommended standard working hours as detailed in the Interim Construction Noise Guideline 2009 (ICNG). All activities and Proposal works, including the arrival and departure of vehicles delivering or removing materials to or from the site, shall be carried out between the hours of:<br>• 7:00am to 6:00pm Monday to Friday,<br>• 8:00am to 1:00pm Saturdays, and | Council and nominated contractor<br><br>Pre-construction Construction |

| Environmental Section | Category | Mitigation measures | Responsibility and timing |
|---|---|---|---|
| | | • No work Sunday and Public Holiday.<br>• Communication of intentions and timeframes to neighbouring properties will be undertaken in order to minimise misconceptions, uncertainty and negative reactions to noise. The site supervisor should supply a Council contact number to aid in community liaison.<br>• All noise and vibration complaints are to be handled in a timely manner in accordance with requirements under the POEO Act.<br>• The appointed contractor will incorporate Noise and Vibration Management strategies in the CEMP, and suitably induct all staff operating machinery on the site to ensure the standard working hours are adhered to, and that machinery movement (revving, reverse beepers) is kept to a minimum. This management plan must include the general noise and vibration management practices (AS 2436-2010).<br>• Plant deliveries and site access will occur quietly and efficiently, with parking allowed only within designated areas located away from nearby sensitive receivers.<br>• Simultaneous operation of high-level noise generating machinery should be avoided by operating at contrasting times or increasing the distance between the plant and the nearest identified receiver.<br>• High noise generating activities, such as jack hammering, should be carried out in continuous blocks, not exceeding three (3) hours with a minimum respite period between blocks of one (1) hour.<br>• Low-pitch tonal beepers should be installed where possible and reversing minimised on site.<br>• All engine covers are to be closed and machines that are not in use, shut down.<br>• Where possible, high noise generating activities such as loading and unloading and material dumps should be located as far as possible from the nearest receptors. | |
| **Air quality** | Construction | • Daily visual construction dust monitoring should occur, with works to cease if dust plumes are occurring that have potential to impact areas outside the direct impact footprint.<br>• Speed limits of 40 km / hr or slower are to be enforced on access tracks and across the site during dry weather to keep dust to a minimum. | Council and nominated contractor<br><br>Pre-construction<br>Construction |

| Environmental Section | Category | Mitigation measures | Responsibility and timing |
|---|---|---|---|
| | | • An adequate water supply is to be provided on the construction site for effective dust/particulate matter suppression/mitigation. If synthetic dust suppressants are used, they must be biodegradable in nature and non-toxic for waterways.<br>• Earthworks and exposed areas/soil stockpiles are to be revegetated using appropriate native species to stabilise surfaces as soon as practicable to reduce risk of dust emissions from wind erosion.<br>• Only vegetation that has been approved for removal may be removed or otherwise impacted; intact vegetation stabilises soils and keeps dust to a minimum.<br>• Vegetation and other materials are not to be burnt on site, unless the vegetation material is a weed that prohibits transportation and disposal by other means.<br>• Vehicles transporting waste or other materials that may produce odours or dust are to be covered during transit.<br>• Tracking of machinery carrying soil/spoil through nearby townships is to be avoided where possible.<br>• Stockpiles or areas that may generate dust are to be managed to suppress dust emissions.<br>• Dampening of exposed soils will be undertaken during weather conditions conducive to visible dust formation.<br>• Construction plant and equipment will be maintained in a good working condition in order to limit impacts on air quality through vehicle emissions.<br>• Fuel operated plant and equipment will not be left idle when not in use.<br>• Regular site inspections will be undertaken as part of air quality monitoring, and inspection results recorded by Council's Principal Contractor.<br>• Any dust complaints received during construction will be duly investigated in accordance with Council's requirements under the POEO Act.<br>• Any exceptional incidents that cause dust and/or air emissions, either on or off site, will be recorded, and the action taken to resolve the situation recorded in the site management logbook. | |

| Environmental Section | Category | Mitigation measures | Responsibility and timing |
|---|---|---|---|
| | Operational | • Council is to conduct regular road maintenance activities to ensure the road surface doesn't deteriorate, resulting in emissions to air.<br>• Any exposed areas revegetated during construction are to be monitored and maintained until the areas are fully stabilised to reduce risk of erosion and dust emissions, as well as dust settling on nearby native vegetation. | Council and nominated contractor<br><br>Post-construction |
| **Non-aboriginal heritage** | General | • The proposed works must be contained to the subject site area assessed during the construction. If the proposed location is amended, further heritage assessment may be necessary to determine if the proposed works will impact on heritage items(s).<br>• It is recommended that Council create and maintain photographic records of the external condition of the Kelloshiel Creek Stone Bridge structure to be used to monitor for any signs of visual damage for the duration of the Proposal.<br>• If archaeological remains or items defined as relics under the NSW Heritage Act 1977 are uncovered during the works, all works must cease in the vicinity of the material/find and Council's Manager Strategic Planning and Environmental Officer are to be contacted immediately.<br>• Council's workers and all staff must be made aware of the heritage sites and places that occur within the area and all care must be taken to avoid interference with and damage to these sites.<br>• The Kelloshiel Creek Stone Bridge must be clearly fenced and flagged with removable flagging or other temporary means to delineate its presence and to prevent the item being harmed during the construction process.<br>• Any movement of heavy machinery within 5m of the Kelloshiel Creek Stone Bridge must be supervised by a trained signaller. | Council and nominated contractor<br><br>Pre-construction<br>Construction |
| **Aboriginal Heritage** | Construction | • All land ground disturbance activities must be confined to within the study area, as this will eliminate the risk of harm to potential Aboriginal objects in adjacent landforms. Should the parameters of the Proposal extend beyond the assessed area shown in Figure 2, then further archaeological assessment will be required before works can proceed. | Council and nominated contractor<br><br>Pre-construction<br>Construction |

| Environmental Section | Category | Mitigation measures | Responsibility and timing |
|---|---|---|---|
| | | • All staff and contractors involved in the proposed work should be made aware of the legislative protection requirements for all Aboriginal sites and objects.<br>• Should unanticipated archaeological material be encountered during site works, all work must cease and an archaeologist contacted to make an assessment of the find. Further archaeological assessment and Aboriginal community consultation may be required prior to the recommencement of works. Any objects confirmed to be Aboriginal in origin must be reported to Heritage NSW.<br>• If any human remains are found, all works should stop immediately, the site should be secured and NSW police contacted immediately.<br>• The information in the ADD meets the requirements of the Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales. It should be retained as shelf documentation for five(5) years as it may be used to support a defence against prosecution in the event of unanticipated harm to Aboriginal objects. | |
| **Biodiversity** | General | • Ensure construction workers are provided with an environmental induction prior to the commencement of works to outline key biodiversity features of the site (Shrubby vegetation and waterway), and the management measures in place to protect biodiversity during construction.<br>• Vehicles and machinery to work from the existing road wherever possible and are not to extend beyond the subject site.<br>• Site is to be kept tidy and free from rubbish at all times, to prevent wastes being blown into adjacent areas of native vegetation or waterways.<br>• Where additional vegetation removal is proposed, this must first be assessed to consider any additional or cumulative impacts against the approved clearance footprint, and if appropriate, supervised by a qualified ecologist.<br>• Any required revegetation activities will be undertaken using native species sourced from local seed wherever possible. Areas to be re-seeded may be marked in the CEMP or Management Plan as a record of rehabilitation efforts made. Vegetation cover should be returned to the site within a reasonably practicable timeframe post-clearing to reduce soil exposure and loss. | Council and nominated contractor<br><br>Pre-construction<br>Construction |

| Environmental Section | Category | Mitigation measures | Responsibility and timing |
|---|---|---|---|
| | Loss of flora species and vegetation communities | • Clearly delineate vegetation to be removed/retained and induct all site personnel as to the approved process and extent of clearing.<br>• Where possible, heavy vehicles are not to be parked under tree drip lines/ leaf canopy to avoid compaction of soil, which is damaging to mature native trees and can cause dieback or tree mortality. Existing cleared areas and roadways are to be used for parking as a first priority. | Council and nominated contractor<br><br>Pre-construction<br>Construction |
| | Loss of fauna habitat resources and impacts to aquatic fauna | • Prior to commencement of works, a site survey should be undertaken including inspection for native fauna, threatened species and habitat features (i.e nests, rock pools) to confirm occupation by fauna. Care should be taken to identify nests and/or roosting sites. If fauna habitat is present, the appointed contractor would contact the project ecologist for further advice prior to clearing.<br>• Consultation with NSW DPI – Fisheries must be undertaken to obtain a Part 7 permit which is required for the proposed instream works.<br>• The introduction of an upstream dam and subsequent diversion of water flows to establish a dry works area, must be carried out at a minimum of 48hrs prior to entering the waterway and beginning construction of the instream pad, to allow adequate time for aquatic fauna to relocate up or downstream.<br>• Sedimentation, erosion and contamination controls (as defined below) should be in place for the duration of the proposed construction works. | Council and nominated contractor<br><br>Construction<br>Post-construction |
| | Invasion and spread of weeds and pests | • Develop and implement an active weed and pest management plan prior to construction commencing, to reduce the risk of weed spread and safety issues arising from pest and weed presence (e.g. WoNS and NSW Priority Weeds).<br>• Declared weeds within the subject site must be managed according to requirements under the Biosecurity Act 2015. It is recommended that all Weeds of National Significance and NSW Priority Weeds should be controlled, and where possible, eradicated to reduce the risk of further spread. | Council and nominated contractor<br><br>Construction |

| Environmental Section | Category | Mitigation measures | Responsibility and timing |
|---|---|---|---|
| | | • Strict hygiene protocols must be followed. If weeds are accidentally transported to site, or identified during construction activities, all weed material should be immediately contained and removed from site.<br>• All machinery and vehicles are to be clean and inspected prior to arriving on-site to reduce the spread of weeds and disease (e.g. *Phytophthora cinnamomi*) to the site. | |
| **Traffic and Transport** | Construction | • Prior notice shall be given to landowners along Freemantle Road to notify residents of the works to be completed, their timing and duration.<br>• Consider the location of designated parking areas, stockpile locations, construction laydown sites, site offices, and access routes carefully such that unnecessary inconveniences to local residents are avoided.<br>• Works are to minimise impacts to residents/landholders by maintaining vehicular access along Freemantle Road using a temporary diversion and traffic control as appropriate.<br>• A Traffic Control Plan (TCP) is to be developed in accordance with Australian Standards (AS 1742.3 – Traffic Control Devices for Works on Roads) and Roads and Maritime Traffic Control at Worksites manual to identify appropriate signage (and location) to advise motorist of upcoming changes in the road network. Any variation to the layout of the TCP on site is to be recorded and certified by accredited Roads and Maritime personnel.<br>• All road signs and marking will be in accordance with the TfNSW Guide to Signs and Markings; Australian Standards AS1742 and AS1743; and the Australian Roads Guide to Traffic Management.<br>• Traffic and transport complaints are to be monitored and addressed promptly where practicable. | Council and nominated contractor<br><br>Pre-construction<br>Construction |
| **Socio-economic** | Construction | • Considerate construction practices are to be implemented at all times during works, including that the construction site is to be left in a clean and tidy manner at the end of each workday, and noise, air quality and visual amenity impacts are to be kept to a minimum.<br>• All materials purchased for the Proposal are to be of highest quality and most sustainable as possible, as per NSW Local Government Sustainable Procurement Policy, to reduce impacts | |

| Environmental Section | Category | Mitigation measures | Responsibility and timing |
|---|---|---|---|
| | | to community and ratepayers through replacement of low-quality or faulty equipment in the future.<br>• Quality assurance is to be applied to all aspects of the Proposal, including design and construction to ensure best value for the local community.<br>• Disruption of traffic/private property access is to be minimised wherever possible and clear communication and planning between construction crew and landowners is to be undertaken.<br>• Community engagement is to be undertaken to obtain feedback on concerns, and address issues as they arise.<br>• Construction machinery and work vehicles to be discretely parked when not in use to reduce visual impact and ensure safe pullover is available where possible. | |
| **Waste and resources** | Construction | • Resource management hierarchy principles are to be followed; namely, the avoidance, reduction, reuse and recycling of resources.<br>• If stockpile or laydown sites are required in locations that have not been considered as occurring within the impact footprint as part of this REF, additional approval/assessment may need to be sought prior to any vegetation clearing taking place.<br>• Requirements under the Landcom (2004) stockpile management procedure must be observed, including correct placement of earth banks (with sedimentation ponds) to divert water around stockpiles if placed on a slope, and/or filter fences erected below stockpiles to capture any sediment moving offsite.<br>• Bulk project waste (e.g. clean virgin excavated natural material or clean fill) sent to a site not owned by Council (excluding DPE licensed landfills) for land disposal is to have prior formal written approval from the landowner.<br>• Waste is not to be burnt on site and all general waste will be contained and disposed of at suitable waste facilities.<br>• Where possible, materials with recycled content will be sourced, and minimum quantities ordered to reduce wastage.<br>• If contamination is encountered during construction, a site assessment must be undertaken in accordance with the *Protection of the Environment Operations Act 1997* (POEO Act). | Council and nominated contractor<br><br>Pre-construction<br>Construction |

| Environmental Section | Category | Mitigation measures | Responsibility and timing |
|---|---|---|---|
| | | • Toilets will be provided for construction workers for the duration of the works to prevent human wastes entering the waterway.<br>• Waste management for construction projects should be undertaken in accordance with the NSW Waste Avoidance and Resource Recovery Act 2001. The objectives of the Act are:<br>o To encourage the most efficient use of resources and to reduce environmental harm in accordance with the principles of Ecologically Sustainable Development (ESD),<br>o To ensure that resource management options are considered against a hierarchy of the following order: Avoidance of unnecessary resource consumption, Resource recovery (including reuse, reprocessing, recycling and energy recovery), Disposal.<br>o To provide for the continual reduction in waste generation,<br>o 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,<br>o To ensure that industry shares with the community the responsibility for reducing and dealing with waste,<br>o To ensure the efficient funding of waste and resource management planning, programs and service delivery,<br>o To achieve integrated waste and resource management planning, programs and service delivery on a State-wide basis,<br>o To assist in the achievement of the objectives of the Protection of the Environment Operations Act 1997.<br>• Don't over-order – ensure quantities are carefully calculated and ordered so as to minimise waste. Where construction materials are leftover, these are to be beneficially used on other projects, or stored by Council until such a need arises. | |
| **Visual amenity** | Construction | • Considerate construction practices are to be implemented at all times, to ensure the works areas are neat and visually not offensive, including to be kept free from rubbish, and stockpile sites actively managed.<br>• No additional, unauthorized clearing or destruction of vegetation is to occur.<br>• Vehicles are to be parked in designated areas only. | Council and nominated contractor<br><br>Pre-construction Construction |

| Environmental Section | Category | Mitigation measures | Responsibility and timing |
|---|---|---|---|
| | | • Cleared, bare patches of ground that form part of the works are to be revegetated and restored following cessation of works.<br>• Obvious and intrusive signs/machinery/equipment are to be removed from the site at the first opportunity.<br>• Appropriate consultation will continue to be undertaken to inform businesses and residents of planned works, timing, and potential visual impacts.<br>• Any complaints received regarding visual amenity at the site are to be dealt with and rectified as soon as possible. | |
| | Operation | • Any impacts to property entrances, driveways or fencing that occur as a result of the Proposal are to be rectified in collaboration with the landholder/s as soon as possible, post completion of works in the vicinity. | Council and nominated contractor<br><br>Construction<br>Post-construction |
| **Climate Change** | Construction | • Resource management hierarchy principles are to be followed:<br>  ○ Avoid unnecessary resource consumption as a priority.<br>  ○ Avoidance is followed by resource recovery (including reuse of materials, reprocessing, recycling and energy recovery); and<br>  ○ Disposal is undertaken as a last resort (in accordance with the Waste Avoidance & Resource Recovery Act 2001).<br>• Council may elect to make a contribution to an accredited carbon offset program to offset greenhouse gas emissions.<br>• Quality assurance and life cycle of materials are to be considered when purchasing, to ensure the newly built infrastructure is resilient and structurally sound.<br>• Local resources are to be used wherever possible, to reduce waste and increase efficiencies and to encourage local economies with fewer 'carbon miles'. | Council and nominated contractor<br><br>Pre-construction<br>Construction |

| Environmental Section | Category | Mitigation measures | Responsibility and timing |
|---|---|---|---|
| | Operation | • Road and culvert upgrades to be monitored and maintained per Council's routine road management strategy, to ensure lifecycle of upgraded road features extended and to reduce wastage from neglect / inadequate maintenance. | Council and nominated contractor<br><br>Construction<br>Post-construction |

# 6 Consideration of State and Commonwealth environmental factors

This section considers the Proposal against key legislation and government policy. This section does not describe the legislation and policy in detail and guidance provided here does not constitute legal advice.

## 6.1 Matters of National Environmental Significance

Under the environmental assessment provisions of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), the following Matters of National Environmental Significance (MNES) are required to be considered to assist in determining whether the Proposal should be referred to the Australian Government Department of Climate Change, Energy, The Environment and Water (DCCEEW).

**Table 19 Compliance with the EPBC Act**

| Factor | Impact |
|---|---|
| **Any impact on a World Heritage property?**<br>**State whether the Proposal would impact on a World Heritage property.** | None. |
| **Any impact on a National Heritage place?**<br>**State whether or not the Proposal would impact on a National Heritage place.** | None. |
| **Any impact on a wetland of international importance?** | None. |
| **Any impact on a listed threatened species or communities?** | Unlikely, refer Appendix B. |
| **Any impacts on listed migratory species?** | Unlikely, refer Appendix B. |
| **Any impact on a Commonwealth marine area?** | None. |
| **Any impact on the Great Barrier Reef Marine Park?** | None. |
| **Does the Proposal involve a nuclear action (including uranium mining)?** | None. |
| **Additionally, any impact (direct or indirect) on Commonwealth land?** | None. |

## 6.2 Compliance with the EP&A Regulation 2021 Checklist

The factors which need to be taken into account when considering the environmental impact of an activity are listed in section 171(2) of the Environmental Planning and Assessment Regulation 2021. Those factors have been taken into account when assessing the likely impacts of the Proposal on the natural and built environment in this REF and are summarised in Table 20.

**Table 20 Summary of compliance with the EP&A Regulation 2021 checklist**

| Environmental Factor | Will there be an impact? | Comments |
|---|---|---|
| **(a) Any environmental impact on a community?** | Yes, minor | Construction: minor temporary impacts to vehicle traffic levels, visual amenity and noise levels.<br><br>Operation: Freemantle Road will be restored providing 2-lane, safe flow of traffic over Kelloshiel Creek. |
| **(b) Any transformation of a locality?** | Unlikely | Construction: Minor modification of vegetation through the clearing of weeds, and the introduction of a fish ladder within Kelloshiel Creek.<br><br>Operation: Improved traffic flow. |
| **(c) Any environmental impact on the ecosystems of a locality?** | Yes. Short term. | Construction: minor, temporary impacts to flora and fauna at the site are expected. These are expected to be negligible if all the Environmental Safeguards are adhered to.<br><br>Operation: resumption of use of the site post completion of the construction phase is not expected to result in significant impacts to ecosystems in the locality, provided Environmental Safeguards are implemented. |
| **(d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?** | No. Positive long term impact anticipated. | Construction: the impact on the visual amenity/aesthetic quality of the site will be temporary, lasting only as long as the duration of construction works.<br><br>Operation: positive change to the site anticipated. |
| **(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 generations?** | Unlikely | Aboriginal Due Diligence Assessment revealed no artefact sites or Potential Archaeological Deposits that require further investigation. Heritage listed stone bridge has the potential to be impacted. Environmental safeguards have been provided to reduce the risk of this impact.<br><br>Operation: positive impact anticipated through the removal of a diversion route that includes a heritage listed stone bridge. |
| **(f) Any impact on habitat of any protected fauna (within the meaning of the National Parks and Wildlife Act 1974)?** | Yes | Impacts to native species is expected (Refer Appendix B), however this is not anticipated to be significant provided the Environmental Safeguards are adhered to for both construction and operation. |
| **(g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?** | Unlikely | Construction: Removal of potential habitat for threatened species is not likely to result in endangerment of these species, assuming all the Environmental Safeguards are adhered to.<br><br>Operation: Continued use of the site as a public roadway is not likely to result in further risk of endangering native species beyond the risk present already. |

| Environmental Factor | Will there be an impact? | Comments |
|---|---|---|
| **(h) Any long-term effects on the environment?** | Yes, minor | Positive effect following the introduction of a rock apron and the subsequent restoration of fish passage during high flow events only. |
| **(i) Any degradation of the quality of the environment?** | No | The current condition of the site is highly degraded with high levels of exotic weed invasion and extensive erosion. The proposed works to stabilise the eroding soils are not anticipated to degrade the quality of the environment, assuming all of the Environmental Safeguards are adhered to. Additionally, it is anticipated that the construction of a rock apron, stabilisation of soils, and removal of environmental weeds within the subject site will subsequently improve the quality of the environment. |
| **(j) Any risk to the safety of the environment?** | Positive impact | The rectification of the Freemantle Road culvert over Kelloshiel Creek is anticipated to increase the safety of the roadway for all road uses. |
| **(k) Any reduction in the range of beneficial uses of the environment?** | No | The range of beneficial uses of the environment will not be reduced as a result of the proposal. |
| **(l) Any pollution of the environment?** | Yes. Potential | Construction: There is potential for movement of sediment and other pollutants into waterways during construction works. Provided environmental safeguards within this report are adhered to, the risk is low.<br><br>Operation: Post completion of the rectification works, there will be reduced potential for sediment to migrate into waterways from the subject site due to the stabilisation of soils and creek bed/banks with the increased flow dissipation brought about by introduction of a rock apron, and the reconstruction of the culvert, construction of a retaining wall and re-establishment of a drivable road surface. |
| **(m) Any environmental problems associated with the disposal of waste?** | No | Construction: The Proposal is not anticipated to generate large volumes of waste and therefore waste impacts are not deemed significant.<br><br>Operation: Typical road use under restored operation of Freemantle Road is not anticipated to generate large volumes of waste and so impact not deemed significant. |
| **(n) Any increased demands on resources, natural or otherwise which are, or are likely to become, in short supply?** | Yes, minor | Construction: not anticipated to consume large volumes of finite resources and so impact not deemed significant.<br>Operation: not anticipated to consume large volumes of finite resources and so impact not deemed significant. |

| Environmental Factor | Will there be an impact? | Comments |
|---|---|---|
| **(o) Any cumulative environmental effect with other existing or likely future activities?** | Unlikely | Construction: It is unlikely that there will be cumulative impacts associated with other activities present in the area.<br><br>Operation: The road use and any other future activities are anticipated to be largely consistent with current operational use of this roadway. |
| **(p) Any impact on coastal processes and coastal hazards, including those under proposed climate change conditions** | No | Construction: subject site is not located on the coast.<br><br>Operation: subject site is not located on the coast. |
| **(q) Any applicable local strategic planning statement, regional strategic plan or district management plan made under Division 3.1 of the Act** | Yes | The following plans have been made under Division 3.1 and are considered applicable:<br>• Central West and Orana Regional Plan 2041- this Proposal contributes to the goal of providing quality infrastructure.<br>• Vision Bathurst 2040 – this Proposal contributes to the achievement of the planning priority to connect the Bathurst Region by providing safe and efficient road networks to improve accessibility. |
| **(r) Any other relevant environmental factors** | No | Construction: Other factors considered include community and stakeholder consultation and works on private property.<br><br>Operation: No other factors have been considered other than those listed above. |

# 7 Certification

This REF provides a true and fair review of the Proposal in relation to its likely effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the Proposal.

This report has been developed in accordance with the NSW Environmental Planning and Assessment Regulation 2021 (EP&A Regulation) and the Department of Planning and Environment's Guidelines for Division 5.1 assessments (DPE Guidelines) and demonstrates how the environmental factors specified in subsection (2) clause 171 of the EP&A Regulation were taken into account when considering the likely impact of the proposed activity.

The assessment has concluded that the proposed works as described in this REF, providing all proposed management measures and Safeguards are implemented, will not result in a significant impact on the environment. An Environmental Impact Statement (EIS) is not required.

The proposed works will not result in a significant impact on any declared critical habitat, threatened species, populations or ecological communities or their habitats. Therefore, a Species Impact Statement (SIS) is not required.

The proposed works are not being carried out on Commonwealth land, are unlikely to affect any Commonwealth land, or have any significant impact on any Matters of National Environmental Significance.

All proposed work contemplated as part of the Proposal will be completed under the guidance of a Construction Environmental Management Plan (CEMP) to manage and minimise potential environmental impacts, particularly ecological impacts, associated with the proposed work. Once operational, the Proposal is not expected to cause any significant environmental or community impacts.

I certify that I have reviewed and endorsed the contents of this REF document, and, to the best of my knowledge, it is in accordance with the EP&A Act, the EP&A Regulation and the Guidelines approved under clause 170 of the EP&A Regulation, and the information it contains is neither false nor misleading.

| Prepared by: | Reviewed and Endorsed for Certification by: |
|---|---|
| Name: A Muir, B Perrot, K Farrell, G Stirling | Name: E Cotterill |
| Title: Various, Environmental Factor | Title: Director and Principal Consultant |
| Date: 31/08/2023 | Date: 31/08/2023 |

Determiner declaration and approval

I have reviewed this REF and determine that the Proposal will not have a significant impact on the environment and can proceed subject to the controls outlined in this REF.

Name:

Title:

Date:

# 8 References

ABS Eglington NSW 2021 Census https://abs.gov.au/census/find-census-data/quickstats/2021/SAL11389 accessed August 2023

Bathurst Regional Council Local Environmental Plan 2014

BOM 2023 weather observations at Bathurst Agricultural Station, http://www.bom.gov.au/climate/averages/tables/cw_063005.shtml accessed July 2023

BOM 2023 weather observations Bathurst, NSW - July 2023 - Daily Weather Observations (bom.gov.au) accessed August 2023

Climate Change in Australia, https://www.climatechangeinaustralia.gov.au/en/projections-tools/climate-analogues/analogues-explorer/ accessed 27 July 2023

DAWE 2023 Species Profile and Threats Databases

DAWE 2023 Protected Matters Search Tool for MNES listed under the EPBC Act. http://www.environment.gov.au/epbc/protected-matters-search-tool

DPI 2023 Priority Weeds of Bathurst Region NSW WeedWise

DPI 2023 Weeds of National Significance NSW WeedWise

DPE 2023 Areas of Outstanding Biodiversity register Area of Outstanding Biodiversity Value register | NSW Environment, Energy and Science

DPE 2023 Biodiversity Values Map https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BVMap

DPE 2023 Key threatening processes http://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/about-threatened-species/key-threatening-processesaccessed July 2023

DPE 2023 SEPP Koala Habitat Protection 2020 Koala Habitat Protection SEPP - (nsw.gov.au)

DPE 2023 NSW Government Vegetation Regulatory Map https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=NVRMap

DPE 2023 Bionet Wildlife Atlas Threatened species records, which holds data from a number of custodians.

DPE 2023 Guidelines for preparing a statement of heritage impact

New South Wales Flora online – PlantNET 2021 http://plantnet.rbgsyd.nsw.gov.au/floraonline.htmlNSW LPI mapping https://maps.six.nsw.gov.au/ accessed July 2023

NSW Government air quality monitoring results in Bathurst https://www.airquality.nsw.gov.au/central-tablelands/bathurst, accessed August 2023

NSW Department of Environment and Climate Change, Description for NSW (Mitchell) Landscapes Version 2 (2002) https://www.environment.nsw.gov.au/resources/conservation/landscapesdescriptions.pdf accessed August 2023

NSW Planning and Environment Department 2018, planning portal http://www.planning.nsw.gov.au/accessed August 2023

OEH 2018, Great Soil Group (GSG) Soil Type map of NSW http://www.environment.nsw.gov.au/eSpade2Webapp# accessed August 2023

NSW SEED Portal – Australian Soil Classification Type https://geo.seed.nsw.gov.au/Public_Viewer/index.html?viewer=Public_Viewer&locale=en-AU&runWorkflow=AppendLayerCatalog&CatalogLayer=SEED_Catalog.107 accessed August 2023

NSW Government SoilsNearME - https://soilsnearme.app/info/1001 accessed August 2023

NSW State Heritage Inventory https://www.hms.heritage.nsw.gov.au/App/Item/ViewItem?itemId=1080700 accessed July 2023

NSW State Heritage Inventory https://www.hms.heritage.nsw.gov.au/App/Item/ViewItem?itemId=1080304 accessed August 2023

TfNSW NSW Road Network Classifications https://roads-waterways.transport.nsw.gov.au/classification/map/ accessed August 2023

# 9 Appendices

| Appendix | Description |
|---|---|
| Appendix A | Design drawings |
| Appendix B | Flora and Fauna Assessment |
| Appendix C | Aboriginal Due Diligence Assessment |

# Appendix A Design Drawings – Barnson REV A

GENERAL NOTES:

1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL AND OTHER CONSULTANTS' DRAWINGS AND SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCIES SHALL BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
2. ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE RELEVANT AND CURRENT SAA CODES AND BY-LAWS AND ORDINANCES OF THE RELEVANT BUILDING AUTHORITIES EXCEPT WHERE VARIED BY THE PROJECT SPECIFICATION.
3. ALL DIMENSIONS SHOWN SHALL BE VERIFIED BY THE BUILDER ON SITE. ENGINEER'S DRAWINGS SHALL NOT BE SCALED FOR DIMENSIONS.
4. UNLESS NOTED OTHERWISE ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES.

SITE PREPARATION NOTES:

1. STRIP SITE REMOVING ALL TOPSOIL, ORGANIC MATTER, AND DELETERIOUS MATERIAL, PROOF ROLL, MAKE GOOD ANY SOFT SPOTS, AND RAISE TO LEVEL WITH COMPACTED GRANULAR MATERIAL ALL AS SPECIFIED BY THE CIVIL ENGINEER AND THE GEOTECHNICAL ENGINEER. REFER TO PROJECT CONSULTING ENGINEERS DRAWINGS FOR DETAILS OF THE SUB-BASE AND BASE COURSES, AND FOR NOTES ON COMPACTION.
2. EXCAVATE GROUND RESTRAINTS AND EDGE THICKENINGS AS DETAILED ON THE DRAWINGS TO THE SETOUT DIMENSIONS PROVIDED. MINOR FLUCTUATIONS IN THE WIDTH, STRAIGHTNESS, PARALLEL ALIGNMENT ETC WILL ENHANCE THE EFFECTIVENESS OF THE RESTRAINTS AND ARE THEREFORE ENCOURAGED.
   REMOVE ALL LOOSE MATERIAL FROM EXCAVATIONS.
3. ANY SERVICE TRENCHES UNDER THE SLAB SHALL BE BACKFILLED WITH FULLY CONSOLIDATED CLEAN SAND OR OTHER APPROVED COHESIONLESS MATERIAL.

REINFORCEMENT NOTES

1. ALL REINFORCEMENT SHALL BE IN ACCORDANCE WITH AS/NZS 4671-2019.
2. REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY, AND IS NOT NECESSARILY SHOWN IN TRUE PROJECTION.
3. REINFORCEMENT DESIGNATIONS AS FOLLOWS:
   A) N - GRADE 500N HS DEFORMED BAR
   B) R - GRADE 250R HOT ROLLED BAR
   C) SL AND RL - GRADE 500L SQUARE MESH
   D) TM - GRADE 500L TRENCH MESH
4. TRENCH MESH SHALL BE SPLICED WHERE NECESSARY BY A LAP OF 500mm.
5. LAPPING OF MESH SHALL BE PROVIDED ACCORDING TO THE FOLLOWING:
   A) A LAPPED SPLICE FOR PROPRIETARY WELDED MESH SHALL BE MADE SO THAT THE TWO OUTERMOST CROSS-BARS OF THE LAPPING SHEET OVERLAP THE TWO OUTERMOST CROSS-BARS OF THE SHEET BEING LAPPED. THE BARS OF THE PROPRIETARY WELDED MESH SHOULD BE SPACED NOT LESS THAN 100mm APART. ALL "ONESTEEL" AUSTRALIAN MESH PRODUCTS MEET THIS REQUIREMENT. THE MINIMUM LENGTH OF THE OVER LAP SHALL EQUAL 100mm.
   B) A LAPPED SPLICE FOR WELDED MESH FABRICATED FROM PLAIN OR DEFORMED BAR, SHALL BE MADE SO THAT THE TWO OUTERMOST CROSS-BARS OF THE LAPPING SHEET OVERLAP THE TWO OUTERMOST CROSS-BARS OF THE SHEET BEING LAPPED. THE BARS OF THE MESH FABRICATED FROM PLAIN OR DEFORMED BAR SHOULD BE SPACED NOT LESS THAN 50mm APART. THE MINIMUM LENGTH OF THE OVERLAP SHALL EQUAL 100mm.
6. REINFORCEMENT STRESS DEVELOPMENT AND LAP SPLICING LENGTHS SHALL BE IN ACCORDANCE WITH AS3600-2018. QUICK REFERENCE GUIDES AS TO DEVELOPMENT, LAP AND COG LENGTH REQUIRED FOR EACH BAR DESIGNATION ARE AVAILABLE FROM "ONESTEEL" AT www.reinforcing.com
7. WELDING OF REINFORCEMENT SHALL NOT BE PERMITTED WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER.
8. ALL REINFORCEMENT IS TO BE ADEQUATELY SUPPORTED IN ITS REQUIRED POSITION. MESH AND BAR SUPPORT CHAIRS ARE TO BE AT 800mm MAX CENTERS, BOTH DIRECTIONS. BAR SUPPORT CHAIRS SHALL BE PROVIDED ALONG THE EDGES OF ALL CONSTRUCTION JOINTS.
9. BARS SHALL BE EVENLY DISTRIBUTED OVER THE WIDTH OF THE STRIP UNLESS NOTED OTHERWISE.

REINFORCEMENT NOTES continued

10. REINFORCEMENT SHALL NOT BE CUT OR WELDED ON SITE UNLESS APPROVED BY THE ENGINEER. BARS CONFLICTING WITH SMALL HOLES AND OTHER MINOR PENETRATIONS LESS THAN 300mm LONG MAY BE DISPLACED LATERALLY.

CONCRETE NOTES

1. ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH AS3600-2018, FORMWORK TO AS3610.1-2018
2. CONCRETE SHALL NOT BE POURED WHEN THE AIR TEMPERATURE IS GREATER THAN 38 DEGREES, NOR LESS THAN 5 DEGREES CELSIUS WITHOUT APPROVAL FROM THE ENGINEER.
3. NO ON SITE WATER IS TO BE ADDED TO THE CONCRETE WITHOUT PERMISSION FROM THE ENGINEER.
4. THE USE OF CALCIUM CHLORIDE SHALL NOT BE PERMITTED.
5. ALL CONCRETE IS TO BE COMPACTED USING A HIGH FREQUENCY VIBRATOR.
6. CONCRETE IS TO BE CURED A MIN OF 7 DAYS
7. SIZES OF CONCRETE ELEMENTS DO NOT INCLUDE THICKNESS OF APPLIED FINISHES.
8. SPECIFIED COVER IS THE CLEAR DISTANCE BETWEEN ANY REINFORCING (INCLUDING FITMENTS) AND THE FACE OF THE STRUCTURAL ELEMENT.
9. NO HOLES, CHASES OR EMBEDMENT OF PIPES OTHER THAN THOSE SHOWN ON THE STRUCTURAL DESIGN DRAWINGS SHALL BE MADE IN ANY CONCRETE MEMBERS WITHOUT PRIOR APPROVAL OF THE ENGINEER.
10. CONSTRUCTION JOINTS SHALL ONLY BE PROVIDED IN LOCATIONS SPECIFICALLY SHOWN IN THE STRUCTURAL DESIGN DRAWINGS.
11. FREE DROPPING OF CONCRETE FROM A HEIGHT GREATER THAN 1000mm IS NOT PERMITTED.
12. CONCRETE SHALL BE SEPARATED FROM SUPPORTING MASONRY BY TWO LAYERS OF DAMP-PROOF COMPRESSIBLE JOINT FILLER. VERTICAL FACES OF CONCRETE SHALL BE KEPT FREE OF ADJOINING SURFACES BY 10mm THICKNESS OF COMPRESSIBLE JOINT FILLER UNLESS NOTED OTHERWISE ON THE DRAWINGS. ALL NON-LOADBEARING WALLS SHALL BE KEPT CLEAR OF THE UNDERSIDE OF SLABS AND BEAMS BY 20mm UNLESS NOTED OTHERWISE ON THE DRAWINGS.
13. BRICKWORK MUST NOT BE BUILT ON CONCRETE SLABS OR BEAMS UNTIL FORMWORK SUPPORTING SAME, HAS BEEN REMOVED.
14. THE FOLLOWING REQUIREMENTS SHALL BE INCORPORATED INTO THE FORMWORK DESIGN AND/OR ALLOWED FOR BY THE FORMWORK SUB-CONTRACTOR AS APPROPRIATE-
    A) MINIMUM FORMWORK STRIPPING TIMES ARE TO BE AS FOLLOWS-
       (i) VERTICAL SURFACES MAY BE STRIPPED OF FORMWORK WHEN THE MINIMUM MEAN COMPRESSIVE STRENGTH OF THE CONCRETE HAS REACHED 5.0 MPa OR A MINIMUM OF 2 DAYS AFTER CONCRETE POUR PROVIDED THE AVERAGE AMBIENT TEMPERATURE OVER THAT PERIOD IS BETWEEN 12 AND 20 DEGREES CELSIUS.
       (ii) SOFFITS OF BEAMS AND SLABS MAY BE STRIPPED OF FORMWORK WHEN THE MINIMUM MEAN COMPRESSIVE STRENGTH OF THE CONCRETE HAS REACHED 22 MPa OR A MINIMUM OF 6 DAYS AFTER CONCRETE POUR PROVIDED THE AVERAGE AMBIENT TEMPERATURE OVER THAT PERIOD IS BETWEEN 12 AND 20 DEGREES CELSIUS.
       (ii) REMOVAL OF FORMWORK SUPPORT (PROPS) TO BEAM AND SLAB SOFFITS MAY BE UNDERTAKEN WHEN THE MINIMUM MEAN COMPRESSIVE STRENGTH OF THE CONCRETE HAS REACHED 28 MPa OR A MINIMUM OF 18 DAYS AFTER CONCRETE POUR PROVIDED THE AVERAGE AMBIENT TEMPERATURE OVER THAT PERIOD IS BETWEEN 12 AND 20 DEGREES CELSIUS.
    B) ALL CONCRETE COMPRESSIVE STRENGTH (20-32 MPa) SHALL BE DETERMINED FROM SAMPLE CYLINDER TESTING BY A NATA REGISTERED LABORATORY.

# KEECH CONSTRUCTIONS

# CULVERT HEADWALL REPAIR
# FREEMANTLE ROAD
# EGLINGTON NSW 2795

STRUCTURAL DRAWING SCHEDULE



PRELIMINARY DRAWING
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| Rev | Date | Description |
|---|---|---|
| A | 19-06-2023 | ISSUED FOR CLIENT REVIEW |

Project
CULVERT HEADWALL REPAIRS

Site Address
FREEMANTLE ROAD
EGLINGTON NSW 2795
Client
KEECH CONSRTUCTIONS

Drawing Title
COVER SHEET & NOTES

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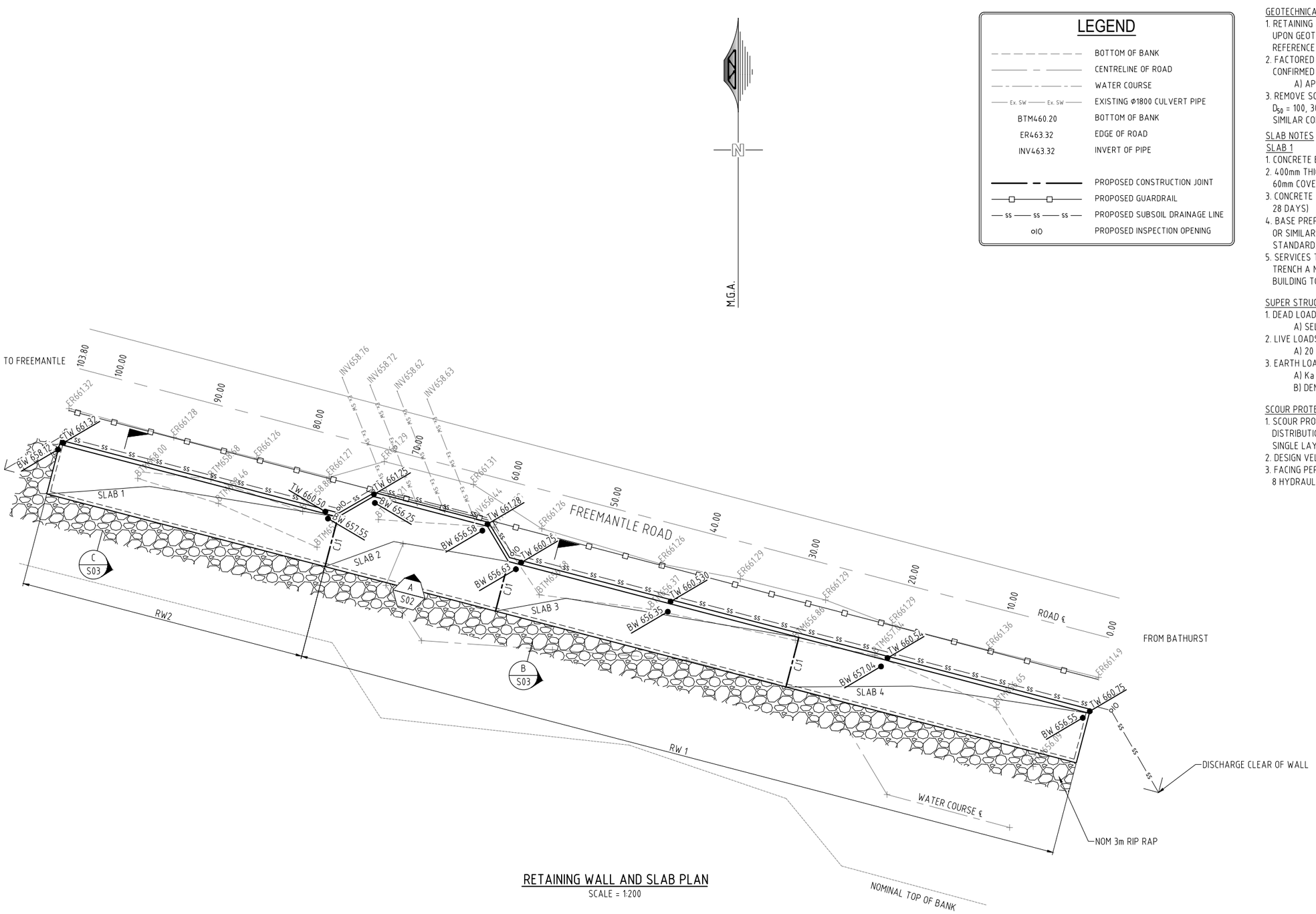
| Drawn | MK | | |
| Check | RN | Revision | A |

Certification

Project No 41012
Drawing No S00




RETAINING WALL AND SLAB PLAN
SCALE = 1:200

## LEGEND

| | |
|---|---|
| | BOTTOM OF BANK |
| | CENTRELINE OF ROAD |
| | WATER COURSE |
| Ex. SW Ex. SW | EXISTING Φ1800 CULVERT PIPE |
| BTM460.20 | BOTTOM OF BANK |
| ER463.32 | EDGE OF ROAD |
| INV463.32 | INVERT OF PIPE |
| | PROPOSED CONSTRUCTION JOINT |
| | PROPOSED GUARDRAIL |
| ss ss ss | PROPOSED SUBSOIL DRAINAGE LINE |
| oIo | PROPOSED INSPECTION OPENING |

GEOTECHNICAL NOTES
1. RETAINING WALL FOOTINGS HAVE BEEN DESIGNED BASED UPON GEOTECHNICAL REPORT BY BARNSON PTY LTD, REFERENCE 41012-GL01_A DATED 26/05/2023.
2. FACTORED ULTIMATE BEARING CAPACITIES Qu: TO BE CONFIRMED ON SITE:
   A) APRON SLAB = 100 kPa
3. REMOVE SOIL TO NOMINAL 1.4m DEPTH, AND REPLACE WITH $D_{50}$ = 100, 300 THICK RIP RAP BRIDGING LAYER THEN, DGS20 OR SIMILAR COMPACTED TO 98% STD. COMPACTION.

SLAB NOTES
SLAB 1
1. CONCRETE EXPOSURE CLASSIFICATION = B1 TO AS3600-2018
2. 400mm THICK (T) SLAB PANEL REINFORCED AS SPECIFIED WITH 60mm COVER TOP & BTM.
3. CONCRETE IS TO BE GRADE N32 (32 MPa STRENGTH AT 28 DAYS)
4. BASE PREPARATION: MIN. 1400mm HARD-CORE BASE (DGS20 OR SIMILAR APPROVED) COMPACTED IN 150mm LAYERS TO 98% STANDARD. COMPACTION.
5. SERVICES TO BE PLACED IN A 300mm WIDE x 450mm DEEP TRENCH A MINIMUM OF 600mm FROM EDGE OF BUILDING TO AVOID UNDERMINING OF FOOTINGS.

SUPER STRUCTURE LOADING NOTES
1. DEAD LOADS:
   A) SELF WEIGHT OF STRUCTURE
2. LIVE LOADS:
   A) 20 kPa TOP OF WALL SURCHARGE LOAD
3. EARTH LOADS:
   A) Ka = 0.35
   B) DENSITY = 18kN/m$^3$

SCOUR PROTECTION NOTES
1. SCOUR PROTECTION IS TO BE PROVIDED AS A 3000mm WIDE DISTRIBUTION x 500mm DEEP $D_{50}$ 300mm RIP RAP PLACED ON A SINGLE LAYER OF GEOTEXTILE (BIDIM A34 OR EQUIVALENT)
2. DESIGN VELOCITY < 2.6 m/s
3. FACING PER AGBT08-19 GUIDE TO BRIDGE TECHNOLOGY PART 8 HYDRAULIC DESIGN OF WATERWAY STRUCTURES

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Project
CULVERT HEADWALL REPAIRS

Site Address
FREEMANTLE ROAD
EGLINGTON NSW 2795
Client
KEECH CONSRTUCTIONS

Drawing Title
RETAINING WALL AND SLAB PLAN

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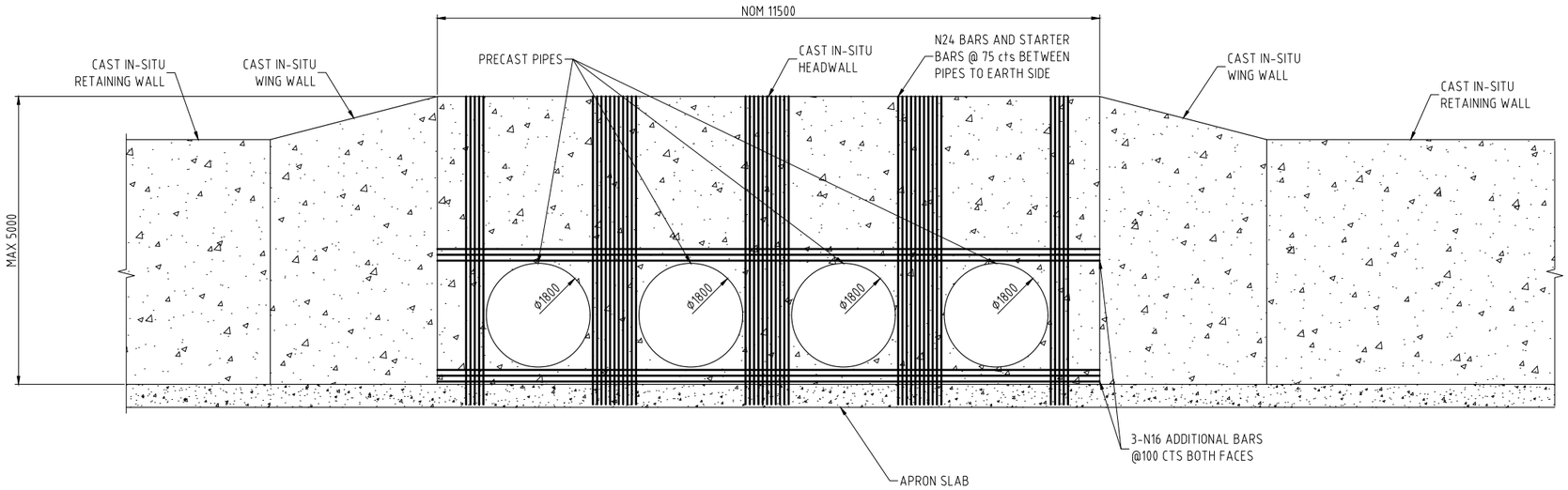
| Check | RN | Revision | A |

Certification

Project No 41012
Drawing No S01




ELEVATION A
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PRELIMINARY DRAWING
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Project
CULVERT HEADWALL REPAIRS

Site Address
FREEMANTLE ROAD
EGLINGTON NSW 2795

Client
KEECH CONSRTUCTIONS

Drawing Title
RETAINING WALL ELEVATION

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| Drawn | MK | | |
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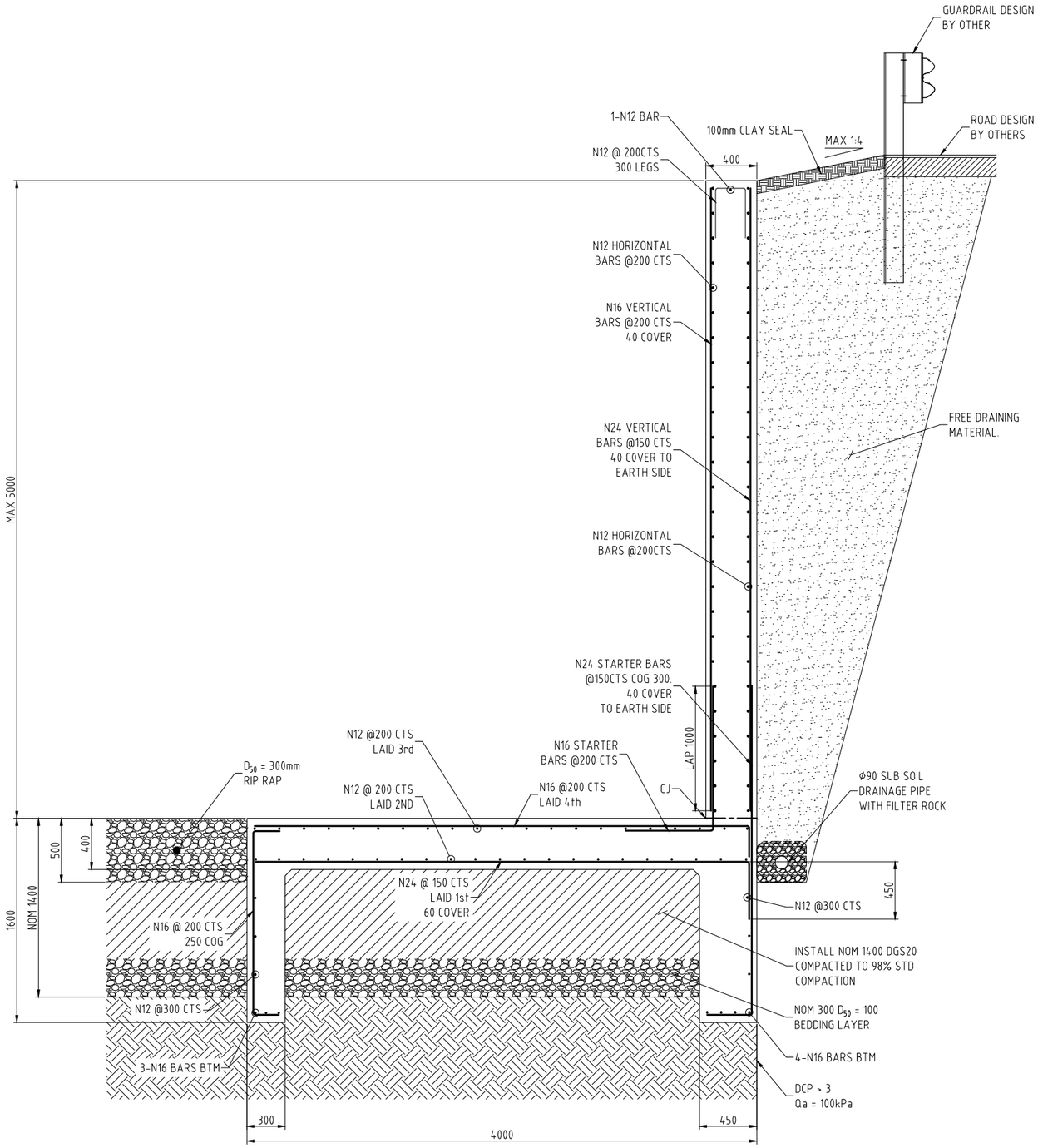
Certification

Project No 41012

Drawing No S02




RW1 - RETAINING WALL 1

SECTION B S01
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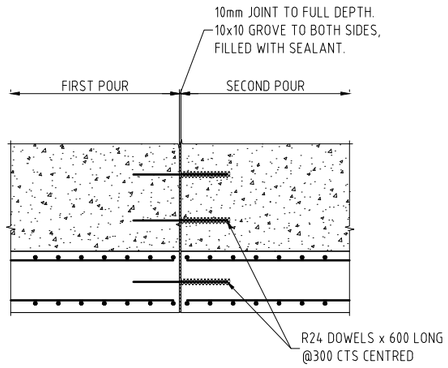


CJ1 - CONSTRUCTION JOINT 1

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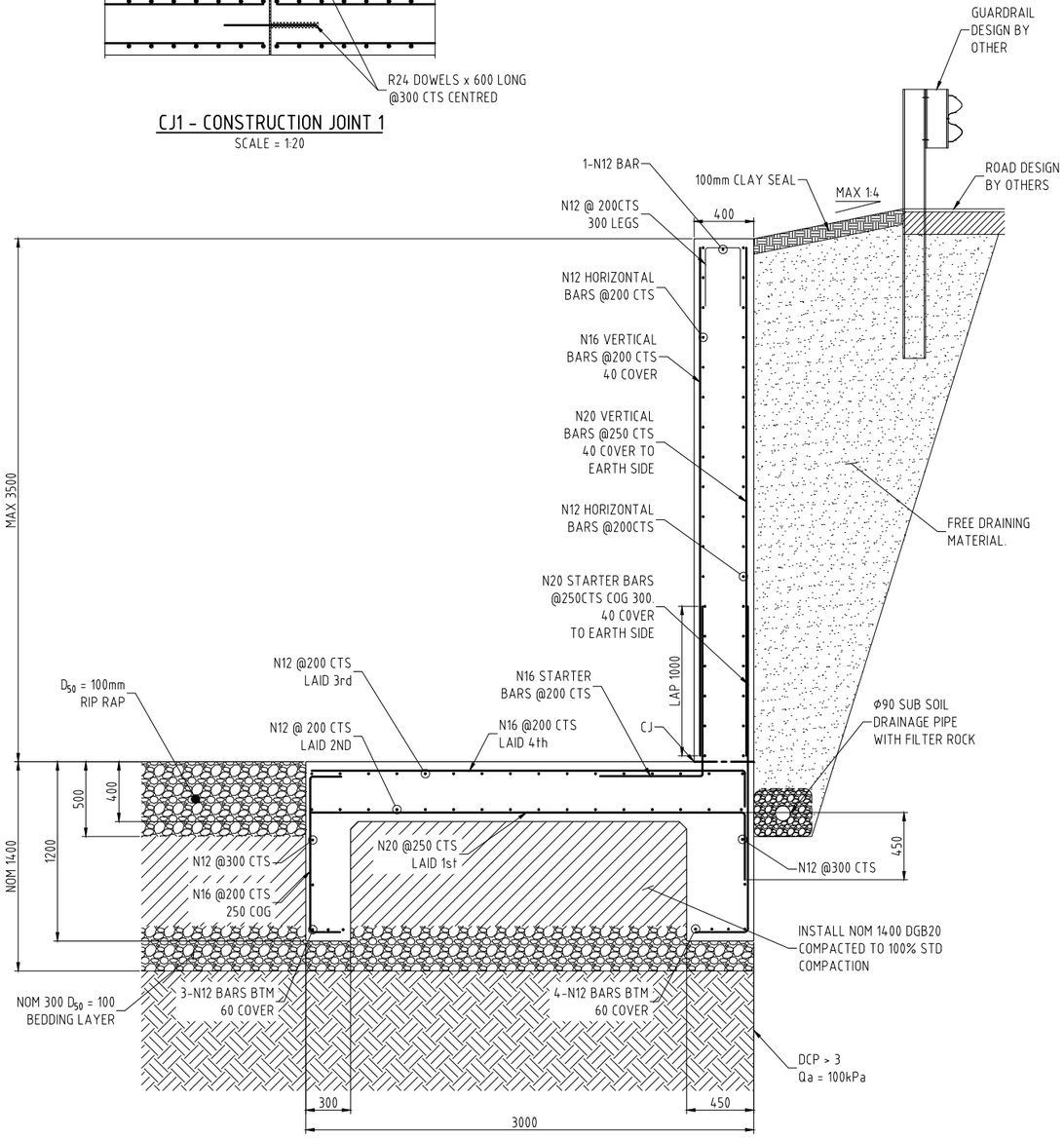


RW2 - RETAINING WALL 2

SECTION C S01
SCALE = 1:20

PRELIMINARY DRAWING
Not to be used for construction purposes

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| Rev | Date | Description |
|---|---|---|
| A | 19-06-2023 | ISSUED FOR CLIENT REVIEW |

Project
CULVERT HEADWALL REPAIRS

Site Address
FREEMANTLE ROAD
EGLINGTON NSW 2795

Client
KEECH CONSRTUCTIONS

Drawing Title
RETAINING WALL SECTION

| | | | |
|---|---|---|---|
| Design | MK | Original Sheet Size | A1 |
| Drawn | MK | | |
| Check | RN | Revision | A |

Certification

Project No 41012

Drawing No S03

# Appendix B Flora and Fauna Assessment

# Flora and Fauna Assessment Report

**Freemantle Road Culvert Reconstruction, Eglinton NSW**

**Prepared for Keech Construction**

**August 2023**

The Environmental Factor

# Flora and Fauna Assessment –Freemantle Road Culvert Rectification, Eglinton

| Revision | Author/s | Internal Review | Date Submitted | Client Review and Approval | |
|---|---|---|---|---|---|
| | | | | Name | Date |
| **0.1** | B Perrott, B Turner, K Farrell | E Cotterill | 18/08/2023 | | |
| **1.0** | B Perrot | E Cotterill | 31/08/2023 | | |
| | **Endorsed by BAM Accredited Assessor** | | E Cotterill (BAAS 20011) | | |

**EnviroFact Pty Ltd, T/A The Environmental Factor**
**P.O. Box 268 Bathurst NSW 2795**
**ABN: 37 607 339 131**
www.envirofact.com.au

This Report has been prepared by The Environmental Factor (TEF) on behalf of Bathurst Regional Council (BRC or Council), to assess the ecological impacts arising from the proposed rectification of an approximately 100m section of Freemantle Road in Eglinton, NSW.

The purpose of this report is to document the biodiversity assets present on site, and to assess those that are likely to be impacted either directly or indirectly as a result of the Proposal, to support a Review of Environmental Factors (REF), Construction Environmental Management Plan (CEMP) and Environmental Control Plan (ECP) to be prepared for these works.

This document is not intended to be utilised or relied upon by any persons other than the Client and their appointed contractors nor to be used for any purpose other than that articulated above. TEF accepts no responsibility in any way whatsoever for the use of this report by any other persons or for any other purpose.

The information, statements, recommendations and commentary (together the "Information") contained in this report have been prepared by TEF on the basis of information provided by the Client and from material provided by the NSW department of Planning and the Environment (DPE) and the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) and through the survey process. This report has been developed in accordance with the NPWS Guidelines for Preparing a Review of Environmental Factors, developed by the DPE (2022). TEF has not sought any independent confirmation of the reliability, accuracy, or completeness of this information. It should not be construed that TEF has carried out any form of audit of the information which has been relied upon.

Accordingly, whilst the statements made in this report are given in good faith, TEF accepts no responsibility for any errors in the information provided by the Client nor the effect of any such errors on the analysis undertaken, suggestions provided, or this report. Site conditions may change after the date of this report. TEF does not accept responsibility arising from, or in connection with, any change to the site conditions. TEF is also not responsible for updating this report if site conditions change.

# Table of Contents

Appendix E - Weather observation during survey period (Bureau of Meteorology)

## Tables



## Figures



## Plates

## Abbreviations

| Abbreviation | Description |
|---|---|
| **AOBV** | Areas of Outstanding Biodiversity Value |
| **AoS** | Assessment of Significance (5-part test) - NSW BC Act |
| **AWS** | Active Weather Station |
| **ASL** | Above Sea Level |
| **BAM** | Biodiversity Assessment Methodology |
| **BC Act** | Biodiversity Conservation Act 2016 |
| **BOS** | Biodiversity Offset Scheme |
| **BRC** | Bathurst Regional Council |
| **BVM** | Biodiversity Values Map |
| **CEEC** | Critically Endangered Ecological Community |
| **CEMP** | Construction Environmental Management Plan |
| **CEnvP** | Certified Environmental Planner |
| **DCCEEW** | Department of Climate Change, Energy, the Environment and Water (formerly DAWE) |
| **DPE** | Department of Planning and Environment (formerly OEH) |
| **DPI** | Department of Primary Industries |
| **ECP** | Environmental Control Plan |
| **EEC** | Endangered Ecological Community |
| **EPA** | Environmental Protection Agency |
| **EPBC Act** | Environmental Protection and Biodiversity Conservation Act 1999 |
| **ERSED** | Erosion and Sediment |
| **FFA** | Flora and Fauna Assessment |
| **FM Act** | Fisheries Management Act 1994 |
| **GBD** | General Biosecurity Duty |
| **HTE** | High Threat Exotic |
| **KFH** | Key Fish Habitat |
| **KTP** | Key Threatening Process |
| **LEP** | Local Environment Plan |
| **MNES** | Matters of National Environmental Significance |
| **NSW** | New South Wales |
| **OEH** | Office of Environment and Heritage |
| **PCT** | Plant Community Type |
| **PMST** | Protected Matters Search Tool |

| Abbreviation | Description |
|---|---|
| **POEO Act** | Protection of the Environment Operations Act 1997 |
| **SICA** | Significant Impact Criteria Assessment (Assessment of Significance) - Commonwealth EPBC Act |
| **TEC** | Threatened Ecological Community |
| **TEF** | The Environmental Factor |
| **WoNS** | Weeds of National Significance |

# Executive Summary

The Environmental Factor (TEF) has been engaged by Bathurst Regional Council (BRC or Council) to present findings of the investigations undertaken into matters affecting or likely to affect the environment by reason of the proposed rectification of the Freemantle Road culvert in Eglinton, NSW (hereafter 'the Proposal'). The works would occur within Council owned and managed road reserve and an adjacent private property (Lot 31 DP1147371) on the outskirts of Eglinton, NSW in the Bathurst Regional Council Local Government Area (LGA). The Proposal involves the rectification of a section of Freemantle Road where it crosses Kelloshiel Creek after heavy rain and flooding in November 2022 resulted in the collapse of the culvert and the road surface above. Freemantle Road is a Council managed road that provides the only practical access into Bathurst from rural areas such as Mount Rankin and Billywillinga. To maintain access along the road following the incident, Council constructed a temporary detour across the Kelloshiel Creek Stone Bridge, which until 2010 when the current waterway crossing was constructed, served as the only crossing point for road users. The temporary diversion has reduced the road section to a single lane with a reduced speed limit and traffic lights, which has resulted in inconvenience to road users and an ongoing safety concern, particularly during foggy mornings when poor visibility makes driving across a single lane bridge precarious. In addition, Kelloshiel Stone Creek bridge is a listed heritage item on the Bathurst LEP; the detour currently presents a risk of damage to the bridge from regular vehicle crossings.

The Proposal involves the construction of a retaining wall, backfilling with material to reestablish the previous road level, reconstruction of the culvert, deposition of large boulders to create an energy dissipating rock apron, reestablishment of a drivable road surface over Kelloshiel Creek and removal of the current diversion route over the heritage listed bridge. To facilitate these works, a dry works area will be established and an instream pad will be formed. The dry works area will require the temporary diversion of water flows including the installation of a temporary holding pool immediately upstream of the culvert and below the Kelloshiel Creek Stone Bridge. To maintain the dry works area, water will be pumped from the temporary holding pool and reintroduced into Kelloshiel Creek around 100m downstream of the culvert within the subject site. Machinery will enter Kelloshiel Creek from the western end of the subject site and work from the instream dry works pad for the duration of the proposed works.

The study area occurs on the edge of a peri-urban environment with both the town of Eglinton and the regional centre of Bathurst, in a predominantly agricultural landscape under grazing and pasture management pressure on the edge of town. The area has subsequently been historically cleared of canopy and is now dominated by predominantly exotic vegetation including common pasture species and agricultural weeds. Native vegetation in the study area is limited to some juvenile planted native canopy species River Sheoak (Casuarina cunninghamiana) and some minor occurrences of native ground cover species and planted native riparian vegetation within the study area.

The subject site occurs in the degraded road reserve of Freemantle Road and encompasses the collapsed culvert site which crosses Kelloshiel Creek. The area has been modified significantly, and currently consists of predominantly exotic groundcover vegetation, including some significant environmental weeds. The creek area in the subject site and surrounding study area is highly degraded, with significant erosion of the waterway evident. Major erosion has resulted in road collapse and undercutting of creek banks with subsequent rubble and road debris scattered across the creek bed below the culvert under Freemantle Road. Kelloshiel Creek is a tributary of the Wambul Macquarie River, both of which are mapped as Key Fish Habitat (KFH). Limited

remnant native vegetation and connectivity remains within the locality with extensive historical clearing undertaken to facilitate agriculture and urbanisation within the region.

The majority of the vegetation within the subject site has been subject to high levels of anthropogenic disturbance including historical clearing, agriculture and livestock grazing, road and infrastructure construction, and both historical and recent erosion and sedimentation due to unstable waterway banks. The vegetation occurring onsite is further detailed in Section 4.2. These disturbances have led to the introduction of many common exotic annual weeds and environmental weeds spreading throughout the subject site, as detailed in Section 4.2.3. Subsequently, no native plant community types (PCT's) were identified in the study area during surveys (Section 4.2.2), and clearing of vegetation will be limited to 0.46 ha of non-native vegetation as per Table 1 below.

**Table 1 Summery of vegetation communities occurring within the study area**

| Vegetation type | subject site (ha) |
|---|---|
| Non-native vegetation including areas dominated by woody weeds | 0.46 |
| **Total Area** | **0.46** |
| **Total Area Native** | **0.00** |

Kelloshiel Creek, which is mapped as supporting Key Fish Habitat (KFH) occurs within the subject site. A roadside drainage line along the southern side of Freemantle Road enters Kelloshiel Creek from the west; the drainage line along with the creek and its tributaries form an ephemeral catchment which was subject to significant waterflows and erosion during the November flooding event. Fish passage through the culvert towards the upper catchment area is currently severed due to erosion and scouring of the creek bed, which has resulted in an approximately 1.2m drop from the base of the culvert to the waterway below. The construction of the rock apron below the culvert is expected to reestablish fish passage during high flow events only. The Proposal includes dredging and reclamation works within a waterway mapped as containing KFH and as such a Part 7 permit from DPI - Fisheries will be required.

The subject site supports limited native fauna habitat due to its location situated in a highly disturbed and heavily cleared agricultural landscape; vegetation in the study area is dominated by exotic flora and environmental weeds. Fauna observed during surveys were limited to highly mobile bird species and common disturbance tolerant frog species. Minimal native flora was identified during surveys due to the invasion and dominance of exotic weed species. It has been determined in Section 4.4.1 of this report, that no threatened species, ecological communities, populations or their habitats listed under either the EPBC Act or the BC Act are considered likely to be significantly impacted by the Proposal.

Flora and fauna surveys, including habitat assessments and incidental flora and fauna recordings were completed during the site visit to identify important habitat components for any threatened species or ecological communities recorded, or with the potential to occur, within the locality. Based on the desktop assessment, site visit and habitat assessments undertaken, no threatened species or TEC's were considered as having the potential to be impacted as a result of the Proposal.

Consultation with NSW DPI – Fisheries will be undertaken to obtain a Part 7 permit which is required for the proposed works due to the proximity of Key Fish Habitat (recorded within Kelloshiel Creek), and the nature of the works occurring within Kelloshiel Creek.

Further mitigation measures proposed for these works include timing of vegetation clearing and weed removal to occur outside of key breeding times (Spring) where practicable, sediment and erosion control, stockpiling and earthworks in line with Bluebook requirements, and adherence to strict hygiene procedures.

# 1 Introduction

## 1.1 Overview

The Environmental Factor (TEF) has been engaged by Keech Constructions on behalf of Bathurst Regional Council (BRC or Council) to present findings of the investigations undertaken into matters affecting or likely to affect the environment by reason of the proposed rectification of the Freemantle Road culvert in Eglinton, NSW (hereafter 'the Proposal'). The works would occur within Council owned and managed road reserve and an adjacent private property (Lot 31 DP1147371) on the outskirts of Eglinton, NSW in the Bathurst Regional Council Local Government Area (LGA). The Proposal involves the rectification of a section of Freemantle Road where it crosses Kelloshiel Creek after heavy rain and flooding in November 2022 resulted in the collapse of the culvert and the road surface above.

This FFA has been prepared to assess the potential for impacts on ecological values, with particular emphasis on threatened ecological communities, populations and species listed under the NSW Biodiversity Conservation Act 2016 (BC Act) and Matters of National Environmental Significance (MNES) listed under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The FFA has been undertaken in accordance with the Environmental Planning and Assessment Act 1979 (EP&A Act) and the Environmental Planning and Assessment Regulation 2000 (EP&A Regulation). The Proposal is being determined under Part 5 Section 1.7 of the EP&A Act via a separate Review of Environmental Factors (REF), which this report will support.

Concept design plans have been provided to display the location and detail of the proposed construction area and works methodology (Appendix A).

## 1.2 Terms and definitions

The terms defined in Table 2 are used in this report.

**Table 2 Terms and definitions**

| Term | Definition |
|---|---|
| **Subject site** | The maximum area to be directly affected by the Proposal, including earthworks, vegetation clearing, instream works and any proximal areas that could be directly impacted by the Proposal. This equates to a direct impact area of **0.46 ha** (Figure 1).<br><br>Note: a total direct impact footprint of maximum 30 m width has been assigned, to account for the temporary holding pool and works area within the existing road corridor (which includes stockpile area, site office and vehicle washdown facilities). This forms a construction corridor along a 200m section of Freemantle Road. Details of this are shown in Figure 1. |
| **Study area** | Includes the subject site (as described above) and any proximal areas that could be potentially indirectly impacted by the Proposal (assumed to be restricted to a 50 m buffer surrounding the subject site) and an extended buffer downstream of 100m. This equals a total impact area (direct and indirect) of **2.87 ha**. |
| **The locality** | The area within 10 kilometres of the subject site. |

## 1.3 Proposal description

Freemantle Road is a Council managed road that provides the only practical access into Bathurst from rural areas such as Mount Rankin and Billywillinga. Heavy rain and flooding experienced on the 14th of November 2022 led to a culvert failure and subsequent collapse of the road surface above. Scouring and erosion from excessive turbulent water flows led to the collapse of the concrete pipe culvert leading to subsidence of the road surface above, which then washed into the waterway below. To maintain access along the road following the incident, Council constructed a temporary detour across the Kelloshiel Creek Stone Bridge, which until 2010 when the current waterway crossing was constructed, served as the only crossing point for road users. The temporary diversion has reduced the road section to a single lane with a reduced speed limit and traffic lights, which has resulted in inconvenience to road users and an ongoing safety concern, particularly during foggy mornings when poor visibility makes driving across a single lane bridge precarious. In addition, Kelloshiel Stone Creek bridge is a listed heritage item on the Bathurst LEP; the detour currently presents a risk of damage to the bridge from regular vehicle crossings.

The Proposal involves the construction of a retaining wall, backfilling with material to reestablish the previous road level, reconstruction of the culvert, deposition of large boulders to create an energy dissipating rock apron, reestablishment of a drivable road surface over Kelloshiel Creek and removal of the current diversion route over the heritage listed bridge.

The proposed works are planned to commence in October 2023 with the construction time estimated to be approximately 12 weeks.

### *1.3.1 Proposal objectives*

The primary objective of the Proposal is to restore the road to its existing alignment through the rectification of the culvert and road surface such that the existing 2-lane, 100 kmph speed limit road section over Kelloshiel Creek is restored to its original specifications.

The secondary objective is to achieve this primary goal with minimal impact to the surrounding natural and built environment and with minimal disruption to surrounding residents and businesses.

Project objectives will be achieved through delivery of a comprehensive community consultation and stakeholder engagement plan, pre-commencement impact boundary delineation and careful design and construction methodology to minimise potential impacts to the surrounding community and natural environment. Council will complete ongoing engagement and communications with residents and businesses adjacent to the construction area, pre-clearing survey and site inductions for work personnel, in combination with implementation of the Environmental Safeguards provided in this report.

## 1.4 Aims of the report

The aims of this assessment are to:

- Identify the presence or likely presence of threatened species, populations and ecological communities and their habitats listed under the BC Act.
- Identify the potential for any Matters of National Environmental Significance (MNES) listed under the EPBC Act to occur within the Proposal footprint and/or to be indirectly impacted by the Proposal.

- Identify the potential impacts of the Proposal on threatened biota or migratory species and their habitats.
- Assess the significance of impacts on threatened biota listed under the BC Act and identify the likely requirement or otherwise for further assessment and approvals under the EP&A Act.
- Assess the significance of impacts on MNES and identify the likely requirement or otherwise for further assessment and approvals under the EPBC Act.
- Recommend mitigation and environmental management measures to avoid or minimise adverse impacts on threatened biota and biodiversity values, as appropriate, to facilitate the relevant planning approvals process.

The results of this assessment will determine the significance of impacts to biodiversity values as a result of the Proposal, and the requirement for further assessment or the completion of a Species Impact Statement (SIS), or a referral to the Minister for Environment (EPBC Act) for impacts to threatened biota listed under NSW legislation, or MNES listed under the EPBC Act, prior to determination of the Proposal through completion of the project Review of Environmental Factors (REF).

The conclusions of this assessment are provided in Section 7 of this report.

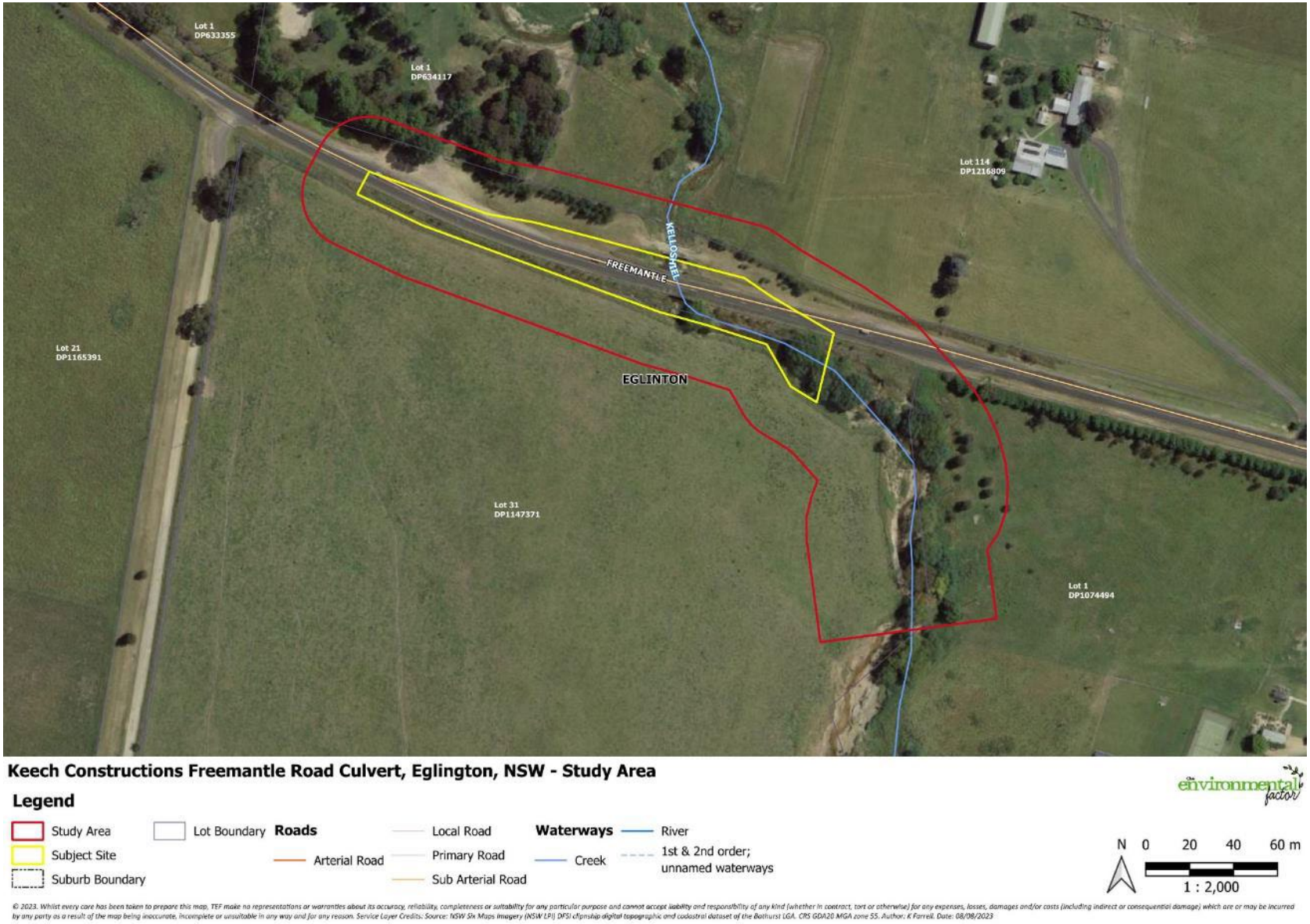



**Figure 1 study area and subject site**

# 2 Legislative Context

## 2.1 Commonwealth (Federal) Legislation

### *2.1.1 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*

The purpose of the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) is to ensure that actions likely to cause a significant impact on 'matters of national environmental significance' undergo an assessment and approval process. Under the EPBC Act, an action includes a project, a development, an undertaking, an activity or a series of activities, or an alteration of any of these things (DEWHA 2009). An action that 'has, will have or is likely to have a significant impact on a matter of national environmental significance' is deemed to be a 'controlled action' and may not be undertaken without prior approval from the Australian Government Minister for Sustainability, Environment, Water, Population and Communities (the 'Minister').

The EPBC Act identifies nine Matters of National Environmental Significance (MNES) as:

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

The EPBC Act has been addressed in the current assessment through:

- Desktop review to determine the MNES that are predicted to occur within the locality of the proposed scheme and hence could occur, subject to the habitats present.
- Targeted field surveys for threatened biota and migratory species listed under the Act.
- Identification of suitable impact mitigation and environmental management measures for threatened biota, where required.
- Assessment of potential impacts on MNES, if appropriate.

Potential impacts on relevant MNES must be subject to Assessments of Significance pursuant to the EPBC Act Significant Impact Guidelines (DEWHA 2009). If a significant impact is considered likely, a referral under the EPBC Act must be submitted to the Commonwealth Environment Minister.

No Significant Impact Criteria Assessments (SICA) were completed for this Proposal as no EPBC Act listed biota were considered to be at risk of impact as part of the Proposal.

## 2.2 State (NSW) Legislation, Policies and Guidelines

### *2.2.1 Biodiversity Conservation Act 2016 (BC Act)*

The BC Act provides legal status for biota of conservation significance in NSW. Section 7.2 and 7.8 of the Biodiversity Conservation Act 2016 (BC Act) states that the determining authority must consider the effect of an activity on:

- Areas of Outstanding Biodiversity Value (AOBV), and/or
- Species, populations or ecological communities, or their habitats and whether there is likely to be a 'significant effect' on those species, populations or ecological communities.

The BC Act provides legal status for biota of conservation significance in NSW. It provides a framework for the Biodiversity Assessment Method (BAM) and the calculation of offset requirements for projects participating in the Biodiversity Offset Scheme (BOS). The BC Act aims to:

- Conserve biological diversity on a bioregional and state scale
- Lists Areas of Outstanding Biodiversity Value (AOBV)
- Assess the extinction risk of species and ecological communities
- Identify Key Threatening Processes
- Slow the rate of biodiversity loss, and conserve threatened species
- Areas of Outstanding Biodiversity Value (AOBV) (as defined under the BC Act).
- Species, populations or ecological communities, or their habitats (as listed under the BC Act) and whether there is likely to be a 'significant effect' on those species, populations or ecological communities.
- Other protected fauna or protected native plants listed under the National Parks and Wildlife Act 1974.

Section 7.3 of the BC Act lists five factors that must be taken into account when determining the significance of potential impacts of a proposed activity on threatened species, populations or ecological communities (or their habitats) listed under the BC Act. The 'five part test' or 'assessment of significance' is used to assist in the determination of whether a project is 'likely' to impose 'a significant effect' on threatened biota and thus whether a SIS is required. There is also the option to prepare a BDAR rather than an SIS, where a significant impact is likely.

Threatened biota and migratory species recorded or likely to occur in the study area are detailed further in Section 4.4 and Appendix D and any potential impacts are identified in Section 5.4.

### *2.2.2 Environmental Planning and Assessment Act 1979 (EP&A Act)*

The Environmental Planning and Assessment Act 1979 (EP&A Act) forms the legal and policy platform for Proposal assessment and approval in NSW and aims to, inter alia, 'encourage the proper management, development and conservation of natural and artificial resources'. All development in NSW is assessed in accordance with the provisions of the EP&A Act and the Environmental Planning and Assessment Regulation (EP&A Regulation 2000).

The EP&A Act contains three parts that impose requirements for planning approval. The main two are as follows:

- Part 4 provides for control of 'local development' that requires development consent from the local Council.
- Part 5 provides for control of 'activities' that do not require approval or development consent under Part 4.

The Proposal does not require development consent under Part 4 of the EP&A Act. The proposed works are a Division 5.1 activity under the EP&A Act, as the Proposal is 'permissible without consent' by virtue of State Environmental Planning Policy (Infrastructure) 2007. The determining authority for the project is Council.

Section 5.5 of the EP&A Act stipulates the duty of determining authorities to consider the environmental impacts of an 'activity'. When considering an activity, the determining authority is required to 'examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment'.

As part of the consideration of impacts of a Proposal on the environment under Division 5.1 of the EP&A Act, the significance of impacts on threatened species, populations and endangered ecological communities listed under the Biodiversity Conservation Act 2016 (BC Act) or Fisheries Management Act 1994 (FM Act) must be assessed as described below. Where a significant impact is likely to occur, a species impact statement (SIS) must be prepared in accordance with the Secretary's Environmental Assessment Requirements, or a biodiversity development assessment report (BDAR) in accordance with the Biodiversity Offsets Scheme and Biodiversity Assessment Method.

### *2.2.3 Fisheries Management Act 1994 (FM Act)*

The objectives of the Fisheries Management Act 1994 (FM Act) are to conserve, develop and share the fishery resources of the State for the benefit of present and future generations. It provides for:

- The listing of threatened species, populations and ecological communities, with endangered species, populations and communities listed under Schedule 4, 'critically endangered' species and communities listed under Schedule 4A, and vulnerable species and communities listed under Schedule 5.
- The listing of 'Key Threatening Processes' (under Schedule 6).
- Diseases affecting fish and marine vegetation (under Schedule 6B).
- Noxious fish and noxious marine vegetation (under Schedule 6C).
- The preparation and implementation of Recovery Plans and Threat Abatement Plans.
- Requirements or otherwise for the preparation of a SIS.

One of the objectives of the FM Act is to 'conserve key fish habitats ' which includes aquatic habitats that are important to the maintenance of fish populations generally and the survival and recovery of threatened aquatic species.

The FM Act has been addressed in the current assessment through undertaking:

- A desktop review to determine the threatened species, populations or ecological communities that have been previously recorded within the locality of the Proposal and hence could occur subject to the habitats present.
- Assessment of aquatic habitats during terrestrial field surveys.
- Assessment of impacts on aquatic habitats.

- Assessment of the potential for impacts on threatened species, populations and ecological communities listed under the Act.
- Identification of suitable impact mitigation and environmental management measures to avoid or mitigate impacts on the aquatic environment.

A Part 2 or Part 7 Fisheries Management Act (FM Act) permit is required for works within a third order (or higher) streams (based on the Strahler system of stream order classification), and first and second order streams that are known or likely to be habitat for listed threatened species, populations or communities (i.e Key Fish Habitat).

The subject site interacts with areas mapped as Key Fish Habitat (Figure 3), and both dredging and reclamation works within KFH will be undertaken as part of this Proposal, subsequently the Proposal will require consideration under the FM Act. Accordingly, a Part 7 permit is required for these works. Upon gaining a Part 7 permit, works must be carried out in accordance with the fisheries permit requirements.

### 2.2.4 Policy and guidelines for fish habitat conservation and management (NSW DPI 2013)

The Policy and Guidelines for Fish Habitat Conservation and Management (2013) provides classification of Key Fish Habitats based on the characteristics of the waterway present.

Key Fish Habitats are further categorized according to 'sensitivity', with Type 1 containing Highly Sensitive habitat, Type 2 containing Moderately Sensitive habitats and Type 3 containing Minimally Sensitive habitats.

**Table 3 Key Fish Habitat Waterways Classifications (NSW DPI 2013)**

| Classification | Characteristics of Waterway |
|---|---|
| **Class 1 Major Key Fish Habitat** | Marine or estuarine waterway or permanently flowing or flooded freshwater waterway (e.g. river or major creek), habitat of a threatened or protected fish species or 'critical habitat'. |
| **Class 2 Moderate Key Fish Habitat** | Non-permanently flowing (intermittent) stream, creek or waterway (generally named) with clearly defined bed and banks with semi-permanent to permanent waters in pools or in connected wetlands areas. Freshwater aquatic vegetation is present. Type 1 and 2 habitats present. |
| **Class 3 Minimal Key Fish Habitat** | Named or unnamed waterway with intermittent flow and sporadic refuge, breeding or feeding areas for aquatic fauna (e.g. fish, yabbies). Semi-permanent pools form within the waterway or adjacent wetlands after a rain event. Otherwise, any minor waterway that interconnects with wetlands or other Class 1-3 fish habitats. |
| **Class 4 Unlikely Key Fish Habitat** | Waterway (generally unnamed) with intermittent flow following rain events only, little or no defined drainage channel, little or no flow or free-standing water or pools post rain events (e.g. dry gullies or shallow floodplain depressions with no aquatic flora present). |

### 2.2.5 NSW Biosecurity Act 2015 (Biosecurity Act)

The NSW Biosecurity Act 2015 (Biosecurity Act) outlines mandatory measures that persons are to take with respect to biosecurity matters including the management of weeds (Part 2, Division 8 including Weeds of National Significance (WoNS)). Under the Biosecurity Act, the responsibilities for weed management by public and private landholders are consistent, reflecting that weed management is a shared community responsibility. The Act introduces the legally enforceable concept of a General Biosecurity Duty (GBD). Priority

weeds are listed within Regional Strategic Weed Management Plans, however the GBD is not restricted to listed weeds.

The Biosecurity Act is administered by NSW Department of Primary Industries which determines the weed species covered by regulatory tools including Prohibited Matters, Control Orders and Biosecurity Zones. Existing Local Control Authorities (Councils) continue to be responsible for enforcing weed legislation.

Priority weeds and WONS observed on site are outlined in Section 4.2.3.

### *2.2.6 Local Land Services Act 2013 (LLS Act)*

The Local Land Services Act 2013 (LLS Act) includes the management of natural resources in the consideration of the principles of Ecological Sustainable Development (ESD).

Vegetation clearing provisions are considered under Part 5A of the LLS Act. The LLS Act regulates the clearing of native vegetation on all land in NSW mapped as Category 2 – Regulated Land, as mapped on the Native Vegetation Regulatory Map. It does not include Excluded Land and Category 1 Exempt Land mapped on the Native Vegetation Regulatory Map (NVR Map).

Vegetation clearing which does not require development consent under the EP&A Act is considered for approval by the Native Vegetation Panel under the LLS Act.

### *2.2.7 Local Land Services Amendment Act 2016 (LLSA Act)*

The Local Land Services Amendment Act 2016 (LLSA Act), which amended the Local Land Services Act 2013, authorised the making of the Land Management (Native Vegetation) Code 2018 (Div 5, Sch 1 of the LLSA Act). The aim of the Code is to authorise clearing of native vegetation on Category 2 regulated land under certain conditions and provide for the establishment and maintenance of set aside areas.

Review of the Native Vegetation Regulatory map (Appendix A) has confirmed areas of Category 2 – Vulnerable Regulated Land as steep or highly erodible land, protected riparian land or special category land associated with Kelloshiel Creek which bisects the subject site.

# 3 Methodology

## 3.1 Desktop review

A desktop assessment was undertaken to identify threatened flora and fauna species, populations and ecological communities listed under the BC Act, and MNES listed under the EPBC Act that may be affected by the Proposal. The results of the desktop assessment were then used to guide onsite field investigations.

### *3.1.1 Database searches*

Database records pertaining to the site and locality (i.e. 10 kilometre radius) were reviewed and included:

**Relevant State and Commonwealth Databases**

- Protected Matters Search Tool (Department of Climate Change, Energy, the Environment and Water 2023)
- NSW BioNet (DPE 2023), the website of the Atlas of NSW Wildlife
- NSW Scientific Committee Final Determinations
- Priority Weeds for the Central Tablelands (DPI 2023)

**State and Federal Guidelines**

- Threatened Species Survey and Assessment: Guidelines for developments and activities. Working Draft (DEC 2004)
- NSW Survey Guide for Threatened Frogs (DPIE 2020)
- NSW Guideline to Surveying Threatened Plants and their Habitats (DPIE 2020)
- Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia 2010)
- Survey guidelines for Australia's threatened bats: Guidelines for detecting bats listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia 2010)
- Survey guidelines for Australia's threatened mammals. Guidelines for detecting mammals listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia 2011)
- Draft survey guidelines for Australia's threatened orchids.

**Spatial data**

- NSW State Vegetation Types PCT's v1.1 (DCS Spatial Services)
- Bathurst Region LGA Topographical and Cadastral layers (DFSI)
- Sixmaps Satellite Imagery 2013/2014
- OEH Mitchell Landscape Soil v3.1
- CRS GDA 94 MGA zone 55
- Google Satellite Imagery 2019
- NSW Spatial Portal ss-sdi Spot 6/7 Satellite Imagery 2020

Following collation of database records and species and community profiles, a 'likelihood of occurrence' assessment was prepared with reference to the broad habitats contained within the subject site (Appendix D). The assessment was further refined following field surveys and assessment of habitat present.

### *3.1.2 Vegetation mapping*

GIS mapping was completed prior to surveys being undertaken to inform our ecologists of the habitats and vegetation likely to be on site and to provide a visual representation of vegetation communities present within the study area, as well as any previous records of threatened species recorded.

## 3.2 Field survey

A rapid site assessment was undertaken over 1 day on the 20th July 2023, by qualified consultant and ecologist Emily Cotterill (CEnvP and BAMAA), and ecologist Ben Perrott. During the site assessment, the following activities were undertaken:

- Identifying and recording the vegetation communities present within the subject site, and where they extend beyond and into the study area, with focus on identifying any threatened ecological communities (TEC)
- Recording of incidental flora species encountered within the study area, including searches for locally occurring threatened species where relevant, species diagnostic of threatened ecological communities and priority weeds (High Threat Exotics or HTE)
- Recording opportunistic sightings of any fauna species, seen or heard, within the study area
- Identifying and recording the locations of threatened fauna habitat such as important nesting, roosting or foraging microhabitats where relevant within the study area
- Undertaking targeted searches for the habitat of any threatened and regionally significant fauna **where relevant**, including:
    - Tree hollows (habitat for threatened large forest owls, parrots, cockatoos, bats and arboreal mammals)
    - Caves and crevices (habitat for threatened reptiles, small mammals and microbats),
    - Termite mounds (habitat for threatened reptiles and the echidna)
    - Waterbodies (habitat for threatened fish, frogs and water birds)
    - Fruiting / flowering trees (food for threatened birds and mammals)
    - Rocky outcrops and overhangs (habitat for threatened microbats, herpetofauna and marsupials)
    - Trees and shrubs supporting nest structures (habitat for threatened birds and arboreal mammals)
    - Any other habitat features that may support fauna (particularly threatened) species.
- Assessing the connectivity and quality of the vegetation within the study area and surrounding landscape

A detailed summary of onsite investigation is included in Table 4.

### *3.2.1 Terrestrial flora survey*

**Vegetation mapping**

GIS mapping was completed using QGIS prior to surveys being undertaken to provide a visual representation of vegetation communities predicted to be present within the study area and any previous records of threatened species recorded.

Native vegetation was assessed within the study area to categorise and map potential PCTs and to determine the quality and extent of vegetation present, with particular emphasis on vegetation occurring within the subject site. A combination of Rapid Data Points (RDPs), and random meander surveys on foot were completed to assess vegetation composition and structure, including dominant native species and the extent of weed occupation of the site.

RDPs were completed in each potential condition zone present within the vegetation recorded in the study area. In total, two (2) RDP were completed (Figure 2) in order to identify the extent, type, and condition of vegetation present, and to assess the floristic attributes (species richness, cover and abundance) within different PCTs and condition zones present.

The identification of PCTs was conducted in accordance with the NSW PCT classification as described in the BioNet Vegetation Classification database (OEH 2019). PCT identification, in this case the identification of non-native plant community presence, was determined by identifying species dominance across stratums (canopy, shrub and groundcover), geographic distribution (based upon IBRA subregions) and vegetation and landform formation. Reference was given to existing State Vegetation Type Mapping (SVTM) for the locality, to inform the selection of PCTs where applicable.

Vegetation occurring outside of the study area was not ground-truthed as part of the field survey.

**Targeted flora surveys**

Targeted threatened flora transect surveys in the correct survey periods for individual species were not undertaken as part of this assessment. Threatened flora assessment was limited to habitat assessment and incidental observations only. The study area was surveyed incidentally for detectable threatened flora species via random meander transect surveys. Habitat quality for species with potential to occur along the trail was assessed to determine the likelihood of species occurrence within the site.

### *3.2.2 Terrestrial fauna surveys*

**Opportunistic observations**

Opportunistic observations of fauna species were recorded at all times during field surveys. All species observed or heard utilising the site during surveys were recorded. Any observed evidence of faunal activity (tracks, scats, feathers, pellets) were noted and specimens collected (if applicable) were sent for analysis (Scats About 2020) and identification. Disturbance caused by animals including diggings and burrows were noted and any road/driveway kill was recorded where identifiable.

**Habitat assessment**

Habitat assessments on site included active searches for the following habitat features where relevant:

- Trees with bird nests or other potential fauna roosts
- Burrows, dens and warrens, bridges, culverts and hollow-bearing trees for evidence (e.g. guano or bat droppings) of roosting microbats

- Hollow-bearing trees/stags and logs which provide refuge, nest and den sites for a range of threatened fauna species
- Koala food trees and/or evidence of scratches or scats
- Distinctive scats or latrine sites, owl whitewash and regurgitated pellets under roost sites
- Tracks or animal remains
- Evidence of activity such as feeding scars, scratches and diggings
- Leaf litter and fallen timber were inspected for reptile habitat
- Presence of potential habitat for threatened frog species

**Table 4 Survey effort summary**

| Survey method | Effort |
|---|---|
| **Rapid Data Points** | Modified floristic rapid data points were undertaken within vegetation throughout the creek and road corridors to verify any potential Plant Community Types (PCTs) present and to develop a flora list within the study area. |
| **Fauna habitat assessments** | Habitat assessments were conducted across the site. Tree hollows, possible denning sites, waterways, leaf litter, rocky outcrops and other resources were inspected for their suitability as fauna habitat. |
| **Opportunistic general surveys** | Observations of fauna or flora on site during the survey period were recorded. |

## 3.3 Assessments of the significance of impacts

Following collation of database records and review of species and community profiles, a 'likelihood of occurrence' assessment was prepared with reference to the habitats contained within the study area based on information provided in the species profiles, recovery plans, journal articles, and the field staffs' knowledge of species habitat requirements. The likelihood of occurrence assessment was refined after field surveys based on habitat features recorded within the subject land. The likelihood of threatened and migratory biota occurring in the locality was assessed based on presence of records from the locality for the last 20 years (since 2000), species distribution and habitat preferences, and the suitability of potential habitat present in the subject land. The results of this assessment are provided in Appendix D.

For ecological communities or threatened species determined known or with a moderate to high likelihood of being impacted by the Proposal, assessment of the likely significance of impacts is required to be prepared in accordance with Section 7.3 of the BC Act and the EPBC Act Matters of National Environmental Significance – Significant Impact Criteria Guidelines (DEWHA, 2013) where relevant.

Given the minor impacts proposed, primarily limited to the clearing of small areas of exotic dominated vegetation of minor habitat value to threatened species, no assessments of the likely significance of impacts are required to be prepared for the Proposal.

## 3.4 Survey conditions and limitations

Results from field investigations were influenced by timing and duration of surveys and weather conditions prior to, and during the surveys. Details of the weather conditions recorded at Bathurst Airport Active Weather Station (AWS) #063291 around 13km east of the subject site, and the limitations of the surveys undertaken, are outlined further below.

**Survey conditions**

Site conditions were cool and sunny. The field survey was subject to the following weather conditions preceding and at the time of surveys, as outlined in Table 5 below.

**Table 5 Weather conditions preceding and during field survey (weather station: Bathurst Airport AWS 063291, Bureau of Meteorology 2023).**

| Date | Temperature(˚C) | | Total Rain (mm) | Max Wind Speed 9am km/hr | Wind direction |
|---|---|---|---|---|---|
| | Minimum | Maximum | | | |
| **14/07/2023** | -3.0 | 16.5 | 0 | 35 | WNW |
| **15/07/2023** | 1.9 | 17.4 | 0.2 | **43** | NW |
| **16/07/20232** | 7.8 | 13.6 | 0 | 19 | ENE |
| **17/07/2023** | 0.3 | **16.5** | 0.8 | 22 | NNW |
| **18/07/2023** | 1.7 | 14.3 | 0.2 | 28 | SW |
| **19/07/2023** | 0.6 | 13.2 | **1.4** | 20 | WSW |
| **20/07/2023** | **-5.5** | 13.6 | 0.2 | 28 | NNW |

**Survey limitations**

TEF ecologists were able to walk the entire site and survey flora within the subject site; however, detailed searches outside the immediate impact footprint were not undertaken. Plant identification and habitat assessment within these areas were made based on visible species and resources that could be identified from accessible locations. Seasonal restrictions due to project timeframes also limited the detectability of species on site during the survey period.

Given the limited survey effort, it is likely that some species that occur in the study area either permanently, seasonally or transiently were not detectable during surveys. These species may include annual, ephemeral or cryptic flora and fauna species; nocturnal fauna; birds and frogs which call at other times of year; and mobile or transient fauna in general.

The habitat assessment conducted allows for identification of habitat resources available for such species, in order to assess their likelihood of occurring within the study area. As such, the survey was not designed to detect all species, rather to provide an overall assessment of the ecological values within the Proposal footprint. This information was used to predict potential impacts of the Proposal on ecological values and to develop a design and/or mitigation measures to specifically avoid impacts on threatened ecological communities and known and potential habitat for threatened species, where practicable.

Due to the nature of the site and the restrictions of impacts to areas that have already undergone significant past disturbance the level of assessment conducted is deemed adequate.

# 4 Results

## 4.1 Site description

The study area occurs on the edge of a peri-urban environment with both the town of Eglinton and the regional centre of Bathurst situated within a predominantly agricultural landscape under grazing and pasture management pressure on the edge of town. The area has subsequently been historically cleared of canopy and is now dominated by predominantly exotic vegetation including common pasture species and agricultural weeds. Native vegetation in the study area is limited to some juvenile planted native canopy species River Sheoak (*Casuarina cunninghamiana*) and some minor occurrences of native ground cover species and native riparian vegetation within Kelloshiel Creek which occurs in the study area.

The subject site occurs in the degraded road reserve of Freemantle Road and encompasses the failed bridge site which crosses Kelloshiel Creek. The area has been modified significantly, and currently consists of predominantly exotic groundcover vegetation, including some significant environmental weeds. The creek area in the subject site and surrounding study area is highly degraded, with significant erosion of the waterway evident. Major erosion has resulted in road collapse and undercutting of creek banks with subsequent rubble and road debris scattered across the creek bed below the culvert under Freemantle Road.

Kelloshiel Creek is a tributary of the Wambul Macquarie River, both of which are mapped as KFH. Limited remnant native vegetation and connectivity remains within the locality with extensive historical clearing undertaken to facilitate agriculture and urbanisation within the region.

The entire study area is located on unmapped land on the Native Vegetation Regulatory Mapping (Appendix A). However, small areas of Category 2 – Vulnerable Regulated Land are mapped in relation to Kelloshiel Creek. Kelloshiel Creek and the downstream Wambul Macquarie River are also mapped as containing biodiversity values on the Biodiversity Values Map (BVM) (Appendix A).

### *4.1.1 Waterways and aquatic habitats*

The subject site is bisected by a 3rd Order stream named Kelloshiel Creek which is mapped as Key Fish Habitat (KFH) and was observed to have running water flowing during surveys. However, the damage caused during the collapse of the under-road culvert associated with this Proposal, has resulted in an disconnect in creek continuity and potential for fish passage as the culvert is now suspended around 1200mm above the creek bed. This has subsequently prevented fish passage from the lower sections of Kelloshiel Creek and the Wambul Macquarie River, to higher parts of Kelloshiel Creek and its tributary Sandy Creek. In addition to KFH, Kelloshiel Creek also contains potential frog habitat features including aquatic and fringing semi-aquatic vegetation along the banks of the creek and within the waterway. It is predicted that this creek will maintain running water year-round outside of a drought climate.

## 4.2 Flora results

### *4.2.1 Flora species*

Thirty-nine (39) species of flora were recorded within the study area, comprising 31 (79%) exotic species and 8 (21%) native species. The full list of species recorded during the survey is presented in Appendix C. No

threatened flora species were recorded as occurring on the site, however targeted seasonal surveys were not undertaken as part of this assessment.

### 4.2.2 Vegetation and Plant community types

The majority of the vegetation within the subject site has been subject to high levels of anthropogenic disturbance including historical clearing, agriculture and livestock grazing, road and infrastructure construction, and both historical and recent erosion and sedimentation due to unstable waterway banks. These disturbances have led to the introduction of many common exotic annual weeds and environmental weeds spreading throughout the subject site.

The site is largely comprised of exotic species, including *Bromus catharticus* (Prairie Grass), *Polypogon monspeliensis* (Beard Grass), *Poa annua* (Winter Grass), *Medicago sp.* (Burr Medic), and *Ranunculus sceleratus* (Celery Buttercup) which were common throughout and dominated some areas of the subject site. In addition, exotic aquatic weed *Veronica anagallis-aquatica* (Blue Water-speedwell) was also recorded frequently within and fringing the waterway, and *Verbena bonariensis* (Purple top) and *Bromus catharticus* (Prairie Grass) were abundant in the road reserve. Minor occurrences of native grasses such as *Cynodon dactylon* (Couch), *Chloris truncate* (Windmill Grass), and *Sprobolus sp.* (Rat-tail Grass), and forbs such *Geranium sp.* (Native Geranium) and *Pseudoghnaphalium luteoalbum* (Cudweed) were present. Native semi-aquatic species *Juncus usitatus* (Common Rush) was persisting in low numbers within wet areas of Kelloshiel Creek bed across the subject site. Native species *Chloris truncata* (Windmill Grass) was the most commonly occurring, however did not occur abundantly across the subject site. Due to historical clearing and degradation, canopy vegetation was highly limited, and consisted of a small number of juvenile planted *Casuarina cunninghamiana* (River Sheoak) along the southern roadside shoulder above Kelloshiel Creek, and some planted *Eucalyptus sp.* in the study area. *Salix sp.* (Willow) were also recorded downstream of the bridge area. Native canopy vegetation would not be impacted by the Proposal. Regionally and nationally listed priority weeds such as *Rubus fruticosus* (Blackberry), *Ligustrum lucidum* (Large-leaf Privet), and *Salix sp.* (Willow), were also recorded in the subject site which are discussed further in Section 4.2.3.

As described above, vegetation present was largely comprised of exotic species, and subsequently no native plant community types (PCT's) were identified in the study area during surveys. Clearing of vegetation will be limited to 0.46 ha of non-native vegetation (Table 6).

**Table 6 Ground-truthed Vegetation & PCTs within the subject site**

| Vegetation type | subject site (ha) |
|---|---|
| Non-native vegetation | 0.46 |
| **Total Area** | **0.46** |
| **Total Area Native** | **0.00** |

Plate 1 Exotic dominated roadside/Creekside vegetation within the subject site

Plate 2 Exotic dominated and highly degraded creek line vegetation including Willows (*Salix sp.*), exotic aquatic weeds, and planted Eucalyptus species in the background downstream of the subject site.

Plate 3 Exotic aquatic vegetation within Kelloshiel Creek

Plate 4 Planted River Sheoak bordering subject site.

### 4.2.3 Declared and listed Environmental Weeds

Thirty-one (31) exotic plant species occurred within the study area (see Appendix C for full list). Of these, two (2) are listed as Weeds of National Significance (WoNS) with Prohibition of Certain Dealings, including a large Blackberry (*Rubus fruticosus*) thicket on the downstream banks of the waterway (Plate 8) and Willow species (*Salix sp*) which occurred on the downstream and upstream banks. One (1) further species Large-leaved Privet (*Ligustrum lucidum)* is listed as Priority Weed with Regional Recommended Measures within the Central Tablelands of NSW.

**Table 7 WoNS and NSW Priority Listed Weeds recorded within the study area**

| Scientific name | Common name | Control Category |
|---|---|---|
| *Ligustrum lucidum* | Large-leaved Privet | **Priority Weed with Regional Recommended Measure – Central Tablelands** |
| *Rubus fruticosus species aggregate* | Blackberry | **WoNS**<br><br>**Prohibition of Certain Dealings – All of NSW** |

| Scientific name | Common name | Control Category |
|---|---|---|
| | | **Priority Weed with Regional Recommended Measure – Central Tablelands** |
| *Salix sp.* | Willow | **WoNS**<br><br>**Prohibition of Certain Dealings – All of NSW**<br><br>**General Biosecurity Duty – All of NSW** |

## 4.3 Fauna results

### *4.3.1 Fauna species*

Fauna recording was limited to incidental observation only during the site assessment. A total of six (6) fauna species were recorded, including four (4) avian species and two (2) amphibian species. A full list of species recorded on site can be found in Appendix C.

### *4.3.2 Fauna habitat*

The subject site and study area are likely to support a very limited range of habitat for native wildlife given the lack of connected remnant vegetation present. Habitat within the subject site which is limited to predominantly exotic groundcover and low quality aquatic vegetation, is isolated from other areas of habitat within the broader locality due to the extent of historic clearing throughout the predominantly agricultural landscape. This has resulted in limited native fauna biodiversity which is predominantly restricted to more mobile birds species such as Australian Raven (*Corvus coronoides*), Crimson Rosellas (*Platycercus elegans*) and Wedge-tailed Eagle (*Aquila audax*) recorded flying near the site, or bird species able to persist in small patches of highly disturbed vegetation such as Superb Fairy-wrens (*Malurus cyaneus*) which was recorded in Blackberry thickets on the edge of the waterway during surveys.

Kelloshiel Creek in the study area provides some habitat suitable to support amphibian species such as some fringing aquatic vegetation including *Juncus usitatus* (Common Rush). Species such as the Spotted March Frog (*Limnodynastes tasmaniensis*) and Common Eastern Froglet *Crinia signifera*) were heard calling during surveys and likely to utilise the study area to forage and breed.

The bridge area was inspected for suitable microbat roosting habitat including swallow nests and cracks or crevices. No suitable microbat habitat was observed.

Plate 5 Shallow pools within Kelloshiel Creek under heritage bridge upstream from subject site

Plate 6 Running creek within subject site downstream from culvert

Plate 7 Degraded habitat on site, including Willow (*Salix sp.*), long exotic grasses, exotic trees, juvenile planted *Casuarina cunninghamiana*, *E. bridgesiana* and *Eucalyptus rubida*

Plate 8 Dense Blackberry (*Rubus fruticosus*) thickets providing nesting and shelter habitat for native birds

Plate 9 Fallen Willows and logs within Kelloshiel Creek bed downstream from culvert

Plate 10 Logs surrounding shallow pools within Kelloshiel Creek

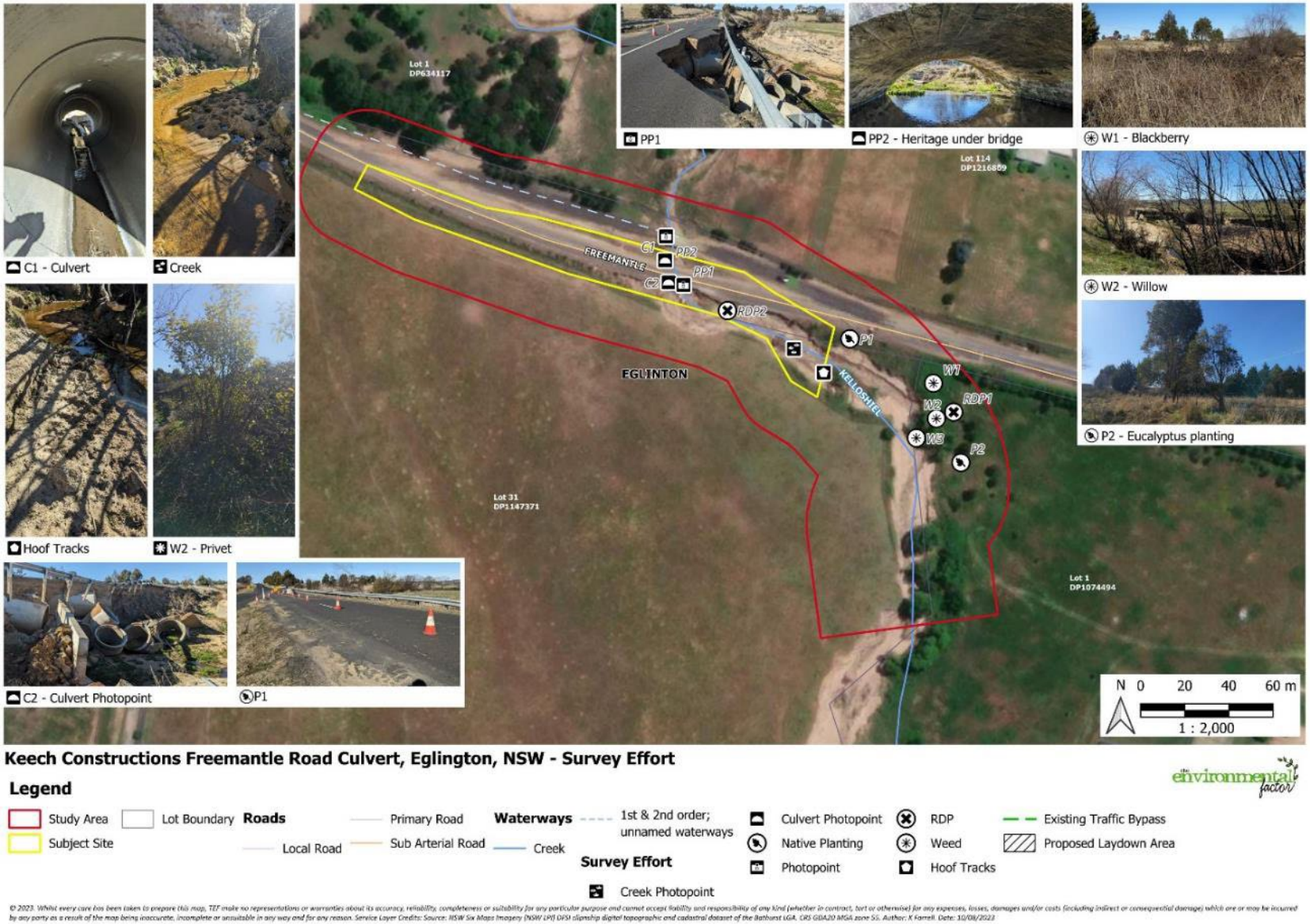





**Figure 2 Survey Effort**

## 4.4 Conservation significance

### *4.4.1 Likelihood of occurrence of threatened biota*

A desktop assessment was undertaken to identify threatened flora and fauna species, populations and ecological communities listed under the BC Act, and Matters of National Environmental Significance (MNES) listed under the EPBC Act that may be affected by the Proposal. For each species and ecological community, the specific habitat requirements have been considered in relation to the natural resources present within the study area and described accordingly. Based on the presence or absence of important habitat resources required for each species, as well as the location of recent records, habitat connectivity, and the age of historical sightings, a likelihood of occurrence rating has been assigned to reflect the probability of whether each species will frequent and/or rely on resources within the study area (Appendix D).

### *4.4.2 Threatened ecological communities*

A desktop assessment was undertaken to identify threatened flora and fauna species, populations and ecological communities listed under the BC Act, and Matters of National Environmental Significance (MNES) listed under the EPBC Act that may be affected by the Proposal. For each species and ecological community, the specific habitat requirements have been considered in relation to the natural resources present within the study area and described accordingly. Based on the presence or absence of important habitat resources required for each species, as well as the location of recent records, habitat connectivity, and the age of historical sightings, a likelihood of occurrence rating has been assigned to reflect the probability of whether each species will frequent and/or rely on resources within the study area (Appendix D).

### *4.4.3 Threatened species*

No threatened species were recorded during surveys and minimal habitat for threatened species was observed due to lack of connectivity between the study area and larger tracts of vegetation in the broader locality.

Twenty-nine (29) species of threatened fauna, and nine (9) threatened flora, have previously been recorded within the locality (Figure 6), with a further twenty-one (21) threatened fauna and eight (8) threatened flora species predicted to occur (Appendix D).

### *4.4.4 Migratory species*

Following the field survey and habitat assessment, of the three (3) listed migratory species with records occurring within the locality and the additional ten (10) listed migratory species (PMST 2023) with the potential to occur within the locality, no migratory species were considered likely to occur within the study area or be impacted by the Proposal (Appendix D).

### *4.4.5 Other MNES*

The listed additional Matters of National Environmental Significance (MNES), that are predicted to occur within the locality, are unlikely to be impacted by the Proposal.

The assessment (PMST 2021) indicates that there are four (4) Wetlands of International Importance (Ramsar) between 300 and 1000 km away from the study area. No marine areas occur within proximity to the study area.

## 4.5 Habitat connectivity

The study area consists of predominantly exotic groundcover vegetation within a highly disturbed agricultural and semi-residential area which has been historically cleared of canopy due to agricultural practices and for development. The study area is subsequently isolated from remnant vegetation or tracts of species habitat. Some scattered isolated remnant vegetation communities and planted street trees or treelines in agricultural paddocks occur across the surrounding landscape, and likely provide the capacity for highly mobile bird species to move through the landscape and subsequently persist in the area.

Riparian vegetation within the study area is predominantly cleared and dominated by exotic ground cover and degraded by subsequent bank de-stabilisation as a result of clearing and adjacent agricultural practices. There is generally a lack of contiguous canopy cover and subsequently a lack of shelter for more disturbance sensitive fauna to travel through the landscape or utilise the riparian corridor.

Larger tracts of remnant native vegetation that occur within the broader locality and beyond include, Mount Rankin and Billywillinga to Killongbutta around 6km north-west, Boundary Road Reserve around 6km south-east, Rock Forest around 9km west, Peel Reserve 11km north-east, and Winburndale Range 17 km east of the subject site. These larger areas of remnant vegetation are isolated from the subject site by large open agricultural areas and urbanised landscapes with predominantly no connectivity beyond limited road reserve vegetation, sparse paddock trees, and limited urban vegetated corridors.

The above factors have resulted in a lack of connectivity features and subsequent low native fauna diversity within the study area.


**Keech Constructions Freemantle Road Culvert REF - PCTs and Waterways within 1.5 km of Proposal location, Eglinton, NSW**

**Legend**

- 1500m Radius
- Subject Site
- Suburb Boundary
- Lot Boundary

**Roads**

- Arterial Road
- Local Road
- Primary Road
- Sub Arterial Road

**Waterways**

- Creek
- River
- 1st & 2nd order; unnamed waterways
- Key Fish Habitat

**NSW SVTM PCTs**

- PCTID: 0 - Not native vegetation
- PCTID: 3376 - Southern Tableland Grassy Box Woodland
- PCTID: 3387 - Central West Creekflat Grassy Woodland
- PCTID: 4063 - Central and Southern Tableland River Oak Forest

N 0 150 300 450 m

1 : 16,000



**Figure 3 Identified waterways, Key Fish Habitat (KFH), and mapped Plant Community Types (PCTs)**

# 5 Impact Assessment

This section assesses the potential impacts of the Proposal during construction and operation on threatened flora and fauna species and their habitats.

## 5.1 Vegetation clearing and construction impacts

The subject site consists of a 200m section of Freemantle Road and a 100m section of Kelloshiel Creek which will be cleared and resurfaced to establish an instream pad to facilitate reconstruction of the culvert as part of the Proposal. The vegetation within the subject site is exotic dominated and highly degraded with multiple WoNS and Regional priority weeds present. The Proposal will impact and clear up to 0.46 ha of this degraded vegetation. The study area consists of the subject site and a 50 m buffer surrounding the subject site and 100m downstream of the site to allow for impacts from movement of machinery and possible minor sedimentation.

### *5.1.1 Loss of flora species and vegetation communities*

Approximately 0.46 ha of predominantly exotic vegetation occurs within the subject site. Of this, it is anticipated that 0.46 ha of highly degraded exotic dominated vegetation will need to be cleared to establish a dry works area, instream pad, and to enable reconstruction of the culvert and associated retaining wall above Kelloshiel Creek. Although this vegetation is dominated by exotic species, some native ground cover and canopy species will be cleared, including three (3) juvenile River Sheoak (*Casuarina cunninhamiana*), and minor occurrences of ground cover species Windmill Grass (*Chloris truncata*), Couch Grass (*Cynodon dactylon*), Common Rush (*Juncus usitatus*), Slender Rats Tail Grass (*Sporobolus creber*), and Jersey Cudweed (*Pseudognaphalium luteoalbum*).

### *5.1.2 Loss of fauna habitat resources*

Minor occurrences of stumps, logs, scattered timer, and flood debris occur throughout the subject site. Care should be taken when removing these habitat features to ensure any fauna utilising this habitat has an opportunity to relocate. Additionally, where practicable logs should be carefully relocated within the vicinity of the creek and study area to provide refuge for and relocating fauna.

Exotic weeds including WoNS and Regional Priority Weeds such as Blackberry (*Rubus fruticosus*) and Willows (*Salix sp.*) provide good quality nesting habitat and shelter for birds such as Superb Fairy Wren which were observed utilising this habitat feature during surveys. Adequate refuge exists within the study area for these highly mobile species. Clearing of these weeds is required, however appropriate mitigation measures including pre-clearing surveys of shrubby vegetation and weeds, and restricting clearing of vegetation to outside of the key breeding period (Spring) for most species, will reduce the potential impacts to native fauna. Where clearing of vegetation is undertaken during pre-clearing surveys must be undertaken by an ecologist or other appropriately qualified person to reduce potential impacts to protected native fauna. Where vegetation clearing occurs during Spring, a suitably qualified fauna handler must be present during pre-clearing surveys to ensure any relocation of protected native fauna is carried out lawfully and appropriately.

Given the existing disturbed nature of the site and the relatively small area of highly degraded exotic dominated vegetation to be impacted, and the availability of alternant habitat within the study area, the impacts on non-aquatic terrestrial fauna habitat are likely to be minimal, and predominantly associated with bird species which may utilise this habitat for nesting and foraging.

### 5.1.3 Impacts to aquatic habitat

Kelloshiel Creek, as a subject of the Proposal and associated culvert reconstruction, is a tributary of the Wambul Macquarie River and is mapped as containing Key Fish Habitat (KFH).

There is the potential for erosion and sedimentation impacts as a result of surface water runoff and stormwater runoff from the subject site during construction to enter Kelloshiel Creek and the Wambul Macquarie River. Therefore, there is the potential for impacts to water quality and aquatic habitat within these areas mapped as KFH. Mitigation measures to control erosion and run-off of sediment into waterways and KFH in the broader locality will reduce potential impacts to these environments.

Recent erosion events have resulted in the prevention of potential fish passage upstream of Freemantle Road, and the ephemeral and degraded nature of this creek is currently not providing any quality fish habitat within the subject site. The Proposal will improve the current condition of the creek bed through the proposed rock armouring, which will prevent future erosion and provide a substrate for the growth of aquatic vegetation over time where the rock is submerged.

The Proposal will temporarily divert water flows and establish a dry works area along a 100m section of Kelloshiel Creek where current frog habitat occurs. However, this habitat will be restored and largely improved post-completion of the proposed works, impacts may occur to frogs where adequate mitigation measures are not undertaken.

Additionally, there is a requirement for a Fisheries Permit for the proposed works, which must be approved prior to commencement of works.

### 5.1.4 Habitat fragmentation

The subject site and Proposal occur in a significantly fragmented landscape which has been the subject of extensive historical clearing and other anthropogenic disturbances such as agriculture and the introduction of roadways. Clearing of degraded and exotic dominated groundcover vegetation, and a small number of juvenile native trees associated with this Proposal will not increase localised habitat fragmentation within the study area or further isolate remnant vegetation within the locality.

### 5.1.5 Fauna injury and mortality

Due to the nature of the works, the main threat to native fauna remains disturbance during the vegetation clearing, instream pad construction, and the establishment of the dry works area phase of the Proposal. Direct impacts to ground dwelling fauna such as reptiles and amphibians may occur during earthworks, while impacts nesting birds may occur during the proposed removal of shrubs or woody weeds. Mitigation measures outlined in Section 6 including stage dry works area implementation and pre-clearing surveys of vegetation, are to be strictly adhered to, which will help to reduce possible impacts to fauna.

## 5.2 Indirect impacts

### 5.2.1 Invasion and spread of weeds

Disturbance associated with vegetation clearing, importation of earth materials, construction traffic and general construction has the potential to increase the spread, introduction and establishment of weed and pest species in the subject site.

Weed species are effective competitors for food and habitat resources and have the potential to exclude native species and modify the composition and structure of vegetation communities.

The site already contains extensive infestations of a variety of NSW Priority Weeds and WonS (See Section 4.2.3). Considering the current and historical high levels of weed invasion the subject site has incurred; it is unlikely that the reconstruction of this previously established culvert and roadway, and the associated instream works, will result in an increased risk of spread of weeds to the site beyond which already occurs. Mitigation measures have also been outlined to help further reduce this potential threat.

### *5.2.2 Sedimentation, erosion and contamination*

Indirect erosion and sedimentation impacts to waterways have the potential to occur due to highly erodible soils and the subject site occurring within KFH and upstream of the Wambul Macquarie River. A risk of sedimentation from exposed soils has the potential to occur during the establishment and construction of the instream pad and retaining walls, and the reconstruction of the culvert and roadway. It is recommended that no surface disturbance or vegetation removal works be undertaken during times of predicted rainfall, wet weather or when running water is present in in the study area, where this can be avoided. Potential water quality impacts would be managed through the implementation of mitigation measures, including the provision of silt fences and other structures to intercept runoff.

Additionally, erosion and sediment controls should continue to be implemented during the re-establishment of water flows after the works are completed, to mitigate any potential sedimentation event whilst the newly established creek bed and banks are settling.

Stockpile areas are to be established with adequate ERSED controls. Cement truck washout areas are to be a minimum of 40 m away from the top of bank of any waterways and KFH with appropriate controls in place to prevent contamination of these waterways.

Mitigation measures outlined in Section 6 will help to reduce possible indirect impacts from sedimentation, erosion and contamination.

### *5.2.3 Noise and vibration disturbance*

The proposed culvert reconstruction and retaining wall implementation is anticipated to generate additional noise or vibration during the construction phase of the Proposal. Construction would be conducted during standard, daytime construction hours. An increase above existing background levels is unlikely to result in a significantly impact on fauna that occur in the subject site given the existing noise environment that species persist in at the site. Areas subject to construction noise would be temporarily disturbed, and some fauna may vacate areas in proximity to the Proposal site during construction. Mitigation measures to control and limit noise and vibration disturbance, including the recommendation to restrict loud construction noises to outside of the key breeding period (Spring) for most species will reduce the potential impacts to these environments.

## 5.3 Key threatening processes

A key threatening process (KTP) is defined under the BC Act as an action, activity or Proposal that:

- Adversely affects two (2) or more threatened species, populations or ecological communities.
- Could cause species, populations or ecological communities which are not currently threatened to become threatened.

There are currently thirty-eight (38) KTPs listed under the BC Act (DPIE 2021) eight (8) listed under the FM Act (DPIE 2021) and twenty-one (21) under the EPBC Act (DAWE 2021). Several KTPs are listed under more than one Act. Those KTPs potentially relevant to this Proposal are discussed in Table 8 below. Although the Proposal is not anticipated to impact on threatened biota, it may exacerbate a number of KTPs (as tabled below) and appropriate mitigation actions should be employed to minimise these impacts. Mitigation measures to limit the impacts of KTPs of relevance are discussed in Section 6.

**Table 8 Key threatening processes relevant to the Proposal**

| KTP | Status | Comment |
|---|---|---|
| **Removal of deadwood and dead trees** | BC Act | A small number of logs and fallen timber may be impacted within the study area. Therefore, the Proposal has the potential to result in a minor increase in the operation of this KTP. |
| **Infection of frogs by amphibian chytrid causing the disease chytridiomycosis** | BC Act, EPBC Act | Chytridiomycosis, caused by the bacteria chytrid Batrachochytrium dendrobatidis, is a global epidemic which is potentially fatal to all native species of amphibian.<br><br>All machinery should be clean and free of soil and plant matter which can spread disease and pathogens into waterways. (Further discussed within the project REF) |

## 5.4 Impacts to threatened biodiversity

No impacts to threatened biodiversity are predicted to occur as a result of this Proposal, as outlined in Appendix D.

# 6 Mitigation Measures

Proposed mitigation measures, persons responsible and timing are outlined in Table 9 below.

**Table 9 Proposed mitigation measures, responsibilities and timing**

| Biodiversity impact | Mitigation Measure | Responsibility and timing |
|---|---|---|
| **General** | Ensure construction workers are provided with an environmental induction prior to the commencement of works to outline key biodiversity features of the site (Shrubby vegetation and waterway), and the management measures in place to protect biodiversity during construction. | Contractor, Council<br><br>Construction |
| | Vehicles and machinery to work from the existing road wherever possible and are not to extend beyond the study area. | Contractor<br><br>Construction |
| | Site is to be kept tidy and free from rubbish at all times, to prevent wastes being blown into adjacent areas of native vegetation or waterways. | Contractor<br><br>Construction & post construction |
| | Where additional vegetation removal is proposed, this must first be assessed to consider any additional or cumulative impacts against the approved clearance footprint, and if appropriate, supervised by a qualified ecologist. | Contractor, Council<br><br>Construction |
| | Any required revegetation activities will be undertaken using native species sourced from local seed wherever possible. Areas to be re-seeded may be marked in the CEMP or Management Plan as a record of rehabilitation efforts made. Vegetation cover should be returned to the site within a reasonably practicable timeframe post-clearing to reduce soil exposure and loss. | Contractor, Council<br><br>Construction |
| **Loss of flora species and vegetation communities** | Clearly delineate vegetation to be removed/retained and induct all site personnel as to the approved process and extent of clearing. | Contractor, Council<br><br>Construction |
| **Loss of Fauna habitat resources** | Prior to clearing of any vegetation, a pre-clearance survey should be undertaken including inspection for native fauna, threatened species and habitat features (i.e nests) to confirm occupation by fauna. Care should be taken to identify nests and/or roosting sites. If fauna habitat is present, the appointed contractor would contact the project ecologist for further advice prior to clearing. | Contractor, Council<br><br>Pre-construction and construction |
| | Where any trees requiring removal contain hollows, nests or other signs of occupation, a staged clearing approach must be undertaken where hollow limbs are removed carefully and incrementally by a qualified tree surgeon/arborist. Care should be taken to inspect nests and limbs where possible for fauna prior to their removal. | Contractor, Council<br><br>Construction |

| Biodiversity impact | Mitigation Measure | Responsibility and timing |
|---|---|---|
| | Where possible felled trees and removed logs should be placed strategically and in proximity to the work site to provide refuge and potential habitat in the understorey whilst ensuring no further damage to surrounding vegetation. Placement of logs and felled trees will also aid in the regeneration of the area. | Contractor, Council<br><br>Construction |
| **Impacts to aquatic habitat** | Consultation with NSW DPI – Fisheries must be undertaken to obtain a Part 7 permit which is required for the proposed instream works.<br><br>**<u>Staged introduction of dry works area and instream pad</u>**<br>The introduction of an upstream dam and subsequent diversion of water flows to establish a dry works area, must be carried out at a minimum of 48hrs prior to entering the waterway and beginning construction of the instream pad, to allow adequate time for aquatic fauna to relocate up or downstream.<br><br>Sedimentation, erosion and contamination controls (as defined below) should be in place for the duration of the proposed construction works. | Contractor, Council<br><br>Pre-construction and construction |
| **Fauna injury and mortality** | Where practicable, it is recommended that construction occurs outside of key breeding seasons (fledging of active nests/roosts) (approximately June to January) for species likely to utilise the site to avoid or minimise the chance of nest abandonment, injury or death to native fauna.<br><br>Ensure the presence of an ecologist or fauna spotter catcher at all times during pre-clearing and clearing activities to remove and relocate wildlife as necessary, and to attend to any wildlife that are injured as a result of works. | Contractor, Council<br><br>Pre-construction and construction |
| **Invasion and spread of weeds and pests** | Develop and implement an active weed and pest management plan prior to construction commencing, to reduce the risk of weed spread and safety issues arising from pest and weed presence (e.g. WoNS and NSW Priority Weeds).<br><br>Declared weeds within the subject site must be managed according to requirements under the Biosecurity Act 2015. It is recommended that all Weeds of National Significance and NSW Priority Weeds should be controlled, and where possible, eradicated to reduce the risk of further spread.<br><br>Strict hygiene protocols must be followed. If weeds are accidentally transported to site, or identified during construction activities, all weed material should be immediately contained and removed from site. | Contractor, Council<br><br>Construction & post-construction |
| **Sedimentation, erosion and contamination** | All soils to be stockpiled at designated stockpile locations away from waterways, drainage lines and native vegetation in a cleared area, within | Contractor, Council |

| Biodiversity impact | Mitigation Measure | Responsibility and timing |
|---|---|---|
| | pre-approved zones. Ensure these are appropriately stabilized in accordance with the 'Blue Book' (Landcom 2004).<br><br>Appropriate erosion and sediment migration reduction/control measures should be in place.<br><br>Where possible, heavy vehicles are not to be parked under tree drip lines/ leaf canopy to avoid compaction of soil, which is damaging to mature native trees and can cause dieback or tree mortality. Existing cleared areas and roadways are to be used for parking as a first priority.<br><br>All machinery and vehicles are to be clean and inspected prior to arriving on-site to reduce the spread of weeds and disease (e.g. *Phytophthora cinnamomi*) to the site. | Pre-construction, Construction |
| **Noise and vibration disturbance** | Where practicable, it is recommended that construction occurs outside of key breeding seasons (fledging of active nests/roosts) (approximately June to January) to avoid noise and vibration related disturbance (i.e nest abandonment) to nesting fauna. | Contractor, Council<br><br>Construction |

# 7 Conclusion

The subject site occurs in an agricultural landscape bordering a peri-urban environment. The existing section of Freemantle Road within the study area and the associated culvert were badly damaged during heavy rain in November 2022 and has subsequently been temporarily redirected across the decommissioned heritage bridge and reduced to single lane access with temporary traffic lights to direct single lane traffic. Freemantle Road connects rural properties from Freemantle, Billywillinga, and Mount Rankin to the Bathurst town centre and beyond, subsequently supporting frequent and consistent vehicle traffic of both light and heavy vehicle. Repair works are required to reinstate the existing road alignment and restore 2 lane access.

Kelloshiel Creek which bisects Freemantle Road and is the subject of the proposed culvert reconstruction is a tributary of the Wambuul Macquarie River and is mapped as supporting KFH; however, the degraded nature of the creek in the study area was observed not to contain habitat of a moderate or high quality. Significant erosion has severed fish passage to the upper reaches of Kelloshiel Creek beyond the Freemantle Road culvert. Vegetation within the subject site and study area is in a degraded condition being dominated by exotic vegetation and environmental weeds, with only minor occurrences of native vegetation including sparse low diversity ground cover and a small number of juvenile planted native tree species along the roadside.

Habitat within the study area is limited to the above noted vegetation and waterway, with dense shrubby exotic vegetation such as Blackberry (*Rubus fruticosus*) providing nesting and foraging habitat for highly mobile bird species, and Kelloshiel Creek providing some areas of shallow pools with sparse fringing vegetation suited to many frog species. No contiguous vegetation connectivity exists however adequate vegetation exists within the study area to provide refuge and shelter to any native fauna disturbed or temporarily displaced by the proposed works.

Additionally, the Proposal intends to rehabilitate culvert and downstream creek bed within the subject site introducing a flow dissipating rock apron and clearing areas of environmental weed infestation to improve vegetation and creek condition within the study area.

Mitigation measures proposed for these works include timing of vegetation clearing to occur outside of key breeding times (Spring) where practicable, staged dry area and instream pad establishment, sediment and erosion control, stockpiling and earthworks in line with Bluebook requirements, and adherence to strict hygiene procedures. These mitigation measures are further detailed in Section 6.

# 8 References

Bureau of Meteorology (BOM) (2023) Weather observations at Bathurst Airport Weather Station (AWS: 063291)

DCCEEW 2023 Species Profile and Threats Databases

DCCEEW 2023 Protected Matters Search Tool for MNES listed under the EPBC Act. http://www.environment.gov.au/epbc/protected-matters-search-tool

DPI 2023 Priority Weeds of the Bathurst Regional NSW WeedWise

DPI 2023 Weeds of National Significance NSW WeedWise

DPIE 2020, NSW Survey Guide for Threatened Frogs, environment.nsw.gov.au

DPE 2023 Areas of Outstanding Biodiversity register Area of Outstanding Biodiversity Value register | NSW Environment, Energy and Science

DPE 2023 Biodiversity Values Map https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BVMap

DPE 2023 Key threatening processes http://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species/about-threatened-species/key-threatening-processes accessed July 2023

DPE 2023 NSW Government Vegetation Regulatory Map https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=NVRMap

DPE 2023 BioNet Wildlife Atlas Threatened species records, which holds data from a number of custodians.

New South Wales Flora online – PlantNet 2023 http://plantnet.rbgsyd.nsw.gov.au/floraonline.html

NSW Government, Local Land Services 2023 Central Tablelands Regional Strategic Weed Management Plan 2023-2027. https://www.lls.nsw.gov.au/__data/assets/pdf_file/0009/722727/Central-Tablelands-Regional-Strategic-Weed-Management-Plan-2023-2027.pdf

# 9 Appendices

Appendix A - Native Vegetation Regulatory Map

Appendix B - Biodiversity Values Map

Appendix C - Species recorded during surveys

Appendix D - Threatened Species Likelihood of Occurrence table

Appendix E - Weather observation during survey period (Bureau of Meteorology)

## Appendix A - Native Vegetation Regulatory Map

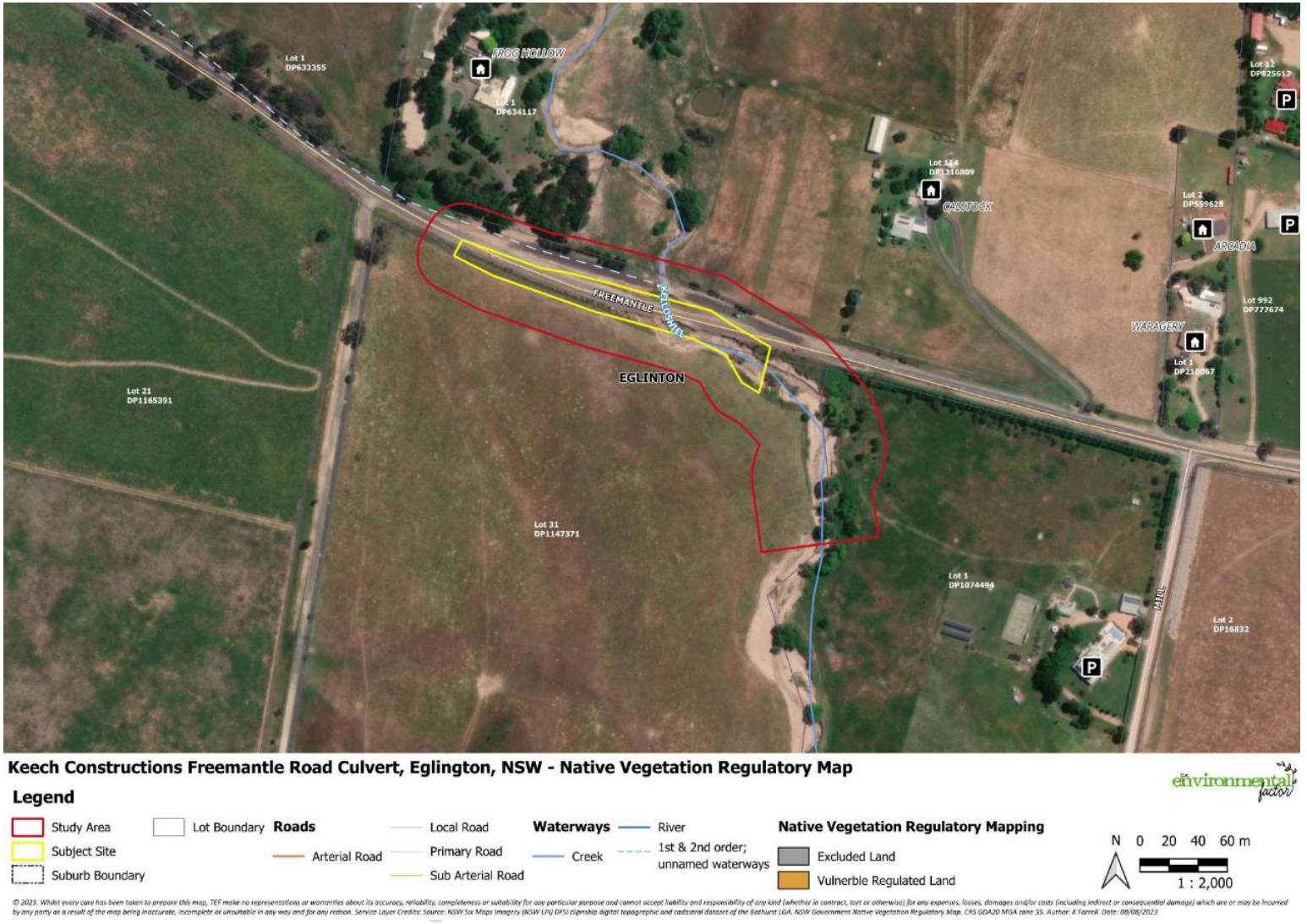



**Figure 4 Native Vegetation Regulatory Map**

## Appendix B - Biodiversity Values Map

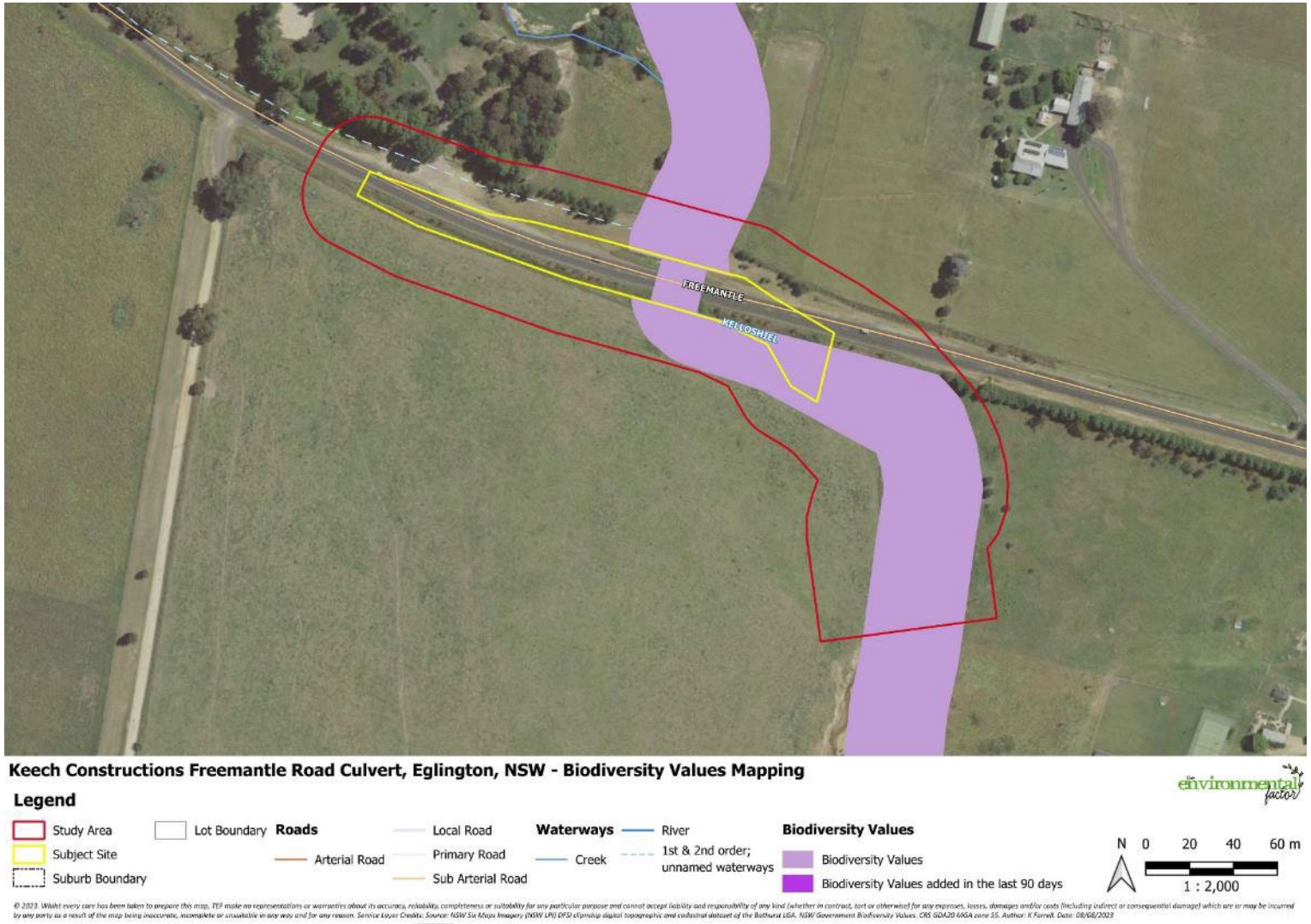



**Figure 5 Biodiversity Values Map**

# Appendix C - Species recorded during surveys

**Table 10 Flora species recorded during surveys**

| *Scientific name* | Common name | Exotic | Weed listing status |
|---|---|---|---|
| *Bromus catharticus* | Prairie Grass | Ex | - |
| *Callitriche stagnalis* | Common starwort | Ex | - |
| *Casuarina cunninghamiana subsp. cunninghamiana* | River Sheoak | N | - |
| *Cenchrus clandestinus* | Kikuyu | Ex | - |
| *Chloris truncata* | Windmill Grass | | - |
| *Cirsium vulgare* | Spear Thistle | Ex | **NSW Priority Weed –** General Biosecurity Duty all of NSW |
| *Conyza bonariensis* | Flaxleaf Fleabane | Ex | **NSW Priority Weed –** General Biosecurity Duty all of NSW |
| *Cynodon dactylon* | Common Couch | N | - |
| *Cyperus eragrostis* | Umbrella Sedge | Ex | - |
| *Dactylis glomerata* | Cocksfoot | Ex | - |
| *Eragrostis sp.* | A Lovegrass | Ex | - |
| *Eucalyptus bridgesiana* | Apple Box | N | - |
| *Eucalyptus rubida* | Candlebark | N | - |
| *Geranium solanderi* | Native Geranium | N | - |
| *Hypericum perforatum* | St. Johns Wort | Ex | **NSW Priority Weed –** General Biosecurity Duty all of NSW |
| *Hypochaeris radicata* | Catsear | Ex | - |
| *Juncus usitatus* | - | N | - |
| *Ligustrum lucidum* | Large-leaved Privet | Ex | **NSW Priority Weed –** General Biosecurity Duty all of NSW |
| *Malva sp.* | Mallow | Ex | - |
| *Medicago spp.* | A Medic | Ex | - |
| *Onopordum acanthium subsp. acanthium* | Scotch Thistle | Ex | - |
| *Persicaria maculosa* | Redshank | Ex | - |
| *Phalaris aquatica* | Phalaris | Ex | - |
| *Plantago lanceolata* | Lamb's Tongues | Ex | **NSW Priority Weed –** General Biosecurity Duty all of NSW |
| *Poa annua* | Winter Grass | Ex | - |
| *Polygonum aviculare* | Wireweed | Ex | - |
| *Prunus spp.* | - | Ex | - |

| *Scientific name* | Common name | Exotic | Weed listing status |
|---|---|---|---|
| *Pseudognaphalium luteoalbum* | Jersey Cudweed | N | - |
| *Ranunculus sceleratus* | Celery Buttercup | Ex | - |
| *Rubus fruticosus sp. agg.* | Blackberry complex | Ex | **WoNS**<br><br>**Prohibition on Certain Dealings – All of NSW**<br><br>**Regional Recommended Measure – Bathurst Regional LGA** |
| *Rumex acetosella* | Sheep Sorrell | Ex | - |
| *Salix spp.* | - | Ex | **WoNS**<br><br>**Prohibition on Certain Dealings – All of NSW**<br><br>**NSW Priority Weed – General Biosecurity Duty all of NSW** |
| *Sonchus oleraceus* | Common Sow Thistle | Ex | - |
| *Sporobolus creber* | Slender Rats Tail Grass | N | - |
| *Trapogon porrifolius subsp. porrofolius* | Salsify | Ex | - |
| *Trifolium spp.* | A Clover | Ex | - |
| *Verbascum spp.* | A Mullien | Ex | - |
| *Verbascum virgatum* | Twiggy Mullein | Ex | - |
| *Verbena bonariensis* | Purpletop | Ex | - |
| *Veronica anagallis-aquatica* | Blue Water-speedwell | Ex | - |

Native (N), Exotic (Ex)

**Table 11 Fauna species recorded during surveys**

| Class | Common Name | *Scientific name* | Conservation Status | Observation |
|---|---|---|---|---|
| *Amphibia* | Common Eastern Froglet | *Crinia signifera* | P | W |
| *Amphibia* | Spotted Grass Frog | *Limnodynastes tasmaniensis* | P | W |
| *Aves* | Australian Raven | *Corvus coronoides* | P | O |
| *Aves* | Crimson Rosella | *Platycercus elegans* | P | O |
| *Aves* | Superb Fairy-wren | *Malurus cyaneus* | P | O |
| *Aves* | Wedge-tailed Eagle | *Aquila audax* | P | O |

## Appendix D - Threatened Species Likelihood of Occurrence table

The below assessment includes national and state significant species from the following sources:

- Bionet Atlas of NSW Wildlife
- DAWE database (PMST search)
- Current survey
- Search area is 10 km radius.
- Not considered further pelagic seabirds, shorebirds, sandpipers, turtles, whales, sharks - no preferred marine or coastal habitat in study area.

All habitat information is taken from NSW DPIE and Commonwealth DAWE Threatened Species profiles (DPIE 2022 DAWE 2022) unless otherwise stated. The codes used in this table are:

- CE – Critically Endangered
- E – Endangered
- V – Vulnerable
- EP – Endangered Population
- C – CAMBA
- J – JAMBA
- R – ROKAMBA
- CEEC – Critically Endangered Ecological Community
- EEC – Endangered Ecological Community
- Mi – Migratory species

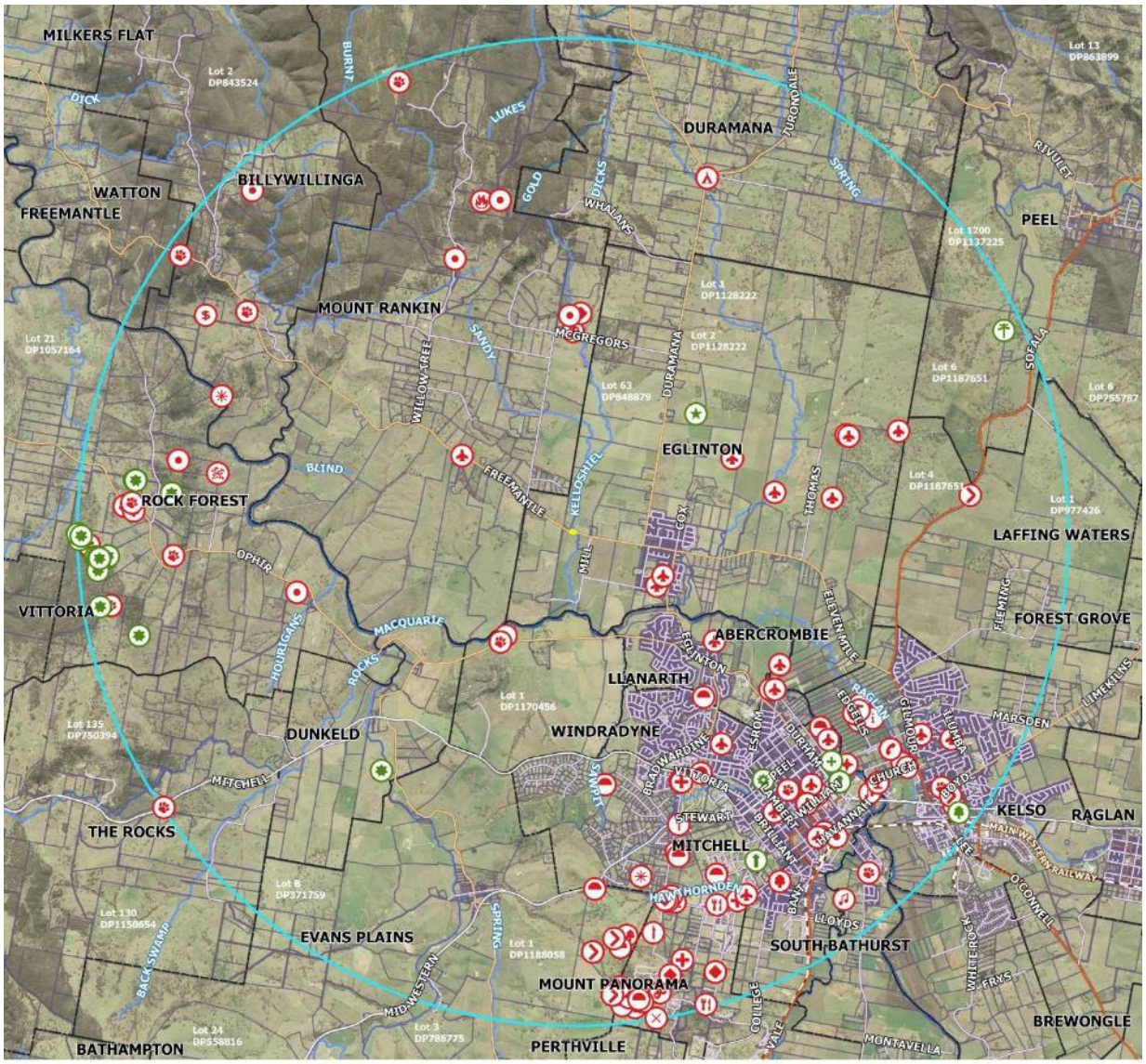
**Table 12 Likelihood of occurrence definitions**

| Likelihood of occurrence | Definition |
|---|---|
| **Known** | Species recorded in the subject site or Subject Land |
| **Likely** | Species previously recorded within a 10 kilometre radius of the subject site and suitable habitat occurs within the subject site. |
| **Possible** | Species previously recorded within a 10 kilometre radius of the subject site but only marginal suitable habitat recorded.<br>OR<br>Species not previously recorded within a 10 kilometre radius of the subject site, but the Proposal footprint is within the species known distribution and suitable habitat occurs within the Subject Land. |
| **Unlikely** | Species previously recorded within a 10 kilometre radius of the subject site but no suitable habitat recorded. |
| **Nil** | Species not previously recorded within a 10 kilometre radius of the subject site and no suitable habitat occurs in the area. |

**Table 13 Likelihood of impact definitions**

| Likelihood of occurrence | Definition |
|---|---|
| **High** | Species / community is 'known' or 'likely' to occur within the study area and the Proposal will impact on important habitat resources. |
| **Moderate** | Species / community is 'known' or 'likely' to occur within the study area however the Proposal does not impact on important habitat resources. |

| Likelihood of occurrence | Definition |
|---|---|
| **Low** | Species / community is unlikely to be impacted by the Proposal. |
| **Nil** | Species / community will not be impacted by the Proposal. |




**Keech Constructions Freemantle Road Culvert REF - Threatened species within 10 km of Proposal, Eglinton, NSW**

**Legend**

- Subject Site
- 10km Radius
- Suburb Boundary
- Lot Boundary
- State Forest

**Roads**

- Arterial Road
- Local Road
- Primary Road
- Sub Arterial Road

**Waterways**

- Creek
- River

**Threatened Species**

- Aromatic Peppercress
- Australian Painted Snipe
- Barking Owl
- Black Falcon
- Black Gum
- Black-chinned Honeyeater (eastern subspecies)
- Bossiaea fragrans
- Brown Treecreeper (eastern subspecies)
- Canberra Grassland Earless Dragon
- Clandulla Geebung
- Curlew Sandpiper
- Diamond Firetail
- Dusky Woodswallow
- Flame Robin
- Fork-tailed Swift
- Gang-gang Cockatoo
- Granite Zieria
- Green and Golden Bell Frog
- Grevillea divaricata
- Grey-headed Flying-fox
- Koala
- Large Bent-winged Bat
- Large-eared Pied Bat
- Latham's Snipe
- Little Eagle
- Magpie Goose
- Red-tailed Tropicbird
- Regent Honeyeater
- Rough Eyebright
- Scarlet Robin
- Sharp-tailed Sandpiper
- Silky Swainson-pea
- Silver-leafed Gum
- Speckled Warbler
- Spotted Harrier
- Spotted-tailed Quoll
- Squirrel Glider
- Swift Parrot
- Varied Sittella
- White-fronted Chat
- Yellow-bellied Sheathtail-bat
- Yellow-spotted Tree Frog

N 0 1 2 3 km

1 : 110,000



**Figure 6 Threatened species recorded within 10km of the study area**

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
|---|---|---|---|---|---|---|---|
| ***Amphibia*** | | | | | | | |
| *Litoria booroolongensis* | Booroolong Frog | E | E | The Booroolong Frog is restricted to NSW and north-eastern Victoria, predominantly along the western-flowing streams of the Great Dividing Range with recent records from the south-west slopes of NSW. It is now thought to be regionally extinct in all but the southern part of its range and an isolated population near Tamworth. It inhabits riffle habitat in pristine rivers and streams. Water quality is important for this species as it does not tolerate high turbidity and pollution levels. The frog lives along permanent streams with some fringing vegetation cover such as ferns, sedges or grasses. Adults occur on or near cobble banks and other rock structures within stream margins, and will shelter under rocks or amongst vegetation near the ground on the stream edge. Breeding occurs in spring and early summer and tadpoles metamorphose in late summer to early autumn. Eggs are laid in submerged rock crevices and tadpoles grow in slow-flowing connected or isolated pools. | PMST | **Unlikely –** Booroolong Frog is known to occur in reaches of the Wambul Macquarie River, several kilometres upstream from the confluence with Kelloshiel Creek. No records for this species exist within the locality (10 km radius), however there is a known population previously recorded just outside this, 19 km upstream. No suitable habitats, such as rocky cobbles and fringing vegetation occur within the study area, and this species is unlikely to occur downstream due to no historical records. | Low – Given that this species has been deemed unlikely to occur within the study area, there is a low impact potential for these species. Additionally, the Proposal includes establishment of appropriate erosion and sediment controls, and repairs to a waterway crossing within a damaged section of the Kelloshiel Creek waterway. Some minor sedimentation may occur, however the likelihood of this impacting Booroolong Frog is low given the condition of the existing environment, no historical records downstream of the study area, and distance to Wambul Macquarie River and any known population records upstream. |
| *Litoria aurea* | Green and Golden Bell Frog | E | V | There are records of occurance of Litoria aurea from west to Bathurst, Tumut and the ACT region. Since 1990 there have been approximately 50 recorded locations in NSW, most of which are small, coastal, or | Bionet (2) | Unlikely – One (1) record from 1973 for this species exists within The locality however no suitable swamp or | Nil – Habitat for this species will not be impacted by The Proposal. |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
|---|---|---|---|---|---|---|---|
| | | | | near coastal populations. These locations occur over the species' former range, however they are widely separated and isolated. Large populations in NSW are located around the metropolitan areas of Sydney, Shoalhaven and mid north coast (one an island population). There is only one known population on the NSW Southern Tablelands. Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (Typha spp.) or spikerushes (Eleocharis spp.). Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (Gambusia holbrooki), have a grassy area nearby and diurnal sheltering sites available. Some sites occur in highly disturbed areas. This species is active by day and usually breeds in summer when conditions are warm and wet.(Sourced from NSW Office of Environment - Threatended species profile 2022) | | billabong habitat occurs within the study area. | |
| *Litoria castanea* | Yellow-spotted Tree frog | CE | CE | The Yellow-spotted Tree Frog has similar habitat requirements to the other two Bell Frog species, including deep pools with fringing and emergent aquatic vegetation to breed and nearby refuge habitat to shelter. | Bionet (1), PMST | Unlikely – One (1) record from 1962 for this species exists within The locality however no suitable deep pool habitat occurs within the study area. | Nil – Habitat for this species will not be impacted by The Proposal. |
| ***Aves*** | | | | | | | |
| *Botaurus poiciloptilus* | Australasian Bittern | E | E | Australasian Bitterns are widespread but uncommon over south-eastern Australia. In | PMST | Unlikely – No records for this species exist within | Low – Species is unlikely to be impacted by the minor |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
|---|---|---|---|---|---|---|---|
| | | | | NSW they may be found over most of the state except for the far north-west. Preferred habitat is comprised of wetlands with tall dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water. It favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and reeds (e.g. Phragmites, Cyperus, Eleocharis, Juncus, Typha, Baumea, Bolboschoenus) or cutting grass (Gahnia) growing over a muddy or peaty substrate. | | the locality and only low quality potential habitat (predominantly exotic fringing vegetation) occurs in the subject site | loss of low quality predominantly aquatic fringing vegetation given the wide availability of alternant resources for the species in the locality |
| *Rostratula australis* | Australian Painted Snipe | E | E | The Australian Painted Snipe is restricted to Australia. Most records are from the south east, particularly the Murray Darling Basin. This species occupies wetland and swamp habitats, preferring the fringes of swamps and dams with a cover of grasses, reeds, scrub or woodland. Breeding occurs anytime during spring and summer when conditions are favourable. It nests on the ground amongst tall vegetation. | Bionet (3), PMST | Possible - Records of this species exist within the locality, however only low quality habitat occurs within the study area. | Low – Species is unlikely to be impacted by the minor loss of low quality predominantly aquatic fringing vegetation given the wide availability of alternant resources for the species in the locality |
| *Ninox connivens* | Barking Owl | V | - | Found throughout continental Australia except for central arid regions. The Barking Owl requires large tree hollows in order to roost and breed. It occupies open forests and woodlands including partially cleared farmland. They often roost in densely formed Acacia and Casuarina species. Known to successfully breed along timbered | Bionet (1) | Possible – A single record of this species exist within the locality, only marginally suitable foraging habitat occurs within the study area. | Low – No habitat resources for this species will be impacted by the Proposal. |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
|---|---|---|---|---|---|---|---|
| | | | | watercourses in heavily cleared habitats, where a higher density of prey is found around fertile riparian soils. A large portion of its diet consists of arboreal mammals but can adapt to ground dwelling species where the habitat cannot sustain preferred prey. Requires very large permanent territories in most habitats due to sparse prey densities. | | | |
| *Falco subniger* | Black Falcon | V | - | The Black Falcon is widely, but sparsely, distributed in New South Wales, mostly occurring in inland regions. Tree lined watercourses and isolated woodlands in arid and semi-arid areas are preferred nesting and roosting habitat. Large old trees are a resource that is critical for nesting and hunting. | Bionet (3) | Possible - Records of this species exist within the locality, however only marginally suitable foraging habitat occurs within the study area. | Low – No important habitat resources for this species will be impacted by the Proposal. |
| *Melithreptus gularis gularis* | Black-chinned Honeyeater | V | - | The Black-chinned Honeyeater is widespread throughout NSW, with records from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. It is rarely recorded east of the Great Dividing Range, although regularly observed from the Richmond and Clarence River areas. The Black-chinned Honeyeater occupies open woodland habitats and open forests of smooth gums, stringybarks, ironbarks and Casuarinas and Melaleucas. They require large foraging territories of woodland patches at least 5 hectares large. | Bionet (2) | Unlikely - Records of this species exist within the locality, however no suitable habitat occurs within the study area. | Low – No habitat resources for this species will be impacted by the Proposal. |
| *Neophema chrysostoma* | Blue-winged Parrot | - | V | Blue-winged Parrots breed on mainland Australia south of the Great Dividing Range | PMST | Unlikely – No records of this species exist within | Low – No important habitat resources for this |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
|---|---|---|---|---|---|---|---|
| | | | | in Victoria, South Australia and Tasmania. During the non-breeding period, from autumn to early spring, birds are recorded in western New South Wales and sometimes south-eastern NSW, particularly on the southern migration. Birds inhabit a range of habitats from coastal, sub-coastal and inland areas through to semi-arid zones. They tend to favour grasslands and grassy woodlands and are often found near wetlands. Can also be found in altered environments such as airfields, golf-courses and paddocks. Forage mainly near or on the ground for seeds of a wide range of native and introduced grasses, herbs and shrubs. Nests are made in hollows, preferably with a vertical opening, in live or dead trees or stumps, in eucalypt forests and woodlands within the breeding range. | | the locality, and no suitable habitat occurs within the study area. | species will be impacted by the Proposal. |
| *Climacteris picumnus victoriae* | Brown Treecreeper (eastern sub-species) | V | - | The eastern subspecies of Brown Treecreeper lives in eastern NSW in eucalypt woodlands through central NSW and in coastal areas with drier open woodlands such as the Snowy River Valley, Cumberland Plains, Hunter Valley and parts of the Richmond and Clarence Valleys with its western boundary of the range running approximately through Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell. This species territory is in open woodland habitats (including Box-Gum Woodland), prefering woodlands dominated by stringybarks and rough barked eucalypts with a grassy understory. It requires tree | Bionet (1), PMST | Unlikely - Records of this species exist within the locality, however no suitable habitat occurs within the study area. | Low – No important habitat resources for this species will be impacted by the Proposal. |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
|---|---|---|---|---|---|---|---|
| | | | | hollows in live and dead trees or stumps for nesting. | | | |
| *Calidris ferruginea* | Curlew Sandpiper | E | CE - Mi, C,J,R | Mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. Inland records are probably mainly of birds pausing for a few days during migration. | Bionet (4), PMST | Possible - Records of this species exist within the locality, however only marginally suitable foraging habitat occurs within the study area. | Low – Species is unlikely to be impacted by the minor loss of low quality predominantly aquatic fringing vegetation given the wide availability of alternant resources for the species in the locality |
| *Stagonopleura guttata* | Diamond firetail | V | - | The Diamond Firetail tends to occur in proximity to watercourses building small dome nests in shrubs and dense foliage. It is found within Box-Gum Woodlands, Snow Gum Woodlands, open forests, mallee, Natural Temperate Grassland and in secondary grasslands derived from other communities. This species forages on grasses, forbs and insects along the ground. Nests are globular structures built either in the shrubby understorey, or higher up, especially under hawk's or raven's nests. (DPE 2022) | Bionet (4), PMST | Possible - Records of this species exist within the locality, however only marginally suitable foraging habitat occurs within the study area. | Low – No important habitat resources for this species will be impacted by the Proposal. |
| *Artamus cyanopterus cyanopterus* | Dusky Woodswallow | V | - | Dry, open eucalypt forests and woodland are the preferred habitat. Mallee associations with a sparse understorey of eucalypt saplings, acacias and other shrubs and ground cover of grasses or sedges and | Bionet (18) | Possible - Records of this species exist within the locality, however only marginally suitable | Low – No important habitat resources for this species will be impacted by the Proposal. |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
|---|---|---|---|---|---|---|---|
| | | | | woody debris are also inhabited. Farmland, particularly forest or woodland edges are also inhabited and very occasionally, moist forest or rainforest. This species feeds on insects foraged aerially or from the ground or canopy, and also feeds on flower nectar. The nest is a loose bowl of grass, twigs and roots which is lined with finer grass and typically placed 1-10m above ground level in a tree fork, however also behind bark or in stump hollows about. The Dusky Woodswallow feeds on insects taken on the wing, as well as from foliage and on the ground. It also eats nectar from flowers. | | foraging habitat occurs within the study area. | |
| *Numenius madagascariensis* | Eastern Curlew | - | CE - Mi, C,J,R | The Eastern Curlew is found on intertidal mudflats and sandflats, often with beds of seagrass, on sheltered coasts, especially estuaries, mangrove swamps, bays, harbours, lagoons and occasionally on wooden oyster leases or other similar structures. It is rarely found inland. The Eastern Curlew occurs only in our flyway, and about 75 per cent of the world's curlews winter in Australia. | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – Species is unlikely to be impacted by the minor loss of low quality predominantly aquatic fringing vegetation given the wide availability of alternant resources for the species in the locality |
| *Petroica phoenicea* | Flame Robin | V | - | Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. Occasionally occurs in temperate rainforest, and also in herbfields, heathlands, shrublands and sedgelands at high altitudes. In winter, birds migrate to drier more open habitats in the lowlands (i.e. | Bionet (1) | Possible - Records of this species exist within the locality, however only marginally suitable foraging habitat occurs within the study area. | Low – No important habitat resources for this species will be impacted by the Proposal. |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
|---|---|---|---|---|---|---|---|
| | | | | valleys below the ranges, and to the western slopes and plains). Nests are often near the ground and are built in sheltered sites, such as shallow cavities in trees, stumps or banks. | | | |
| *Callocephalon fimbriatum* | Gang-gang Cockatoo | V | E | This species is nomadic, spending summer in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests and winter at lower altitudes in drier more open eucalypt forest and woodlands, particularly in coastal areas. This species nests in hollow-bearing trees close to water with breeding taking place between October and January. Favours old growth forest and woodland attributes with dense understoreys, for nesting and roosting. Nests are located in hollows that are 10 cm in diameter or larger and at least 9 m above the ground in eucalypts. | Bionet (7), PMST | Possible - Records of this species exist within the locality, however only marginally suitable foraging habitat occurs within the study area. | Low – No important habitat resources for this species will be impacted by the Proposal. |
| *Falco hypoleucos* | Grey Falcon | V | - | Restricted to shrubland, grassland and wooded watercourses and sometimes near wetlands where surface water attracts prey. Occasionally found in open woodlands near the coast. Nests are constructed in high living eucalypts near a watercourse. Likely to be extinct in areas with higher than 500mm annual rainfall. | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – No important habitat for this species will be impacted by the Proposal. |
| *Melanodryas cucullata cucullata* | Hooded Robin (south-eastern form) | V | - | The Hooded Robin is considered a sedentary species, but local seasonal movements are possible. Prefers lightly wooded country, usually open eucalypt woodland, wattle scrub and mallee, often in or near clearings or open areas. The species requires | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – No important habitat for this species will be impacted by the Proposal. |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
|---|---|---|---|---|---|---|---|
| | | | | structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. Territories range from around 10 ha during the breeding season, to 30 ha in the non-breeding season. | | | |
| *Hieraaetus morphnoides* | Little Eagle | V | - | The Little Eagle occupies habitats rich in prey within open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used. For nest sites it requires a tall living tree within a remnant patch, where pairs build a large stick nest in winter and lay in early spring. | Bionet (4) | Possible - Records of this species exist within the locality, however only marginally suitable foraging habitat occurs within the study area. | Low – No important habitat resources for this species will be impacted by the Proposal. |
| *Anseranas semipalmata* | Magpie Goose | V | - | The Magpie Goose prefers shallow wetlands (less than 1 metre deep) with dense rushes and sedges. It forages on grasses, bulbs and rhizomes often seen in paddocks. It occurs on the floodplains of rivers with breeding occurring both during winter or summer dependent on rainfall, however breeding is unlikely in south-eastern NSW. | Bionet (1) | Possible - Records of this species exist within the locality, however only marginally suitable foraging habitat occurs within the study area. | Low – Species is unlikely to be impacted by the minor loss of low quality predominantly aquatic fringing vegetation given the wide availability of alternant resources for the species in the locality. |
| *Leipoa ocellata* | Malleefowl | E | V | Historically found widely throughout Australia, Malleefowl are now mostly limited to areas of inland semi-arid scrub. It requires light sandy loam soils with a diverse shrub and understory. They prefer a dry environment with low-growing eucalypt trees and shrubs, referred to as mallee country. Feeds mostly on ants and the seeds of wattle and senna plants. | PMST | Nil – No records or suitable habitat occur within t the study area. | Nil – No impacts will occur to this species or its habitat. |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
|---|---|---|---|---|---|---|---|
| *Grantiella picta* | Painted Honeyeater | V | V | A nomadic species inhabiting Boree/ Weeping Myall (Acacia pendula), Brigalow (A. harpophylla) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus Amyema. Insects and nectar from mistletoe or eucalypts are occasionally eaten. Nest from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches. | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – No important habitat for this species will be impacted by the Proposal. |
| *Pycnoptilus floccosus* | Pilotbird | - | V | The Pilotbird is found in wet forested areas and heathland in eastern Victoria and southeastern New South Wales. It forages on the ground, turning over leaf litter using strong legs. | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – No important habitat for this species will be impacted by the Proposal. |
| *Anthochaera phrygia* | Regent Honeyeater | CE | CE | The Regent Honeyeater is a migratory woodland bird moving across the landscape in response to climatic conditions and food availability. This species prefers Box-Ironbark woodland and riparian forests particularly habitats with mature trees, high canopy cover and abundance of mistletoes. Nonbreeding flocks occasionally seen in coastal areas foraging in flowering Spotted Gum and Swamp Mahogany forests, presumably in response to drought. The species breeds between July and January in Box-Ironbark and other temperate woodlands and riparian gallery forest | Bionet (9), PMST | Unlikely – High levels of anthropogenic disturbance and no suitable habitat occurs within the study area. | Low – No important habitat for this species will be impacted by the Proposal. |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
|---|---|---|---|---|---|---|---|
| | | | | dominated by River Sheoak. Regent Honeyeaters usually nest in horizontal branches or forks in tall mature eucalypts and Sheoaks. Also nest in mistletoe haustoria. An open cup-shaped nest is constructed of bark, grass, twigs and wool by the female. | | | |
| *Petroica boodang* | Scarlet Robin | V | - | In NSW, this species occupies open forests and woodlands from the coast to the inland slopes. It breeds in drier eucalypt forests and temperate woodlands, often on ridges and slopes, within an open understorey of shrubs and grasses and sometimes in open areas. Abundant logs and coarse woody debris are important structural components of its habitat. In autumn and winter it migrates to more open habitats such as grassy open woodland or paddocks with scattered trees. | Bionet (1) | Possible - Records of this species exist within the locality, however only marginally suitable foraging habitat occurs within the study area. | Low – No important habitat resources for this species will be impacted by the Proposal. |
| *Calyptorhynchus lathami lathami* | South-eastern Glossy Black-Cockatoo | V | V | This species predominantly nests in eucalypts and feeds on casuarinas. It nests in both living and dead trees. Glossy Black Cockatoos prefer to live in untouched, rugged country, especially that containing Brigalow scrub or rocky hilly country. Other habitat includes where she-oaks are common, coastal woodlands and drier forest areas as well as timbered watercourses. The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – No habitat for this species will be impacted by the Proposal. |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
|---|---|---|---|---|---|---|---|
| | | | | plains of NSW, with a small population in the Riverina. | | | |
| *Aphelocephala leucopsis* | Southern Whiteface | - | V | Southern Whiteface occur across most of mainland Australia south of the tropics, from the northeastern edge of the Western Australian wheatbelt, east to the Great Dividing Range within NSW. Southern whitefaces live in a wide range of open woodlands and shrublands where there is an understorey of grasses or shrubs. Breeding takes place from July to October throughout most of the species' range, however, the timing of breeding can be affected by rainfall in arid regions. Southern whiteface forage almost exclusively on the ground, favouring habitat with low tree densities and an herbaceous understorey litter cover. Birds mainly feed on insects, spiders, and seeds, largely gleaned from the bare ground or leaf litter. (DCCEEW 2023) | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – No important habitat for this species will be impacted by the Proposal. |
| *Chthonicola sagittata* | Speckled Warbler | V | - | The Speckled Warbler occupies open Eucalypt woodlands with a grassy understory and often rocky outcrops. Relatively large undisturbed areas are required to sustain this species in an area. The Speckled Warbler lives in a wide range of Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. The diet consists of | Bionet (4) | Unlikely – High levels of anthropogenic disturbance and no suitable habitat occurs within the study area. | Low – No habitat for this species will be impacted by the Proposal. |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
|---|---|---|---|---|---|---|---|
| | | | | seeds and insects, with most foraging taking place on the ground around tussocks and under bushes and trees. Pairs are sedentary and occupy a breeding territory of about ten hectares, with a slightly larger home-range when not breeding. The rounded, domed, roughly built nest of dry grass and strips of bark is located in a slight hollow in the ground or the base of a low dense plant, often among fallen branches and other litter. A side entrance allows the bird to walk directly inside. A clutch of 3-4 eggs is laid, between August and January, and both parents feed the nestlings. | | | |
| *Circus assimilis* | Spotted Harrier | V | - | Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. Found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands on terrestrial mammals (eg bandicoots, bettongs, and rodents), birds and reptiles. They build a stick nest in a tree and lays eggs in spring (or sometimes autumn), with young remaining in the nest for several months. | Bionet (2) | Possible - Records of this species exist within the locality, however only marginally suitable foraging habitat occurs within the study area. | Low – No important habitat resources for this species will be impacted by the Proposal. |
| *Polytelis swainsonii* | Superb Parrot | V | V | Found to forage in grassy box woodland up to 10km from the nesting site. They typically nest in colonies and return to the same location over generations. During the summer they return from wintering in northern NSW to breed, often in open box- | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – No important habitat for this species will be impacted by the Proposal. |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
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| | | | | woodland or isolated paddock trees requiring tree hollows to breed. | | | |
| *Lathamus discolor* | Swift Parrot | E | CE | In NSW, the Swift Parrot mostly occurs mostly on the coast and south west slopes. It breeds in Tasmania and returns to the south-eastern mainland to forage over the cooler months (March – October). They move across the landscape to forage on lerp infestations or an abundance of eucalypt flowers. Preferred feed trees include Eucalyptus robusta, Corymbia maculata, C. gummifera, E. sideroxylon and E. albens. | Bionet (1), PMST | Unlikely – One historic record of this species occur within the locality however no suitable habitat occurs within the study area. | Low – No habitat for this species will be impacted by the Proposal. |
| *Daphoenositta chrysoptera* | Varied Sitella | V | - | The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands, with a nearly continuous distribution in NSW from the coast to the far west.It prefers open Eucalypt and Acacia woodlands with Stringybark Eucalypts from which to glean insects. They are territorial preferring to use the same tree fork to construct nests for breeding. | Bionet (4) | Unlikely – Records of this species occur within the locality associated with prime woodland habitat outside the study area. No suitable habitat occurs within the study area. | Low – No habitat for this species will be impacted by the Proposal. |
| *Epthianura albifrons* | White-fronted Chat | V | - | Found across the southern half of Australia in mostly temperate to arid climates and rarely sub-tropical areas. It occupies foothills and lowlands up to 1000m above sea level, mostly in damp open habitats along the coast and near waterways. The species can be seen foraging on bare or grassy ground in wetland areas for insects. This species has been observed breeding from late July | Bionet (1) | Unlikely – One historic record of this species occur within the locality however no suitable habitat occurs within the study area. | Low – No important habitat for this species will be impacted by the Proposal. |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
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| | | | | through to early March, with 'open-cup' nests built in low vegetation. | | | |
| *Hirundapus caudacutus* | White-throated Needletail | - | V - Mi, C,J,R | In eastern Australia, the species is recorded in all coastal regions of Queensland and NSW, extending inland to the western slopes of the Great Dividing Range and occasionally onto the adjacent inland plains. This species is mostly aerial. Although they occur over most types of habitat, they are recorded most often above wooded areas, including open forest and rainforest, and may also fly below the canopy between trees or in clearings. This species forages aerially and opportunistically in many environments. The species has been recorded roosting in trees in forests and woodlands, both among dense foliage in the canopy or in hollows and it has been suggested that they also sometimes roost aerially. The species breeds in Asia in wooded lowlands and sparsely vegetated hills, as well as mountains covered with coniferous forests. White-throated Needletails take refuge in a range of shelter types during extreme conditions including the potential to roost in tree hollows. | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – No important habitat for this species will be impacted by the Proposal. |
| ***Fish*** | | | | | | | |
| *Macquaria australasica* | Macquarie Perch | E | E | This species of freshwater fish inhabits river and lake habitats, especially the upper reaches of rivers and their tributaries. Spawning occurs in spring and summer in shallow upland streams or flowing sections of river systems. This species is found in the | PMST | Nil – No records for this species exist within the locality and the study area is not within the species known distribution. | Low – The species does not occur within the study area, and no habitat will be impacted by the Proposal. Additionally, the Proposal includes establishment of |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
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| | | | | upper reaches of the Lachlan, Murrumbidgee and Murray Rivers, and in parts of the Hawkesbury and Shoalhaven catchment areas. The species requires clear water with deep, rocky holes with abundant cover (including aquatic vegetation, woody debris, large boulders and overhanging banks (DotE 2016c; DPI 2016b). | | | appropriate erosion and sediment controls whilst repairs to a waterway crossing within a damaged section of the Kelloshiel Creek waterway occur. Some minor sedimentation may occur, however the likelihood of this Proposal impacting this species is low given the condition of the existing environment, distance to Wambul Macquarie River, and no historical records occurring within the locality. |
| *Maccullochella peelii* | Murray Cod | - | V | The Murray Cod occurs throughout the Murray-Darling Basin and utilises a diverse range of habitats from clear rocky streams, such as those found in the upper western slopes of NSW, and slow-flowing lowland rivers. Generally, they are found in waters up to 5 m deep and in sheltered areas with cover from rocks, timber or overhanging banks. The presence of wood debris has been shown to be the primary factor determining Murray cod presence. | PMST | Nil – No records for this species exist within the locality and the study area is not within the species known distribution. | Low – The species does not occur within the study area, and no habitat will be impacted by the Proposal. Additionally, the Proposal includes establishment of appropriate erosion and sediment controls whilst repairs to a waterway crossing within a damaged section of the Kelloshiel Creek waterway occur. Some minor sedimentation may occur, however the likelihood of this Proposal impacting this species is low given the condition of |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
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| | | | | | | | the existing environment, distance to Wambul Macquarie River, and no historical records occurring within the locality. |
| *Bidyanus bidyanus* | Silver Perch | V | CE | The Silver Perch has disappeared from most of its former range. It currently persists predominantly within a population along the central Murray River downstream of Yarrawonga weir as well as within anabranches and tributaries. They occur within lowland often turbid, slow-flowing rivers in similar habitats to the Murray Cod. | PMST | Nil – No records for this species exist within the locality and the study area is not within the species known distribution. | Low – The species does not occur within the study area, and no habitat will be impacted by the Proposal. Additionally, the Proposal includes establishment of appropriate erosion and sediment controls whilst repairs to a waterway crossing within a damaged section of the Kelloshiel Creek waterway occur. Some minor sedimentation may occur, however the likelihood of this Proposal impacting this species is low given the condition of the existing environment, distance to Wambul Macquarie River, and no historical records occurring within the locality. |
| *Maccullochella macquariensis* | Trout Cod | E | E | The Trout Cod is endemic to the Murray Darling River system. The closest record occurs from the Wambul Macquarie River dating from 2006. This species requires deep water habitat with plenty of cover and | PMST | Nil – No records for this species exist within the locality and the study area is not within the | Low – The species does not occur within the study area, and no habitat will be impacted by the Proposal. Additionally, the Proposal |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
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| | | | | refuge including undercut banks, snags (large woody debris) and prefer waterways with relatively fast currents. They typically have small home ranges and remain in the same area. | | species known distribution. | includes establishment of appropriate erosion and sediment controls whilst repairs to a waterway crossing within a damaged section of the Kelloshiel Creek waterway occur. Some minor sedimentation may occur, however the likelihood of this Proposal impacting this species is low given the condition of the existing environment, distance to Wambul Macquarie River, and no historical records occurring within the locality. |
| ***Flora*** | | | | | | | |
| *Bossiaea fragrans* | - | CE | CE | Currently only known from the Abercrombie Karst Conservation Reserve and within the adjacent Travelling Stock Reserve, south of Bathurst on the NSW central tablelands. It has a highly restricted distribution, with only a small number of discreet known sub-populations. Occurs on spilite, rhyolite or slate and volcanic substrates and is often associated with Red Stringybark (Eucalyptus macrorhyncha) - Red Box (Eucalyptus polyanthemos) woodland with or without White Box (Eucalyptus albens). | Bionet (1) | Unlikely – Records of this species occur within the locality however no suitable habitat occurs within the study area. | Low – Species unlikely to occur in the subject site due to significant degradation of the understory and dominance of exotic species. No habitat would be impacted |
| *Caladenia attenuata* | Duramana Fingers | CE | CE | Caladenia attenuata is endemic to NSW. It has a highly restricted distribution, having | PMST | Unlikely – No records of this species occur within | Low – Species unlikely to occur in the subject site |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
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| | | | | been recorded from 2 localities within the Bathurst Ilford region with an area of occupance estimated to be 8 square kilometres. Recent surveys have only found an unconfirmed specimen from the Ilford site. (Sourced from NSW Office of Environment and Heritage - Species Profile - 2022) | | the locality and no suitable habitat occurs within the study area. | due to significant degradation of the understory and dominance of exotic species. No habitat would be impacted |
| *Dichanthium setosum* | Bluegrass | V | V | Dichanthium setosum occurs in heavy soils (predominantly cracking clays or alluvium, often in gilgai) in woodland or open woodland usually dominated by Acacia (brigalow) and/or Eucalyptus species. Occurs on the New England Tablelands, North West Slopes and Plains and the Central Western Slopes of NSW, extending to northern Queensland. It occurs widely on private property, including in the Inverell, Guyra, Armidale and Glen Innes areas. Flowering time is mostly in summer. Associated with heavy basaltic black soils and red-brown loams with clay subsoil. Often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture. (Often collected from disturbed open grassy woodlands on the northern tablelands, where the habitat has been variously grazed, nutrient-enriched and water-enriched). Associated species include Eucalyptus albens, Eucalyptus melanophloia, Eucalyptus melliodora, Eucalyptus viminalis. (DPE 2022) | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – Species unlikely to occur in the subject site due to significant degradation of the understory and dominance of exotic species. No habitat would be impacted |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
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| *Eucalyptus aggregata* | Black Gum | V | V | This species grows in grassy woodlands on alluvial soils in moist sites along creeks on broad, cold and poorly-drained flats and hollows. It commonly occurs with Eucalyptus ovata, E. pauciflora, E. rubida, E. stellulata and E. viminalis with a grassy understorey of River Tussock. It occurs on the central and southern tablelands of NSW, and in a small disjunct population in Victoria. In NSW, it occurs predominantly in the South Eastern Highlands Bioregion, with the most eastern part of the distribution located just within the Sydney Basin Bioregion. | Bionet (1) | Unlikely – Records of this species occur within the locality however species was not recorded within study area | Low – Species not recorded and would not be impacted |
| *Eucalyptus pulverulenta* | Silver-leafed Gum | V | V | The Silver-leafed Gum grows in shallow soils as an understorey plant in open forest, typically dominated by Brittle Gum (Eucalyptus mannifera), Red Stringybark (E. macrorhynca), Broad-leafed Peppermint (E. dives), Silvertop Ash (E. sieberi) and Apple Box (E. bridgesiana). Sometimes planted as street trees or ornamental (in private gardens), this species is found in two quite separate areas, the Lithgow to Bathurst area and the Monaro (Bredbo to Bombala). | Bionet (2), PMST | Unlikely – Records of this species occur within the locality however species was not recorded within study area | Low – Species not recorded and would not be impacted |
| *Euphrasia arguta* | - | CE | CE | Euphrasia arguta is restricted to the Nundle State Forest but historically has been recorded along the plains and woodlands of Bathurst. Known populations occur in eucalypt forest with a mixed grass/shrub understorey, while previous records are described as occurring in open forest, grassy country and river meadows. Annual and dies | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – Species unlikely to occur in the subject site due to significant degradation of the understory and dominance of exotic species. No habitat would be impacted |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
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| | | | | back over winter. Dense stands observed in cleared firebreak areas, suggesting it may respond well to disturbance. | | | |
| *Euphrasia scabra* | Rough Eyebright | E | - | Rough Eyebright is a parasitic plant however does not appear to be host specific. It prefers swampy grasslands and sphagnum bogs in wet, peaty soils. There are three extant populations in NSW: Bondi State Forest, South East Forests National Park and near Nunnock Swamp. This species does not tolerate grazing and weed infestation pressures well. | Bionet (1) | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – Species unlikely to occur in the subject site due to significant degradation of the understory and dominance of exotic species. No habitat would be impacted |
| *Grevillea divaricata* | - | E | - | Known only from the type collection made in 1823 by Allan Cunningham, from "north of Bathurst". Specimen notes describe the plant as occurring frequently in dry open forest lands and as possibly growing on rocky river margins. Flowers recorded in April, but the species probably also flowers in the spring months. | Bionet (1) | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – Species unlikely to occur in the subject site due to significant degradation of the understory and dominance of exotic species. No habitat would be impacted |
| *Lepidium aschersonii* | Spiny Pepper-cress | V | V | "Not widespread, occurring in the marginal central-western slopes and north-western plains regions of NSW (and potentially the south western plains). In the north of the State recent surveys have recorded a number of new sites including Brigalow Nature Reserve, Brigalow State Conservation Area, Leard State Conservation Area and Bobbiwaa State Conservation Area. Also known from the West Wyalong in the south of the State. Records from Barmedman and Temora areas are likely to be no longer | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – Species unlikely to occur in the subject site due to significant degradation of the understory and dominance of exotic species. No habitat would be impacted |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
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| | | | | present. Approximately 50% of the total Lepidium aschersonii recorded for Australia occurs in NSW. Found on ridges of gilgai clays dominated by Brigalow (Acacia harpophylla), Belah (Casuarina cristata), Buloke (Allocasuarina luehmanii) and Grey Box (Eucalyptus microcarpa). In the south has been recorded growing in Bull Mallee (Eucalyptus behriana). Often the understorey is dominated by introduced plants. The species grows as a a component of the ground flora, in grey loamy clays. Vegetation structure varies from open to dense, with sparse grassy understorey and occasional heavy litter. Flowers from spring to autumn." | | | |
| *Lepidium hyssopifolium* | Aromatic Peppercress | E | E | A population of Aromatic Peppercress is known to occur on private property within the Bathurst area. This species tends to germinate following disturbance when open areas of bare ground provide suitable access to light without the competition from other species. It has been found within grassy Eucalypt woodlands, low open Casuarina woodlands as well as weed infested areas with high degradation and soil disturbance i.e. road and rail corridors. | Bionet (2), PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – Species unlikely to occur in the subject site due to significant degradation of the understory and dominance of exotic species. No habitat would be impacted |
| *Leucochrysum albicans var. tricolor* | Hoary Sunray | E | E | The Hoary Sunray occurs in a wide variety of grassland, woodland and forest habitats, generally on relatively heavy soils, often on roadsides. It requires bare ground and disturbance for germination. In NSW it | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – Species unlikely to occur in the subject site due to significant degradation of the understory and dominance |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
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| | | | | currently occurs on the Southern Tablelands adjacent areas in an area roughly bounded by Albury, Bega and Goulburn, with a few scattered localities know from beyond this region. | | | of exotic species. No habitat would be impacted |
| *Ozothamnus tesselatus* | - | V | V | Restricted to a few locations in an east-west zone south of Bunnan and between west Bylong and east Ravensworth. Grows in eucalypt woodland.(DPE 2022) | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – Species unlikely to occur in the subject site due to significant degradation of the understory and dominance of exotic species. No habitat would be impacted |
| *Persoonia marginata* | Clandulla Geebung | V | V | Occurs in the western blue mountains. Populations are largely disjunct and include Clandulla, Ben Bullen and Sunny Corner State Forests; isolated populations have also been recorded from Turon and Gardens of Stone National Parks. Grows on sandstone in woodland communities and dry sclerophyll forest. | Bionet (1) | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – Species unlikely to occur in the subject site due to significant degradation of the understory and dominance of exotic species. No habitat would be impacted |
| *Swainsona recta* | Mountain Swainsona Pea | E | E | Small Purple-pea was recorded historically from places such as Carcoar, Culcairn and Wagga Wagga where it is probably now extinct. Populations still exist in the Queanbeyan and Wellington-Mudgee areas. Before European settlement Small Purple-pea occurred in the grassy understorey of woodlands and open-forests dominated by Blakely's Red Gum Eucalyptus blakelyi, Yellow Box E. melliodora, Candlebark Gum E. rubida and Long-leaf Box E. goniocalyx. Grows in association with understorey | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – Species unlikely to occur in the subject site due to significant degradation of the understory and dominance of exotic species. No habitat would be impacted |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
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| | | | | dominants that include Kangaroo Grass Themeda australis, poa tussocks Poa spp. and spear-grasses Austrostipa spp. | | | |
| *Swainsona sereicea* | Silky Swainson-pea | V | - | Silky Swainson-pea has been recorded from the Northern Tablelands to the Southern Tablelands and further inland on the slopes and plains. There is one isolated record from the far north-west of NSW. Its stronghold is on the Monaro. Also found in South Australia, Victoria and Queensland. Occuring in Natural Temperate Grassland and Snow Gum Eucalyptus pauciflora Woodland on the Monaro and also in Box-Gum Woodland in the Southern Tablelands and South West Slopes. Sometimes found in association with cypress-pines Callitris spp.. Regenerates from seed after fire. | Bionet (3) | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – Species unlikely to occur in the subject site due to significant degradation of the understory and dominance of exotic species. No habitat would be impacted |
| *Thesium australe* | Australe Toadflax | V | V | Austral Toad-flax is found in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands in grassland on coastal headlands or grassland and grassy woodland away from the coast. Australe Toadflax has been recorded from the Lithgow are to the east of Bathurst. This species does not tolerate high intensity grazing or dominant weeds such as Blackberry. It occurs along coastal headlands or grassy woodland habitats inland. It is a root parasite plant with a strong association with Kangaroo Grass (Themeda australis). | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – Species unlikely to occur in the subject site due to significant degradation of the understory and dominance of exotic species. No habitat would be impacted |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
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| *Zieria obcordata* | Granite Zieria | E | E | Occurs at two sites with a geographic range of 105 km. These are in the Wuuluman area near Wellington, comprising of a single subpopulation over 3 sites comprising up to 200 plants and Crackerjack Rock/Rock Forests area NW of Bathurst, with a subpopulation comprising of 14 sites, totaling to approximately 700 adults plants after good seasons. Grows in eucalypt woodland or shrubland dominated by species of Acacia on rocky hillsides. Also occurs in Eucalyptus and Callitris dominated woodland with an open, low shrub understorey, on moderately steep, mainly west to north-facing slopes in sandy loam amongst granite boulders. The altitude range of sites is 500 to 830 metres. Associated vegetation includes Eucalyptus sp., Brachychiton populneus, Callitris glaucophylla and Acacia sp.. Occuring in woodland with pockets of low shrub understorey consisting of Pandorea pandorana, Isotoma axillaris, Westringia eremicola, Leucopogon attenuatus, Dillwynia sericea, Olearia ramulosa, Stypandra glauca, Stellaria pungens, Acacia vestita, Melichrus urceolatus, Cryptandra amara, Lepidosperma, Styphelia, Kunzea, Haloragis and Cheilanthes species. Main flowering period is in spring (September-October). Zieria obcordata is extremely sensitive to grazing and browsing | Bionet (35), PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – Species unlikely to occur in the subject site due to significant degradation of the understory and dominance of exotic species. No habitat would be impacted |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
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| | | | | disturbances by domestic stock and native herbivores. | | | |
| ***Mammals*** | | | | | | | |
| *Petauroides volans* | Greater Glider | E | E | The Greater Glider has low mobility and a typically small home range (1 – 4ha). Found in tall eucalypt forests and woodlands this species is dependent on large tracts of undisturbed tall forest with suitably large nesting hollows.The species is solitary, with populations ranging from 0.6 to 2.8 individuals per hectare and are unlikely to disperse this patch. Modelling suggests at least 160 km2 of native forest patches is required to support a viable population. | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – No habitat for this species will be impacted by the Proposal. |
| *Pteropus poliocephalus* | Grey-headed Flying-fox | V | V | This species roosts in camps generally located within 20 km of a regular food source and are commonly found in gullies, close to water and in vegetation with a dense canopy. This species is known to forage in areas supporting subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps on the nectar and pollen of native trees, in particular eucalypts, Melaleucas and Banksias. This species will also forage in urban gardens and cultivated fruit crops. Typically found on the coastal plain and eastern slopes of NSW, only making regular movements to the western slopes in northern NSW. This species has complex migratory movements across local landscapes to source food across different | Bionet (40), PMST | Unlikely – Records of this species occur within the locality however no suitable habitat occurs within the study area. | Low – No habitat for this species will be impacted by the Proposal. |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
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| | | | | time of the year. The Grey-headed Flying-fox roosts in aggregations of various sizes on exposed branches. Roost sites are typically located near water, such as lakes, rivers or the coast. | | | |
| *Phascolarctos cinereus* | Koala | E | E | The Koala has a fragmented distribution throughout eastern Australia. It is limited to areas of preferred feed trees in eucalypt woodlands and forests. The size of their home range varies depending on the quality of habitat. Inhabit eucalypt woodlands and forests. The Koala feeds on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Inactive for most of the day, feeding and moving mostly at night. They spend most of their time in trees, but will descend and traverse open ground to move between trees. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size. Generally solitary, but have complex social hierarchies based on a dominant male with a territory overlapping several females and sub-ordinate males on the periphery. Females breed at two years of age and produce one young per year. | Bionet (28), PMST | Unlikely – Records of this species occur within the locality however no suitable habitat occurs within the study area. | Low – No habitat for this species will be impacted by the Proposal. |
| *Miniopterus orianae oceanensis* | Large Bent-winged Bat | V | - | Caves are the primary roosting habitat for this species, but they may also use mines, stormwater outlets or tunnels and other man-made infrastructure. Eastern Bentwing-bats occur along the east and north-west | Bionet (7), PMST | Unlikely – Records of this species occur within the locality however no suitable habitat occurs within the study area. | Low – No habitat for this species will be impacted by the Proposal. |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
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| | | | | coasts of Australia, hunting in forested areas, catching moths and other flying insects above the tree tops. | | | |
| *Chalinolobus dwyeri* | Large-eared Pied Bat | V | V | The Large-eared Pied Bat is distributed between south-eastern QLD to NSW from the coast to the western slopes of the divide. This species primarily roosts beneath cliff overhangs, within disused mine shafts and may use tree hollows. Only two maternity roosts are known to occur within NSW. This species requires a combination of sandstone cliff for roosting habitat adjacent to Box-Gum Woodland or riparian corridors to provide appropriate foraging grounds. | Bionet (1), PMST | Unlikely – Records of this species occur within the locality however no suitable habitat occurs within the study area. | Low – No habitat for this species will be impacted by the Proposal. |
| *Pseudomys novaehollandiae* | New Holland Mouse | - | V | The New Holland Mouse occurs in disjunct, coastal populations in South-east Australia from Tasmania to Queensland. In NSW it has been found in a variety of coastal habitats including heathland, woodland, dry sclerophyll forest with a dense shrub layer and vegetated sand dunes, though it has also recently been recorded from sites up to 100 km inland between 550 – 900 m asl. It is commonly referred to as a 'disturbance enhanced' or early successional species as populations have demonstrated the capacity to recolonise and increase in size in areas of regenerating native vegetation after wildfire, clearing and sandmining. The species' presence has been strongly correlated with the density of understorey | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – No habitat for this species will be impacted by the Proposal. |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
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| | | | | vegetation, and with a high floristic diversity in regenerating heath. | | | |
| *Dasyurus maculatus* | Spotted-tailed Quoll | V | E | The Spotted Tailed Quoll inhabits a range of environments in NSW including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Den subject sites are in hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces. Females occupy home ranges of up to 750 ha and males up to 3,500 ha, which are usually traversed along densely vegetated creek lines. | Bionet (8), PMST | Unlikely – Records of this species occur within the locality however no suitable habitat occurs within the study area. | Low – No habitat for this species will be impacted by the Proposal. |
| *Petaurus norfolcensis* | Squirrel Glider | V | - | This species of glider is widely though sparsely distributed throughout eastern Australia. In NSW it inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. This species prefers a diversity of food supplies including wattle, gum, eucalypt saplings, nectar, honeydew and manna, with invertebrates and pollen providing protein, and requires an abundant supply of tree-hollows for nesting and shelter. | Bionet (3) | Unlikely – Records of this species occur within the locality however no suitable habitat occurs within the study area. | Low – No habitat for this species will be impacted by the Proposal. |
| *Saccolaimus flaviventris* | Yellow-bellied Sheathtail Bat | V | - | The Yellow-bellied Sheathtail Bat is found throughout south-east Australia. It roosts in tree hollows and buildings and occasionally in mammal burrows where roost sites area scarce. When foraging for insects, flies high and fast over the forest canopy, but lower in | Bionet (12), PMST | Unlikely – Records of this species occur within the locality however no suitable habitat occurs within the study area. | Low – No habitat for this species will be impacted by the Proposal. |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
|---|---|---|---|---|---|---|---|
| | | | | more open country. Breeding has been recorded from December to mid-March, when a single young is born. | | | |
| ***Migratory*** | | | | | | | |
| *Monarcha melanopsis* | Black-faced Monarch | - | Mi | This species of bird usually inhabits dense gullies of rainforest, sclerophyll forests and eucalypt woodlands along the coastal regions from Victoria to Cape York and is migratory over much of its range. | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – No habitat for this species will be impacted by the Proposal. |
| *Actitis hypoleucos* | Common Sandpiper | - | Mi, C,J,R | In Australia, the Common Sandpiper is found in coastal or inland wetlands, both saline or fresh. It is found mainly on muddy edges or rocky shores. When in Australia, the population is concentrated in northern and western Australia . | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – No habitat for this species will be impacted by the Proposal. |
| *Calidris ferruginea* | Curlew Sandpiper | E | CE - Mi, C,J,R | Mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. Inland records are probably mainly of birds pausing for a few days during migration. | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – No habitat for this species will be impacted by the Proposal. |
| *Numenius madagascariensis* | Eastern Curlew | - | CE - Mi, C,J,R | The Eastern Curlew is found on intertidal mudflats and sandflats, often with beds of seagrass, on sheltered coasts, especially estuaries, mangrove swamps, bays, | PMST | Unlikely – No records of this species occur within the locality and no | Low – No habitat for this species will be impacted by the Proposal. |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
|---|---|---|---|---|---|---|---|
| | | | | harbours, lagoons and occasionally on wooden oyster leases or other similar structures. It is rarely found inland. The Eastern Curlew occurs only in our flyway, and about 75 per cent of the world's curlews winter in Australia. | | suitable habitat occurs within the study area. | |
| *Apus pacificus* | Fork-tailed Swift | - | Mi, C,J,R | In Australia, the Fork-tailed Swift mostly occurs over dry or open habitats, including inland plains, riparian woodland and tea-tree swamps, low scrub, heathland, saltmarsh and sometimes above foothills or in coastal areas spending most of their time in the air, or roosting on cliffs or walls. They also occur over settled areas, including towns, urban areas and cities. They are also found at treeless grassland and sandplains covered with spinifex, open farmland and inland and coastal sand-dunes. An aerial eater, flying anywhere from 1 m to 300 m above the ground to forage on insects including small bees, wasps, termites and moths. (DCCEEW 2022) | PMST | Unlikely – No records of this species occur within the locality and only very marginally suitable habitat occurs within the study area. | Low – No important habitat for this species will be impacted by the Proposal. |
| *Gallinago hardwickii* | Latham's Snipe | - | Mi, J,R | Latham's Snipe are seen in small groups or singly in freshwater wetlands on or near the coast, generally among dense cover. They are found in any vegetation around wetlands, in sedges, grasses, lignum, reeds and rushes and also in saltmarsh and creek edges on migration. They also use crops and pasture (DCCEEW 2022). | Bionet (4), PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – No habitat for this species will be impacted by the Proposal. |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
|---|---|---|---|---|---|---|---|
| *Calidris melanotos* | Pectoral Sandpiper | - | Mi, J,R | These birds forage on grasslands and mudflats, picking up food by sight, sometimes by probing. They mainly eat arthropods and other invertebrates. Some Asian breeders winter in southern Australia and NZ. | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – No habitat for this species will be impacted by the Proposal. |
| *Phaethon rubricauda* | Red-tailed Tropicbird | V | Mi, C,J | The Red-tailed Tropicbird is an exclusively marine species breeding predominantly on Lord Howe Island. This species would only occur near Bathurst as a vagrant potentially after severe storms. | Bionet (1) | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – No habitat for this species will be impacted by the Proposal. |
| *Rhipidura rufifrons* | Rufous Fantail | - | Mi | Found along NSW coast and ranges. Inhabits rainforest, dense wet forests, swamp woodlands and mangroves. During migration, it may be found in more open habitats or urban areas. | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – No habitat for this species will be impacted by the Proposal. |
| *Myiagra cyanoleuca* | Satin Flycatcher | - | Mi | In NSW widespread on and east of the Great Divide, sparsely scattered on the western slopes, very occasional records on the western plains. Inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, often near wetlands and watercourses. On migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests. Generally, not in rainforests. | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – No habitat for this species will be impacted by the Proposal. |
| *Calidris acuminata* | Sharp-tailed Sandpiper | - | Mi, C,J,R | The Sharp-tailed Sandpiper prefers the grassy edges of shallow inland freshwater wetlands. It is also found around sewage farms, flooded fields, mudflats, mangroves, rocky shores and beaches. Its breeding | Bionet (3), PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – No habitat for this species will be impacted by the Proposal. |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
|---|---|---|---|---|---|---|---|
| | | | | habitat in Siberia is the peat-hummock and lichen tundra of the high Arctic. | | | |
| *Hirundapus caudacutus* | White-throated Needletail | - | V - Mi, C,J,R | In eastern Australia, the species is recorded in all coastal regions of Queensland and NSW, extending inland to the western slopes of the Great Dividing Range and occasionally onto the adjacent inland plains. This species is mostly aerial. Although they occur over most types of habitat, they are recorded most often above wooded areas, including open forest and rainforest, and may also fly below the canopy between trees or in clearings. | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – No habitat for this species will be impacted by the Proposal. |
| *Motacilla flava* | Yellow Wagtail | - | Mi, C,J,R | The Yellow Wagtail is an extremely rare visitor to Australia and may be recorded as a vagrant on occasion. It prefers a range of damp or wet habitats with low vegetation, including damp meadows, pastures near water, and can even be found occupying sewage farms and bogs. It breeds from April to August, although this varies with latitude. The nest is a grass cup lined with hair and placed on or close to the ground in a shallow scrape. It feeds on a wide variety of terrestrial and aquatic invertebrates as well as some plant material, particularly seeds.(Birdlife.org 2022) | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – No habitat for this species will be impacted by the Proposal. |
| ***Reptiles*** | | | | | | | |
| Tympanocryptis mccartneyi | Bathurst Grassland | CE | - | Tympanocryptis mccartneyi is endemic and restricted to the grasslands and open country on the alluvial plains around | Bionet (2), PMST | Unlikely – Records of this species occur within the locality however no | Low – No habitat for this species will be impacted by the Proposal. |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
|---|---|---|---|---|---|---|---|
| | Earless Dragon | | | Bathurst NSW. The grasslands occur at altitudes up to approximately 1200 m and are naturally treeless or sparsely treed, with native tussock grasses being the dominant vegetation. Tympanocryptis mccartneyi is a grassland specialist, inhabiting treeless plains and open grasslands. The species has been found along railway tracks, with weedy Paspalum grass thickets, and in vacant paddocks with tall pasture grass (Melville et al. 2019). Within its habitat, apparently prefers areas with a more open structure, characterised by small patches of bare ground between the grasses and herbs. Little is known about habitat requirements of this species, but other species of grassland earless dragons have been discovered beneath rocks in either burrows, rock crevices or depressions. Burrows excavated by wolf spiders (Lycosidae sp.) associated with partially embedded surface rocks are of critical importance to T. mccartneyi. These burrows provide shelter sites for overwintering, refuge from trampling by livestock and predation and as locations where eggs can be laid. Fidelity to these burrows is known to increase with the onset of winter and the species is reported to be torpid in winter between May and September. Like the other grassland earless dragons, Tympanocryptis mccartneyi is likely to be a sit-and-wait predator, feeding mainly | | suitable habitat occurs within the study area. | |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
|---|---|---|---|---|---|---|---|
| | | | | on small invertebrates including ants, beetles, spiders and moths. (DPE 2023) | | | |
| *Aprasia parapulchella* | Pink-tailed Worm-lizard | V | V | Inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by Kangaroo Grass (Themeda australis). Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks. Commonly found beneath small, partially-embedded rocks and appear to spend considerable time in burrows below these rocks; the burrows have been constructed by and are often still inhabited by small black ants and termites. | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – No habitat for this species will be impacted by the Proposal. |
| *Delma impar* | Striped Legless Lizard | V | V | Occurs in the Southern Tablelands, the South West Slopes and possibly on the Riverina. Populations are known in the Goulburn, Yass, Queanbeyan, Cooma and Tumut areas. Also occurs in the ACT, Victoria and south-eastern South Australia. Mainly in Natural Temperate Grassland but has also been captured in grasslands that have a high exotic component. Sometimes found in modified grasslands with significant amounts of surface rocks. | PMST | Unlikely – No records of this species occur within the locality and no suitable habitat occurs within the study area. | Low – No habitat for this species will be impacted by the Proposal. |
| ***Threatened Ecological Community*** | | | | | | | |
| *Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia* | | - | EEC | Eucalyptus microcarpa (Inland Grey Box), is often found in association with E.populnea subsp. bimbil (Bimble or Poplar Box), Callitris glaucophylla (White Cypress Pine), Brachychiton populneus (Kurrajong), Allocasuarina luehmannii (Bulloak) or E. | PMST | Nil – This community was not recorded as occurring within the subject site. | Nil – This community will not be impacted by The Proposal. |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
|---|---|---|---|---|---|---|---|
| | | | | melliodora (Yellow Box), and sometimes with E. albens (White Box). Shrubs are typically sparse or absent, although this component can be diverse and may be locally common, especially in drier western portions of the community. A variable ground layer of grass and herbaceous species is present at most sites. At severely disturbed sites the ground layer may be absent. | | | |
| *Weeping Myall Woodlands* | | | E | Weeping Myall Woodlands occur in a range of forms from open woodlands to woodlands*, in which weeping myall (Acacia pendula) trees are the sole or dominant overstorey species. Although weeping myall trees are often the only tree species in these woodlands, other trees can occur in the overstorey of the ecological community. This community typically occurs in red-brown earths and heavy textured grey and brown alluvial soils in areas receiving between 375 and 500 mm mean annual rainfall. | PMST | Nil – This community was not recorded as occurring within the subject site. | Nil – This community will not be impacted by The Proposal. |
| *White Box-Yellow Box-Blakely's Red Gum Woodland and Derived Native Grassland* | | - | CE | White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland can occur as either grassland or woodland is characterised by a species diverse understory of grasses, herbs and sparse shrubs. Dominant canopy species include Eucalyptus albens, E. melliodora and E. blakelyi. This ecological community occurs in areas where rainfall is between 400 and 1200 mm per annum, on moderate to highly | PMST | Nil – This community was not recorded as occurring within the subject site. | Nil – This community will not be impacted by The Proposal. |

| *Scientific name* | Common name | BC Act | EPBC Act | Habitat | Record source | Likelihood of occurrence | Likelihood of impact |
|---|---|---|---|---|---|---|---|
| | | | | fertile soils at altitudes of 170 metres to 1200 metres | | | |

# Appendix E - Weather observation during survey period (Bureau of Meteorology)

## Bathurst Airport, New South Wales
## July 2023 Daily Weather Observations

Australian Government
Bureau of Meteorology

| Date | Day | Temps | | Rain | Evap | Sun | Max wind gust | | | 9am | | | | | | 3pm | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Min | Max | | | | Dirn | Spd | Time | Temp | RH | Cld | Dirn | Spd | MSLP | Temp | RH | Cld | Dirn | Spd | MSLP |
| | | °C | °C | mm | mm | hours | | km/h | local | °C | % | eighths | | km/h | hPa | °C | % | eighths | | km/h | hPa |
| 1 | Sa | 4.2 | 11.4 | 0.2 | | | WSW | 39 | 13:44 | 6.6 | 99 | 8 | WNW | 7 | 1024.2 | 9.6 | 67 | 5 | WSW | 24 | 1023.1 |
| 2 | Su | -1.7 | 13.5 | 0.2 | | | S | 26 | 00:33 | 2.1 | 99 | | E | 2 | 1032.3 | 13.1 | 51 | | WNW | 9 | 1030.0 |
| 3 | Mo | -0.8 | 13.8 | 0 | | | NE | 26 | 21:26 | 4.4 | 100 | 5 | NNE | 6 | 1033.0 | 13.1 | 63 | 8 | ENE | 11 | 1027.4 |
| 4 | Tu | 4.4 | 11.6 | 4.0 | | | N | 20 | 12:59 | 8.9 | 100 | 8 | | Calm | 1021.2 | 10.4 | 100 | 8 | N | 6 | 1015.7 |
| 5 | We | 8.8 | 12.9 | 11.2 | | | WNW | 24 | 10:58 | 10.7 | 100 | 8 | NW | 11 | 1015.6 | 11.8 | 99 | 6 | WSW | 17 | 1014.5 |
| 6 | Th | 3.0 | | 0.2 | | | | | | 5.2 | 100 | 8 | N | 2 | 1016.7 | 8.4 | 71 | | NW | 17 | 1012.3 |
| 7 | Fr | 2.9 | 9.4 | | | | NW | 39 | 00:47 | 6.9 | 96 | 7 | W | 20 | 1014.7 | 7.9 | 80 | 8 | W | 24 | 1015.2 |
| 8 | Sa | 2.5 | 12.5 | 0 | | | WNW | 56 | 19:20 | 6.7 | 71 | 8 | NW | 20 | 1019.3 | 10.1 | 64 | 8 | NW | 28 | 1015.1 |
| 9 | Su | 5.6 | 9.4 | 0.4 | | | W | 46 | 12:30 | 6.7 | 92 | | W | 24 | 1021.3 | 8.9 | 84 | 8 | W | 20 | 1021.3 |
| 10 | Mo | 5.6 | 11.4 | 0 | | | | | | 7.8 | 78 | 8 | SSW | 20 | 1025.6 | 9.1 | 75 | 8 | WSW | 19 | 1024.8 |
| 11 | Tu | 3.5 | 12.7 | | | | SSW | 37 | 11:20 | 6.4 | 79 | | SSE | 9 | 1029.0 | 11.8 | 63 | 4 | SW | 17 | 1027.4 |
| 12 | We | -3.4 | 15.6 | 0.4 | | | NW | 20 | 14:23 | -0.8 | 100 | 6 | W | 6 | 1032.1 | 15.1 | 44 | | NNW | 11 | 1028.8 |
| 13 | Th | -4.1 | 14.9 | 0 | | | N | 20 | 13:06 | -1.3 | 100 | 6 | WSW | 9 | 1031.9 | 14.2 | 51 | | N | 9 | 1028.2 |
| 14 | Fr | -3.0 | 16.5 | 0 | | | WNW | 35 | 13:36 | 2.1 | 100 | | | Calm | 1029.1 | 15.4 | 51 | 1 | NW | 24 | 1025.3 |
| 15 | Sa | 1.9 | 17.4 | 0.2 | | | NW | 43 | 12:51 | 9.8 | 88 | 8 | N | 7 | 1024.9 | 15.4 | 52 | 5 | NW | 24 | 1022.7 |
| 16 | Su | 7.8 | 13.6 | 0 | | | ENE | 19 | 21:53 | 8.9 | 100 | 8 | SE | 6 | 1029.5 | 12.8 | 76 | 8 | NW | 7 | 1028.7 |
| 17 | Mo | 0.3 | 16.5 | 0.8 | | | NNW | 22 | 14:54 | 4.1 | 100 | 8 | SW | 2 | 1032.0 | 15.8 | 59 | 8 | N | 17 | 1028.6 |
| 18 | Tu | 1.7 | 14.3 | 0.2 | | | SW | 28 | 21:04 | 6.0 | 100 | 8 | | Calm | 1026.7 | 13.2 | 73 | 2 | N | 17 | 1021.9 |
| 19 | We | 0.6 | 13.2 | 1.4 | | | WSW | 20 | 01:42 | 3.8 | 88 | | S | 7 | 1024.9 | 12.5 | 37 | | WSW | 4 | 1023.0 |
| 20 | Th | -5.5 | 13.6 | 0.2 | | | NNW | 28 | 12:51 | -1.5 | 94 | | | Calm | 1022.8 | 13.3 | 33 | | N | 13 | 1017.7 |
| 21 | Fr | -1.5 | 11.9 | 0.6 | | | W | 41 | 13:58 | 7.4 | 99 | 8 | NW | 4 | 1019.8 | 9.7 | 64 | 4 | SW | 19 | 1018.9 |
| 22 | Sa | -3.4 | 12.7 | 0 | | | WSW | 19 | 17:17 | -0.1 | 100 | 8 | SW | 4 | 1024.2 | 12.3 | 45 | | WNW | 7 | 1021.4 |
| 23 | Su | -4.4 | 14.0 | 0.2 | | | SE | 19 | 18:48 | 0.1 | 99 | | SSW | 6 | 1024.4 | 13.6 | 49 | | WSW | 6 | 1022.9 |
| 24 | Mo | -2.0 | 15.1 | 0 | | | SW | 24 | 16:15 | 3.5 | 99 | | | Calm | 1030.2 | 14.6 | 47 | 1 | NW | 4 | 1029.5 |
| 25 | Tu | -2.4 | 16.1 | 0.2 | | | W | 13 | 13:28 | 2.4 | 99 | | | Calm | 1037.3 | 15.1 | 40 | | | Calm | 1035.5 |
| 26 | We | -3.0 | 16.1 | 0 | | | W | 20 | 13:24 | 1.3 | 100 | 8 | | Calm | 1038.4 | 14.9 | 49 | | NNW | 4 | 1033.7 |
| 27 | Th | -2.7 | 16.2 | 0.2 | | | N | 28 | 14:08 | 0.7 | 99 | | WSW | 6 | 1034.0 | 15.4 | 50 | | NNW | 13 | 1028.8 |
| 28 | Fr | -0.7 | | 0 | | | | | | 8.1 | 92 | 8 | N | 9 | 1026.7 | 14.0 | 58 | 8 | W | 15 | 1024.1 |
| Statistics for the first 28 days of July 2023 | | | | | | | | | | | | | | | | | | | | | |
| Mean | | 0.5 | 13.7 | | | | | | | 4.5 | 95 | 7 | | 6 | 1026.5 | 12.6 | 60 | 5 | | 13 | 1023.8 |
| Lowest | | -5.5 | 9.4 | | | | | | | -1.5 | 71 | 5 | | Calm | 1014.7 | 7.9 | 33 | 1 | | Calm | 1012.3 |
| Highest | | 8.8 | 17.4 | 11.2 | | | WNW | 56 | | 10.7 | 100 | 8 | W | 24 | 1038.4 | 15.8 | 100 | 8 | NW | 28 | 1035.5 |
| Total | | | | 20.6 | | | | | | | | | | | | | | | | | |

Observations were drawn from Bathurst Airport AWS (station 063291)
Some cloud observations are from automated equipment; these are somewhat different to those made by a human observer and may not appear every day.

IDCJDW2166.202307 Prepared at 05:36 UTC on 28 Jul 2023

# Appendix C Aboriginal Due Diligence Assessment

FREEMANTLE ROAD, EGLINTON, NSW

# ABORIGINAL DUE DILIGENCE ASSESSMENT

Report to The Environmental Factor
on behalf of Bathurst Regional Council

Bathurst LGA

August 2023

APEX ARCHAEOLOGY

PO Box 236, Nowra, NSW 2541 | heritage@apexarchaeology.com.au | www.apexarchaeology.com.au

ABN 56 625 618 993

# Executive Summary

Apex Archaeology has been engaged by The Environmental Factor (TEF) on behalf of Bathurst Regional Council to prepare an Aboriginal due diligence assessment to support a Review of Environmental Factors (REF) for the proposed repair of a short section of Freemantle Road in Eglinton, just north of Bathurst, NSW.

This report has been produced with reference to the DECCW 2010 Due Diligence *Code of Practice for the Protection of Aboriginal Objects in New South Wales* (the Due Diligence Code of Practice).

The study area is located within the suburb of Eglinton, located approximately 7km north west of the centre of Bathurst, NSW. It is located within the Bathurst Local Government Area (LGA).

A site visit was conducted in July 2023. The proposed repair site was inspected via pedestrian survey. No newly identified archaeological material was identified during the survey. No raw material sources were identified on the ground surface.

Ground surface visibility (GSV) was low throughout the study area. GSV was rated at 15% overall due to the grass cover and weeds along the road verge.

The site is located within an existing disturbed road corridor with significant site disturbance due to the failed culverts from severe storm water/flood events and previous road/culvert construction. No areas of Potential Archaeological Deposit (PAD) remain or are likely to be impacted by the remediation activities.

It is recommended that:

- No further Aboriginal archaeological assessment is required prior to the commencement of works as described in this report. No Aboriginal Heritage Impact Permit (AHIP) is required to permit the works to proceed.
- This due diligence assessment must be kept by Bathurst Regional Council so that it can be presented, if needed, as a defence from prosecution under Section 86(2) of the *National Parks and Wildlife Act* 1974.
- The results of this assessment fulfil the requirement for archaeological assessment in accordance with the 2010 *Guide to Investigation, assessing and reporting on Aboriginal cultural heritage in NSW* and the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (Code of Practice).
- The proposed works must be contained to the area assessed during this archaeological assessment, as shown on Figure 1. If the proposed location is expanded, further archaeological assessment may be necessary to determine if the proposed works will impact any Aboriginal objects or archaeological deposits.

- Should unanticipated archaeological material be encountered during site works, all work must cease and an archaeologist contacted to make an assessment of the find. Further archaeological assessment and Aboriginal community consultation may be required prior to the recommencement of works. Any objects confirmed to be Aboriginal in origin must be reported to Heritage NSW.

Apex Archaeology would like to acknowledge the Aboriginal people who are the traditional custodians of the land in which this project is located. Apex Archaeology would also like to pay respect to Elders both past and present.

## Document Control

The following register documents the development and issue of the document entitled 'Freemantle Road, Eglinton, NSW – Aboriginal Due Diligence Assessment', prepared by Apex Archaeology in accordance with its quality management system.

| Revision | Prepared | Reviewed | Comment | Issue Date |
|---|---|---|---|---|
| 1 – Draft | Leigh Bate | Jenni Bate | Issue for client review | 7 August 2023 |
| 2 - Final | Leigh Bate | Graham Stirling | Final issued to client | 258 August 2023 |

# GLOSSARY OF TERMS

| | |
|---|---|
| **Aboriginal Object** | An object relating to the Aboriginal habitation of NSW (as defined in the NPW Act), which may comprise a deposit, object or material evidence, including Aboriginal human remains. |
| **AHIMS** | Aboriginal Heritage Information Management System maintained by Heritage NSW, detailing known and registered Aboriginal archaeological sites within NSW |
| **AHIP** | Aboriginal Heritage Impact Permit |
| **BP** | Before Present, defined as before 1 January 1950. |
| **BRC** | Bathurst Regional Council |
| **DA** | Development Application |
| **DECCW** | The Department of Environment, Climate Change and Water – now Heritage NSW |
| **Disturbed Land** | If land has been subject to previous human activity which has changed the land's surface and are clear and observable, then that land is considered to be disturbed |
| **Due Diligence** | Taking reasonable and practical steps to determine the potential for an activity to harm Aboriginal objects under the *National Parks and Wildlife Act 1974* and whether an application for an AHIP is required prior to commencement of any site works, and determining the steps to be taken to avoid harm |
| **Due Diligence Code of Practice** | The DECCW Sept 2010 *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* |
| **GIS** | Geographical Information Systems |
| **GSV** | Ground Surface Visibility |
| **Harm** | To destroy, deface or damage an Aboriginal object; to move an object from land on which it is situated, or to cause or permit an object to be harmed |
| **Heritage NSW** | Heritage NSW within the Department of Premier and Cabinet; responsible for overseeing heritage matters within NSW |
| **LALC** | Local Aboriginal Land Council |
| **LGA** | Local Government Area |
| **NPW Act** | NSW *National Parks and Wildlife Act* 1974 |
| **OEH** | The Office of Environment and Heritage of the NSW Department of Premier and Cabinet – now Heritage NSW |
| **RAPs** | Registered Aboriginal Parties |

# CONTENTS

## FIGURES



## PLATES

# 1.0 Introduction

Apex Archaeology has been engaged by The Environmental Factor (TEF) on behalf of Bathurst Regional Council to prepare an Aboriginal due diligence assessment to support a Review of Environmental Factors (REF) for the proposed repair of a short section of Freemantle Road in Eglinton, just north of Bathurst, NSW (Figure 1).

This report has been produced in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (the Due Diligence Code of Practice), in order to assess the Aboriginal archaeological values of the study area.

## 1.1 Study Area

The study area is located within the suburb of Eglinton, located approximately 7km north west of the centre of Bathurst, NSW. It is located within the Bathurst Local Government Area (LGA).

## 1.2 Investigators and Contributors

This report has been prepared by Leigh Bate, Director and Archaeologist with Apex Archaeology, and Jenni Bate, Director and Archaeologist with Apex Archaeology. Both have over sixteen years of consulting experience within NSW.

| Name | Role | Qualifications |
|---|---|---|
| Leigh Bate | Project Manager, GIS, Field inspection, Primary Report Author | B. Archaeology; Grad. Dip. Arch; Dip. GIS |
| Jenni Bate | Review | B. Archaeology; Grad. Dip. CHM |

## 1.3 Statutory Context

Heritage in Australia, including both Aboriginal and non-Aboriginal heritage, is protected and managed under several different Acts. The following section presents a summary of relevant Acts which provide protection to cultural heritage within NSW.

### 1.3.1 Commonwealth Native Title Act 1993

The *Native Title Act 1993*, as amended, provides protection and recognition for native title. Native title recognises the traditional rights of Aboriginal and Torres Strait Islanders to land and waters.

The National Native Title Tribunal (NNTT) was established to mediate native title claims made under this Act. Three registers are maintained by the NNTT, as follows:

- National Native Title Register
- Register of Native Title Claims
- Register of Indigenous Land Use Agreements.

A search of the above registers did not identify any applicable Native title claims, registrations, or applications, for the study area or surrounds.

### 1.3.2 NSW National Parks and Wildlife Act 1974

Protection for Aboriginal heritage in NSW is provided primarily under the *National Parks and Wildlife Act* 1974 (NPW Act). Although cultural heritage is protected by other Acts, the NPW Act is the relevant Act for undertaking due diligence assessments. Protection for Aboriginal sites, places and objects is overseen by Heritage NSW, of the Department of Premier and Cabinet.

Changes to the NPW Act with the adoption of the *NPW Amendment (Aboriginal Objects and Places) Regulation* 2010 in October 2010 led to the introduction of new offences regarding causing harm to Aboriginal objects or declared Aboriginal places. These new offences include destruction, defacement or movement of an Aboriginal object or place. Other changes to the NPW Act include:

- Increased penalties for offences relating to Aboriginal heritage for individuals and companies who do not comply with the legislation;
- Introduction of the strict liability offences, meaning companies or individuals cannot claim 'no knowledge' if harm is caused to Aboriginal objects or places; and
- Changes to the permitting process for AHIPs – preliminary archaeological excavations can be undertaken without the need for an AHIP, providing the excavations follow the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*.

A strict liability offence was introduced, meaning a person who destroys, defaces or moves an Aboriginal object without an Aboriginal Heritage Impact Permit (AHIP) is guilty of an offence, whether they knew it was an Aboriginal object or not. Exercising due diligence (as described in Section 1.4) provides a defence against the strict liability offence.

### 1.3.1 NSW National Parks and Wildlife Regulation 2019

Part 5, Division 2 of the *National Parks and Wildlife Regulation 2019* addresses Aboriginal objects and places in relation to the NPW Act 1974, and outlines how compliance with relevant codes of practice can be met, including with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales*. Clause 57 states:

> *For the purposes of section 87(3) of the Act, compliance with any of the following codes of practice and documents (when undertaking an activity to which the code of document applies) is taken for the purposes of section (87(2) of the Act to constitute due diligence in determining whether the act or omission constituting the alleged offence would harm an Aboriginal object.*

Clause 58(1) outlines the defence of low impact acts or omissions to the offence of harming Aboriginal objects, which includes maintenance works on existing roads and fire trails, farming and land management work, grazing of animals, activities on land that has been disturbed that is exempt or complying development, mining

exploration work, removal of vegetation (aside from Aboriginal culturally modified trees), seismic surveying or groundwater monitoring bores on disturbed ground, environmental rehabilitation work (aside from erosion control or soil conservation works such as contour banks) or geological mapping, surface geophysical surveys, or sub-surface geophysical surveys.

Clause 58(4) outlines the definition of 'disturbed land', as land that "has been the subject of a human activity that has changed the land's surface, being changes that remain clear and observable".

'Disturbance' is further defined in a note to the above clause as follows:

> *Examples of activities that may have disturbed land include the following—*
>
> *(a) soil ploughing,*
> *(b) construction of rural infrastructure (such as dams and fences),*
> *(c) construction of roads, trails and tracks (including fire trails and tracks and walking tracks),*
> *(d) clearing of vegetation,*
> *(e) construction of buildings and the erection of other structures,*
> *(f) construction or installation of utilities and other similar services (such as above or below ground electrical infrastructure, water or sewerage pipelines, stormwater drainage and other similar infrastructure),*
> *(g) substantial grazing involving the construction of rural infrastructure,*
> (h) *construction of earthworks associated with anything referred to in paragraphs (a)–(g).*

### 1.3.2 Bathurst Regional Local Environmental Plan 2014

Part 5 of the *Bathurst Regional Local Environmental Plan 2014* (Bathurst LEP 2014) provides specific provisions for the protection of heritage items and relics within the Bathurst Region LGA, defined in the LEP as follows:

Clause 5.10(2) (e) of the Bathurst LEP identifies that no buildings may be erected on land within a heritage conservation area or which contains an Aboriginal object, without first obtaining development consent. Further, Clause 5.10(2) (c) states that archaeological sites may not be disturbed or excavated without development consent. Exceptions to the requirement for development consent are detailed by Clause 5.10(3) and include low impact activities, or activities for the maintenance of a heritage item.

Clause 5.10(8) requires that the effect of any development on an Aboriginal place of heritage significance must be considered, and the Aboriginal community must be notified of any proposed developments.

Schedule 2 of the Bathurst LEP 2014 provides a list of heritage items within the Bathurst Region LGA.

There are no Aboriginal heritage items listed in this schedule that fall within the Project Area.

### 1.3.3 NSW Due Diligence Code of Practice

The *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (Code of Practice) was introduced in September 2010. It outlines a method to undertake 'reasonable and practical' steps to determine whether a proposed activity has the potential to harm Aboriginal objects within the subject area, and thereby determine whether an application for an Aboriginal Heritage Impact Permit (AHIP) is required. When due diligence has been correctly exercised, it provides a defence against prosecution under the NPW Act under the strict liability clause if Aboriginal objects are unknowingly harmed without an AHIP.

The Code of Practice provides the 'reasonable and practicable' steps to be followed when determining the potential impact of a proposed activity on Aboriginal objects. Due diligence has been defined by OEH as "taking reasonable and practical steps to determine whether a person's actions will harm an Aboriginal object and, if so, what measures can be taken to avoid that harm" (DECCW 2010:18).

These steps include:

- Identification of whether Aboriginal objects are, or are likely to be, present within the subject area, through completing a search of the Aboriginal Heritage Information Management System (AHIMS);
- Determine whether the proposed activity is likely to cause harm to any Aboriginal objects; and
- Determine the requirement for an AHIP.

Should the conclusion of a due diligence assessment be that an AHIP is required, further assessment must be undertaken, with reference to the following guidelines:

- DECCW, April 2010, *Aboriginal cultural heritage consultation requirements for proponents 2010. Part 6 National Parks and Wildlife Act 1974*;
- DECCW, Sept 2010, *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*;
- OEH, April 2011, *Guide to Investigation, assessing and reporting on Aboriginal cultural heritage in NSW*; and
- OEH, May 2011, *Applying for an Aboriginal Heritage Impact Permit: Guide for Applicants*.


PO Box 236
NOWRA
NEW SOUTH WALES 2541

0 150 300
meters

Projection:
MGA Zone 55 (GDA 94)
Base Map:
NearMaps 2023
Image Date: 04/05/2023
Final - Version 1

Figure 1: General location of the study area in its local context.

N

# 2.0 The Due Diligence Code of Practice Process

The Due Diligence Code of Practice provides a specific framework to guide the assessment of Aboriginal cultural heritage. The following section presents the results of this process.

## 2.1 Step 1: Will the activity disturb the ground surface?

The proposed works will disturb the ground surface. It is proposed to repair an existing section of Freemantle Road which has failed due to stormwater and flooding. Earthworks would include clearing, grubbing, stripping and moving topsoil, excavation of soil and backfilling, to support he remediated road surface. All proposed works would have an impact to some extent on the ground surface.

## 2.2 Step 2a: AHIMS and Available Literature Search

Heritage NSW is required to maintain a register of Aboriginal sites recorded during archaeological assessments and other activities within NSW. This is known as the Aboriginal Heritage Information Management System (AHIMS). This register provides information about site types, their geographical location, and their current status. It is the requirement for the recorder of a newly identified site to register this site with Heritage NSW to be placed onto the AHIMS register. It is a requirement of the Code of Practice to undertake a search of this register as part of undertaking a due diligence assessment.

Heritage NSW also maintains a register of archaeological reports relating to archaeological investigations throughout NSW. These reports are a valuable source of information regarding investigations previously completed and their findings, and can inform the assessment process regarding the potential for Aboriginal cultural material and archaeological potential within a study area.

### 2.2.1 AHIMS Results

A basic search of the Aboriginal Heritage Information Management System (AHIMS) was undertaken using a map extents search of the study area. No sites were identified within the search area.

### 2.2.2 Literature review

A review of previous archaeological work within the wider region of the study area was undertaken as there were only a small number of reports for the immediate study area. A number of reports were identified from the AHIMS database and are detailed below.

#### Moore 1970

The Australian Museum completed detailed surveys and excavations of specific sites within the Hunter River Valley between 1965 and 1967, from the source of the Hunter River to Singleton, and the headwaters of the Goulburn River at the watershed of the Great Dividing Range to the junction of the Goulburn with the Hunter near Denman. A number of rock shelters and open sites were excavated within the Hunter River region, with a wide range of results. One rock shelter (BOB/1) near Bobadeen, was

excavated in 1967, with a large assemblage of 16,609 artefacts recovered and a carbon-14 date obtained from Spit 7 at approximately 25-30 inches (approximately 63-76cm) depth of 7750±120 BP. Subsequent additional dating (Moore 1981) estimated occupation of the shelter to commence around 6,000 years BP.

### Bell 1979-80

Throughout 1979 and 1980 David Bell undertook field surveys across Central West NSW and parts of northern NSW to identify and record Aboriginal carved trees. The survey was funded by a grant made to the NSW National Parks and Wildlife Service by the Australian Heritage Commission. 120 carved trees were relocated and recorded over two periods of field survey. Methods of protection and preservation were formulated for every tree recorded. 23 carved tree sites were listed within David Bells report located within the Bathurst region. Only four of these carved trees remain in situ around Bathurst at this time this report was compiled.

### Pickering 1980

Michael Pickering undertook a survey for the Electricity Commission of NSW to locate Aboriginal and Historic archaeological sites along a proposed transmission line route from Bathurst to Mount Panorama. Eight artefact sites were identified and one historic site.

### Cubis 1982

Leonard Cubis was commission by the Electricity Commission of NSW to undertake a survey to locate and assess Aboriginal archaeological sites along the proposed transmission line from Wallerang to Wellington. The survey was conducted in February of 1982 and a total of 55 sites were found to be on or in close proximity to the proposed transmission line route. A number of recommendations were made including immediate salvage work, test excavation and conservation of sites.

### Bowdler 1982

In August of 1982 Sandra Bowdler was commissioned by the National Parks and Wildlife Service on behalf of the Electricity Commission of NSW to assess five prehistoric sites within the Macquarie River Valley to the east of the current study area and to determine the need for further archaeological work to be carried out should a proposed transmission line running from Wellington to Wallerang impact the sites. It seems that the previous assessment that was undertaken by Leonard Cubis was determined to be erroneous and had overstated the significance of the sites he had recorded. Upon conclusion of the assessment undertaken by Bowdler the recommendations for the five sites were that no further work needed to occur at any of the sites.

### Haglund 1985

Laila Haglund was commissioned by the Evans Shire Council (dissolved in 2004) to undertake a historical study of the area specifically an assessment of the prehistoric heritage within the shire. The Evans Shire Council area used to encircle the city of Bathurst. General recommendations for further archaeological work were made to

understand and define the degree of archaeological sensitivity of areas within the shire as well as the condition of sites within the area. Survey was recommended to be undertaken in advance of any future developments to mitigate harm to the potential sites within the area.

### Williams 1992

Doug Williams conducted a survey for a proposed 66kv transmission line from the Stewart substation to the Panorama substation. 4 Aboriginal sites were identified.

### Dallas 1993

Mary Dallas undertook an archaeological survey for the Perthville sewerage scheme. No new sites were identified during the survey. One registered site was relocated and its current site status was recorded.

### Williams 1993

Doug Williams was commissioned to complete an archaeological investigation of a proposed subdivision between Eusdale and Diamond Swamp Creeks, Meadow Flat near Bathurst, NSW. Two artefact scatters were identified.

### Williams & Barber 1993

Doug Williams and Matthew Barber completed an archaeological assessment for a 218 ha property located near to Bathurst. The property was labelled the "Greenhills" property. A total of 5 sites were identified during the survey.

### Williams & Barber 1994

Williams and Barber undertook a survey for both Aboriginal and European heritage items along the foreshore of Ben Chifley Dam in advance of the proposed raising of the dam wall, along with widening of the spillway. The assessment noted that the southern and western margins of Ben Chifley Dam comprise low to gently undulating topography, which was considered to have "potential for open artefact scatters to occur on the flatter spurlines overlooking the dam...these would once have overlooked Campbells River" (Williams & Barber 1994:4). However, it was noted that the proposed works would be unlikely to impact these sites, should they exist.

A total of six Aboriginal sites were identified, including two on Snake Island to the north east of the current study area, although none were noted in the immediate vicinity of the study area itself. Five sites identified comprised low density artefact scatters on flat to gently sloping areas above permanent or semi-permanent water courses, with the sixth comprising an area of PAD on a prominent 'peninsula' at the southern end of the impounded water. Application for a Consent to Destroy was recommended for all six Aboriginal sites, including test excavation and collection of surface artefacts.

### Williams 1996

Williams was engaged to undertake an archaeological survey of an area for proposed road works on the Mid-Western Highway, Between Bathurst and Evans Plains, NSW. No sites were identified.

### CWA&HS 2000A

Jim Kelton of Central West Archaeological and Heritage Services was engaged to undertake the collection of artefacts associated with the Aboriginal sites identified by Williams & Barber in 1994. A total of 58 artefacts were collected from a total of six sites, with one of these sites identified subsequent to Williams and Barber's 1994 assessment of the site. A range of raw material types were identified within the assemblage recovered, including chert, quartz, quartzite, volcanic, indurated mudstone, and a single glass item.

### CWA&HS 2000B

Kelton was also engaged to undertake test excavation at one location on the southern end of Ben Chifley Dam prior to the raising of the dam wall and subsequent inundation of the area considered to have archaeological potential. A total of six artefacts were recovered from a total of 15 1m$^2$ test pits spaced 5m apart.

It was noted that the site was heavily disturbed, although it was not clear whether this disturbance happened prior or subsequent to the recording of the site by Williams and Barber in 1994. It was further noted that the "largest sites recorded around the dam foreshore...in both area and artefact density, occur at topographically lower locations around the dam foreshore than BCD-5, in closer proximity to and at locations with gently sloping access to, the original Campbells River bed (that which existed prior to the flooding of the valley for the Ben Chifley Dam), at locations generally unlike BDC-5."

The site was noted to display evidence of a small, low density artefact scatter, which was considered to be of low scientific significance due to the site's minimal archaeological deposits and highly disturbed nature. No further work was considered necessary.

### OzArk Environment and Heritage 2011

OzArk were engaged by Bathurst Regional Council to assess two route options for construction of a pipeline from Ben Chiefly Dam to Bathurst Option one was along the road verge from Bathurst to the Dam and Option two was the river bank option. A total of six Aboriginal sites were recorded during the survey. The road verge option was determined to present the least constraints however would still impact one of the six newly identified Aboriginal sites. Most sites were recorded along The Macquarie River and Campbells River and were determined to have sub surface archaeological potential along with an expression of surface artefacts.

### Apex Archaeology 2017

Apex Archaeology were engaged to prepare an Aboriginal due diligence assessment and historical archaeological assessment of an area surrounding the dam wall at Winburndale Dam, near Bathurst, NSW. Several areas were identified as being potentially related to historical gold mining in the area, and avoidance of these areas was recommended. No Aboriginal heritage constraints were identified for the project.

### Extent Heritage 2017

Extent Heritage were engaged to complete the Bathurst Regional Local Government Area Aboriginal History Study. The aim of the study was to identify objects, places and archaeological sites of Aboriginal cultural significance, record those places and develop recommendations for their management and conservation. As a part of this project Extent have developed a predictive model of Aboriginal heritage sensitivity with the Bathurst LGA (Figure 3).

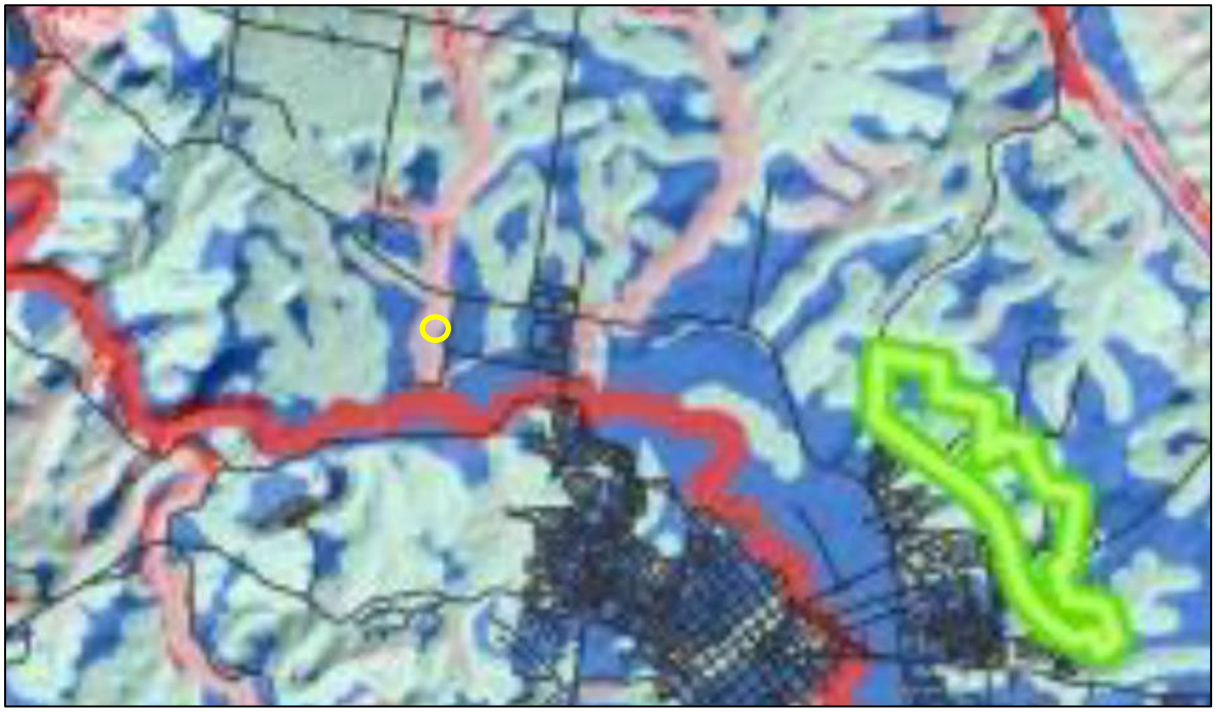

Figure 2: Extract of predictive model of Aboriginal heritage sensitivity within the Bathurst LGA (Source: Extent 2017). Study area circled in yellow.

### AECOM 2018

AECOM were engaged to undertake an Aboriginal due diligence assessment on behalf of the New South Wales (NSW) Department of Justice (DoJ) for the Bathurst Correctional Centre expansion project. No Aboriginal heritage constraints were identified for the project.

### Apex Archaeology 2021

Following an initial due diligence assessment of the proposed subdivision of land comprising the Hampden Park Estate in Kelso, NSW, Apex Archaeology were engaged to prepare an ACHA to determine the need for an AHIP application. A number of sites were present within the study area that could not be avoided by the proposed development. As such, an application for an AHIP was made to permit impact to the sites located within the study area. Test excavation of the area did not identify any additional sites. The existing sites comprised isolated finds in disturbed contexts. The AHIP permitted collection of these sites prior to impact, but the artefacts could not be relocated once the AHIP was issued.

#### APEX ARCHAEOLOGY 2022

Apex archaeology were engaged by RBC Property to prepare an Aboriginal site assessment report to support a Development Application (DA) for an industrial development located at 33 Michigan Road, Kelso. A site visit was conducted in March 2022. The proposed development site was inspected via pedestrian survey. No newly identified archaeological material was identified during the survey. One previously registered site (AHIMS 44-3-0064) was located 5m west of the eastern boundary fence within the transmission line easement, within the study area. The site was recorded in 1980 as an isolated find and was not relocated during the current assessment. Following discussions with Heritage NSW, and acknowledging the level of disturbance which has occurred in the vicinity of the registered site since its initial recording, the site card for the site was updated to reflect its status as no longer valid.

### 2.2.3 SYNTHESIS

Archaeological works within the wider areas have generally been related to development proposals. It appears that artefact evidence generally comprises low density background scatter or discard distributed widely across the locality, with higher densities occurring occasionally in areas of more focused occupation such as camp sites or repeat occupation sites. This generally occurs in favourable environmental contexts such as elevated, well drained spur and ridge crests, flats, terraces and simple slopes in close proximity to watercourses, with a greater focus on higher order water courses. Artefacts tend to comprise raw materials such as quartz, tuff, silcrete and chert. In general, non-specific flaking activities are represented, although microlith and microblade production is also noted.

Rock shelter sites in the area are identified as varying in size and habitable area, their topographical location and also contents; with rock art occurring relatively infrequently in the locality and generally comprising red ochre hand stencils. Grinding groove sites are not only identified along watercourses on sedimentary bedrock such as sandstone, but also on open sandstone surfaces in other contexts such as in rock shelters. Scarred or culturally modified trees have been identified within the Bathurst area and wider region, generally in areas of uncleared old growth vegetation. Low numbers of other sites such as stone arrangements, a possible burial, and ochre or lithic quarries have also been identified.

## 2.3 STEP 2B: LANDSCAPE FEATURES

An assessment of landscape features is required to determine whether Aboriginal objects are likely to be present within the proposed activity area. Certain landscape features are more likely to have been utilised by Aboriginal people in the past and therefore are more likely to have retained archaeological evidence of this use. Focal areas of activity for Aboriginal people include rock shelters, sand dunes, water courses, waterholes and wetlands, as well as ridge lines for travel routes.

The presence of specific raw materials for artefact manufacture, as well as soil fertility levels to support vegetation resources, are also factors to be considered in

the assessment of the environmental context of a study area. Geomorphological factors, such as erosion and accretion of soils, affect the preservation of potential archaeological deposits and therefore need to be considered when making an assessment of the potential for archaeological material to be present within a study area. This assessment is predominantly a desktop exercise.

### 2.3.1 Soils, Geology and Vegetation

The study area falls wholly within the Raglan soil landscape. The Raglan soil landscape occurs on gently undulating to undulating rises, 680–780m above sea level. Average slope angles range from 2–5%, with small pockets between 6–10%. Slope lengths are from 100–300m, with some up to 2000m. Soils are generally reddish or dark brown sandy loam to loam with a weak structure. The underlying geology consists of Bathurst Granite. Vegetation communities consists of Savannah grassland with river she-oaks along main drainage channels.

### 2.3.2 Hydrology

The nearest major permanent water source is Kelloshiel Creek, which runs through the study area. Kelloshiel Creek is part of the Upper Macquarie catchment within the Murray–Darling basin and connects to the Macquarie River 1.6km south of the study area. Kelloshiel Creek is a third order water course according to the Strahler system as used by DPI Water (Figure 3). Watercourse classification ranges from first order through to fourth order (and above) with first order being the lowest, ie a minor creek or ephemeral watercourse.

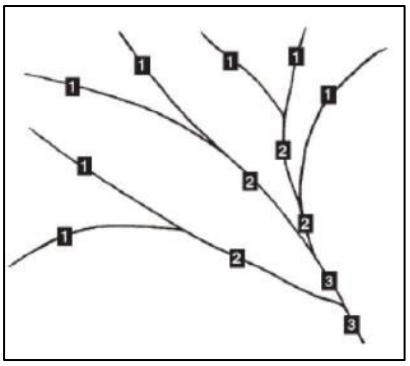

Figure 3: The Strahler system (Source: Department of Planning and Environment 2016).

### 2.3.3 Ethnohistory

According to Tindale (1974), the study area is located within the Wiradjuri tribal and linguistic territory. This territory is described by Tindale (1974) as being:

> *...on the Lachlan River and south from Condoblin to Booligal; at Carrathool, Wagga Wagga, Cootamundra, Cowra, Parkes, Trundle; east to Gundagai, Boorowa and Rylstone; at Wellington, Mudgee, Bathurst and Carcoar; west along Billabong Creek to beyond Mosgiel, south west to near Hay and Narranderra, south to Howlong on the upper Murray; at Albury and east to about Tumbarumba (Tindale 1974).*

Aboriginal society was constructed of a hierarchy of social levels and groups, with fluid boundaries (Peterson 1976), with the smallest group comprising a family of a

man and his wife/wives, children and some grandparents. The next level consists of bands, which were small groups of several families who worked together for hunting and gathering purposes. The third level comprised regional networks with a number of bands, and these bands generally shared a common language dialect and/or had a belief in a common ancestor. Networks would come together for specific ceremonial purposes. The highest level is the tribe, which is usually described as a linguistic unit with flexible territorial boundaries (Peterson 1976). Various dialects of the Wiradjuri language were identified within the region (Tindale 1974). Tindale also considered the Wiradjuri to be "one of the largest tribal groupings in Australia, with many hordes".

The initial settlement of the Bathurst area provoked righteous anger from the Wiradjuri Aboriginal people. These people were forced from their homes and to compete for resources which were heavily compromised by the increase in habitation in the area. Violent clashes occurred between the Aboriginal people and the settlers, and reprisals from the settlers provoked more retaliation from the Wiradjuri. This included the poisoning of food given to the Wiradjuri by the settlers (Jinks 2014).

As a result of the violence, martial law was declared in 1824, with a party of seventy-five soldiers sent to the area. A number of attacks were carried out, with "extermination" of the Wiradjuri considered the best description of the outcome of martial law. After the cessation of martial law, an uneasy peace was reached, but the Wiradjuri were still forced to compete for resources that until recently had been easily accessible for them.

Aboriginal people utilised a wide range of subsistence resources in the past, with ethnohistorical sources recording the diet of Aboriginal people including kangaroo, possum, kangaroo rat, lizards, birds, platypus, wallaby and a range of plants and insects as well as fish and shell fish (Pearson 1981). A wide range of native animals, including birds and reptiles, have been identified within the wider environment around Bathurst, and are likely to have been utilised as food resources by Aboriginal people in the past.

Early recorded accounts of European settlers identify some aspects of the traditional lifestyles of Aboriginal peoples. By studying these accounts, we can reconstruct portions of the Wiradjuri traditional lifestyle.

### 2.3.4 Raw Materials

A wide range of raw materials were selected by Aboriginal people for flaking to create stone implements. Material types ranged from high quality to poor quality for flaking purposes, depending on the geology of the area and readily available material types. The following is a description of a range of raw material types known to have been utilised by Aboriginal people for the creation of stone artefacts.

### Breccia

Breccias are coarse, angular volcanic fragments cemented together by a finer grained tuffaceous matrix.

### Chalcedony

Chalcedony is a microcrystalline, siliceous rock which is very smooth and can be glossy. Introduction of impurities can produce different coloured versions of chalcedony, including yellow/brown (referred to as carnelian), brown (sard), jasper (red/burgundy) and multicoloured agate. It flakes with a sharp edge and was a prized material type for the creation of stone artefacts in parts of Australia (Kuskie & Kamminga 2000: 186).

### Chert

Chert is a highly siliceous sedimentary rock, formed in marine sediments and also found within nodules of limestone. Accumulation of substances such as iron oxide during the formation process often results in banded materials with strong colours. Chert is found in the Illawarra Coal Measures and also as pebbles and colluvial gravels. It flakes with durable, sharp edges and can range in colour from cream to red to brown and grey.

### Petrified Wood

Petrified wood is formed following burial of dead wood by sediment and the original wood being replaced by silica. Petrified wood is a type of chert and is a brown and grey banded rock and fractures irregularly along the original grain.

### Quartz

Pure quartz is formed of silicon dioxide, and has a glossy texture and is translucent. Introduction of traces of minerals can lead to colouration of the quartz, such as pink, grey or yellow. The crystalline nature of quartz allows for minute vacuoles to fill with gas or liquid, giving the material a milky appearance. Often quartz exhibits internal flaws which can affect the flaking quality of the material, meaning that in general it is a low-quality flaking material (Kuskie & Kamminga 2000: 186). However, quartz is an abundant and widely available material type and therefore is one of the most common raw materials used for artefact manufacture in Australia. Flaking of quartz can produce small, very sharp flakes which can be used for activities such as cutting plant materials, butchering and skinning.

### Quartzite

Formed from sandstone, quartzite is a metamorphic stone high in silica that has been heated or had silica infiltrate the voids found between the sand grains. Quartzite ranges in colour from grey to yellow and brown.

### Silcrete

Silcrete is a siliceous material formed by the cementing of quartz clasts with a matrix. These clasts may be very fine grained to quite large. It ranges in colour from grey to white, brown, red or yellow. Silcrete flakes with sharp edges and is quite

durable, making silcrete suitable for use in heavy duty woodworking activities and also for spear barbs (Kuskie & Kamminga 2000:184).

### Tuff/Indurated Mudstone

There is some disagreement relating to the identification of lithic materials as tuff or indurated mudstone. The material is a finely textured, very hard yellow/orange/reddish-brown or grey rock. Kuskie and Kamminga (2000: 6, 180) describe that identification of lithic materials followed the classification developed by Hughes (1984), with indurated mudstone described as a common stone material in the area. However, Kuskie and Kamminga's analysis, which included x-ray diffraction, identified that lithics identified as 'indurated mudstone' was actually rhyolitic tuff, with significant differences in mineral composition and fracture mechanics between the stone types. They define mudstone as rocks formed from more than 50% clay and silt with very fine grain sizes and then hardened.

The lithification of these mudstones results in shale (Kuskie & Kamminga 2000: 181) and thus 'indurated mudstone', in the opinion of Kuskie and Kamminga, do not produce stones with the properties required for lithic manufacture.

In 2011, Hughes, Hiscock and Watchman undertook an assessment of the different types of stones to determine whether tuff or indurated mudstone is the most appropriate terminology for describing this lithic material. The authors undertook thin section studies of a number of rocks and determined that the term 'indurated mudstone' is appropriate, with an acknowledgment that some of this material may have been volcanic in origin. They also acknowledge that precise interpretation of the differences between material types is difficult without detailed petrological examination, and suggest that artefacts produced on this material are labelled as 'IMT' or 'indurated mudstone/tuff'.

### Basalt

Basalt, which is commonly referred to as 'blue metal', is solidified lava that was produced by now extinct volcanoes and diatremes that are spread-out within the Sydney Basin. If the lava cools quickly it results in fine-grained basalt that is easily flaked or ground to make tools, implements or weapons. Tuff forms from the tiny ash particles that are also released during volcanic explosions. When it cools it hardens into a fine-grained rock called 'tuff', as discussed above.

Basalt would have been either collected from the primary deposits formed during the eruption, which would require pieces to be broken off (quarried) or it was collected in cobble-form from a creek bed or shoreline. Cobbles are referred to as secondary sources as they are formed from pieces of rock that have been dislodged from their primary source and end up in creeks and/or river systems (Petrequin 2016; Attenbrow et al. 2017). The flow of water moves them around and smooths them into water-rolled cobbles that can be transported considerable distance from the original source. Basalt was often used to make axes which were either flaked into

the desired shape from quarried stone, or from cobbles which quite often only required only one end to be ground into a sharp working edge.

Basalt cobbles can be found along the banks of rivers, and in bedrock quarries within the Hunter Region. Recent research undertaken by the Australian Museum and University of New England using portable XRF technology demonstrated that a number of stone axes held at the Australian Museum from the Hunter Valley area have been traced to these sources (Attenbrow et al. 2017).

### 2.3.5 PROCUREMENT

Assemblage characteristics are related to and dependent on the distance of the knapping site from raw materials for artefact manufacture, and different material types were better suited for certain tasks than other material types. Considerations such as social or territorial limitations or restrictions on access to raw material sources, movement of groups across the landscape and knowledge of source locations can influence the procurement behaviour of Aboriginal people. Raw materials may also have been used for trade or special exchange between different tribes.

### 2.3.6 MANUFACTURE

A range of methodologies were used in the manufacture of stone artefacts and tools, through the reduction of a stone source. Stone may have been sourced from river gravels, rock outcrops, or opportunistic cobble selection. Hiscock (1988:36-40) suggests artefact manufacture comprises six stages, as follows:

1. The initial reduction of a selected stone material may have occurred at the initial source location, or once the stone had been transported to the site.
2. The initial reduction phase produced large flakes which were relatively thick and contained high percentages of cortex. Generally the blows were struck by direct percussion and would often take advantage of prominent natural ridges in the source material.
3. Some of these initial flakes would be selected for further reduction. Generally only larger flakes with a weight greater than 13-15 grams would be selected for further flaking activities.
4. Beginning of 'tranchet reduction', whereby the ventral surface of a larger flake was struck to remove smaller flakes from the dorsal surface, with this retouch applied to the lateral margins to create potential platforms, and to the distal and proximal ends to create ridges and remove any unwanted mass. These steps were alternated during further reduction of the flake.
5. Flakes were selected for further working in the form of backing.
6. Suitable flakes such as microblades were retouched along a thick margin opposite the chord to create a backed blade.

Hiscock (1986) proposed that working of stone materials followed a production line style of working, with initial reduction of cores to produce large flakes, followed by heat treatment of suitable flakes before the commencement of tranchet reduction.

These steps did not necessarily have to occur at the same physical location, but instead may have been undertaken as the opportunity presented.

### 2.3.7 Predictive Model

Predictive models have been developed and refined over the years. Detailed predictive and occupational models for the Aboriginal occupation in the wider region in general identified that:

- Aboriginal occupation focussed predominantly on resource rich zones, particularly along higher order watercourses. Abundant resources for sustenance and water would supply longer stays for family and community base camps, as well as occasional gatherings of larger groups. These areas were considered to be primary resource zones;
- Secondary resource zones were focussed on watercourses, wetlands and/or swamps in close proximity to higher order watercourses and the associated flats and terraces. These areas were seasonally occupied during the course of hunting and gathering activities by small hunting parties and family groups. Generally level ground was selected for camping, near water sources, and was sporadic rather than continuous occupation;
- Outside of the primary and secondary resource zones, activities included resource gathering and movement across the landscape by small parties, in order to access areas with greater resources;
- Opportunistic reduction of raw materials to create stone artefacts would be quite widespread across the landscape, in order to produce stone tools on an 'as needed' basis;
- Locally available quartz was favoured for knapping activities, along with tuff and chert, depending on their availability;
- Exposed sandstone would be utilised for creating and maintaining ground edge hatchets, creating grinding grooves. This action may have been opportunistic rather than specific, with evidence of long term, repeated use not expected to occur; and
- Aboriginal occupation of the general area is believed to have occurred within the past 5,000 years, although it is possible it may extend as far as 30,000-40,000 years ago (SEA 2013:23).

From these general predictions of how the area was utilised for occupation by Aboriginal people in the past, a predictive model for the location of archaeological sites was developed and this has been summarised below:

- Low spurs within 100m of higher order streams are likely to contain sites with relatively higher numbers of artefacts;
- Very low density artefact scatters may occur throughout valley floor contexts;
- Elevated, level ground adjacent to major, permanent streams has the potential for open sites with higher concentrations of artefacts;
- Stone artefact scatters are likely to increase in number and density relative to the site's proximity to water and raw material sources;

- Suitable rockshelters with relatively level floors, adequate shelter and located in basal slope contexts in association with a drainage line may contain occupation deposit and/or pigment rock art;
- Grinding grooves are likely to occur only where suitable sandstone exposures occur in association with a source of water;
- Burials are rare but may occur in deep, fine grained alluvial or Aeolian sediments, or in the form of stone cairns;
- Scarred trees have the potential to survive in areas of suitable old growth trees;
- Archaeological deposits with high scientific significance are most likely to be found in rockshelters with suitable deposit depth, or on elevated areas with aggrading sediments in close proximity to permanent or reliable water sources, or within rockshelter contexts;
- Outside of these identified areas, stratified deposits or in situ archaeological material is unlikely to survive due to bioturbation and/or natural processes such as water action, erosion etc; and
- Isolated surface and subsurface archaeological material may exist as background scatter in very low densities, but the location of this potential material is impossible to predict.

The hydrology, topography, soils and geology of an area are all important considerations when developing a predictive model for an area.

## 2.4 Step 3: Avoid Harm

Given the proximity to water (Kelloshiel Creek) as well as the moderate predicted Aboriginal heritage sensitivity as per the Bathurst LGA Preliminary Aboriginal site model, it was necessary to undertake a visual inspection of the study area. This inspection assisted in determining if there was any archaeological potential within the study area which could potentially be harmed by the proposed development, and in turn, assisted in determining if harm to the archaeological resource could be avoided.

The proposed works will impact the entire site through the earthworks associated with the repair of a formalised road, along with reinstatement of culverts and associated infrastructure. These works will include excavation and landform modification.

## 2.5 Step 4: Visual Inspection

A visual pedestrian inspection of the study area was undertaken in July 2023 by Leigh Bate and Jenni Bate, Archaeologists with Apex Archaeology.

### 2.5.1 Survey Coverage

Given the small size of the study area, the entire area was inspected by pedestrian survey to identify any surface artefacts or any areas with potential for intact subsurface deposits to be present.

### 2.5.2 RESULTS

As indicated by the Bathurst LGA Preliminary Aboriginal site model, the area falls within a broader area of Moderate Aboriginal sensitivity; however due to the severe disturbance factor and ongoing maintenance of the road the predicted potential becomes altogether non-existent. Whilst the study area does cross a higher order named creek, the level of disturbance factors present negate the predicted potential for intact Aboriginal cultural heritage to exist.

Ground surface visibility (GSV) was low throughout the study area. GSV was rated at 15% overall due to the grass cover and regrowth across the entire site. No artefacts were identified on the ground surface given the low GSV. A significant section of the road has been washed away by floodwaters, impacting the natural creek bed and removing any intact areas which may have once contained Aboriginal archaeological deposits.

Following consideration of the results of the previous assessments in the area and the predictive modelling, the study area was assessed as highly disturbed with no potential for sub surface archaeological deposits to exist.

Plate 1: General view looking west from the eastern end of the repair section along Freemantle Road.

Plate 2: Looking west along the repair section of Freemantle Road. Start of road failure along the southern side of the road.

Plate 3: Road and culvert failure along southern side of road verge.

Plate 4: Road and culvert failure along southern side of road verge.

Plate 5: Road and culvert failure along southern side of road verge looking east.

Plate 6: Looking east from the western end of the road failure section along Freemantle Road.

Plate 7: Looking south east across the road failure section from the bypass section to the north.

Plate 8: Looking east along the bypass section north of the road/culvert failure along Freemantle Road.

In accordance with the Due Diligence Code of Practice, land is considered disturbed if human activities within the area have left clear and observable changes on the landscape. The study area meets the definition of disturbed land and has been assessed as having no Aboriginal heritage constraints, and as such no further archaeological assessment is necessary.

# 3.0 Conclusions and Recommendations

## 3.1 Conclusions

- No previously registered Aboriginal sites are located within the study area.
- A portion of the study area is located within an area of moderate Archaeological Potential as defined on the Predictive model of Aboriginal heritage sensitivity within the Bathurst Regional LGA Figure 12 (Extent 2017).
- No archaeological material was identified on the ground surface of the study area.
- The study area was considered to be highly disturbed by previous land use practices within much of the site.
- The study area was re-assessed as having no sub-surface archaeological potential or Aboriginal sensitivity based on the results of the visual pedestrian inspection.
- This assessment was based on identification of landform elements, previous archaeological work undertaken within the wider Bathurst region, and a visual inspection of the study area.

## 3.2 Recommendations

- No further Aboriginal archaeological assessment is required prior to the commencement of works as described in this report. No Aboriginal Heritage Impact Permit (AHIP) is required to permit the works to proceed.
- This due diligence assessment must be kept by Bathurst Regional Council so that it can be presented, if needed, as a defence from prosecution under Section 86(2) of the *National Parks and Wildlife Act* 1974.
- The results of this assessment fulfil the requirement for archaeological assessment in accordance with the 2010 *Guide to Investigation, assessing and reporting on Aboriginal cultural heritage in NSW* and the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (Code of Practice).
- The proposed works must be contained to the area assessed during this archaeological assessment, as shown on Figure 1. If the proposed location is expanded, further archaeological assessment may be necessary to determine if the proposed works will impact any Aboriginal objects or archaeological deposits.
- Should unanticipated archaeological material be encountered during site works, all work must cease and an archaeologist contacted to make an assessment of the find. Further archaeological assessment and Aboriginal community consultation may be required prior to the recommencement of works. Any objects confirmed to be Aboriginal in origin must be reported to Heritage NSW.

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# APPENDIX A: AHIMS SEARCH RESULTS

# AHIMS Web Services (AWS)
## Search Result

Your Ref/PO Number : 23110

Client Service ID : 799448

Apex Archaeology

PO BOX 236

Nowra New South Wales 2541

Attention: Leigh Bate

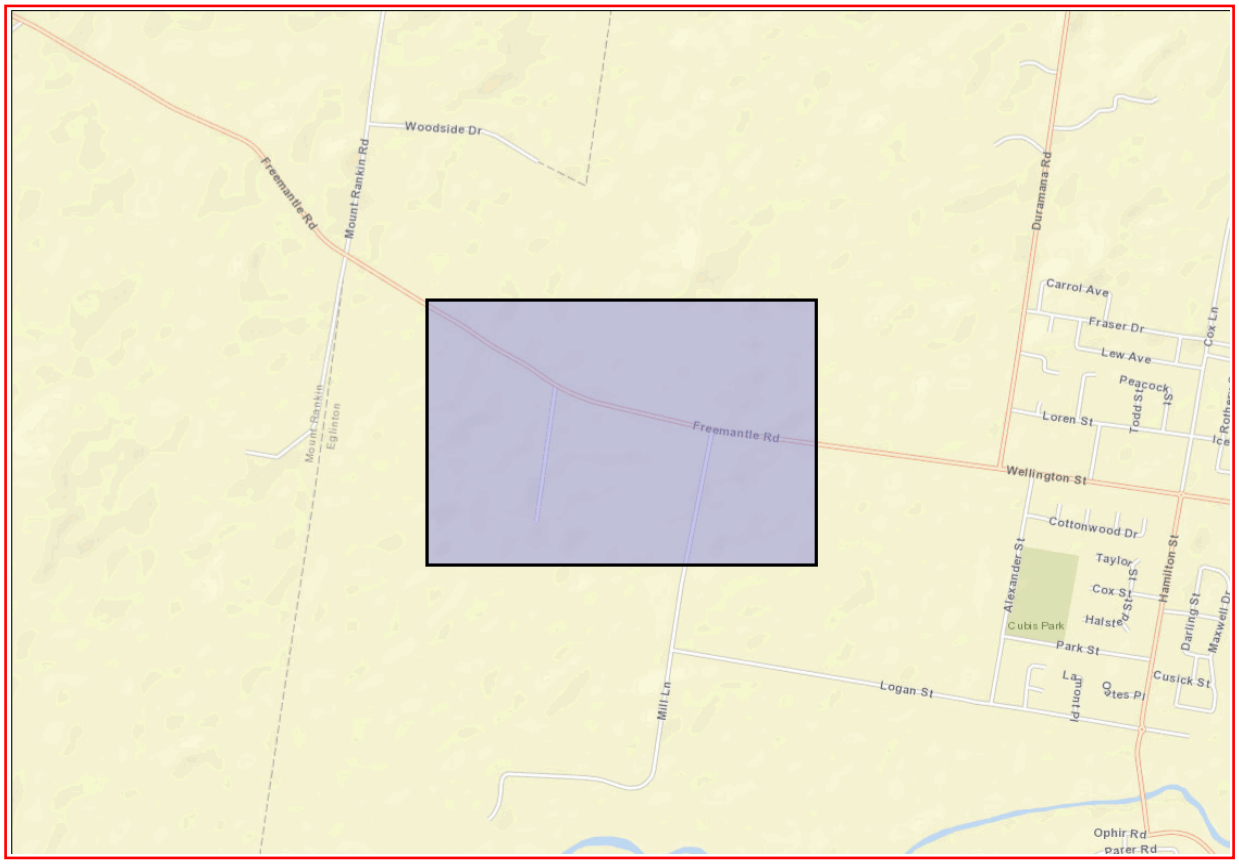
Email: leigh@apexarchaeology.com.au

Date: 11 July 2023

Dear Sir or Madam:

**AHIMS Web Service search for the following area at Lat, Long From : -33.3759, 149.5177 - Lat, Long To : -33.367, 149.5331, conducted by Leigh Bate on 11 July 2023.**

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




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

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

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

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

**Important information about your AHIMS search**

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

Level 6, 10 Valentine Ave, Parramatta 2150
Locked Bag 5020 Parramatta NSW 2124
Tel: (02) 9585 6345

ABN 34 945 244 274
Email: ahims@environment.nsw.gov.au
Web: www.heritage.nsw.gov.au