Lachlan River Pumping Station Augmentation, Pre-Treatment Plant and Solar Photovoltaic (PV) Array – Review of Environmental Factors

Parkes Shire Council

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Template 2.8.1

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Abbreviations

Abbreviation	Description
ACHA	Aboriginal Cultural Heritage Assessment
AHIMS	Aboriginal Heritage Information Management System
AHIP	Aboriginal Heritage Impact Permit
BC Act	*Biodiversity Conservation Act 2016*
CBA	Cost Benefit Analysis
CEMP	Construction Environmental Management Plan
CIV	Capital Investment Value
DAWE	Department of Agriculture, Water and the Environment
DBYD	Dial Before You Dig Assessment
DPIE	Department of Planning, Industry and Environment
EEC	Endangered Ecological Community
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ERPS	Eugowra Road Pump Station
KFH	Key Fish Habitat
FM Act	*Fisheries Management Act 1994*
Forbes LEP	Forbes Local Environment Plan 2013
FTE	Full-time Employment
Heritage Act	*Heritage Act 1977*
Infrastructure SEPP	*State Environmental Planning Policy (Infrastructure) 2007*
IWCM	Integrated Water Cycle Management
Koala Habitat Protection SEPP	*State Environmental Planning Policy (Koala Habitat Protection) 2020*
LGA	Local Government Area
LLS Amendment Act	*Local Land Services Amendment Act 2016*
LRPS	Lachlan River Pump Station
MNES	Matters of National Significance
NPW Act	*National Parks and Wildlife Act 1974*
NRAR	Natural Resources Access Regulator
PAD	Potential Archaeological Deposit
PCT	Plant Community Type
PEA	Preliminary Environmental Assessment
POEO Act	*Protection of the Environment and Operations Act 1997*
PSC	Parkes Shire Council

Abbreviation	Description
REF	Review of Environmental Factors
SEPP 55	*State Environmental Planning Policy 55 – Remediation of Land*
SHR	State Heritage Register
WM Act	*Water Management Act 2000*
WSP	Water Sharing Plan

Executive Summary

This Review of Environmental Factors (REF) has been prepared by Eco Logical Australia Pty Ltd (ELA) under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) on behalf of the Parkes Shire Council (PSC). This REF assesses the potential environmental impacts associated with the proposed construction of a pre-treatment plant and solar system and the augmentation of the existing Lachlan River Pump Station (LRPS). The proposal will assist in working towards securing a reliable water supply for Parkes Shire.

This REF considers the potential environmental impacts that may result from the proposed works and proposes appropriate mitigation measures to negate, offset or minimise these impacts. To support the preparation of this REF, a review of previous reports and database information, site investigations and assessments has been carried out.

Terrestrial and aquatic biodiversity and Aboriginal heritage were key environmental considerations in the preparation of this REF. Specialist assessments have been undertaken for each of these studies and have been incorporated into the REF chapters. The key findings are summarised below.

Terrestrial Biodiversity

The study area consists of scattered patches of roadside native vegetation, isolated trees, riparian vegetation and cleared / exotic agricultural land. Four Plant Community Types (PCTs) have been mapped as occurring within the study area:

- **PCT 5:** River Red Gum herbaceous-grassy tall open forest wetland on inner floodplains in the lower slopes sub-region of the NSW South Western Slopes Bioregion and the eastern Riverina Bioregion
- **PCT 74:** Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion
- **PCT 201:** Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion
- **PCT 277:** Blakelys Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion'

The proposed works will impact on 0.15 ha of native vegetation, including 0.14 ha of PCT 277, which is consistent with the Threatened Ecological Community (TEC) White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland, listed as Critically Endangered under both the *Biodiversity Conservation Act 2016* (BC Act) and *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act). A Test of Significance in accordance with Section 7.3 of the BC Act was undertaken for this TEC, which concluded that a significant impact is unlikely. Therefore, the preparation of a Species Impact Statement (SIS) or Biodiversity Development Assessment Report (BDAR) is not warranted. This TEC did not meet the condition threshold in accordance with the EPBC Act therefore, an Assessment of Significance was not undertaken.

Potential habitat for the following terrestrial threatened fauna species was identified within the study area:

- *Anseranas semipalmata* (Magpie Goose)
- *Anthochaera phrygia* (Regent Honeyeater)
- *Artamus cyanopterus cyanopterus* (Dusky Woodswallow)
- *Austrostipa wakoolica*
- *Certhionyx variegatus* (Pied Honeyeater)
- *Chthonicola sagittata* (Speckled Warbler)
- *Circus assimilis* (Spotted Harrier)
- *Climacteris picumnus victoriae* (Brown Treecreeper (eastern subspecies))
- *Daphoenositta chrysoptera* (Varied Sittella)
- *Dasyurus maculatus* (Spotted-tailed Quoll)
- *Epthianura albifrons* (White-fronted Chat)
- *Falco hypoleucos* (Grey Falcon)
- *Falco subniger* (Black Falcon)
- *Glossopsitta pusilla* (Little Lorikeet)
- *Haliaeetus leucogaster* (White-bellied Sea-eagle)
- *Hieraaetus morphnoides* (Little Eagle)
- *Lathamus discolor* (Swift Parrot)
- *Melanodryas cucullata cucullata* (Hooded Robin (south-eastern form)
- *Melithreptus gularis gularis* (Black-chinned Honeyeater (eastern subspecies))
- *Neophema pulchella* (Turquoise Parrot)
- *Ninox connivens* (Barking Owl)
- *Pachycephala inornata* (Gilbert's Whistler)
- *Petaurus norfolcensis* (Squirrel Gilder)
- *Petroica boodang* (Scarlet Robin)
- *Petroica phoenicea* (Flame Robin)
- *Phascolarctos cinereus* (Koala)
- *Polytelis swainsonii* (Superb Parrot)
- *Pomatostomus temporalis temporalis* (Grey-crowned Babbler (eastern subspecies))
- *Stagonopleura guttata* (Diamond Firetail)

Tests of Significance in accordance with Section 7.3 of the BC Act were undertaken for the above species, which concluded that a significant impact is unlikely. Therefore, the preparation of a SIS or BDAR is not warranted.

Assessment of Significance in accordance with the EPBC Act were also undertaken for the following threatened terrestrial species:

- *Anthochaera phrygia* (Regent Honeyeater)
- *Falco hypoleucos* (Grey Falcon)
- *Grantiella picta* (Painted Honeyeater)
- *Hydroprogne caspia* (Caspian Tern)
- *Polytelis swainsonii* (Superb Parrot)

It was concluded that the proposed works were unlikely to constitute a significant impact on the above species.

Aquatic Biodiversity

The works will take place within the Aquatic Ecological Community in The Natural Drainage System Of The Lowland Catchment Of The Lachlan River, an Endangered Ecological Community (EEC) under the *Fisheries Management Act 1994* (FM Act). An Assessment of Significance under the FM Act was undertaken for this EEC, which concluded that there is unlikely to be a significant impact due to the minor nature of the works.

Three aquatic fauna species have been modelled to occur in the subject site:

- *Ambassis agassizii* (Olive Perchlet – Western population)
- *Bidyanis bidyanis* (Sliver Perch)
- *Tandanus tandanus* (Eel-tailed Catfish)

Assessments of Significance under the FM Act were prepared for these species and concluded that there is unlikely to be a significant impact due to the large area of habitat available and minor nature of the works.

As part of the works, a second in-stream intake will be required to be installed within the Lachlan River, which is considered to be Key Fish Habitat (KFH) in accordance with the FM Act. The works are anticipated to require dredging, reclamation and partial obstruction of fish passage through the use of coffer dams during installation. Therefore, a Fisheries Permit under Part 7 s200 of the FM Act will be required prior to construction.

Aboriginal Heritage

The proposed pre-treatment plant will impact a known Aboriginal site (Aboriginal Heritage Information Management System (AHIMS) ID 43-3-0108) and is likely to impact unknown Aboriginal objects. According to the *Due Diligence Code of Practice* (DECCW 2010a), the study area is considered a sensitive landscape as it is within 200 m of waters, being in close proximity to the Lachlan River. Further investigation is currently underway, in the form of an Aboriginal Cultural Heritage Assessment (ACHA) and any impact to Aboriginal sites will require an Aboriginal Heritage Impact Permit (AHIP), which will be obtained prior to the commencement of construction.

Conclusion

Provided the recommended legislative requirements and the mitigation measures outlined within this REF are adhered to, the environmental impacts associated with this project are expected to be minor given the already disturbed nature of the majority of the subject site and the short duration of the activity. Based on the assessment contained in this REF, the proposal is not likely to have a significant impact upon the environment or any threatened species, populations or communities. As such it is not necessary for further assessment under section 5.7 of the EP&A Act.

Based on the current scope of works, the following additional approvals will be required prior to the commencement of construction:

- A Fisheries Permit under Part 7, S200 of the FM Act from DPI – Fisheries
- An AHIP in accordance with the *National Parks and Wildlife Act 1974* (NPW Act) from Heritage NSW

The upgrade to the existing pumping station will comply with the existing Water Access Licence (WAL) allocations and for the short to medium foreseeable future, no changes to the current WALs are warranted.

1. Introduction

1.1 Project Description and Background

In accordance with the proposed actions outlined in both the Integrated Water Cycle Management (IWCM) Strategy and the Parkes 2030 Community Strategic Plan, Parkes Shire Council (PSC) has made significant investment in water supply and sewerage infrastructure for the Parkes and Peak Hill townships. Such projects include the recent augmentation of the Lachlan River Pump Station (LRPS).

However, there is a growing need for enhanced water security in the Parkes region, as sporadic rainfall events and the current water supply infrastructure reaching capacity, limits the overall supply network. The current water supply infrastructure is at capacity and is impacting Parkes security and future development (AEC Group, 2019).

In order to account for significant industrial and residential growth and development in a changing climate, whilst ensuring water extraction is sustainable and spread across a variety of available sources, PSC are proposing a series of strategic water infrastructure renewal initiatives intended to 'future proof' the Parkes Shire water supply.

This is known as the Parkes Town Water Security Program ('the Program').

1.1.1 Parkes Town Water Security Program

The Program includes many components, including up to 90 km of new raw water transfer pipelines, an expansion of the Forbes bore field, and construction of a pre-treatment facility and pump stations. Accordingly, the Program has been divided into four (4) discrete Projects, which have been separated according to their locations within the landscape, and the scale of each core component in terms of size, significance of environmental impacts, and Capital Investment Value (CIV). The projects will be progressed and assessed separately as follows:

1. **Eugowra Road Pump Station to Forbes Bore 3 Pipeline:** A new approximately 9 km long pipeline to connect the existing Eugowra Pump Station to the Forbes Bore 3.
2. **Eugowra Road Pump Station to Gooloogong Pipeline:** A new 39 km rising main from the Eugowra Pump Station to the Gooloogong Bores Reservoir.
3. **Parkes Borefield Refurbishment:** The refurbishment of four (4) existing bores.
4. **Lachlan to Parkes Water Supply Duplication and Pumping Station Augmentation:**

a. **Lachlan River Pumping Station Augmentation and Pre-Treatment Plant:** The construction and operation of a pre-treatment plant and solar system for raw river water at the LRPS.

b. **Lachlan to Parkes Water Supply Duplication and Bore Fields Expansion:** The augmentation or replacement of approximately 30 km of raw water transfer pipeline from the LRPS to the Parkes Water Treatment Plant.

Figure 1-1 identifies the geographic distribution of the above projects within the overall Program.

This Review of Environmental Factors (REF) has been prepared for Project 4a – Lachlan River Pumping Station Augmentation and Pre-Treatment Plant ('the Proposal'). A preliminary Project Site layout is provided in Figure 1-2.

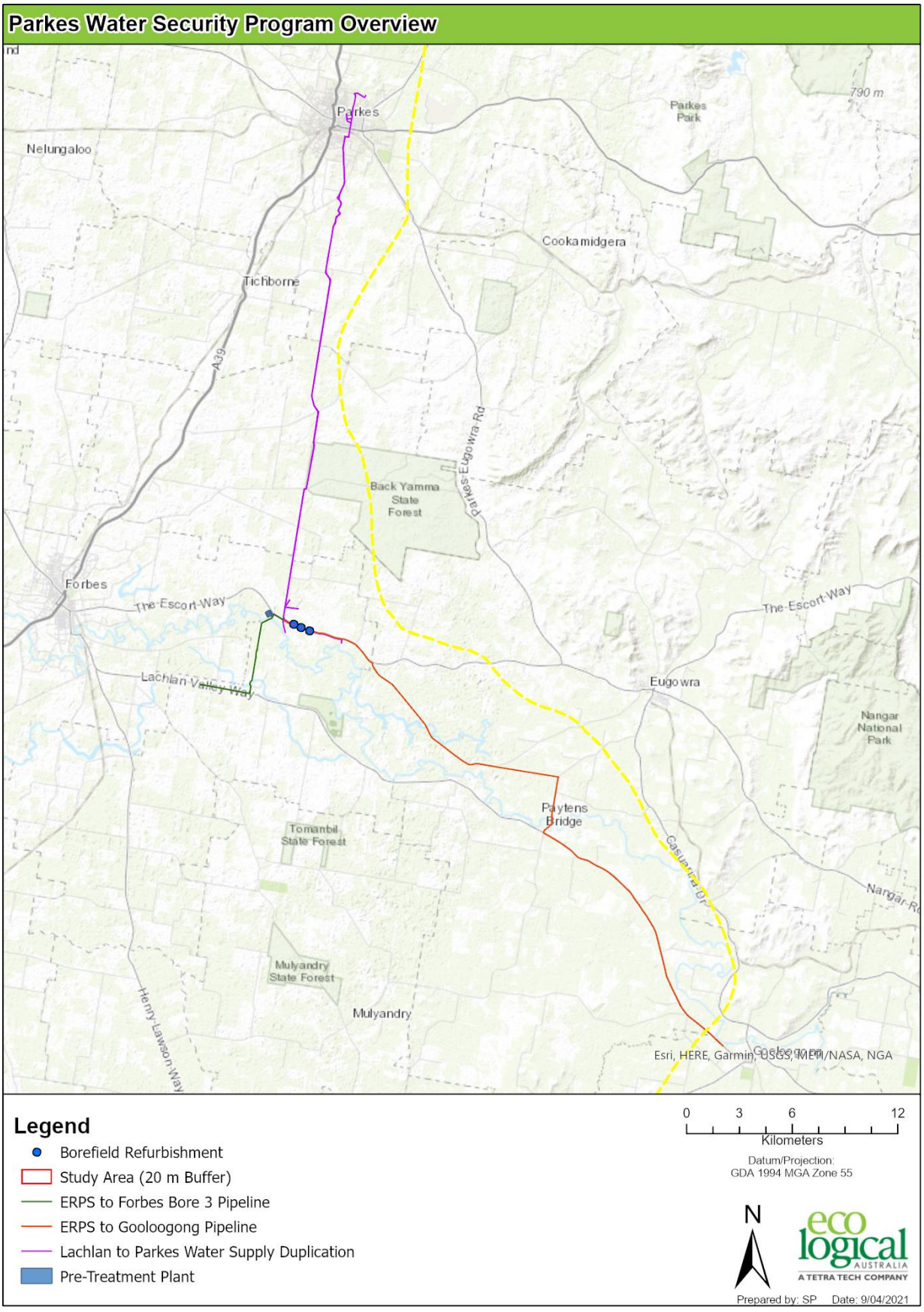

Figure 1-1: Parkes Town Water Security Program location overview

Figure 1-2: Location of subject site (impact area)

1.1.2 Lachlan River Pumping Station Augmentation, Pre-Treatment Plant and Solar System

It has been estimated that Parkes will require a raw water supply capacity of approximately 620 L/s (PSC, 2020). The existing bores used for water supply have been estimated to yield 120 L/s, leaving a deficit of approximately 500 L/s. This deficit is then sourced from the Lachlan River, via the LRPS. The LRPS was constructed in 2017, and today consists of the following:

- An intake screen within Lachlan River, with a debris deflector
- A wet well with two pumps
- An electrical building with switchboards
- A Hydroburst unit
- Retrofitting to the existing mag flow meter within a pit.

The current LRPS has a maximum flow capacity of 188 L/s with both existing pumps operating in duty mode (PSC, 2020). The original design of the LRPS allowed for future upgrade and augmentation of a third pump in the wet well, connecting pipework, and a second intake with screen. Augmentation of the LRPS will increase the output flow to 222 L/s. Furthermore, by duplicating the existing rising main from the LRPS to the Eugowra Road Pumping Station (ERPS), there is the potential to further increase the output flow to 278 L/s.

To increase the efficiency of water transfer to the Parkes Water Treatment Plant (WTP), a pre-treatment plant is also proposed near the existing LRPS. The pre-treatment process would improve the quality of the raw water being transferred to the Parkes WTP by reducing the turbidity of river water and removing suspended impurities and solids before transferring the raw water to the Parkes WTP.

To provide operational flexibility and reliability for the operation of the water supply scheme the construction of a solar system is also proposed. Raw water transfer infrastructure will be powered by Photo Voltaic (PV) arrays, which will allow water transfer to occur in either off peak times and/or during day light hours, and in turn, reduce electricity costs to PSC. The proposed layout area is capable of supplying 3,809 kW at peak output, with provision for future expansion to peak output of 950 kW.

1.2 Land Use and Ownership

1.2.1 Land Use

The study area is zoned RU1 (Primary Production) in accordance with the Forbes Local Environmental Plan (LEP) 2013 the objectives of which are, as follow:

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
- *To encourage diversity in primary industry enterprises and systems appropriate for the area.*
- *To minimise the fragmentation and alienation of resource lands.*
- *To minimise conflict between land uses within this zone and land uses within adjoining zones.*
- *To provide opportunities for intensive and extensive agriculture in appropriate locations consistent with the environmental capability of the land.*

1.2.2 Land Ownership

The proposed work will be wholly contained within Lot 81 DP 750183. This lot is owned by PSC.

1.3 Document Purpose

PSC are progressing its funding application for the *Building Better Regions Fund: Community Investments Stream* and are currently preparing a Business Case. To support the Business Case, this REF has been prepared to identify all environmental constraints, which may require further investigation and approval.

This REF is an environmental assessment made under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Part 5 of the EP&A Act applies to development without consent, as well as to activities undertaken by government departments or agencies as part of their everyday responsibilities. Many of these activities are allowed to be carried out under the *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP), which assists local Councils and the communities they support by simplifying the provision of necessary infrastructure development, including water supply.

A Water Reticulation System is defined under clause 124 of the Infrastructure SEPP to mean a facility for the transport of water, including pipes, tunnels, canals, bores, pumping stations, related electricity infrastructure, dosing facilities and water supply reservoirs. A Water Treatment Facility is defined within the Forbes Local Environmental Plan 2013 as a building or place used for the treatment of water (such as a desalination plant or a recycled or reclaimed water plant) whether the water produced is potable or not, and includes residuals treatment, storage and disposal facilities, but does not include a water recycling facility. The pre-treatment plant and the solar system are considered to meet the definitions of a Water Reticulation System and Water Treatment Facility. As such, the proposed works shall be carried out under Division 24, Clause 125 of the Infrastructure SEPP and are permitted without consent. PSC is the proponent and the determining authority for the proposed works.

The purpose of this REF is to describe the proposal, identify and discuss relevant planning legislation, carry out assessments to identify potential environmental values, document the likely impacts of the proposal on the environment and detail mitigation measures to be implemented. This will allow PSC to fulfil the requirements of Section 5.5 of the EP&A Act, namely in their examination and consideration of all matters affecting or likely to affect the environment by reason of the activity.

The layout of this REF is based, in part, on the Proponents *Guidelines for the Review of Environmental Factors* published by the Department of Environment, Climate Change and Water, February 2011. For this REF, the specialist studies undertaken, comprising the Flora and Fauna Assessment and Aboriginal Heritage Assessment have been incorporated into the relevant chapters of this REF.

1.4 Definitions

The ‘subject site’ refers to the area directly affected by the proposal (also referred to as the ‘impact area’). It includes the footprint of the development and any ancillary works, facilities and accesses that support the construction or operation of the development or activity. For the purposes of this REF, the subject site corresponds to the proposed pre-treatment plant, solar array and the Lachlan River intake.

The ‘study area’ refers to the subject site with the addition of a 10 m indirect construction buffer around the outskirts of the footprint (Figure 1-2).

2. Planning and Statutory Matters

Table 2-1 provides a description of the legislative context for the proposal. Where a particular approval or consideration is required, this report addresses the objectives and requirements of the legislation.

Table 2-1: Planning framework and relevance to the proposal

Legislation	Relevance
	Commonwealth
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	The EPBC Act aims to protect Matters of National Environmental Significance (MNES) including wetlands of international importance, threatened species and communities and listed migratory species. An action that may or is likely to have a significant impact on MNES should be referred to the Commonwealth to determine whether it is a Controlled Action that requires approval from the Commonwealth. Assessment of potential impacts to MNES have been assessed in this report. MNES have been identified within the study area. MNES within the study area are considered unlikely to be adversely affected by the proposed works.
	State
Biodiversity Conservation Act 2016 (BC Act)	The purpose of the BC Act is to maintain a healthy and productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development. Assessments of significance for the impact to threatened species and endangered ecological communities in accordance with s7.3 of the Act have been undertaken for the proposed works. The proposed works are not anticipated to have a significant impact, provided that mitigation measures are implemented in accordance with this REF.
Environmental Planning and Assessment Act 1979 (EP&A Act)	The EP&A Act is the principal planning legislation for NSW. It provides a framework for the overall environmental planning and assessment of development proposals. The proposal is likely to be development permitted without consent under *the State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP) as development for water supply systems and will therefore be assessed under Part 5 of the EP&A Act 1979 at a later date.
Fisheries Management Act 1994 (FM Act)	The objectives of the FM Act are to conserve, develop and share the fishery resources of the State for the benefits of present and future generations. The Act provides protection and approval processes for activities which may impact on threatened species, protected marine vegetation or involve dredging, reclamation or obstruction of fish passage. The proposed works do not involve harm to marine vegetation and, therefore a permit under s205 of the FM Act is not required. Lachlan River is mapped as Key Fish Habitat (KFH). Installation of the second Lachlan River intake will require the use of coffer dams and works to part of the bed of the river and will therefore, obstruct fish passage and require a small amount of reclamation of the bed. Therefore, a permit will be required under Section 219 and 200 of the FM Act. Works are proposed within the EEC known as the *Aquatic Ecological Community In The Natural Drainage System Of The Lowland Catchment Of The Lachlan River* and where threatened aquatic species including Olive Perchlet, Eel Tailed Catfish and Silver Perch have been modelled to occur. Assessments of Significance under the FM Act concluded that there would be no significant impact on this EEC or the threatened

Legislation	Relevance
	species due to the minor nature of the works and the availability of more extensive areas of habitat elsewhere along the river (Appendix C).
Heritage Act 1977 (Heritage Act)	The Heritage Act aims to conserve the environmental heritage of NSW and regulates development impacts on the state's heritage places, buildings, works, relics, moveable objects or precincts that are important to the people of NSW. These include items of Aboriginal and historic heritage significance. Where these items have importance to the state of NSW, they are sited on the State Heritage Register (SHR). The proposed works do not involve an item or place listed on the NSW State Heritage Register. Approval of works on the site is therefore not required under s57 of the Heritage Act.
Local Land Services Amendment Act 2016 (LLS Amendment Act)	The LLS Amendment Act repealed the *Native Vegetation Act 2003*. The proposal would involve clearing of native vegetation as defined in Part 5A Division 1 Section 60B and 60C of the LLS Amendment Act. Clearing that is authorised under the provisions of Division 3 Section 60O of the LLS Amendment Act includes clearing that is: *an activity carried out by a determining authority within the meaning of Part 5 of that Act after compliance with that Part of the EP&A Act.* *"(ii) an activity carried out by a determining authority within the meaning of Part 5 of that Act after compliance with that Part of the EP&A Act."* The future REF will provide an assessment of the proposed works under Part 5 of the EP&A Act and the proposed works would be carried out by Council, a determining authority as defined by the Act. Therefore, the proposal is not subject to the LLS Amendment Act.
National Parks and Wildlife Act 1974 (NPW Act)	The NP&W Act regulates the proper care, preservation and protection of 'Aboriginal objects' and 'Aboriginal places' in NSW. Under the provisions of the NP&W Act, all Aboriginal objects are protected, and Part 6 of the Act provides specific protection for Aboriginal objects and places making it an offence to destroy, deface, damage or move them from the land. The Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales provides guidance to exercise due diligence when carrying out activities that may harm Aboriginal objects. There is a registered AHIMS site (#43-3-0108) located where the pre-treatment plant is proposed. The AHIMS site is registered as a Potential Archaeological Deposit (PAD). Therefore, an Aboriginal Heritage Impact Permit (AHIP) under the NP&W Act will be required prior to construction commencing.
Protection of the Environment and Operations Act 1997 (POEO Act)	The NSW Environmental Protection Authority (EPA) is responsible for the administration of the POEO Act. The POEO Act regulates air, noise, land and water pollution. Activities listed under Schedule 1 of the POEO Act are scheduled activities which require an Environmental Protection Licence (EPL). The proposal is not likely to constitute a scheduled activity under Schedule 1 of the POEO Act. Section 120 of the POEO Act makes it an offence to pollute waters. It is considered that the proposed works can be carried out without causing water pollution and therefore a licence would not be required. The EPA is the appropriate regulatory authority as the work is being undertaken by a public authority.
Water Management Act 2000 (WM Act)	The WM Act is the sustainable and integrated management of the state's water for the benefit for both present and future generations. If a 'controlled activity' is proposed on 'waterfront land', an approval is required under the *Water Management Act* (s91). 'Controlled activities' include:

Legislation	Relevance
	• the construction of buildings or carrying out of works (except for land based private dwellings, a dual occupancy building or related ancillary facilities); • the removal of material or vegetation from land by excavation or any other means; • the deposition of material on land by landfill or otherwise; or • any activity that affects the quantity or flow of water in a water source. Clause 38 of the *Water Management (General) Regulation 2018* states that public authorities are exempt from the requirement to obtain a controlled activity approval. Therefore, Council is not required to obtain an approval under this Act for any works which may be required within waterfront land. Licensing for the purpose of water supply and conveying water is not exempt; hence a water use and water supply approval would be required under s89 and s90 of the WM Act. Provided that works are undertaken in accordance with the current Water Access Licence and corresponding Works Approval, no changes will be required to the WAL. This is further discussed below in Section 2.1.
	State Environmental Planning Policies
State Environmental Planning Policy (Infrastructure) 2007 (Infrastructure SEPP)	The Infrastructure SEPP simplifies the process for providing essential infrastructures such as schools, hospitals, roads, railways, sewer, water supply and electricity delivery by providing specific planning provisions and development controls. It specifies when development consent is (and is not) required for such development to be carried out in certain zones. As the proposed works will be undertaken by a public authority on land zoned RU1 (Primary Production) and SP2 (Infrastructure), the proposed works are permissible without consent under Division 24 clause 125 of the Infrastructure SEPP.
State Environmental Planning Policy 55 – Remediation of Land (SEPP 55)	SEPP 55, along with the Contaminated Land Planning Guidelines provide the planning framework for the management of contaminated land in NSW. The study area is not identified as being contaminated land by the NSW EPA.
State Environmental Planning Policy (Koala Habitat Protection) 2021 (Koala Habitat Protection SEPP)	The Koala Habitat Protection SEPP aims to encourage the conservation and management of areas of natural vegetation that provide habitat for koalas to support a permanent free-living population over their present range and reverse the current trend of koala population decline. The proposal will be assessed under Part 5 of the EP&A Act; therefore, the Koala Habitat Protection SEPP does not apply. Assessment of the likelihood of occurrence of the Koala is included in Appendix B.
	Local Environmental Plans
Forbes Local Environmental Plan 2013 (Forbes LEP)	The proposed works are located within lands zoned RU1 (Primary Production) and SP2 (Infrastructure). The study area is partially mapped under the Terrestrial Biodiversity layer, which requires consideration of matters listed in clause 7.3 of the Forbes LEP and is within a mapped Groundwater Vulnerability area, requiring consideration of matters listed in clause 7.4 of the Forbes LEP. However, Clause 5.12 of the Forbes LEP states that the Forbes LEP does not restrict or prohibit the carrying out of any development by or on behalf of a public authority that is permitted to be carried out with or without development consent, under the Infrastructure SEPP.

Legislation	Relevance
	Clause 8 of the Infrastructure SEPP states that should there be any inconsistency between the Infrastructure SEPP and any other Environmental Planning Instrument, such as the Forbes LEP, then the Infrastructure SEPP prevails. Therefore, the Forbes LEP provisions do not apply to the proposed works. However, they should be considered. The future REF will consider the consistency of the proposal with the Forbes LEP.

2.1 Licences

2.1.1 Water Sharing Plan

There are three Water Sharing Plans that relate to the water sources found within the PSC LGA. These include:

- Water Sharing Plan for the Lachlan Unregulated River Sources 2012
- Water Sharing Plan for the Lachlan Regulated River Source 2016
- Water Sharing Plan for the Macquarie Bogan Unregulated Rivers Water Sources 2012
- Draft Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2019

2.1.2 Water Access Licence

A Water Access Licence (WAL) is generally required to extract water from rivers or aquifers to use for irrigation, industrial or commercial purposes. The WM Act governs the issue of WALs and approvals for water sources in NSW, where Water Sharing Plans have commenced. PSC currently own 9 WALs for differing purposes as outline in Table 2-2.

Table 2-2: Current WALs owned by PSC

Licence Number	Water Source	Water Sharing Plan	Category	Share (ML)	Nominated Works
70AL600025	Lachlan Regulated	Lachlan Regulated River Source 2016	Local Water Utility	3,225	70WA600026
70AL601569	Lachlan Regulated	Lachlan Regulated River Source 2016	Regulated (General Security)	195	70WA601571
70AL603093	Lachlan Regulated	Lachlan Regulated River Source 2016	Regulated (General Security)	1,500	70WA600026
70AL613603	Upper Lachlan Alluvial Groundwater	Lachlan Unregulated River Sources 2012	Aquifer (Groundwater)	4,350	70CA613604
70AL614682	Upper Lachlan Alluvial Groundwater	Macquarie Bogan Unregulated Rivers Water Sources 2012	Aquifer (Groundwater)	350	70CA613604
80AL719516	Upper Bogan River	Macquarie Bogan Unregulated Rivers Water Sources 2012	Unregulated River	2	80CA719517
80AL719514	Upper Bogan River	Macquarie Bogan Unregulated Rivers Water Sources 2012	Domestic and Stock	4	80CA719517

Licence Number	Water Source	Water Sharing Plan	Category	Share (ML)	Nominated Works
80AL719515	Upper Bogan River	Macquarie Bogan Unregulated Rivers Water Sources 2012	Domestic and Stock (Town Water Supply)	10	80CA719517
-	Gunningbland and Yarrabandai	Lachlan Unregulated River Sources 2012	Local Water Utility	2	70CA611396

PSC currently own three WALs for the Lachlan River water source for both General Security and Local Water Utility purposes, which have a combined share capacity of 4,920 ML (equating to approximately 160 L/s). There are also an additional two WALs for the Upper Lachlan Alluvial Groundwater for groundwater purposes, which have a combined share capacity of 4,700 ML (equating to approximately 149 L/s). Together this provides for an approximate share capacity of 305 L/s.

The current and future average and peak demands for the Parkes WTP, North Parkes Mine and Special Activation Precinct (SAP) are outlined in Table 2-3. As shown, the current average and peak demand is approximately 185 L/s and 280 L/s, respectively. This is problematic as the existing infrastructure has a capacity of 240 L/s. Furthermore, the estimated future average and peak demand is approximately 300 L/s and 410 L/s, respectively. The Program therefore proposes to increase the capacity of existing infrastructure to approximately 440 L/s to service current peak demands and predicted future average and peak demands.

Table 2-3: Estimated demands of water users

	Current Average Demand	Current Peak Demand	Estimated Future Average Demand	Estimated Future Peak Demand
Parkes WTP	85 L/s	180 L/s	120 L/s	180 L/s
North Parkes Mine	100 L/s	100 L/s	120 L/s	150 L/s
SAP	-	-	60 L/s	80 L/s
TOTAL	**185 L/s**	**280 L/s**	**300 L/s**	**410 L/s**

The existing WAL allocations can provide for a significant increase in average daily demands. Therefore, short to medium term impacts on existing WAL allocations are not anticipated and the existing WALs to not currently need to be amended.

3. Project Description

3.1 Detailed Scope of Works

A detailed map of the proposed works is provided in Figure 3-1.

3.1.1 Site Set Up

- A Dial Before You Dig Assessment (DBYD) will be undertaken prior to any excavation or construction works to locate any service infrastructure present on site.
- Transport of machinery, equipment and materials to the site and establishment of site storage and parking areas.
- Preparation of delegated compound site within Lot 81 DP 750183.
- Installation of sediment and erosion protection measures in accordance with the 'Blue Book' Soils and Construction, Managing Urban Stormwater (Landcom, 2004) with reference to Chapter 5 'Erosion Control: Management of Water'.
- Installation of protection and exclusion fencing around vegetation that is to be protected and to delineate area of works.
- Installation of fencing to restrict pedestrian access.
- Temporary traffic control for when temporary plant and material entering site.

3.1.2 Construction Work

3.1.2.1 Lachlan River Pump Station Augmentation

The construction works for the LRPS augmentation will include:

- Installation of an additional intake with screen from Aqseptance, similar to the existing intake and screen. Construction would require the use of coffer dams to allow for the construction of the footing / mounting pad for the inlet and screen to be mounted.
- Excavation into the bank of the river will be required to access the existing pipework to allow the installation of the new pipework for the second intake and to expose the footing for the screen.
- Minor modifications to the existing Hydrobust system in order to allow for staggered operation of the unit for both screens.
- Installation of a third wet well pump (most likely Flygt N3301 Ht 3 Model). Excavation around the existing wet well will be required, including trenching between pits and electrical infrastructure. The trenches will be approximately 700 mm deep and excavation around the existing valve pit will be approximately 1,800 mm deep.
- Construction of pipe from the wet well pump to the discharge manifold.
- Reconfiguration of the turbidity sensor within the existing wet well, to provide consistent turbidity data.
- Augmentation of the above ground power line.

3.1.2.2 Construction of Lachlan River Pre-Treatment Plant

The Lachlan River Pre-Treatment Plant will be approximately 7.8 ha in size and consist of the following infrastructure:

- Two sediment lagoons, plus room for one additional lagoon. The volume of each lagoon will be 56,000 m^3 (including freeboard) and each will have a working volume of 45,000 m^3 (settling mode)
- Chemical dosing building
- Switch room and amenities building
- Solar array
- Access roads (approximately 12 m wide)
- Clear water collection pit and pump station
- Connecting pipelines

The construction works for the Lachlan River Pre-Treatment Plant will include:

- Excavation for the sediment lagoons and the pump station sump at a depth of 1.5 m and 4 m, respectively.
- Proof-rolling of lagoons will be undertaken to ensure the subgrade is smooth and free of stones.
- Lagoons will be constructed with an appropriate clay liner, which achieves the required permeability criteria and minimises leakage. The permeability of the clay liner will be 1x10-9 m/s.
- All lagoons will be constructed above the water table to ensure no underlying seasonal water tables are intersected and risk of inundation, overflow or damage from flood waters is minimised.
- Construction of sdolar array, including 1,620 panels each rated at 330 W for a total system size of 535 kW. The spacing between rows of solar tables will be constructed at approximately 4.9 m (resulting from a pitch of 8.5 m from centre of one table to the centre of the next table) to allow for a maintenance vehicle to drive down in order to access panels.
- Other ancillary infrastructure such as a chemical dosing building, clear water pump station and switch room will be constructed.

3.1.3 Post Construction Work

- Removal of excess materials and disposal of excavated debris as appropriate.
- Reinstate disturbed surfaces, including Lachlan River channel and flow after coffer dams are removed.
- Removal of any instream erosion and sediment controls.
- Establishment of native species cover and density along the riparian corridor through revegetation works.

A Construction Environmental Management Plan (CEMP) will be prepared prior to on-ground works commencing. This will specify the location of proposed site compound and stockpiling areas for materials and equipment, and 'no go' zones around environmentally sensitive areas.

3.1.4 Machinery, Equipment, Access and Ancillary Works

Works will be undertaken predominantly using machinery such as:

- Excavator(s) for earthworks
- Front Loader Truck

- Compactor
- Cement Truck
- Cement Pump
- Dump Truck / Mocksy
- Scraper
- Water Cart
- Bobcat or posi track
- Light vehicles for transportation

Access to the site will be via the existing road infrastructure, The Escort Way, locally known as the Forbes-Eugowra Road.

3.1.5 Duration and Working Hours

Work hours will be in accordance with both PSC standard work times and the Interim Construction Noise Guideline (ICNG), detailed below which will minimise impacts to residents in proximity to the works:

- Monday to Friday 7 am to 6 pm
- Saturday 8 am to 1 pm
- No work on Sunday or public holidays

Works are aimed to commence in 2021.

Figure 3-1: Detailed map of proposed works

4. Project Justification

The Program and Project are justified for the main reason of securing an adequate supply of water, which will support economic development and growth in the industrial, commercial, residential and transportation sectors in the Parkes Shire.

In a worst-case scenario, Parkes has only 48-hours' worth of water supply (The Environmental Factor, 2020). That is, within the Shire, there is enough capacity in storage for two days if water cannot be sourced due to river flow ceasing, the aquifer being unavailable due to heavy draw down, or if pump/power failures occur.

With no surface recharge to the aquifers in the valley since 2012, the security of the borefields is a growing concern. The bores are a constrained water source, and consideration of the many users at the Forbes site must be given, with five bores for townships and six irrigation bores currently operational in one location. This groundwater resource has the potential to 'bottom out', requiring at least seven days to recharge. In addition to which, when Wyangala Dam is dry, the Parkes town water supply will be under severe stress.

The predicted impact of climate change is likely to exacerbate existing water supply issues. Climate change is predicted to alter existing rainfall patterns by generally reducing the frequency of rainfall events but increase intensity of events. Further, despite recent increases in rain, Parkes Shire has been declared in an 'intense drought' for over 24 months (DPI, 2019), with rainfall declining to 328 mm for the year in 2018 (down 13.9% on average per annum since 2010). The proposal will support existing demand reduction activities undertaken by PSC to create resilience to the predicted impacts of climate change such as drought (AEC, 2019).

Despite water supply issues, the area presents mining and industrial development opportunities that will boost employment and population thereby significantly improving the regional economy and social outcomes. The proposal will facilitate improved economic outcomes for Parkes and surrounding regions embedded in higher population, visitation and employment growth as water security provides confidence for economic investment opportunities associated with the Parkes National Logistics Hub, SAP, Inland Rail and the Airport Business Park. It is estimated that construction of the Program will add $7.4 million in output for local businesses as well as $3.7 million in GRP for the Parkes economy and $2.0 million in wages and salaries paid to households (AEC Group, 2019). Further discussion on the social and economic benefits are included in Section 5.11 of this report.

5. Existing Environment and Impact Assessment

5.1 Geology and Soils

5.1.1 Existing Environment

5.1.1.1 Topography

The landforms within the area are comprised of high-level floodplains of the Lachlan River on Quaternary alluvium. The works will be situated on flat land, which sits at an elevation of approximately 240 m throughout the entire study area. The surrounding landscape is largely flat with an elevation ranging from 200 m to 280 m across the Lachlan floodplains.

5.1.1.2 Soil Landscapes

The study area is located on the Lower Slopes subregion of the NSW South Western Slopes Bioregion (IBRA7).

The north-eastern portion of the study area is mapped as being within the Waughan soil landscape in accordance with the Soil Landscapes of the Forbes 1:250 000 Sheet Report (Department of Land and Water Conservation 1998) (Figure 5-1). Soils of the Waughan landscape are typified by deep imperfectly drained Yellow Podzolic Soils and occasional poorly drained brown and red clays.

The remainder, and majority of the study area is mapped as being within the Lachlan soil landscape. The Lachlan soil landscape is characterised by moderately deep to deep alluvial soils that comprise the alluvial plains and terraces of the Lachlan River.

The proposed works will be primarily located within a heavily modified landscape, which has predominantly been used for agricultural purposes, water supply infrastructure and roading. The current and past land use practices of the study area have been recorded as agricultural cultivation. Pesticides may have been used within the study area occasionally for agricultural purposes, however contaminated soils are not considered likely to occur.

There are no recorded occurrences of acid sulfate soils or salinity within the study area.

Figure 5-1: Soil landscapes within and in proximity to the proposed works area

5.1.2 Impact Assessment

Excavation is required to construct the sediment lagoons, new wet well and pipe infrastructure. Excavation will occur to a depth of approximately 1.5 m and will largely consist of excavation of alluvial soils. Potential environmental impacts associated with the works include:

- Erosion of exposed soils from wind, rain and flood.
- Sediment migration into the surrounding environment (including to the Lachlan River) due to loose soils exposed by excavation processes.
- Over compaction of soils that will minimise the opportunity for site rehabilitation and revegetation. This could occur throughout the construction period with frequent movement of heavy machinery.
- Contamination and pollution risk associated with the construction process. This could occur through construction waste entering the soil, hazardous particulates from construction materials, leaks of fuel or chemicals used for construction processes.
- Localised flooding would exacerbate any of the above identified impacts

The potential impact to soils is heavily influenced by the weather events such as high intensity and duration of rainfall and/or wind. These conditions may cause stockpiled materials on site to be transported to other environments including increased sedimentation of the river. Furthermore, with the work located on the bed and banks of the Lachlan River within the more erodible alluvial soils of the Lachlan soil landscape, there is further potential to impact soil stability and result in soil erosion and sedimentation of Lachlan River.

While there is potential during construction for erosion and sedimentation to occur, these are expected to be mitigated using strict sediment and erosion controls.

The risk of soil erosion and sedimentation during the works are anticipated to be low if the mitigation measures described in Table 5-1 are implemented.

5.1.3 Mitigation Measures

Table 5-1: Geology and Soils mitigation measures

Reference	Environmental Aspect	Mitigation Measures
GS01	Erosion and sedimentation	• Prepare a CEMP prior to any construction works to address measures to be adopted to minimise impacts on the environment as a result of the construction works, including sediment erosion and sedimentation. • The Sediment and Erosion Control Plan is to be prepared in accordance with *The Blue Book – Managing Urban Stormwater: Soils and Construction* (Landcom 2004) and implemented prior to works, with the aim of achieving an outcome of 'no visible turbid plumes migrating through the waterway'. The Plan must include, but not be limited to: ○ Locations and type of sediment controls, both adjacent to and in the stream, to be erected surrounding the River and anywhere water is predicted to enter/exit the site. These can be constructed from hay bales or sandbags and lined with geofabric; however, they must be secured to ensure they do not mobilise. ○ Prior to forecast heavy rain, work is to cease, accumulated material is to be removed from sediment controls. Any sediment

Reference	Environmental Aspect	Mitigation Measures
		controls instream are to be removed from the waterway to allow free movement of water and prevent them causing a flood hazard or other environmental damage downstream. ○ Works area within the river should be dewatered prior to construction works commencing to reduce likelihood of additional sediment or waste material entering the waterway. It has been proposed for coffer dams to be used to create a work area. As part of dewatering the works area, the coffer dam must not block the entire width of the river to avoid obstructions to fish passage. Dewatering and delineating a dry works area is to be established for no more than half of the channel width at any one time. As part of the dewatering process, the outlet pump is to be positioned in a vegetated, stable area out of the channel to allow water to flow over the vegetated area prior to re-entering the river. This will reduce the likelihood of localised erosion and sedimentation occurring at the discharge area. ○ If fish or other aquatic fauna, such as yabbies, are stranded during the establishment of the dry work area, they must be carefully returned to the river. ○ The inlet pipe must be caged to minimise damage to aquatic fauna. • Inspect erosion controls regularly (daily during workdays) and after rainfall. Fix damaged controls immediately. Remove accumulated sediment or waste material from the sediment controls regularly and dispose of at a licensed waste facility. • Monitor sedimentation down slope of excavated areas. • Leave erosion and sediment controls in place until after the works are completed. • Schedule the works outside of predicted heavy rain periods. • Stop work during and following heavy rainfall to reduce risk of mobilising sediment. • Spoil stockpiles are to be wetted regularly to reduce opportunities for wind assisted sedimentation.
GS02	Soil contamination	• If contaminated soils are uncovered during the works, all works within the vicinity of the find must cease immediately and the PSC Project Manager must be notified immediately. • For any excess spoil material which requires offsite disposal, formal waste classification will be required before being taken to an appropriately licensed landfill in accordance with the EPA (2014) Waste Classification Guidelines. • Store all chemicals (e.g. fuel, oil) in appropriate bunding/storage systems within the approved storage facility. • Ensure appropriate spill kits are carried with the equipment. • Dedicated refuelling areas are to be established outside of the riparian area and away from the river. These areas are to be bunded to ensure any spills do not enter the riparian vegetation areas.

5.2 Groundwater and Surface Water

5.2.1 Existing Environment

The Lachlan River catchment occupies an area of approximately 85,000 km^2 and flows 1,484 km across western NSW from the Great Dividing Range near Gunning to its junction with the Murrumbidgee River near Oxley (Murray-Darling Basin Authority, 2020). The terrain of the Lachlan River catchment varies significantly as the river moves from the headwaters in the tablelands to the flat, western plains. Flows within the Lachlan River reach their maximum at Forbes, with an average flow of 3,197 ML daily (NSW Office of Water, 2011). The Lachlan River in the study area is an 8^{th} order stream adjacent to a narrowly vegetated riparian corridor surrounded by predominantly bare paddocks with pasture grasses.

The subject site, where the pre-treatment plant and additional intake with screen is proposed, is located on the downstream extent of a heavy bend within Lachlan River, with steep vegetated banks. The banks show evidence of fluvial erosion related to heavy rainfall events and flooding. The lower profile of the bank is unvegetated indicative of prolonged inundation associated with irrigation flow releases from Wyangala Dam (GHD, 2015), as well as previous revegetation works not establishing post recent construction activities.

The Lachlan River has high turbidity due to the clay-based soils combined with low flow. Adjacent rural practices have contributed to this with ploughing, in some instances, to the top of the banks. Water quality records at the site show Electrical Conductivity, Copper and Total Phosphorus (TP) exceeded the ANZECC aquatic ecosystems trigger values. High levels of nitrogen found in the river are further reflections of the impact that farming practices have had on the river (OzArk Environmental and Heritage Management, 2015).

The groundwater sources in the vicinity of the development areas are the alluvial groundwater sources, regulated by the Lachlan Unregulated and Alluvial Water Sources Water Sharing Plan (WSP), and the fractured rock aquifers of the Lachlan Fold Belt, regulated by the NSW Murray Darling Basin Fractured Rock Groundwater Sources WSP. The alluvial aquifer associated with the Lachlan River consists of two major formations; the deeper Lachlan Formation that fills the deep paleo channels of the Lachlan River and the overlying thinner Cowra Formation (GHD, 2015). Groundwater in the area is recharged by rainfall with groundwater levels raising in winter and lowering in summer. The site and study area are mapped as having high groundwater vulnerability, meaning that groundwater sources are at particular risk to contamination.

Figure 5-2: Watercourses (Lachlan River) in proximity to the subject site

5.2.2 Impact Assessment

Works proposed on the bed and bank have the potential to impact the river. In particular the installation of the second screen that would require the construction of a coffer dam around the intake screen to allow for the construction of the footing/mounting pad for the inlet screen to be mounted. To determine potential impacts, it is assumed that the coffer dam will partially restrict the flow of the river. In turn, temporarily narrowing the river and increasing velocity. However, opportunities are being investigated to utilise divers for the installation of the second screen.

Potential impacts associated with the works and operation of the works in the bed and bank of the river include:

- Fish and other aquatic animals passage partially blocked during construction by the coffer dam
- Flow of the river and velocity altered by the coffer dam changing natural flow regimes potentially causing bank erosion
- Destabilisation of riverbank resulting in bank erosion
- Risk to proposed and existing infrastructure from future meander bend migration
- Soil erosion from disturbed areas and sedimentation of waterways
- Contamination of Lachlan River through oil/chemical spills

Potential impacts associated with the works and operation of the plant associated to groundwater:

- Due to the high degree of connectivity between surface water and the shallow alluvial aquifer; increasing the rate of extraction from the Lachlan River may result in localised drawdown in the shallow alluvial aquifer
- The River Red Gum vegetation community along the bank of the Lachlan River is a Groundwater Dependent Ecosystem (GDE). Draw down of shallow alluvial aquifer caused by increased extraction of water from the Lachlan River may impact this ecosystem.
- Reduced water availability for other water users including irrigated agriculture, fishermen and surface and groundwater dependent ecosystems.

The risk of impacts on surface and groundwater during construction and operation of the works is anticipated to be low if the mitigation measures described in Table 5-2 are implemented.

5.2.3 Mitigation Measures

Table 5-2: Surface and groundwater mitigation measures

Reference	Environmental Aspect	Mitigation Measures
W01	Sedimentation of waterway	• Weather forecasts will be checked daily to ensure that work is not carried out before or during high rainfall. • If high rainfall is forecast all sediment erosion controls must be checked to ensure they are operational, and repairs made if required. • Work is to be ceased during and immediately after heavy rainfall.
W02	Contamination of waterway	• Prior to use at the site and/or entry into the waterway, machinery is to be cleaned, degreased and serviced. • Store all chemicals (e.g. fuel, oil) used for construction purposes offsite. If chemicals are required to be stored onsite, chemicals should

Reference	Environmental Aspect	Mitigation Measures
		be stored in appropriate bunding/storage systems, outside of the riparian zones and only for short periods. • All chemicals used for operational purposes must be stored in appropriate bunding/storage system within the approved storage facility. • Ensure appropriate spill kits, are present onsite. • Ensure all equipment is in good working order. • Carry associated Safety Data Sheets (SDS) for all chemicals. • Do not use any chemicals that are labelled as 'harmful to marine life' or 'Class 9 Environmentally hazardous' as part of the proposed activities. • Wash all equipment, including, erosion and sediment control measures and trailers to prevent spread of exotic species. A visual check for vegetation and seeds on all equipment machinery to be used in the activities must be carried out before work commences. • Coffer dams and installation devices must be washed before installation to avoid the spread of exotic species, sedimentation and other contaminants.
WO3	Groundwater Interference	• If required, a groundwater Water Supply Approval and/ or Water Access Licence from Natural Resources Access Regulator (NRAR) should be obtained. PSC are responsible for complying with the approval conditions (such as protecting water quality; minimising aquifer extraction volumes, monitoring extraction with flow meters and recording volumes).

5.3 Biodiversity

5.3.1 Methodology

The preliminary biodiversity assessment has been drafted using a four-step process to determine the likely presence of, and impacts to threatened species, populations, and ecological communities listed under either the NSW BC Act, FM Act and/or the Commonwealth EPBC Act as described below.

5.3.1.1 Literature and Database Review

A desktop review of relevant literature and databases was undertaken to inform a preliminary list of candidate species for assessment for this REF. The following databases and reports were considered during the database search:

- BioNet Atlas (DPIE, 2020), considering all species identified within the locality (>10km of the study area);
- EPBC Act Protected Matters Search Tool (DoEE, 2020), considering all species identified within the locality (>10km of study area);
- Aerial mapping and vegetation mapping, to assess the extent of vegetation including mapped Threatened Ecological Communities (TECs) listed under the BC Act and/or EPBC Act;
- Fisheries Spatial Data Portal (NSW, DPI)
- Fisheries Threatened Species Distribution maps (Riches et al, 2016) and Primefacts
- Biodiversity Values Map (BV Map) (DPIE, 2020)
- Regent Honeyeater Mapping (OEH, 2020)

All flora and fauna candidate species are collated in Appendix B. Species identified as Marine under the EPBC Act have been excluded from the likelihood assessment, as the area of investigation is not within a Commonwealth marine area.

5.3.1.2 Rationalisation of Likelihood Assessment

Following the analysis of the desktop review a likelihood of occurrence assessment was conducted for each threatened and migratory species identified during the database search.

The assessment of likelihood was made for threatened and migratory species identified from the database search. This assessment applies to the identified study area in Figure 1-2. Five terms for the likelihood of occurrence of species are used in this report. This assessment was based on database or other records, presence or absence of suitable habitat, features of the study area and professional judgement.

The terms for likelihood of occurrence are defined below:

- “known” = the species was or has been observed on the site
- “likely” = a medium to high probability that a species uses the site
- “potential” = suitable habitat for a species occurs on the site, but there is insufficient information to categorise the species as likely to occur, or unlikely to occur
- “unlikely” = a very low to low probability that a species uses the site
- “no” = habitat on site and within the study area is unsuitable for this species.

5.3.1.2.1 Field Survey

A one-day rapid assessment was also undertaken by ELA Senior Ecologist (Dr. Cheryl O'Dwyer) to validate Plant Community Types (PCTs) and assess the likelihood of impacts to any threatened flora, fauna or ecological communities.

Assessments for the suitability of the available habitat for threatened flora and fauna species included locating any specific features of importance to threatened biodiversity and recording its location using a handheld GPS unit. Elements of specific interest included stick nests, hollow bearing trees (HBT) and large trees that provide roosting habitat and shelter for fauna species.

The aim of the field survey was to ascertain if any threatened flora, fauna and ecological communities listed under either the BC Act or EPBC Act are likely to be located or have habitat within the study area. The field survey was conducted to determine the following:

- validate or 'ground truth' the extent and quality of terrestrial and riparian native vegetation
- identify the presence of threatened terrestrial species/populations or whether potential habitat for these species/populations is likely to occur
- any other potential ecological values such as regionally or locally significant flora and fauna

5.3.1.3 Impact Assessment

This step involves an assessment of potential direct and indirect impacts to threatened and migratory species. If any impacts are determined mitigation strategies will be discussed. Assessments of Significance are undertaken in accordance with the following legislation:

- BC Act for threatened species and/or TECs
- FM Act for threatened species
- EPBC Act for any MNES

The assumption of this REF is that direct impacts related to the proposed activities will be mainly restricted to the existing disturbed area within the study area, with the exception of any vegetation clearing required to access Lachlan River for the installation of the second screen and roadside vegetation located east of the pre-treatment plant.

Indirect impacts to biodiversity due to the construction of the pre-treatment plant were also considered, although as the study area has previously been cleared, the proposed works are unlikely to significantly exacerbate Key Threatening Processes (i.e. threats that may adversely affect threatened species or ecological communities or cause species or ecological communities to become threatened).

5.3.2 Existing Environment

The study area is located within Lower Slopes subregion of the South Western Slopes Bioregion within the Eugowra Plains and Lachlan-Bland Channels and Floodplains Landscape units. The study area has predominantly been disturbed and cleared for agricultural uses such as cropping and grazing. Due to this long history of land use the study area has been predominantly cleared with the edges of the cleared areas showing a high abundance of established weeds.

There are two mapped watercourses within the study area: a 1st order (Strahler classification) in the south and the Lachlan River, an 8th order Strahler classification in the north. (Figure 5-2). The

recommended riparian corridor width for a 4th Strahler order and greater watercourse is 80 m plus the channel width (40 metres either side of the watercourse) (NRAR, 2018).

The Lachlan River is mapped Key Fish Habitat by NSW Fisheries. Furthermore, the Lachlan River and its associated riparian vegetation has been mapped as sensitive land on NSW Biodiversity Values Map (BVM).

5.3.2.1 Vegetation communities

Vegetation within and around the study area has been extensively modified due to historical disturbances and current agricultural activities. Where the pre-treatment plant is proposed, the majority of the vegetation is either grazed or cropped. Other parts of the study area consist of scattered patches of roadside native vegetation, isolated trees and riparian vegetation.

Four PCTs have been mapped as occurring within the study area (Figure 5-3). Table 5-3 outlines these PCTs, as well as their conservation status under both State and Commonwealth legislation.

Table 5-3: Plant Community Types within the study area

PCT	PCT Name	BC Act Status	EPBC Act Status
0	Exotic Vegetation	-	-
5	River Red Gum herbaceous-grassy tall open forest wetland on inner floodplains in the lower slopes sub-region of the NSW South Western Slopes Bioregion and the eastern Riverina Bioregion	-	-
74	Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion	Critically Endangered	Critically Endangered
201	Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion	Endangered	
277	Blakelys Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion'	Critically Endangered	Critically Endangered

Within the subject site, the location of the proposed pre-treatment plant consists of cleared paddocks that have been cropped with exotic vegetation present including *Echium vulgare* (Vipers bugloss), *Lepidium* sp. (Wild Mustard), *Malva parviflora* (Common mallow) and *Brassica nigra* (Black Mustard).

The vegetation along the southern side of The Escort Way conforms to PCT 277 *Blakely's Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion* with the presence of *Eucalyptus blakelyi* (Blakely's Red Gum) and *Eucalyptus melliodora* (Yellow Box). This PCT is associated with the *White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland* vegetation community, listed as Critically Endangered under both the BC Act and EPBC Act. However, whilst this area conforms to the listed community under the BC Act it is unlikely to conform to the EPBC listed community due to the highly degraded nature of the understorey.

The riparian vegetation along the Lachlan River conforms to a heavily degraded PCT 5 and is dominated by an overstorey of *Eucalyptus camaldulensis* (River Red Gums) with a highly disturbed understorey with *Phalaris aquatica* (Phalaris), *E. vulgare, M. parviflora and B. nigra* present. This PCT does not conform to a TEC.

Figure 5-3: Plant Community Types within the proposed works area (ELA, 2021)

5.3.2.2 Aquatic habitat

The *Aquatic ecological community in the natural drainage system of the lowland catchment of the Lachlan River* is listed as an Endangered Ecological Community (EEC) under Schedule 4 of the FM Act. This EEC includes all native fish and aquatic invertebrates within all-natural rivers, creeks, streams and associated lagoons, billabongs, lakes, wetlands, paleochannels, flood-runners, floodplains and effluent streams of the Lachlan River (DPI, 2006). While the reach of the Lachlan River in the study area is characterised by steep, sparsely vegetated banks and turbid water, the area is likely to provide habitat for a number of aquatic fauna species.

Threatened Species Distribution Maps developed by Riches et al (2016) identify three species of threatened fish listed under the FM Act as likely to occur in the study area (Table 5-4). In addition, there are three species of fish listed as Endangered under the EPBC Act that have potential to occur in the area.

As an 8th order stream, the Lachlan River is considered KFH by DPI Fisheries.

5.3.2.3 Threatened Flora and Fauna Habitat

The literature and database review, including the results of the BioNet database and EPBC Act Protected Matters Search Tool, identified four EECs/CEECs, 61 threatened fauna species, and four threatened flora species with the potential to occur within a 10 km radius of the subject site (Figure 5-4). Each of these were assessed for likelihood of occurrence, incorporating the results of the field survey and assessment of potential habitat within the subject site, with the full likelihood assessment presented in Appendix B. The list was refined to 30 threatened species or communities that are likely or with the potential to occur within the study area.

The presence of KFH requires an assessment of the waterways and the potential for threatened fish as defined under the FM Act to occur in them. Searches for modelled habitat of threatened fish species were undertaken using DPI Primefacts and NSW Fisheries Spatial Portal. The following threatened species and ecological community have a modelled distribution in the Lachlan River:

- *Tandanus tandanus* (Eel-tailed Catfish – Murray Darling Population)
- *Galaxias rostratus* (Flathead galaxias)
- *Ambassis agassizii* (Olive Perchlet – Western population)
- *Bidyanis bidyanis* (Sliver Perch)
- *Maccullochela peelii peelii* (Murray Cod)
- Endangered Ecological Community in the natural drainage system of the lowland catchment of the Lachlan River.

Of the above, only three have been modelled to occur within the subject site, being Olive Perchlet, Eel-tailed Catfish and Silver Perch.

Figure 5-4: Threatened ecological values within 10 km radius of study area

5.3.2.3.1 Threatened Fauna

No threatened fauna species were identified within the study area during the field survey. However, targeted fauna surveys were not undertaken. Vegetation within the proposed pre-treatment plant area has been cleared and highly disturbed and is unlikely to provide potential habitat for threatened fauna species.

The roadside vegetation alongside The Escort Way and riparian vegetation alongside Lachlan River contains moderate condition native vegetation, with an intact canopy. This native vegetation may provide potential habitat for a number of threatened fauna species. The habitat features relevant to each fauna species are identified in Table 5-4. While the reach of the Lachlan River within the subject site was a slow-flowing, turbid section of the channel, large woody debris observed within the channel would provide potential habitat for threatened aquatic species.

Table 5-4: Threatened species likely or with potential to occur in the study area.

Scientific name	Common name	BC/FM Act Status	EPBC Act Status	Habitat features present within study area
Ambassis agassizii	Olive Perchlet, western NSW population	E		Lachlan River – slow-flowing water and sheltered areas such as dead branches
Bidyanus bidyanus	Silver Perch	V		Lachlan River – open sections of river
Maccullochella macquariensis	Trout Cod	E	E	Lachlan River – instream woody debris
Maccullochella peelii	Murray Cod	-	V	Lachlan River- slow-flowing, turbid rivers
Macquaria australasica	Macquarie Perch	E	E	Lachlan River – instream woody debris
Tandanus tandanus	Eel Tailed Catfish, Murray-Darling Basin Population	E		Lachlan River – flowing streams with turbid waters
Anseranas semipalmata	Magpie Goose	V		Grasslands
Anthochaera phrygia	Regent Honeyeater	E4A,	CE	Dry, open eucalypt forests and woodland; Lachlan River.
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V		Dry, open eucalypt forests and woodland
Burhinus grallarius	Bush Stone-curlew	E		Grassland and open eucalypt woodland with LWD
Certhionyx variegatus	Pied Honeyeater	V		Dry, open eucalypt forests and woodland
Chthonicola sagittata	Speckled Warbler	V		Dry, open eucalypt forests and woodland
Circus assimilis	Spotted Harrier	V		Open woodland, grassland and agricultural land
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V		Dry, open eucalypt forests and woodland
Daphoenositta chrysoptera	Varied Sittella	V		Dry, open eucalypt forests and woodland
Epthianura albifrons	White-fronted Chat	V		Open grassland

Scientific name	Common name	BC/FM Act Status	EPBC Act Status	Habitat features present within study area
Falco hypoleucos	Grey Falcon	E1,	V	Open grassland
Falco subniger	Black Falcon	V		Open grassland
Glossopsitta pusilla	Little Lorikeet	V		Dry, open eucalypt forests and woodland
Grantiella picta	Painted Honeyeater		V	Dry, open eucalypt forests and woodland
Haliaeetus leucogaster	White-bellied Sea-Eagle	V		Open grassland
Hieraaetus morphnoides	Little Eagle	V		Open grassland
Hydroprogne caspia	Caspian Tern		M	Grassland and Lachlan River
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V		Dry, open eucalypt forests and woodland
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V		Dry, open eucalypt forests and woodland
Neophema pulchella	Turquoise Parrot	V		Dry, open eucalypt forests and woodland
Ninox connivens	Barking Owl	V		Dry, open eucalypt forests and woodland
Pachycephala inornata	Gilberts Whistler	V		Box iron bark woodlands and River Red gum forests
Petroica phoenicea	Flame Robin	V		Eucalypt forests and woodland
Polytelis swainsonii	Superb Parrot	V	V	Box-Gum woodlands and River Red gum forests
Pomatostomus temporalis temporalis	Grey Crowned Babbler	V		Eucalypt forests and woodland
Stagonopleura guttata	Diamond Firetail	V		Box-Gum woodlands
Stictonetta naevosa	Freckled Duck	V		Grassland and Lachlan River

BC ACT KEY: E1 = ENDANGERED, E4A = CRITICALLY ENDANGERED, V = VULNERABLE.
FM ACT KEY: V = VULNERABLE, E = ENDANGERED.
EPBC ACT KEY: E = ENDANGERED, CE = CRITICALLY ENDANGERED, V = VULNERABLE.

The riparian vegetation (PCT 5) along the Lachlan river consists of large *Eucalyptus camaldulensis* (River Red Gums) with many containing hollows. These trees may be impacted by proposed works if no avoidance or mitigation measures are implemented. However, access to install the second in-take screen will utilise previously cleared areas to avoid the removal of canopy species.

5.3.2.3.2 Threatened Flora

No threatened flora species were observed within the study area during field survey. The majority of the study area was walked, and no threatened flora were found. No habitat was available for threatened flora species, due in part to the high level of modification of ground cover vegetation within the study area.

5.3.3 Impact Assessment

5.3.3.1 Impacts to Vegetation Communities

Construction of the project will be designed to avoid the requirement for removal of native trees, where feasible. However, as a worse-case scenario, minor impacts to native vegetation may be required east of the proposed pre-treatment plant, with the possibility of direct impacts to 0.02 ha of PCT 277. Indirect impacts may occur to 0.12 ha of PCT 277 through accidental trampling, spoil placement and vehicle and machinery access (Table 5-5).

The understorey of the riparian vegetation alongside Lachlan River is highly disturbed (PCT 5). There will be no direct impacts to this PCT (Table 5-5). Trimming and/or lopping of branches may be required to provide access to the Lachlan River during installation of the second screen intake and to provide access to the pre-treatment plant construction site causing indirect impacts. As a worse-case scenario, it is likely that 0.01 ha may be impacted as a result of activities indirectly impacting PCT 5 (Table 5-5).

As a precautionary approach, a Test of Significance in accordance with the BC Act was undertaken for PCT 277 (Appendix D). It was determined that PCT 277 did not meet the condition threshold for the EPBC Act listed TEC. Therefore, a Significance Assessment in accordance with the EPBC Act was not undertaken.

Table 5-5: Areas of PCTs impacted by proposed activity

PCT	Equivalent TEC	Direct Impact (ha)	Indirect Impact (10 m Construction Buffer) (ha)	TOTAL (ha)
277	*White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland*	0.02	0.12	0.14
5	-	0.00	0.01	0.01
			TOTAL	**0.15**

5.3.3.2 Impacts to Threatened Species Habitat

No threatened flora species or suitable habitat for threatened flora species were identified within the study area. Therefore, no significant impacts to any threatened flora species are anticipated.

Through detailed design, it is not anticipated that the proposed works will remove any native trees. The pruning / removal of tree branches will not remove potential habitat for threatened fauna species. Therefore, potential foraging habitat for the terrestrial species listed in Table 5-4 is unlikely to be impacted.

As a worse-case scenario, the proposed works maydirectly impact up to 0.02 ha of native vegetation and may indirectly impact up to 0.13 ha of native vegetation located within the 10 m construction buffer – some of which represents marginal or suitable foraging habitat for the following species:

- *Anseranas semipalmata* (Magpie Goose)
- *Anthochaera phrygia* (Regent Honeyeater)
- *Artamus cyanopterus cyanopterus* (Dusky Woodswallow)
- *Burhinus grallarius* (Bush Stone Curlew)
- *Certhionyx variegatus* (Pied Honeyeater)
- *Chthonicola sagittata* (Speckled Warbler)

- *Circus assimilis* (Spotted Harrier)
- *Climacteris picumnus victoriae* (Brown Treecreeper (eastern subspecies))
- *Daphoenositta chrysoptera* (Varied Sittella)
- *Epthianura albifrons* (White-fronted Chat)
- *Falco hypoleucos* (Grey Falcon)
- *Falco subniger* (Black Falcon)
- *Glossopsitta pusilla* (Little Lorikeet)
- *Grantiella picta* (Painted Honeyeater)
- *Haliaeetus leucogaster* (White-bellied Sea-eagle)
- *Hieraaetus morphnoides* (Little Eagle)
- *Lathamus discolor* (Swift Parrot)
- *Melanodryas cucullata cucullata* (Hooded Robin (south-eastern form))
- *Melithreptus gularis gularis* (Black-chinned Honeyeater (eastern subspecies))
- *Neophema pulchella* (Turquoise Parrot)
- *Ninox connivens* (Barking Owl)
- *Pachycephala inornata* (Gilbert's Whistler)
- *Petroica phoenicea* (Flame Robin)
- *Polytelis swainsonii* (Superb Parrot)
- *Pomatostomus temporalis temporalis* (Grey-crowned Babbler (eastern subspecies))
- *Stagonopleura guttata* (Diamond Firetail)
- *Stictonetta naevosa* (Freckled Duck)

In accordance with the BC Act, Tests of significance were applied for all of the above species and concluded that the activity is unlikely to constitute a significant impact on these species (Appendix D). In accordance with the EPBC Act, Significant Impact Criteria were applied for the following species (Appendix E):

- *Anthochaera phrygia* (Regent Honeyeater)
- *Falco hypoleucos* (Grey Falcon)
- *Grantiella picta* (Painted Honeyeater)
- *Hydroprogne caspia* (Caspian Tern)
- *Polytelis swainsonii* (Superb Parrot)

These assessments concluded that the activity is unlikely to constitute a significant impact on these species. Therefore, a SIS, BDAR or referral is not required for the proposed works.

5.3.3.3 Impacts to Aquatic Species

The proposed works will not remove or modify any critical habitat for potentially occurring threatened aquatic fauna species. However, fish corridors within the Lachlan River will be briefly disturbed by the installation of the second screen intake and construction of the coffer dams. It is recommended that the proposed coffer dams do not intersect the whole width of the river such that fish passage will not be completely obstructed.

The installation of the river intake can lead to increased turbidity. Turbidity within the river can reduce the amount of light that is available for aquatic flora and fauna and reduce the productivity of these species. Scouring of sediments could cause sediments to become suspended in the water, increasing turbidity. The increased sediment load would reduce light penetration through the water column, and sediment particles may settle on aquatic plants. Sediment movement may also smother infauna burrows.

The installation of the river intake also has the potential to decrease water availability however, as the Lachlan River is regulated there will be no change in the existing and sustained water levels or flows.

Impacts to the EEC of the *Aquatic ecological community in the natural drainage system of the lowland catchment of the Lachlan River* are likely to be minor, due to the localised minor nature of the works and the previously disturbed area where the works will take place. Threatened aquatic species listed under the FM Act are also unlikely to be significantly impacted by the proposed works, due to the large area of habitat available elsewhere and the temporary nature of obstruction of fish passage. Assessments of Significance for these threatened species and community have been undertaken in Appendix C.

5.3.3.4 Indirect impacts

An assessment of indirect impacts has been included as part of this REF (Table 5-5). Potential indirect impacts may include:

- Introduction of exotic species
- Trampling of native vegetation for machinery and vehicle access
- Soil compaction
- Increase in surface water runoff, sedimentation and nutrients during and following construction
- Increase in noise and disturbance to fauna inhabitants in adjacent vegetation

Machinery used during construction may introduce new weed species to the area, including to the waterway. Impacts associated with changed water runoff, increased sedimentation and increased nutrients during and following construction will be mitigated through preparation and implementation of an Erosion and Sediment Control Plan and appropriate controls on storage of chemicals.

Increases in noise and disturbance during construction to potential fauna inhabitants in adjacent vegetation is likely to be minimal.

5.3.4 Mitigation Measures

Table 5-6: Biodiversity Mitigation Measures

Reference	Environmental Aspect	Mitigation Measures
B01	Damage to vegetation that is not proposed for removal	• Pre-works briefing to be undertaken by PSC staff advising of sensitive areas and relevant safeguards for these areas. • Install temporary barrier fencing to prevent entry into adjacent vegetation and appropriate 'no-go zone' signage. • Install tree protection measures around trees to be retained in the study area. Structures should be adequate to prevent machinery from entering within the drip zone.

Reference	Environmental Aspect	Mitigation Measures
		• Maintain temporary fencing to prevent access into the native vegetation. • Where possible, relocate works outside of Tree Protection Zones.
B02	Harm to non-identified threatened flora and fauna species	• To ensure that no aquatic fauna is impacted by dewatering within the river, once the dewatered area has been established it should be checked to ensure that no aquatic fauna such as eels have been isolated in the dewatered section of the river. If there are any fauna species located within this area, they should be relocated from the work area following consultation with an aquatic ecologist. • Works must be stopped if any previously undiscovered threatened species or communities are discovered during works. An assessment of the impact and any required approvals must be obtained. Works must not recommence until PSC has provided written approval to do so. • Limit the use of chemicals due to the indirect impacts to threatened fauna and native vegetation.
B03	Injured or orphaned wildlife	• The site-specific CEMP must include instructions for dealing with orphaned or injured native animals and include the contact details for the NSW Wildlife Information, Rescue and Education Service Inc (WIRES).
B04	Spread of Priority Weeds	• Wash down equipment and vehicles prior to and after use, to manage the introduction and spread of weed propagules. • Remove Priority weeds using best management practices (including appropriate controls to prevent impacts to threatened species) prior to removal of native vegetation. Remove weed propagules offsite. • Bag and remove all weed propagules offsite, preferably the same day and dispose of at designated green waste facility. • Consider the implementation of a Weed Management Plan and revegetation works following the completion of works for the adjacent riparian corridor.
B05	Pollutants entering the river	• Establish dedicated refuelling areas outside of the riparian zone and in a dedicated, bunded setup to prevent spills into the waterway • Ensure all machinery and equipment working near the waterway are regularly serviced to prevent leaks and reduce risk of spills.

5.4 Aboriginal Heritage

5.4.1 Existing Environment

An extensive search of the AHIMS database was undertaken on 17 August 2020 covering GDA, Zone: 55, Eastings: 581335-626559, Northings: 6280266-6324898. The search parameters identified 94 Aboriginal sites and 0 Aboriginal places as being within the vicinity of the study area. A total of 14 sites are listed with a site status of 'Deleted'. Therefore, the total Aboriginal sites identified in the search parameter is 80 and the results have been amended accordingly.

The distribution of recorded Aboriginal sites adjacent to the study area is shown in Figure 5-23. The frequencies of site types and contexts recorded within the AHIMS database search area are listed below (Table 5-3). A full copy of the AHIMS results is included as Appendix F of this report.

Table 5-7: AHIMS Search Results

Site Context	Site Features	Number	%
Open	Artefact site	23	28.8
	Potential Archaeological Deposit (PAD)	1	1.3
	Artefact site, PAD	1	1.3
	Modified Tree (Carved or Scarred)	47	58.8
	Burial	5	6.3
	Hearth	1	1.3
	Massacre	1	1.3
Closed	Modified Tree (Carved or Scarred)	1	1.3
		80	**100%**

One Aboriginal site has been identified within the study area. AHIMS ID 43-3-0108 is a low-density open artefact scatter and PAD recorded by OzArk Ecology and Heritage during the construction of the LRPS in 2015. A total of eight artefacts were recorded: seven flaked artefacts and one ground-edge axe. In response to these unexpected finds, an application for an emergency Aboriginal Heritage Impact Permit (AHIP) was made (AHIP number C0001097, status: expired). The ground-edge axe was collected and placed in the custody of the Peak Hill Local Aboriginal Land Council (LALC), and the flaked artefacts were collected and re-located to an area outside of the impact footprint. In association with these Aboriginal objects, a 100 m radius surrounding the artefact scatter was mapped as a PAD (Figure 5-24). The management recommendations of AHIMS ID 43-3-0108 included an exclusion zone in which no earthworks or ground disturbing activities be undertaken outside of the fenced area without assessment of the PAD.

5.4.2 Site Inspection

A site inspection of the study area was undertaken by ELA archaeologist Declan Coman on the 17 September 2020. The inspection aimed to identify Aboriginal objects if present, assess the status of the registered PAD; AHIMS ID 45-3-0108, and assess the archaeological potential of the study area. A total of 31 artefacts were observed during the site inspection and all have been assessed as being associated

with AHIMS Site ID 43-3-0108. In addition, the area of PAD has been assessed as extending further from the river and encompassing the entirety of the study area.

In the south of the study area, the landform rises from the Lachlan river onto a low, open riverbank that then rises 10 m up a steep embankment (Figure 5-5). On the low, flat river bank (Figure 5-6) an artefact was observed and was assessed as being a part of the registered artefact scatter 43-3-0108 (Figure 5-7).

On top of the steep embankment, in the east of the study area, the existing pump station has caused extensive disturbances to ground surfaces (Figure 5-8, Figure 5-9, Figure 5-10). This area lies within the extent of AHIMS site ID 43-3-0108 but has already been registered with AHIMS as being disturbed (Figure 5-24).

To the west of the existing pumping station and irrigation line, a levy and an unsealed road were observed running parallel to the top of the riverbank (Figure 5-11). The irrigation line had been excavated 200 mm into the soil profile with the spoil being dumped on either side to create the irrigation channel. In the disturbed context of the sides, artefacts were observed scattered across the line (Figure 5-12). The artefacts consisted primarily of silcrete and quartz flakes with most being approximately 30 mm in size (Figure 5-13).

The areas to the north and the west of the existing pumping station consist of an open flat plain that has subject to agricultural land use and divided into four paddocks: north, east, central and west.

The eastern paddock consisted of a low, flat floodplain that had been cleared of trees but retained consistent vegetation cover that obscured ground surfaces and hindered the site inspection (Figure 5-14). Two perpendicular irrigation lines separated the eastern paddock from the northern and central paddocks (Figure 5-15). These irrigation lines were consistent with the line running along the riverbank, having been excavated 200 mm into the soil profile and dumped in two lines either side. Further artefacts were observed in this disturbed context (Figure 5-16), they were consistent in size and shape to those found along the riverbank.

The northern paddock consisted of a low, flat floodplain that had been cleared of most trees and had a single informal path running through it (Figure 5-17). Two quartz flakes were observed in the northern paddock; one in the informal pathway (Figure 5-18) and one in a patch of exposed soils at the northern most extent of the study area.

The central paddock consisted of a low, flat floodplain that had been cleared of all trees (Figure 5-19). The ground cover was less consistent compared to the eastern paddock and several patched of exposed earth were observed, however none contained surface expression of artefacts. The central paddock was observably lower than the adjacent eastern paddock (Figure 5-20), the height difference varied between 50 and 80 cm.

The western paddock consisted of a low, flat floodplain that had been subject to less clearing than the other paddocks and contained denser ground vegetation that obscured visual inspection (Figure 5-21). No irrigation lines or other landscaping modifications were observed within the paddock or along the banks of the river (Figure 5-22).

Figure 5-5: View north of existing pump station on the Lachlan River

Figure 5-6: View west of the banks of the Lachlan River within extent of PAD of AHIMS ID 43-3-0108

Figure 5-7: Artefact identified within extent of PAD of AHIMS ID 43-3-0108

Figure 5-8: View east showing the banks of the Lachlan River and existing pump station facilities

Figure 5-9: View west of disturbances associated with existing pump station

Figure 5-10: View east of disturbances from the construction of existing pumping station

Figure 5-11: Irrigation lines and levy along banks of Lachlan River

Figure 5-12: Artefacts in disturbed context of irrigation line

Figure 5-13: Artefacts in disturbed context of irrigation line

Figure 5-14: Ground surfaces in the eastern paddock

Figure 5-15: Irrigation line running north-south, between the eastern and western paddocks

Figure 5-16: Artefacts in disturbed context of irrigation line

Figure 5-17: Ground surfaces and informal path in northern paddock

Figure 5-18: Isolated find in northern paddock

Figure 5-19: Ground surfaces in central paddock

Figure 5-20: Height difference between central and eastern paddock

Figure 5-21: Ground surfaces in western paddock

Figure 5-22: Ground surfaces along top of riverbank in western paddock

5.4.3 Impact Assessment

The proposed works will impact a known Aboriginal site (AHIMS ID 43-3-0108) and is likely to impact unknown Aboriginal objects. According to the *Due Diligence Code of Practice* (DECCW 2010a), the study area is considered a sensitive landscape as it is within 200 m of waters, being in close proximity to the Lachlan River. Further investigation will be required in the form of an Aboriginal Cultural Heritage Assessment (ACHA) and any impact to the study area will require an AHIP, which will be undertaken as part of the preparation of the REF.

5.4.4 Mitigation Measures

Table 5-8: Aboriginal Heritage Mitigation Measures

Reference	Environmental Aspect	Mitigation Measures
AH01	Archaeologically Sensitive Landforms	• Based on the presence of registered Aboriginal sites and the sensitive nature of the study area, an ACHA should be prepared which would include an impact assessment of the proposed development. The ACHA would entail Aboriginal community consultation following the '*Aboriginal cultural heritage consultation requirements for proponents 2010' (DECCW 2010)* to identify Aboriginal cultural heritage values through consultation with Aboriginal stakeholders. • Further archaeological assessment including detailed field survey with Aboriginal stakeholders and archaeological test excavation should be undertaken to inform archaeological values across the developable area.
AH02	Aboriginal Objects	• The ACHA can be used to support a future Aboriginal Heritage Impact Permit (AHIP) application to Heritage NSW if Aboriginal sites cannot be avoided by future development. Heritage NSW require that AHIP applications are supported by a development consent under Part 4 or an REF under Division 5.1 of Part 5 of the EP&A Act or any other required approval, as a supporting document.
AH03	Cultural Values	• Aboriginal sites should be considered for conservation where possible including areas of high archaeological and cultural significance. Consultation with the Aboriginal community will assist in identifying priority areas for conservation. An Aboriginal heritage management plan should be developed for the long-term management of the conservation areas.
AH04	Aboriginal Objects	• Aboriginal objects are protected under the NPW Act regardless if they are registered on AHIMS or not. If suspected Aboriginal objects, such as stone artefacts are located during future works, works must cease in the affected area and an archaeologist called in to assess the finds. If the finds are found to be Aboriginal objects, Heritage NSW must be notified under section 89A of the NPW Act. Appropriate management and avoidance or approval under a section 90 AHIP should then be sought if Aboriginal objects are to be moved or harmed. • In the extremely unlikely event that human remains are found, works should immediately cease, and the NSW Police should be contacted. If the remains are suspected to be Aboriginal, Heritage NSW may also be contacted at this time to assist in determining appropriate management.

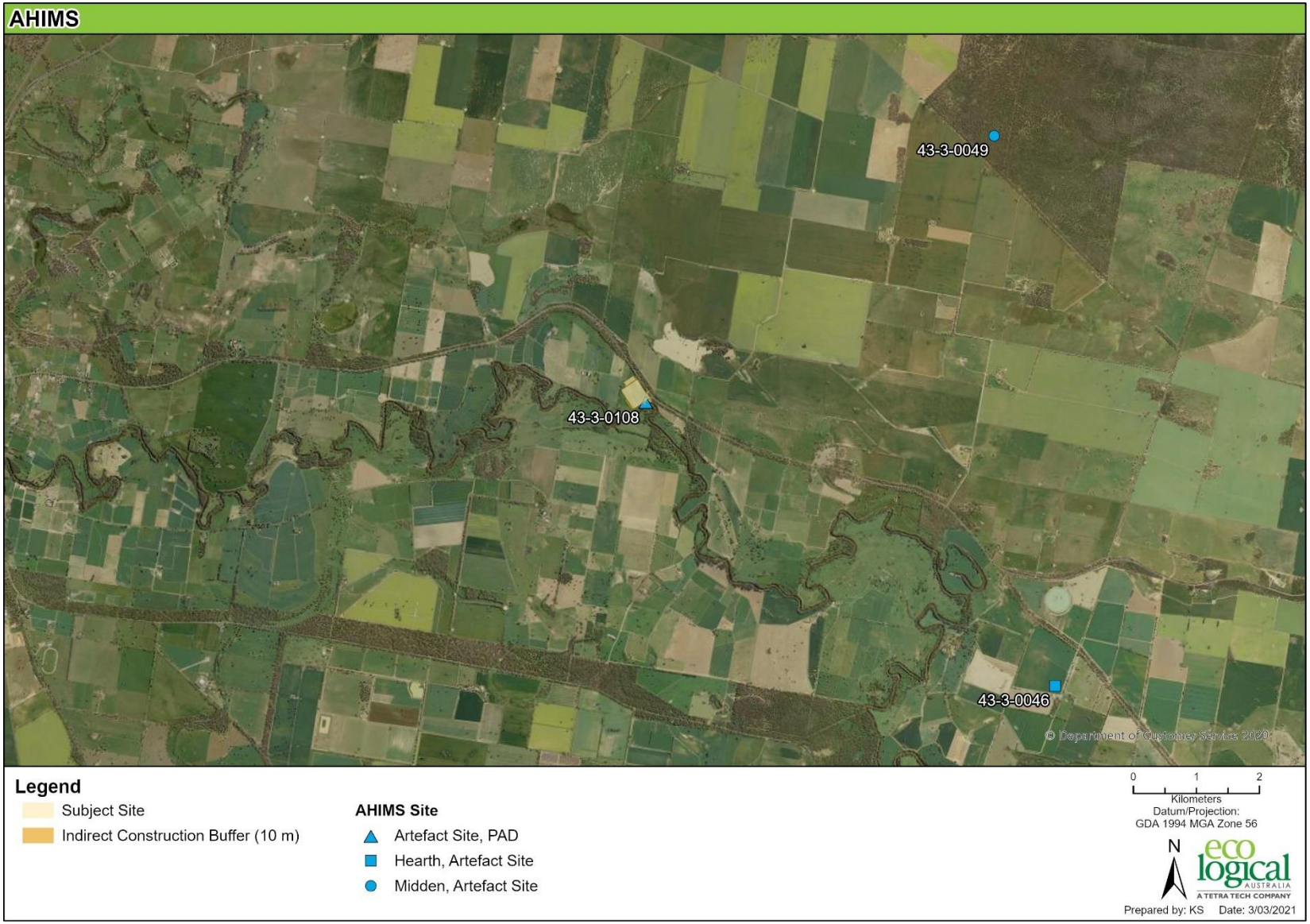

Figure 5-23: AHIMS sites in the vicinity of the study area

Figure 5-24: Extent of AHIMS ID 43-3-0108

5.5 Historic Heritage

5.5.1 Existing Environment

Searches of the Australian Heritage Database, the State Heritage Inventory (SHI) and Forbes Local Environment Plan (LEP) 2013 using the term "Forbes" was conducted on 14 January 2021 in order to determine if any places of Aboriginal or European significance are located within the study area.

No Aboriginal sites or heritage items were recorded within or in the vicinity to the study area.

5.5.2 Impact Assessment

The proposed works will have no impact on heritage items as no heritage items are within or in the vicinity of the study area. No further investigation is required. Table 5-9 outlines general mitigation measures in the event unexpected archaeological finds / relics are uncovered during the proposed works.

5.5.3 Mitigation Measures

Table 5-9: Historic Heritage Mitigation Measures

Reference	Environmental Aspect	Mitigation Measures
HH01	Impacts to Heritage items	• All relevant staff, contractors and subcontractors should be made aware of their statutory obligations for heritage under the NSW *Heritage Act 1977* and be informed of best practice in the event unexpected archaeological relics are uncovered, as outlined in *The Burra Charter 2013*. This may be implemented as a heritage induction. • In accordance with Section 146 of the *Heritage Act 1977*, if an archaeological relic (such as a deposit or artefact) is uncovered during works, work must cease in the affected area and a qualified archaeologist contacted to assess the find. Further advice and clarification may be sought from Heritage NSW under delegation regarding assessment and approvals.

5.6 Landscape and Visual Amenity

5.6.1 Existing Environment

The study area and surrounds consist of a rural landscape with scenic values typical of much of the Forbes area and other rural areas in the greater Central West Region. Although the majority of the study area has been cleared and converted to agricultural land, sections of the alignment lay within patches of intact forest and woodland particularly along the banks of the Lachlan River.

The dominant features of the landscape surrounding the study area are the Lachlan River and The Escort Way.

Visual receivers of the site would be passing in a vehicle travelling along The Escort Way at a distance of 150 m from the site. Other visual receivers include land managers, pumping station workers and neighbouring landowners. The closest neighbours are located approximately 600 m to the south east and west of the site, their view of the plant is obstructed by existing vegetation. The addition of the sediment lagoons to the site increases the proximity of the western neighbour to the pumping station. It is expected that the existing vegetation will obstruct the view of the ponds from this residence.

5.6.2 Impact Assessment

Visual impacts will be most noticeable during the construction. It is likely that The Escort Way will experience higher flows of traffic during construction due to movement of construction vehicles and machinery. Excavated ground, environmental control measures, temporary construction structures, stockpiles and the construction compound will further reduce the visual amenity of the area during construction. Public access to the site will not be permitted, which will reduce impact to The Escort Way based receivers.

The construction of the pre-treatment plant and sediment lagoons will create visual impacts to receivers on The Escort Way. The neighbours located to the southeast of the LRPS will also be receiver of visual impacts during construction. At the closest point the receivers (travelling along The Escort Way) will be 150 m from the construction. The height and location of the sediment lagoons has been designed to suit the site conditions and existing infrastructure.

The work is scheduled for a limited duration and is already obstructed from users by existing vegetation; therefore, the visual impacts are not expected to be significant and the installation of additional screening measures during construction is not recommended.

Neighbouring landowners are not likely to be impacted by the operation of the plant as it will not significantly change the landscape viewed from their properties. The LRPS and sediment lagoons would continue to be screened by the established riparian forest that extends along the watercourse and The Escort Way.

The proposed works are therefore anticipated to have low visual impact if the mitigation measures described in Section 6 are implemented.

5.6.3 Mitigation Measures

Table 5-10: Landscape and Visual Amenity Mitigation Measures

Reference	Environmental Aspect	Mitigation Measures
LAV01	Impact on the community	• Notify community or neighbours where light impacts are anticipated. • Planting of native species should be undertaken to help further screen the facility from neighbouring receivers along the western boundary. • Position lighting in residential areas to direct light away from houses wherever possible.

5.7 Noise and Vibration

5.7.1 Existing Environment

The area surrounding the site is characterised as low noise rural environment. Noise generation in the area is mainly from the existing LRPS, farming activities, and traffic noise along The Escort Way. Other noise sources include wildlife, livestock and noises associate to weather such as wind and rain. The existing LRPS air compressor unit is the main source of industrial noise in the area. The air compressor operates intermittently during the day and produces a maximum of 65dB(A) at the compressor.

The closest permanent sensitive receivers are neighbours are located approximately 600 m to the south east and west of the site, the plant is obstructed by vegetation which may dissipate some of the noise from the LRPS.

5.7.2 Impact Assessment

There is potential for moderate noise impacts to be generated during construction. Excavation, rock breaking, compacting, pilling and other construction machinery noises will be the largest and most frequent emitters. There is potential for increased traffic on The Escort Way however, this is not likely to increase noise impacts on surrounding receivers.

Work hours will be in accordance with the standard work times detailed below which will minimise impacts to residents in proximity to the works:

- Monday to Friday 7.00am to 5.00pm
- Saturday 8.00am to 1.00pm
- No work on Sunday or public holidays

There is potential for noise impacts associated with the operation of the LRPS, in particular the intake pumps associated to the wet wells and the air compressor.

The noise from the intake pumps is heavily muffled by the wet well encasement and would not be heard by the neighbouring receivers. The air compressor will produce noise with a maximum output of 65db(A). As the closest neighbour is 600 m away from the site, the noise is estimated to weaken to an acceptable level.

No significant fauna habitat is present in proximity to the proposed works, and the compressor shall be equipped with a timer to disable its operation at night. This will ensure that fauna that intermittently traverse the site are not impacted by constant noise.

Mitigation measures are provided in Table 5-11 to further minimise noise impact. Overall, noise impacts are considered to be minimal.

5.7.3 Mitigation Measures

Table 5-11: Noise and Vibration Mitigation Measures

Reference	Environmental Aspect	Mitigation Measures
NV01	Elevated noise and vibration levels during construction	• Hours of work limited to specified hours (Monday to Friday between 7 am – 6 pm and Saturday 8 am – 1 pm) • Vehicles and machinery should not be left idling when not in use • Equipment, machinery and vehicles should be regularly maintained (documented). • All machinery and equipment to be used will comply with the relevant Australian standard for noise attenuation (e.g. have noise mufflers and be well maintained). • Well planned site layout to ensure where practical that noisy plant and machinery and overnight parking locations are located away from nearby residences with reversing also minimised in these locations. • Select methods not involving impact where possible. • Community consultation and notification for potentially noise and vibration affected residences detailing timing of noisy activities. • Mechanism to provide noise complaints using signage and usage of a complaints register with relevant triggers for noise monitoring if required. • Where possible, avoid the simultaneous operation of two or more noisy plant items in close vicinity to sensitive noise receivers. • Where possible, orientate equipment such that offensive noise carries away from potential receivers.

5.8 Traffic and Transport

5.8.1 Existing Environment

The site is located adjacent to The Escort Way. The road is a main arterial link managed by TfNSW and connects the towns of Forbes and Eugowra, running east-west. The speed limit of the road in the vicinity of the proposed works is 100 km/hour.

5.8.2 Impact Assessment

There is potential for construction to impact traffic on The Escort Way. Impacts include increased traffic from construction vehicles and in particular heavily vehicle movements. There is potential for road closures or traffic management requirements during work alongside The Escort Way. The impact will be temporary and mitigation measures will ensure ongoing road safety.

Furthermore, the number of vehicle movements to and from the site, associated with the transportation of personnel and the removal of waste during the construction phase will be low, infrequent and of short duration.

Negligible impacts to traffic will result from maintenance and operation of the infrastructure. Day to day operation will not change traffic conditions, and maintenance activities will be short and very infrequent.

Mitigation measures are provided in Table 5-12 to further minimise traffic and transport impacts. Overall, traffic and transport impacts are considered to be minimal.

5.8.3 Mitigation Measures

Table 5-12: Traffic and Transport Mitigation Measures

Reference	Environmental Aspect	Mitigation Measures
TT01	Disruption to traffic flows	• Vehicles, materials and equipment must be positioned to minimise impacts to public access and parking. • Heavy vehicles, if required, will be restricted to specified routes.
TT02	Temporary Road Closures	• A Traffic Management Plan should be implemented prior to the commencement of any construction works to ensure that traffic disruptions are mitigated, and commuters are notified of detours and closures through signage. • Nearby businesses and sensitive receivers should be notified and given an opportunity to comment on temporary road closures prior to commencement of construction. • Undertake consultation with TfNSW and Council if any partial road closures or occupation is required.

5.9 Air Quality

5.9.1 Existing Environment

The area is relatively free of industrial processes that reduce air quality. The main sources of air pollution in the area are vehicle emissions, residual chemicals applied for agricultural purposes, livestock emissions and smoke from bushfires. The area is considered to have good air quality.

5.9.2 Impact Assessment

The proposed activity would involve the generation of carbon dioxide, carbon monoxide, nitrogen oxides, particulate matter, volatile organic compounds and benzene from vehicle emissions associated with driving to and from the site and from the operation of plant and machinery on site. This is expected to be for the duration of the construction works only, and as such limited and minimal by nature. The operation of the proposed activity is not expected to generate significant quantities of gaseous, liquid or solid wastes, or significant emissions.

Dust emissions are predicted as part of the construction phase of the proposed works. The major area of excavation is over 500 m from neighbouring receivers. The anticipated impact on nearby receivers and fauna species in proximity is low, considering that the proposed construction works will not be undertaken on a regular basis and are unlikely to create excessive dust. Furthermore, the proposed construction works will have a short-term duration.

Mitigation measures are proposed below in Section 5.9.3 to minimise impacts further.

5.9.3 Mitigation Measures

Table 5-13: Air Quality Mitigation Measures

Reference	Environmental Aspect	Mitigation Measures
AQ01	Dust generation from vibrating and ground disturbing works	• Works must be minimised during high wind periods. • Dust suppression should be applied as required to limit excessive dust generation. • Look for excessive dust generation and slow down vehicle speeds if needed. • Construction stockpiles should be wetted down to ensure that there is no significant dust generation during high wind periods. • Ensure that construction vehicles are operated safely and are not generating excessive dust through skidding.
AQ02	Fumes generation from machinery	• Plant and equipment must be regularly inspected to ascertain that fitted emission controls are operating efficiently. • Vehicles to maintain recommended speed. • Minimise use of machinery for required activity only.
AQ03	Cumulative impacts of greenhouse gas emissions	• Do not have machinery running while not in use. • Plant and equipment must be maintained in accordance with manufacturer's specifications to ensure that it is in a proper and efficient condition.

5.10 Waste Management

5.10.1 Existing Environment

No significant sources of waste are present within the study area. Some wastes may exist in the surrounding study area associated with agricultural activities of local residents and their domestic waste. Water may also have been lost due to seepage from the existing LRPS to ERPS rising main, where it has degraded.

5.10.2 Impact Assessment

5.10.2.1 Construction

The proposed works are not expected to generate a significant volume of waste. However, some may be produced during the construction phase, potentially including:

- Excess spoil from earthworks
- Vegetation waste from clearing of vegetation
- Construction packaging materials
- Additional waste from construction personnel
- Excess construction material / removed existing infrastructure

The proximity of the Lachlan River means that waste may enter the river if not managed appropriately. It is especially pertinent that waste is managed effectively when installing and removing the coffer dams to reduce the potential impact of construction waste entering the waterway.

To ensure that waste is minimised, a CEMP will be implemented which will detail the proper avenues for the removal of waste on-site. Where possible, excavated material should be reused and emplaced from where it was removed. Only the minimum amount of vegetation required to facilitate the works should be removed.

5.10.2.2 Operation

No further impact is expected to occur during the operational phase, provided the site is managed in accordance with the waste management procedures set out in the CEMP and all waste is removed. Maintenance activities and appropriate design considerations will minimise the risk of water seepage from the pre-treatment plant once it is in operation.

Nonetheless, the proposed works are anticipated to have low waste and contamination impact if the proposed mitigation measures in Table 5-14 are implemented.

5.10.3 Mitigation Measures

Table 5-14: Waste Management Mitigation Measures

Reference	Environmental Aspect	Mitigation Measures
WM01	Excess spoil in the form of excavated material	• Resource management options for the proposal must be considered against a hierarchy of the following order embodied in the *Waste Avoidance and Resource Recovery Act 2001*: o Avoid unnecessary resource consumption. o Recover resources (including reuse, reprocessing, recycling and energy recovery).

Reference	Environmental Aspect	Mitigation Measures
		○ Dispose (as a last resort). • All wastes and excess spoil must be classified in accordance to the Waste Classification Guidelines (DECC, 2009) prior to disposal and transported to a licensed waste disposal facility. • Upon completion of waste disposal, all original weighbridge / disposal receipts issued by the receiving waste facility must be retained in a waste register as evidence of proper disposal.
WM02	Litter left on-site by staff/contractors	• All waste must be removed from the site on completion of the works. • An adequate number of bins must be placed at the site for workers and all litter will be placed in these bins. Work areas of the project site would be kept clean and free of litter, including cigarette butts, at all times.

5.11 Social and Economic Factors

5.11.1 Existing Environment

The study area is located within the Forbes LGA. The population of Forbes as at 2016 was 8,432 and the population of Parkes as at 30 June 2018 was 11,224. Whilst the proposal is in closer proximity to Forbes, it is part of the Parkes Town Water Security Program run by PSC. The overall objective of this Program is to future proof the Parkes Shire water supply.

Current average and peak demand for water usage is outlined in Table 2-3. The current average and peak demand is approximately 185L/s and 280L/s, respectively. This is problematic as not only does the existing infrastructure only have a capacity of 240L/s however, it is also predicted that central NSW will face serious climate impacts in the future such as reduced rainfall and prolonged drought.

The NSW Government has identified Parkes as a location for a SAP. The SAP is a dedicated area in regional NSW identified to become a thriving business hub and will optimise opportunities in the agricultural sector. The SAP will create a future demand for potable water, which is predicted in Table 2-3.

The SAP will proceed or not on its merits and is not contingent on this Project proceeding. The demand for potable water by the SAP could likely be met by a number of alternative approaches. This Project is one option.

A number of future infrastructure projects are also proceeding in the region. These include:

- The expansion of the North Parkes Mine
- Investment in the Parkes Regional Airport (which also currently supports Parkes, Forbes, Wedding and the Lachlan Shires). An Airport Masterplan has been developed which will facilitate future investment in the precinct
- The construction of the Inland Rail.

Each of these projects are proceeding or not on their own merits and none of them are contingent on this Project. However, each of them will need water to be sourced from somewhere. There are numerous options for the supply of water including alternative water pipelines and trucking in of water. The proposal will be one source of available water and thus will be supportive of the above projects. However, the above projects do not depend upon this proposal proceeding.

As Forbes is located along the Lachlan River and within an alluvial floodplain it has an abundance of affordable water that makes the Shire an ideal place for industrial and residential investment. Water scarcity is an emerging issue within the Central West and could impact on the viability of various sectors within the region. The reliability of the Forbes water source is likely to bring new industries to the Shire and also makes Forbes intrinsically important to new development in neighbouring Shires such as the Parkes Special Activation Precinct.

5.11.2 Impact Assessment

5.11.2.1 Construction

Construction activities are unlikely to have a significant negative socio-economic effect on the locality. Potentially, negative impacts will occur to commuters on The Escort Way if temporary road closures are required for any part of the works. The requirement for partial road closures is, however, unlikely. Diversions for vehicles that would usually utilise The Escort Way may lead to slight inconvenience for local residents, and notification of these closures should be provided prior to works commencement. However, these impacts would only be short-term.

Conversely, some local expenditure would occur during the construction phase potentially resulting in some economic benefit to the local community within both Parkes and Forbes, where the study area is located. This may be through the contracting and purchasing of local supplies and services as well as ad hoc visitation to local businesses by project employees and site personnel.

5.11.2.2 Operation

The Program proposes to increase the capacity of existing infrastructure to approximately 440L/s to service future demand and mitigate potential climate change risks. The Program will also facilitate significant economic outcomes for Parkes and surrounding regions that extend beyond the construction and operational phase of the water infrastructure. These economic outcomes are embedded in higher population, visitation and employment growth as water security provides the confidence for investment in the many economic opportunities associated with the Parkes National Logistics Hub, SAP, Inland Rail and the Airport Business Park.

The Program is expected to facilitate a turnaround in the recent population decline and grow the population by nearly 1,200 over the next 30 years. This growth will come about through employment growth that comes with additional industrial investment facilitated through water security. The additional local jobs and enhanced prospects for higher paid positions in the Parkes LGA will improve the region's relative attractiveness to people potentially moving to Parkes as well retention of existing residents. Economic modelling indicates that construction of the proposal is expected to add an additional 22 FTE jobs to the regional economy. Furthermore, the increased employment opportunities through industrial development is conservatively estimated at providing 25 FTE per annum.

A cost benefit analysis (CBA) of the wider project has been undertaken by AEC Group (AEC,2019). The CBA examined the benefits and costs over thirty years and found that at a 7% discount rate the proposal would be deemed economically desirable with the benefits outweighing the costs. The proposal is expected to cost approximately $8 million and is predicted to provide a Net Present Value of $320.7 million. The wider project rate of return is considered to be 27.8%.

As the proposal is a critical component of the wider Parkes Water Security Project it is considered to have a beneficial socio-economic impact. This is achieved by increasing the water storage capacity of the Parkes region and creating a more attractive environment for industrial and residential development.

5.11.3 Mitigation Measures

Table 5-15: Socioeconomic Mitigation Measures

Reference	Environmental Aspect	Mitigation Measures
SE01	Traffic delays	• Undertake early community engagement, early notification / advertisement of construction period through both local and regional channels.
SE02	Community complaints and service disruption	• Carry out community and stakeholder consultation before works start. • Notify Council immediately of any complaints or any accidental damage to property. • Locate existing services on a Dial-Before-You-Dig search and peg out no-go areas to avoid service-disruption.

5.12 Energy and Climate Change

5.12.1 Existing Environment

The local climate for Parkes is typically a warm temperate climate with high seasonal variability in temperature, with hot dry summers and cool to cold winters. Mean summer temperatures can range from 14°C to 33°C, whereas mean winter temperatures range from 2°C to 16°C. The region also receives an average of 400 to 800 mm of rainfall per year.

The Critical Decade 2017: Accelerating Climate Action Report (Climate Council, 2017) concluded that central NSW faces serious climate impacts, including reduce rainfall, prolonged drought and food and water scarcity becoming the 'new normal' unless greenhouse gas emissions are reduced.

In 2010, PSC spent $1.3 million on electricity, and used 9,600 MWh, which resulted in 10,000 tonnes of greenhouse gas. In order to ensure that environmental sustainability was a primary goal for future water infrastructure works, solar systems have been installed within new water recycling infrastructure and future design considerations have taken into account sustainability measures such as accreditation from the Infrastructure Sustainability Council of Australia (ISCA).

5.12.2 Impact Assessment

5.12.2.1 Construction

During the construction period, energy consumption will occur in association with the use of vehicles, plant and machinery. This energy use is negligible in the context of the energy use elsewhere in the locality. Despite this, it can be further mitigated by implementing the mitigation measures identified below in Table 5-16.

5.12.2.2 Operation

The operational impacts of the proposed works will not lead to an increase in factors that will contribute to climate change as day-to-day functioning of the pre-treatment plant will not create further greenhouse gas emissions.

The solar PV system will be oversized in comparison to the required electrical load of the site. The current electrical demand expected is approximately 315 kW at Eugowra Pump Station and approximately 117 kW at the existing pump station/new treatment infrastructure including new assets for a total demand of approximately 432 kW. The proposed solar PV system has a DC rating of 535 kW however the actual production will be lower than this value depending on the solar irradiation available at any given time.

5.12.3 Mitigation Measures

Table 5-16: Energy and Climate Change

Reference	Environmental Aspect	Mitigation Measures
ECC01	Increased energy consumption and production of emissions	• Vehicles, plant and machinery should be kept in good working order and used in an efficient manner. Vehicles should not be left idling when not in use.
ECC02	Increased production of emissions, structural inefficiency	• Construction materials will be sourced locally where possible and will utilise recycled materials to the greatest possible extent

Reference	Environmental Aspect	Mitigation Measures
		• Sustainable design will be incorporated into the design of the pre-treatment plant to reduce the risk of leakage and failure.

5.13 Bushfire Risk

5.13.1 Existing Environment

The study area does not contain any vegetation that has been identified by PSC as bushfire prone. The nearest occurrence of bushfire prone land in relation to the study area is located approximately 5 km south of the pre-treatment plant.

5.13.2 Impact Assessment

5.13.2.1 Construction

The risk of a bushfire as a result of the proposed construction works is considered unlikely as works will predominantly be undertaken on existing disturbed areas that have been historically cleared for agricultural activities. However, bushfire risks may arise due to improper use of machinery or negligent behaviour such as leaving lit cigarette butts within the study area. Risks may also arise as a result of spillage of flammable materials such as fuels and oils may due to improper use of machinery or poor storage and maintenance practices.

Contractors should be briefed and properly trained in the use of equipment to ensure that they are operated and maintained adequately, and risks are mitigated. Provided this is the case, the risk of bushfire during construction activities is deemed low.

5.13.2.2 Operation

During operation of the pre-treatment plant and rising main augmentation, the risk of bushfire impacting upon infrastructure will not increase. It is recommended that infrastructure is to be constructed from fire-resistant materials and appropriate design standards are adhered to in order to ensure that the proposed infrastructure runs efficiently and as designed.

Some existing vegetation is located in proximity to the road corridor and Lachlan River. The study area is located predominantly within a previously cleared paddocked area which consists of pasture grasses that may be prone to fire if allowed to grow. As such, the grasses surrounding the pumping station should intermittently be cut to ensure that bushfire risk is not significantly increased.

5.13.3 Mitigation Measures

Table 5-17: Bushfire Risk

Reference	Environmental Aspect	Mitigation Measures
BF01	Inadvertent increase of bushfire risk	• An adequate number of bins must be placed at the site for workers and all litter will be placed in these bins. Work areas of the proposal site would be kept clean and free of litter, including cigarette butts, at all times. • Flammable substances are stored correctly, and only minimal amounts of these substances are to be present onsite. • Cut grasses surrounding the study area intermittently, particularly in hotter months when conditions are anticipated to be hot and dry.
BF02	Design	• Construction materials should be fire-resistant

5.14 Cumulative Impacts

Clause 228(2) of the EPA&A Regulations requires that cumulative impacts of the proposed works with other existing or planned future activities are considered.

5.14.1 Construction

As discussed in Section 5.11.1, there are numerous other projects which are proceeding in parallel with the Program. These include the following: the SAP, the expansion of the North Parkes Mine, investment in the Parkes Regional Airport, and Inland Rail. The current status of those projects is that the environmental assessments and approvals have not all been fully documented. However, it is likely that the potential environmental impacts of those developments will include increased traffic, noise, Aboriginal heritage and biodiversity impacts.

The proposed works will not cause those other projects to proceed but the water from the Program will be one source of water for them, and the impacts from this project may occur in parallel to those projects.

The proposed works are also intended to proceed along with other projects within the Program. Each of those projects are independent, but there may be construction activities for different projects that occur in parallel, which could result in additional impacts on traffic air quality and noise. Given that PSC are responsible for those projects, the proposed works will be scheduled to minimise any cumulative effects of the separate projects in the Program proceeding at the same time.

5.14.2 Operation

The proposed works will facilitate the SAP status of Parkes township and therefore enable changes to land use planning on the local or regional scale. This is seen as a positive impact as it enables economic and social development of the township. Regional and local planning instruments will direct development in the area to ensure compliance with EP&A Act, in particular the principal of ecologically sustainable development.

The upgrade to the existing pumping station will comply with the existing WAL allocations and for the short to medium foreseeable future, no changes to the current WALs are warranted. The proposed works will continue to ensure that there is minimal impact on other Lachlan River water users and the surrounding environment. This will ensure that only a sustainable amount of water is extracted from the Lachlan River and ensure the cumulative impacts are low.

Overall cumulative impacts are considered to be positive for the Parkes township as the proposal enables economic development in the region. Existing licences and plans will regulate water extraction, therefore cumulative impacts on the Lachlan River are considered to be minimal.

5.15 Matters of National Environmental Significance

Under the environmental assessment provisions of the EPBC Act, the following MNES and impacts on Commonwealth land are required to be considered to assist in determining whether the proposal should be referred to the Australian Government Department of the Environment. Table 5-18: addresses the MNES for the proposal.

Table 5-18: Consideration of Matters of National Environmental Significance

MNES	Impact
Any environmental impact on a World Heritage property?	No
Any environmental impact on National heritage places?	No
Any environmental impact on RAMSAR wetlands?	No
Any environmental impact on Commonwealth listed threatened species or ecological communities?	Non-significant impact
Any environmental impact on Commonwealth listed migratory species?	No
Does any part of the project involve nuclear action?	No
Any environmental impact on a Commonwealth marine area?	No
Any impact on Commonwealth land?	No

5.16 Clause 228 of the Environmental Planning and Assessment Regulation

Clause 228 of the EP&A Regulation sets out 16 factors that need to be considered when assessing environmental impact under Part 5 of the EP&A Act. These factors are addressed in this report and relevant sections are listed in Table 5-19: below.

Table 5-19: Clause 228 Factors

Clause 228 Factors		Impact
(a)	Any Environmental Impact on a Community?	Potential noise, dust emissions and traffic impacts on the community are anticipated to be minimal. The proposed works will result in a positive impact on the community through ensuring securing an adequate supply of water, which will support economic development and growth in the industrial, commercial, residential and transportation sectors in the Shire.
(b)	Any transformation of a locality?	No significant transformation of locality is likely as part of the works. The proposed works involve the construction of pre-treatment plant in previously cleared agricultural land and augmentation of an existing pump station. Vegetation removal will be minimised where possible.
(c)	Any environmental impact on the ecosystems of the locality?	Impacts on ecosystems are anticipated to be non-significant if the recommended mitigation measures are followed.
(d)	Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?	The proposed works involve the construction of pre-treatment plant in previously cleared agricultural land and augmentation of an existing pump station. Impacts on threatened ecological communities and species have been considered and mitigated. Therefore, the works will not significantly reduce aesthetic, scientific, or other environmental quality or value of the locality.
(e)	Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?	Impacts on Aboriginal cultural heritage and historical cultural heritage items have been assessed are anticipated to be mitigated if the proposed recommendations are followed, in particularly through the preparation of an ACHA and attainment of an AHIP.
(f)	Any impact on the habitat of protected fauna (within the meaning of the *National Parks and Wildlife Act* 1974)?	The impact assessment on threatened fauna has been addressed and mitigated. The impact, if any, will not be significant. In addition, the impact resulting from the loss of general fauna habitat as a result of vegetation disturbance is not likely to result in the loss or reduction in the viability of more common fauna species.
(g)	Any endangering of any species of animal, plant or other form of life whether living on land, in water or in the air?	Potential impacts on flora and fauna have been considered as part of this REF. There will be no significant impact on any threatened species or other more common fauna species.
(h)	Any long-term effects on the environment?	The proposed works will not result in long-term impact if mitigation procedures are followed. Maintenance following the completion of the works will be infrequent. The works will have a long-term positive impact on the community through ensuring securing an adequate supply of water, which will support economic development and growth

Clause 228 Factors		Impact
		in the industrial, commercial, residential and transportation sectors in the Shire.
(i)	Any degradation of the quality of the environment?	No significant impacts to the quality of the environment were found. No degradation to the quality of the environment should occur if mitigation measures are adhered to.
(j)	Any risk to the safety of the environment?	A low risk to the environment is associated with the works. Potential for a small chemical spill (e.g. petrol or oil) is possible. There is potential for sedimentation from the works. The risk to the environment is considered minimal if the prescribed mitigation measures are adopted.
(k)	Any reduction in the range of beneficial uses of the environment?	No reduction in the range of beneficial uses of the environment will result as part of the works. The works will not limit or modify any uses of the environment.
(l)	Any pollution of the environment?	No pollution of the environment is proposed or likely. The risk is minimal if the appropriate mitigation measures are followed.
(m)	Any environmental problems associated with the disposal of waste?	All waste is to be taken offsite and disposed of appropriately.
(n)	Any increased demands on resources (natural or otherwise) that are or are likely to become in short supply?	No resources that are being utilised as part of this project are likely to become in short supply.
(o)	Any cumulative environmental effect with other existing or likely future activities?	Minimal cumulative environmental effect is likely as a result of the works.
(p)	Any impact on coastal processes and coastal hazards, including those under projected climate change conditions?	There are no impacts on coastal processes or hazards that will result as part of the works.

6. Consultation

This REF process is designed to meet Council and other stakeholders' standards of due diligence prior to undertaking the road upgrade. Part 2 Division 1 of the ISEPP identifies situations where consultation needs to be undertaken by public authorities with local council or other government agencies prior to the commencement of some forms of development. In this case, consultation with Council is not required as PSC is the proponent and therefore Clauses 13, 14 and 15 do not apply. Clause 16 identifies consultation triggers for consultation with public authorities other than local councils, however following review of this Clause it can be concluded that there is no requirement for PSC to consult with public authorities in terms of the ISEPP (Table 6-1).

Table 6-1: Infrastructure SEPP Clause 16 consultation requirements

ISEPP Clause	Clause Relevance	Consultation Undertaken
Clause 13	Impacts on council-related infrastructure or services Consultation is required if the public authority is of the opinion that the development: (a) will have a substantial impact on stormwater management services provided by a council, or (b) is likely to generate traffic to an extent that will strain the capacity of the road system in a local government area, or (c) involves connection to, and a substantial impact on the capacity of, any part of a sewerage system owned by a council, or (d) involves connection to, and use of a substantial volume of water from, any part of a water supply system owned by a council, or (e) involves the installation of a temporary structure on, or the enclosing of, a public place that is under a council's management or control that is likely to cause a disruption to pedestrian or vehicular traffic that is not minor or inconsequential, or (f) involves excavation that is not minor or inconsequential of the surface of, or a footpath adjacent to, a road for which a council is the roads authority under the Roads Act 1993 (if the public authority that is carrying out the development, or on whose behalf it is being carried out, is not responsible for the maintenance of the road or footpath).	No, PSC is the proponent.
Clause 14	Impacts on local heritage Consultation is required if the development: (a) is likely to have an impact that is not minor or inconsequential on a local heritage item (other than a local heritage item that is also a State heritage item) or a heritage conservation area, and (b) is development that this Policy provides may be carried out without consent.	No consultation required. Impacts on local heritage are unlikely. PSC is the proponent.
Clause 15	Impacts on flood liable land In this clause, flood liable land means land that is susceptible to flooding by the probable maximum flood event, identified in accordance with the principles set out in the manual entitled Floodplain Development Manual: the management of flood liable land published by the New South Wales Government and as in force from time to time.	PSC is the proponent.

ISEPP Clause	Clause Relevance	Consultation Undertaken
Clause 16	Consultation with public authorities other than councils Consultation is required if the development is: (a) development adjacent to land reserved under the National Parks and Wildlife Act 1974—the Department of Environment and Climate Change, (b) development adjacent to a marine park declared under the Marine Parks Act 1997—the Marine Parks Authority, (c) development adjacent to an aquatic reserve declared under the Fisheries Management Act 1994—the Department of Environment and Climate Change, (d) development in the foreshore area within the meaning of the Sydney Harbour Foreshore Authority Act 1998—the Sydney Harbour Foreshore Authority, (e) development comprising a fixed or floating structure in or over navigable waters—the Maritime Authority of NSW, (f) development for the purposes of an educational establishment, health services facility, correctional centre or group home, or for residential purposes, in an area that is bush fire prone land (as defined by the Act)—the NSW Rural Fire Service. Note. The Act defines bush fire prone land, in relation to an area, as land recorded for the time being as bush fire prone land on a map certified as referred to in section 146 (2) of the Act. Note. When carrying out development of a kind referred to in paragraph (f), consideration should be given to the publication of the NSW Rural Fire Service Planning for Bush Fire Protection 2006. (g) (Repealed)	Consultation with public authorities other than PSC was not deemed necessary in relation to Clause 16 of the Infrastructure SEPP.

6.1 DPI – Fisheries

The Lachlan River is mapped as KFH. Installation of the second Lachlan River intake will require the use of coffer dams and works to part of the bed of the river and will therefore, obstruct fish passage and require a small amount of reclamation of the bed. Therefore, a permit will be required under Section 219 and 200 of the FM Act.

Consultation with DPI – Fisheries will be undertaken when a detailed construction methodology for the installation of the second river intake is confirmed.

6.2 Peak Hill Local Aboriginal Land Council and Registered Aboriginal Parties

There is a registered AHIMS site (#43-3-0108) located where the pre-treatment plant is proposed. The AHIMS site is registered as a PAD. Therefore, an AHIP under the NP&W Act will be required prior to construction commencing.

As part of the preparation of the ACHA, ongoing consultation has been undertaken with both Peak Hill LALC and the Registered Aboriginal Parties (RAPs).

6.3 Community Consultation

6.3.1 Consultation Objectives

Stakeholder engagement for the proposal is focused on mitigating direct impacts of the proposal, while at the same time creating benefits for the local community. In particular it will work to, achieve the following objectives:

- Ensure the community is fully informed about the project and provide multiple opportunities for dialogue in various forms and opportunities for feedback
- Engage with stakeholders to understand local views, concerns and impacts and ensure the project team are fully aware
- Incorporate feedback into the design of the project, where possible, and outline where such feedback has been incorporated
- Build and maintain positive relationships with local communities and other stakeholders.

6.3.2 Consultation Approach

PSC has adopted a Council-wide Community Engagement Strategy[1] based on its *Communication Policy* (2016) which underpins the on-going process of project stakeholder engagement. The six-step engagement process is based on the International Association of Public Participation (IAP2) engagement spectrum[2] to align Council's water security projects with community expectations and priorities.

6.3.2.1 Stakeholders

The following preliminary stakeholder groups were identified for the proposal:

- State and Federal Government Agencies
- Local Councils and business organisations
- Surrounding communities
- Potential involved landowners
- Ratepayers, Residents and Community Organisations
- Construction and Trades Industry Representatives
- Local, Regional & National Media, Social Media
- Parkes Working Group
- Local Member / Ministers
- Utilities and transport

A variety of methods have been implemented to consult with the stakeholders above to date and are proposed going forward. A summary is provided below.

[1] Community Engagement Strategy

[2] iap2.org.au/resources/spectrum/.

6.3.2.2 Consultation Principles

- **Inclusive:** identifies and enables the participation of all relevant stakeholders. This includes people who have special needs; those with disabilities, across different age groups and cultures. Inclusivity requires communication techniques that encourage involvement and feedback.
- **Timely:** provides sufficient time for meaningful project engagement throughout the entire project lifecycle, outlining timeframes up front and conducting engagement activities in a coordinated and efficient manner across project locations.
- **Transparent:** explains the engagement process, providing information to enable meaningful participation and setting clear expectations around how participants' input will inform outcomes for example, project design and the management of impacts throughout the construction phase via approved site-specific site management plans.
- **Safety:** public participation and community engagement activities should always take place in a safe environment. COVID is an on-going threat to public health and safety hence, World Health Organization (WHO) guidelines will be followed to maintain safe and healthy work practices at public events. Community safety during construction will be managed on-site via toolbox talks and OHS guidelines.
- **One point of contact:** all project materials will contain an email, phone number and project contact details to allow stakeholder to provide feedback. Complaints and inquiries to be documented via the project stakeholder database and reviewed at regular project team meetings.
- **Informed Consent:** Participants will be asked to register their attendance if they participate in any public project event or activity. Participants should always be given opportunities to ask questions or raise issues and if they want to withdraw, this should be accepted without question. Participants must be offered consent forms for signature prior to the use of photos and video material in Council publications, in the media or on public access websites.

These principles will inform the development of engagement materials and guide the community engagement process during stakeholder engagement. It is noted that this REF will contain mitigation measures to limit impact on community members during the project lifecycle. These mitigation measures form the basis of the contractor's CEMP and the project Community Stakeholder Engagement Plan (CSEP).

6.3.2.3 Consultation to Date

Council's strategic engagement approach will align the project with stakeholder expectations and priorities. A summary of stakeholder consultation to date is detailed below.

Stakeholder Working Group and Working Group Meetings (Integrated Water Cycle Management)

Establishment of the Working Group, known as the Project Reference Group (PRG) has been convened and the first meeting was held in December 2020. Stakeholders involved include Forbes and Central Tablelands Councils, State Government departments, Infrastructure Partners, Local and interested Businesses, and Community Representatives. This is the forum to ensure stakeholder interests are raised and clarified during the project optioneering process.

The establishment of the PRG also ensures alignment of local and regional strategic plans, considers and addresses the views of key stakeholders, and ensures this project has full support of other relevant local water utilities. It will also provide commercial beneficiaries the ability to nominate contributions to costs e.g. mining activities, and have buy in.

Given that this PRG will have many stakeholders, preferred options derived by the group will need to be committed to by all stakeholders involved.

CENTROC Water Pipeline and Regional Water Grid

Council coordinates a stakeholder group to consider the design and implementation of water security projects across the Central West region. This process includes assessment of pipeline and water grid infrastructure, impacts on adjoining landowners, land acquisition requirements, sensitive community infrastructure and construction impact mitigation on adjoining landowners, ecology, fauna communities and water courses. The CENTROC Working Group comprises, Parkes, Forbes and Central Tablelands Councils and sponsoring agency the Department of Planning, Industry and Environment. This Group meets monthly to review preliminary design options, pipeline alignment, co-sharing water arrangements and environmental studies in the development of water security and drought mitigation projects. This includes the Lachlan to Parkes Water Supply Duplication Project.

6.3.2.4 Water security projects public outreach

Council has actively engaged the community in knowledge-sharing and public outreach activities to encourage awareness of and engagement in the purpose, benefits and timeframes for the Council's investment in water security projects. This commenced in 2005 with the release of Council's first IWCM strategy and will continue as projects, including the Lachlan to Parkes Water Supply Duplication Project, progress through preliminary design, business case development, funding approval and construction.

Existing stakeholder engagement channels:

- Rates notices – quarterly newsletter and ad-hoc flyer inserts
- Website – news, events and project updates, strategies and plans
- Public education programs – fact sheets, FAQs project updates via website and social media
- Schools education programs - Eco Days and excursion programs
- Tours of new water facilities and assets: open days and site visits
- Community Information Sessions – workshops and exhibits at community events / annual shire shows

6.3.3 Ongoing Engagement

Table 6-2 provides details of on-going engagement methods relevant to stakeholder groups.

Table 6-2: Ongoing engagement methods relevant to stakeholder groups

Stakeholder Group	Approach
Ratepayers, Residents and Community Organisations	**Inform community about key aspects and progress of the project** • Consult/obtain feedback on concept design and high-profile matters that will affect community amenity. • Print, website and social media content will be published and updated at regular intervals at the planning and implementation phases.

Stakeholder Group	Approach
	• 12-week public display (staffed) at Council-facilities e.g. libraries during evening and weekend periods. • Stakeholder submissions documented and responded to within a 7 day period.
Adjoining Landowners	**Identify and map the adjoining landowners** • Prepare timely communication during planning phases and life of project via face to face and or one / one meetings and workshops. • The project intersects with 113 Landowners. • Lot DP/SP have been identified for landowners on Akuna Road, Dowling Lane, Back Yamma Road, Ashburnam Road, Troubalgie Road, Fairview Road and Escort Way. • Sensitive community facilities e.g. East Parkes Public School have been mapped. • Notifications of construction works will include, hours and conditions of construction works, traffic management noise and visual impact suppression, water run-off and site safety.
Construction and Trades Industry Representatives	**Workshops during the planning, construction, commissioning and operational phases of the project** • PSC has adopted a water project tendering process to encourage the upskilling of local construction and trade contractors in the region. This includes: • Tier 1 contractors with capability to train and manage local contractors. • Contract clauses requiring the procurement of local contractors for construction works. • Workshops and training programs for local contractors. • Certification and licensing of local contractors to meet industry standards.
Investors, Developers & Individuals with Business Interests within the Parkes Shire	**Workshops conducted in regular intervals at the planning and implementation phases** • Regular updates via website and project fact sheets including information about economic development resulting from water security and reliable water supply relevant to local businesses and the development industry.
Parkes Working Group	**Regular project updates and project presentations** • Council has an active policy of indigenous engagement and employs an Aboriginal Liaison Officer to consult and work closely with the Wiradjuri traditional landowners. • Regular updates will provide details of project progress and the results of indigenous heritage surveys. • Each project will undergo a cultural heritage survey and appropriate indigenous stakeholder consultation is a condition of project environmental approvals.
Local, Regional & National Media, Social Media (PSC)	**Media engagement around key milestones such as award of contract for construction and site mobilisation** • Coordination of media events such as sod turnings and ribbon cuttings. • Site tours to promote the benefits of the projects, the contractors/suppliers, funders and government representatives. • Media alerts coordinated via Council's communications team with content captured and produced to further share via social and digital channels. • Photo opportunities with state and federal representatives and photo stories of project progress. • Media releases - award of construction contract, mobilized to site / commencement of site works, completion of deliverables.
Local Member / Ministers	**Briefings and publicity opportunities** • The prolonged drought conditions in 2018 created considerable political interest in the future of high value industries in the region, including agriculture.

Stakeholder Group	Approach
	• Council works closely with state and federal representatives and water security is a high priority agenda item. • Council has presented to State and Federal members several times regarding the challenges and opportunities in relation to water security. • Council will provide briefing to Deputy Prime Minister – Michael McCormack the local member with a high level of interest in water security projects. • Briefings will include the development of the SAP and secure water supply.
External Commercial interests e.g.: North Parkes Mine and SAP	**Consultation / updates on implementation progress** • Present preliminary designs and operational strategies to ensure commercial acceptance.
Utilities and transport	**Briefings on project alignment and construction management** • Meetings with utilities and TfNSW on project alignment and geotechnical investigations to limit impact on operations.

7. Mitigation Measures, Recommendations and Design Considerations

Table 7-1: Recommended mitigation measures for the proposed works

Impact On	Reasons	Safeguards/Mitigation Measures	Responsibility
Soil Erosion and Sedimentation	• Sedimentation caused by erosion and runoff from the site caused by, spoil stockpiles, removal of vegetation on river bank, vehicle movements and/or heavy rainfall and/or wind.	• Prepare a CEMP prior to any construction works to address measures to be adopted to minimise impacts on the environment as a result of the construction works, including sediment erosion and sedimentation. • The Sediment and Erosion Control Plan is to be prepared in accordance with *The Blue Book – Managing Urban Stormwater: Soils and Construction* (Landcom 2004) and implemented prior to works, with the aim of achieving an outcome of 'no visible turbid plumes migrating through the waterway'. The Plan must include, but not be limited to: o Locations and type of sediment controls, both adjacent to and in the stream, to be erected surrounding the pedestrian bridge. These can be constructed from hay bales or sandbags and lined with geofabric; however, they must be secured to ensure they do not mobilise. o Prior to forecast heavy rain, work is to cease, accumulated material is to be removed from sediment controls. Any sediment controls instream are to be removed from the waterway to allow free movement of water and prevent them causing a flood hazard or other environmental damage downstream. o Works area within the stream should be dewatered prior to construction works commencing to reduce likelihood of additional sediment or waste material entering the waterway. It has been proposed for coffer dams to be used to create a work area. As part of dewatering the works area, the coffer dam must not block the entire width of the river to avoid obstructions to fish passage. Dewatering and delineating a dry works area should be established for no more than half of the channel width at any one time. As part of the dewatering process, the outlet pump should be positioned in a vegetated, stable area out of the channel to allow water to flow over the vegetated area prior to re-entering the river. This will reduce the likelihood of localised erosion and sedimentation occurring at the discharge area. o If fish or other aquatic fauna, such as yabbies, are stranded during the establishment of the dry work area the must be carefully returned to the river. o The Inlet pipe must be caged to minimise damage to aquatic fauna.	Project Manager All Staff/Contractors

Impact On	Reasons	Safeguards/Mitigation Measures	Responsibility
		• Inspect erosion controls regularly (daily during workdays) and after rainfall. Fix damaged controls immediately. Remove accumulated sediment or waste material from the sediment controls regularly and dispose of at a licensed waste facility. • Monitor sedimentation down slope of excavated areas. • Leave erosion and sediment controls in place until after the works are completed. • Schedule the works outside of predicted heavy rain periods. • Stop work during and following heavy rainfall to reduce risk of mobilising sediment. • Spoil stockpiles should be wetted regularly to reduce opportunities for wind assisted sedimentation.	
Soil Contamination	• Incidental discovery or disturbance of soil contamination. • Pollution of sediment from chemical spills (e.g. fuel or oil from machinery).	• If contaminated soils are uncovered during the works, all works within the vicinity of the find must cease immediately and the PSC Project Manager must be notified immediately. • For any excess spoil material which requires offsite disposal, formal waste classification will be required before being taken to an appropriately licensed landfill in accordance with the EPA (2014) Waste Classification Guidelines. • Store all chemicals (e.g. fuel, oil) in appropriate bunding/storage systems within the approved storage facility. • Ensure appropriate spill kits are carried with the equipment. • Dedicated refuelling areas are to be established outside of the riparian area and away from the river and any other waterways. These areas are to be bunded to ensure any spills do not enter the riparian vegetation areas.	Project Manager All Staff/Contractors
Water Quality and Hydrology	• Excess sediment input into waterway • Localised erosion and sedimentation downstream of the dewatering • Pollution of waterway from chemical spills (e. g. fuel or oil)	• Weather forecasts will be checked daily to ensure that work is not carried out before or during high rainfall. • If high rainfall is forecast all sediment erosion controls must be checked to ensure they are operational, and repairs made if required. • Prior to use at the site and/or entry into the waterway, machinery is to be cleaned, degreased and serviced. • Store all chemicals (e. g. fuel, oil) used for construction purposes offsite. If chemicals are required to be stored onsite, chemicals should be stored in appropriate bunding/storage systems, outside of the riparian zones and only for short periods. • All chemicals used for operational purposes must stored in appropriate bunding/storage system within the approved storage facility. • Ensure appropriate spill kits, are present onsite.	Project Manager All Staff/Contractors

Impact On	Reasons	Safeguards/Mitigation Measures	Responsibility
		• Ensure all equipment is in good working order. • Carry associated Safety Data Sheets (SDS) for all chemicals. • Do not use any chemicals that are labelled as 'harmful to marine life' or 'Class 9 Environmentally hazardous' as part of the proposed activities. • Wash all equipment, including, erosion and sediment control measures and trailers to prevent spread of exotic species. A visual check for vegetation and seeds on all equipment machinery to be used in the activities must be carried out before work commences. • Coffer dams and installation devices must be washed before installation to avoid the spread of exotic species, sedimentation and other contaminants. • If required, a groundwater Water Supply Approval and/ or Water Access Licence from Natural Resources Access Regulator (NRAR) should be obtained. PSC are responsible for complying with the approval conditions (such as protecting water quality; minimising aquifer extraction volumes, monitoring extraction with flow meters and recording volumes).	
Waterway	• Destabilisation of river bank • Disturbance to current hydrological regime	• Stabilise and rehabilitate all disturbed areas including topsoiling, revegetation, weed control and maintenance in order to adequately restore and improve the integrity of the riparian corridor. • Any concrete/cement slurry used in the construction of the footing for the screen must not leave the bunded in stream work area. Slurry must not enter the waterway. • Instream sediment controls, such as a sediment curtains, must be installed downstream of works during installation of the coffer dam and removed once the coffer dam is installed. Prior to the coffer dam being removed the instream sediment controls mut be reinstalled. The instream sediment controls must stay in place for a day after the removal of the coffer dam. • Any metal fill, or other material, used instream works area must be cleaned and free of fines prior to use in the footings for the inlet screen. • All works must be in accordance with the conditions of the Part 7 Fisheries Permit.	Project Manager All Staff/Contractors
Biodiversity	• Damage to vegetation that is not proposed for removal	• Pre-works briefing to be undertaken by PSC staff advising of sensitive areas and relevant safeguards for these areas. • Install temporary barrier fencing to prevent entry into adjacent vegetation and appropriate 'no-go zone' signage. • Install tree protection measures around trees to be retained in the study area. Structures should be adequate to prevent machinery from entering within the drip zone.	Project Manger All Staff/Contractors

Impact On	Reasons	Safeguards/Mitigation Measures	Responsibility
	• Harm to non-identified threatened flora and fauna species • Injured or orphaned wildlife	• Maintain temporary fencing to prevent access into the native vegetation. • Where possible, relocate works outside of Tree Protection Zones. • To ensure that no aquatic fauna is impacted by dewatering within the works area, once the dewatered works area has been established it should be checked to ensure that no aquatic fauna such as eels have been isolated in the dewatered section. If there are any fauna species located within this area, they should be relocated from the works area following consultation with an aquatic ecologist. • Works must be stopped if any previously undiscovered threatened species or communities are discovered during works. An assessment of the impact and any required approvals must be obtained. Works must not recommence until PSC has provided written approval to do so. • The site-specific CEMP must include instructions for dealing with orphaned or injured native animals and include the contact details for the NSW Wildlife Information, Rescue and Education Service Inc (WIRES).	
Priority Weeds	• Spread of priority weeds	• Wash down equipment and vehicles prior to and after use, to manage the introduction and spread of weed propagules. • Remove Priority weeds using best management practices (including appropriate controls to prevent impacts to threatened species) prior to removal of native vegetation. Remove weed propagules offsite. • Bag and remove all weed propagules offsite, preferably the same day and dispose of at designated green waste facility. • Consider the implementation of a Weed Management Plan and revegetation works following the completion of works for the adjacent riparian corridor.	All Staff/Contractors
Aboriginal Heritage	• Discovery of unexpected Aboriginal objects • Discovery of human remains • Harm to AHIMS sites as well as other area of Aboriginal Significance • Previously registered Potential Archaeological Deposit (PAD)	• Based on the presence of registered Aboriginal sites and the sensitive nature of the study area, an ACHA should be prepared which would include an impact assessment of the proposed development. The ACHA would entail Aboriginal community consultation following the '*Aboriginal cultural heritage consultation requirements for proponents 2010' (DECCW 2010)* to identify Aboriginal cultural heritage values through consultation with Aboriginal stakeholders. • Further archaeological assessment including detailed field survey with Aboriginal stakeholders and archaeological test excavation should be undertaken to inform archaeological values across the developable area. • The ACHA can be used to support a future Aboriginal Heritage Impact Permit (AHIP) application to Heritage NSW if Aboriginal sites cannot be avoided by future	Project Manager All Staff/Contractors

Impact On	Reasons	Safeguards/Mitigation Measures	Responsibility
		development. Heritage NSW require that AHIP applications are supported by a development consent under Part 4 or an REF under Division 5.1 of Part 5 of the EP&A Act or any other required approval, as a supporting document. • Aboriginal sites should be considered for conservation where possible including areas of high archaeological and cultural significance. Consultation with the Aboriginal community will assist in identifying priority areas for conservation. An Aboriginal heritage management plan should be developed for the long-term management of the conservation areas.Aboriginal objects are protected under the NPW Act regardless if they are registered on AHIMS or not. If suspected Aboriginal objects, such as stone artefacts are located during future works, works must cease in the affected area and an archaeologist called in to assess the finds. If the finds are found to be Aboriginal objects, Heritage NSW must be notified under section 89A of the NPW Act. Appropriate management and avoidance or approval under a section 90 AHIP should then be sought if Aboriginal objects are to be moved or harmed. • In the extremely unlikely event that human remains are found, works should immediately cease, and the NSW Police should be contacted. If the remains are suspected to be Aboriginal, Heritage NSW may also be contacted at this time to assist in determining appropriate management.	
Historic Heritage	• Impacts to Heritage items	• All relevant staff, contractors and subcontractors should be made aware of their statutory obligations for heritage under the NSW *Heritage Act 1977* and be informed of best practice in the event unexpected archaeological relics are uncovered, as outlined in *The Burra Charter 2013*. This may be implemented as a heritage induction. • In accordance with Section 146 of the *Heritage Act 1977*, if an archaeological relic (such as a deposit or artefact) is uncovered during works, work must cease in the affected area and a qualified archaeologist contacted to assess the find. Further advice and clarification may be sought from Heritage NSW under delegation regarding assessment and approvals.	Project Manager All Staff/Contractors
Noise and Vibration	• Noise impacts on sensitive receivers in proximity	• Hours of work limited to specified hours (Monday to Friday between 7 am – 6 pm and Saturday 8 am – 1 pm) • Vehicles and machinery should not be left idling when not in use • Equipment, machinery and vehicles should be regularly maintained (documented). • All machinery and equipment to be used will comply with the relevant Australian standard for noise attenuation (e.g. have noise mufflers and be well maintained).	Project Manager All Staff/Contractors

Impact On	Reasons	Safeguards/Mitigation Measures	Responsibility
		• Well planned site layout to ensure where practical that noisy plant and machinery and overnight parking locations are located away from nearby residences with reversing also minimised in these locations. • Select methods not involving impact where possible. • Community consultation and notification for potentially noise and vibration affected residences detailing timing of noisy activities. • Mechanism to provide noise complaints using signage and usage of a complaints register with relevant triggers for noise monitoring if required. • Where possible, avoid the simultaneous operation of two or more noisy plant items in close vicinity to sensitive noise receivers. • Where possible, orientate equipment such that offensive noise carries away from potential receivers.	
Air Quality	• Dust generation from vibrating and ground disturbing works • Fumes generation from machinery • Cumulative impacts of greenhouse gas emissions	• Works must be minimised during high wind periods. • Dust suppression should be applied as required to limit excessive dust generation. • Look for excessive dust generation and slow down vehicle speeds if needed. • Construction stockpiles should be wetted down to ensure that there is no significant dust generation during high wind periods. • Ensure that construction vehicles are operated safely and are not generating excessive dust through skidding. • Plant and equipment must be regularly inspected to ascertain that fitted emission controls are operating efficiently. • Vehicles to maintain recommended speed. • Minimise use of machinery for required activity only. • Do not have machinery running while not in use. • Plant and equipment must be maintained in accordance with manufacturer's specifications to ensure that it is in a proper and efficient condition.	Project Manager All Staff/Contractors
Waste and Contamination	• Excess spoil in the form of excavated material • Litter left on-site by staff/contractors	• Resource management options for the proposal must be considered against a hierarchy of the following order embodied in the Waste Avoidance and Resource Recovery Act 2001: o Avoid unnecessary resource consumption. o Recover resources (including reuse, reprocessing, recycling and energy recovery). o Dispose (as a last resort).	All Staff/Contractors

Impact On	Reasons	Safeguards/Mitigation Measures	Responsibility
		• All wastes and excess spoil must be classified in accordance to the Waste Classification Guidelines (DECC, 2009) prior to disposal and transported to a licensed waste disposal facility. • All waste must be removed from the site on completion of the works. • Upon completion of waste disposal, all original weighbridge / disposal receipts issued by the receiving waste facility must be retained in a waste register as evidence of proper disposal. • An adequate number of bins must be placed at the site for workers and all litter will be placed in these bins. Work areas of the proposal site would be kept clean and free of litter, including cigarette butts, at all times.	
Traffic and Transport	• Disruption to traffic flows • Temporary Road Closures	• Vehicles, materials and equipment must be positioned to minimise impacts to public access and parking. • Heavy vehicles, if required, will be restricted to specified routes. • A Traffic Management Plan should be implemented prior to the commencement of any construction works to ensure that traffic disruptions are mitigated, and commuters are notified of detours and closures through signage. • Nearby businesses and sensitive receivers should be notified and given an opportunity to comment on temporary road closures prior to commencement of construction. • Undertake consultation with TfNSW and Council if any partial road closures or occupation is required.	Project Manager All Staff/Contractors
Landscape and Visual Amenity	• Impact on the community	• Notify community or neighbours where light impacts are anticipated. • Planting of native species should be undertaken to help further screen the facility from neighbouring receivers along the western boundary. • Position lighting in residential areas to direct light away from houses wherever possible.	Project Manager All Staff/Contractors
Socioeconomic	• Traffic delays • Community complaints and service disruption	• Undertake early community engagement, early notification / advertisement of construction period through both local and regional channels. • Carry out community and stakeholder consultation before works start. • Notify Council immediately of any complaints or any accidental damage to property. • Locate existing services on a Dial-Before-You-Dig search and peg out no-go areas to avoid service-disruption.	Project Manager All Staff/Contractors
Energy and Climate Change	• Increased energy consumption and production of emissions	• Vehicles, plant and machinery should be kept in good working order and used in an efficient manner. Vehicles should not be left idling when not in use.	Project Manager All Staff/Contractors

Impact On	Reasons	Safeguards/Mitigation Measures	Responsibility
	• Increased production of emissions, structural inefficiency	• Construction materials will be sourced locally where possible and will utilise recycled materials to the greatest possible extent • Sustainable design will be incorporated into the design of the pipeline to reduce the risk of leakage and failure.	
Bushfire	• Inadvertent increase of bushfire risk • Design	• An adequate number of bins must be placed at the site for workers and all litter will be placed in these bins. Work areas of the proposal site would be kept clean and free of litter, including cigarette butts, at all times. • Flammable substances are stored correctly, and only minimal amounts of these substances are to be present onsite. • Cut grasses surrounding the study area intermittently, particularly in hotter months when conditions are anticipated to be hot and dry • Construction materials should be fire-resistant	

8. Conclusion

The proposal has been subject to assessment under Division 5.1, Part 5 of the EP&A act. The REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity. This has included consideration of other environmental planning instruments as well as other NSW and Commonwealth legislation.

The Program and project are justified for the main reason of securing an adequate supply of water, which will support economic development and growth in the industrial, commercial, residential and transportation sectors in the Shire.

The proposal as described in the REF best meets the proposal objectives, however, would still result in some impacts. Environmental impacts associated with the proposal would generally be limited to terrestrial and aquatic biodiversity and Aboriginal heritage. Appropriate mitigation measures to be undertaken both during the detailed design stage and during construction have been recommended to ensure such impacts are minimised.

The REF has considered and assessed these impacts in accordance with clause 228 of the EP&A Regulation and the requirements of the EPBC Act. Based on the assessment contained in this REF, it is considered that the proposal is not likely to have a significant impact upon the environment or any threatened species, populations or communities. Accordingly, an Environmental impact Statement (EIS) is not recommended.

The proposal has also taken into account the principles of ecologically sustainable development and the objects of the EP&A Act. The proposal would be delivered to the maximum benefit for the community, be cost effective and minimise any adverse impacts on the environment. On balance, the proposal is considered justified and in the public interest.

The following additional approvals will be required prior to construction commencing:

- Fisheries permit under Section 219 and 200 of the FM Act from DPI – Fisheries
- Aboriginal Heritage Impact Permit from Heritage NSW

The upgrade to the existing pumping station will comply with the existing Water Access Licence (WAL) allocations and for the short to medium foreseeable future, no changes to the current WALs are warranted.

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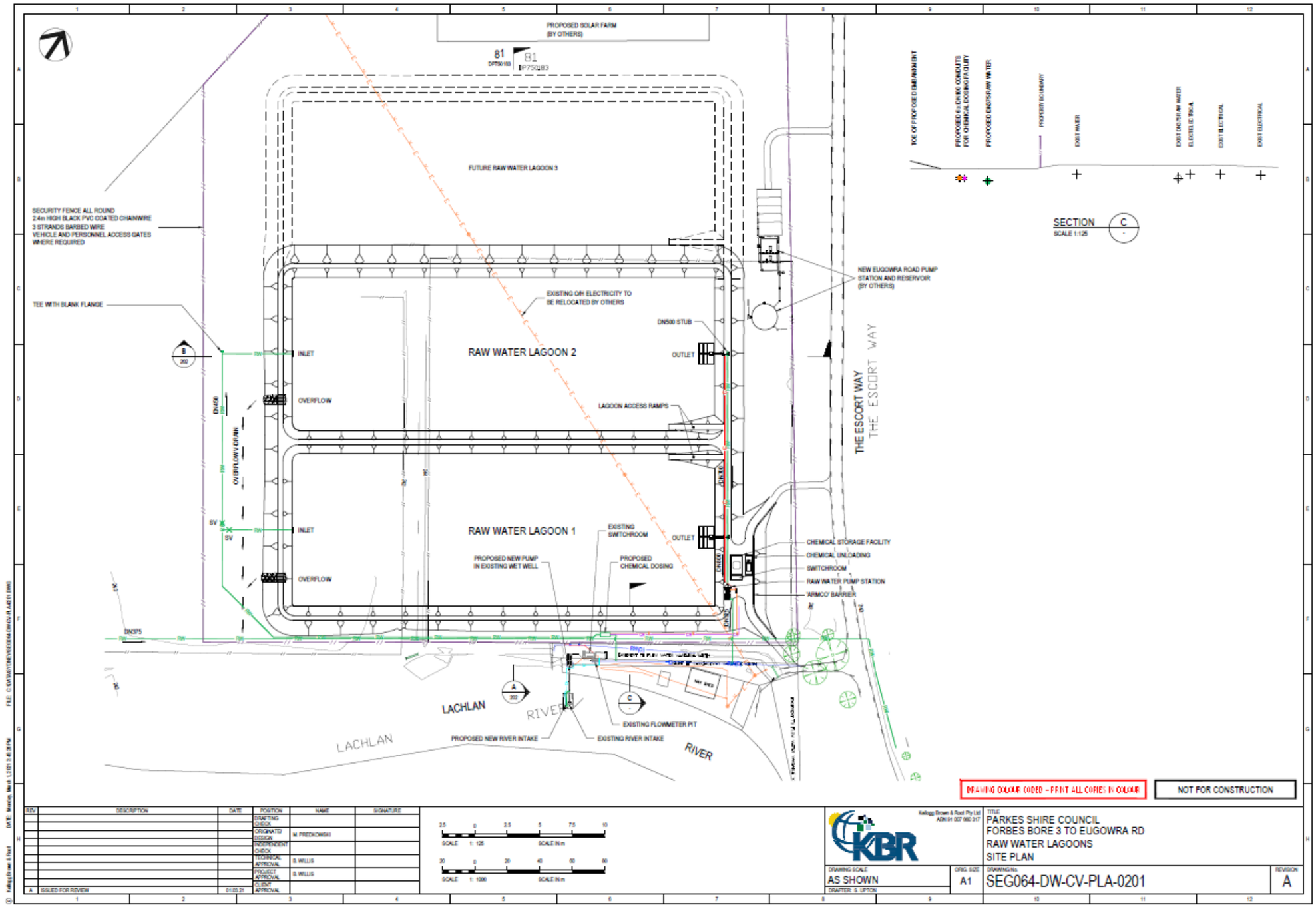
Appendix A Detailed Design Layout



Appendix B Likelihood of Occurrence Table

Table 9-1: Threatened ecological communities likelihood table

Community Name	Conservation Status		Distribution and Habitat	Likelihood of occurrence	Justification
	BC Act	EPBC Act			
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	E	E	Grey Box grassy woodland is an open forest with a canopy dominated by *Eucalyptus macrocarpa* (Grey Box). Other tree species are often present and may be co-dominant with Grey Box at some sites, including *Allocasuarina luehmannii* (Buloke), *Brachychiton populneus* (Kurrajong), *Callitris glaucophylla* (White Cypress Pine), *Eucalyptus albens* (White Box), *Eucalyptus camaldulensis* (River Red Gum), *Eucalyptus conica* (Fuzzy Box), *Eucalyptus leucoxylon* (Yellow Gum), *Eucalyptus melliodora* (Yellow Box) and *Eucalyptus populnea* (Bimble Box). The understorey is characterised by a moderately dense to sparse shrub layer, and a ground layer of perennial and annual native forbs and graminoids, dominated by tussock grasses. The community includes patches of derived grassland, where the tree canopy and mid layer has been removed to less than 10% crown cover, but the native ground layer remains largely intact. This community is found in central New South Wales through northern and central Victoria into South Australia. In NSW, found in the southern subregions of the Brigalow Belt South bioregion, the eastern subregions of the Darling Riverine Plain bioregion, the NSW South Western Slopes bioregion and the eastern subregions of the Cobar Peneplain bioregion.	None	No ecological community within the study area could be characterised by the listed features of this community.
Poplar Box Grassy Woodland on Alluvial Plains		E	The Poplar Box Grassy Woodland is located west of the Great Dividing Range, occurring within the Brigalow Belt North, Brigalow Belt South, Southeast Queensland, Cobar Peneplain, Darling Riverine Plains, NSW South Western Slopes and Riverina IBRA bioregions . The Poplar Box Grassy Woodland is sometimes found in close proximity to ephemeral watercourses and depressions The canopy of the Poplar Box Grassy Woodland is dominated by *Eucalyptus populnea,* and present with other species such as *Callitris glaucophylla* (White Cypress Pine), *Casuarina*	None	No ecological community within the study area could be characterised by the listed features of this community.

Community Name	Conservation Status		Distribution and Habitat	Likelihood of occurrence	Justification
	BC Act	EPBC Act			
			cristata (Belah), *Eucalyptus Coolibah* (Coolibah), *Eucalyptus largiflorens* (Black Box) and *Eucalyptus melanophloia* (Silver-leaved Ironbark).		
Weeping Myall Woodlands	E	E	Weeping Myall Woodlands are generally 4-12 m high, in which *Acacia pendula* (Weeping Myall) trees are the sole or dominant overstorey species. Other vegetation may include *Alectryon oleifolius subsp. elongatus* (Western Rosewood), *Eucalyptus populnea* (Poplar Box) or *Eucalyptus largiflorens* (Black Box). *Amyema quandang* (Grey Mistletoe) commonly occurs on the branches of Weeping Myall trees. The understorey often includes an open layer of shrubs above an open ground layer of grasses and herbs, though the ecological community can exist naturally either as a shrubby or a grassy woodland. This community is on Inland alluvial plains west of the Great Dividing Range.	None	No ecological community within the study area could be characterised by the listed features of this community.
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	CE	CE	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland is characterised by a species-rich understorey of native tussock grasses, herbs and scattered shrubs, and the dominance, or prior dominance, of *Eucalyptus albens* (White Box), *Eucalyptus melliodora* (Yellow Box) and *Eucalyptus blakelyi* (Blakely's Red Gum). In the Nandewar Bioregion, *Eucalyptus microcarpa* or *Eucalyptus moluccana* (Grey Box) may also be dominant or co-dominant. The tree-cover is generally discontinuous and consists of widely-spaced trees of medium height in which the canopies are clearly separated. This community occurs in an arc along the western slopes and tablelands of the Great Dividing Range from Southern Queensland through NSW to central Victoria. In NSW, it occurs in the Brigalow Belt South, Nandewar, New England Tableland, Sydney Basin, NSW North Coast, South Eastern Highlands, South East Corner, NSW South Western Slopes and Riverina Bioregions.	**Yes**	This ecological community is associated with PCT 277, located alongside the south of The Escort Way.

Table 9-2: Threatened fauna likelihood table

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence	Justification	Impact Assessment Required
Actitis hypoleucos	Common Sandpiper		M	The Common Sandpiper is a summer migrant. In NSW, it is widespread along coastline and also occurs in many areas inland. Often occurring in coastal wetlands and some inland wetlands, especially muddy margins or rocky shores. Also estuaries and deltas, lakes, pools, billabongs, reservoirs, dams and claypans, mangroves.	Unlikely	Suitable habitat surrogates are absent from the study area. As such species is unlikely to use the Study area on occasion. No recent records of species within locality (BioNet, 2020).	No
Anseranas semipalmata	Magpie Goose	V		In NSW the Magpie Goose is found in central and northern parts of the state, with vagrants as far as south-eastern NSW. This species will occur in shallow wetlands, floodplains, grasslands, pastures, dams and crops. The Magpie Goose will feed on grasses, bulbs and rhizomes. It roosts in tall vegetation. Breeding is strongly influenced by water level; most breeding now occurs in the late wet season in monsoonal areas. Nests are formed in trees over deep water or on a floating platform of flattened reeds.	Potential	Habitat in the form of grasslands and pastures is present within the subject site	Yes
Anthochaera phrygia	Regent Honeyeater	CE	CE	The Regent Honeyeater occurs on the inland slopes of south-east Australia, and less frequently in coastal areas. In NSW, mostential records are from the North-West Plains, North-West and South-West Slopes, Northern Tablelands, Central Tablelands and Southern Tablelands regions; also recorded in the Central Coast and Hunter Valley regions.	Pot	Suitable habitat for foraging, feeding or related behaviour is likely to occur within the study area. However, no recent records of species within locality (BioNet, 2020). The potential impacts associated with the proposed	Yes

				The Regent Honeyeater will occur on eucalypt woodland and open forest, wooded farmland and urban areas with mature eucalypts, and riparian forests of Casuarina cunninghamiana (River Oak). The species breeds between July and January and usually nests in horizontal branches or forks in tall mature eucalypts and Sheoaks. The Regent Honeyeater primarily feeds on nectar from box and ironbark eucalypts and occasionally from banksias and mistletoes.		works are unlikely to disrupt this highly mobile species.	
Aprasia parapulchella	Pink-tailed Legless Lizard	V	V	In NSW, the Pink-tailed Legless Lizard is only known from the Central and Southern Tablelands, and the South Western Slopes. Sloping, open woodland areas with predominantly native grassy groundlayers, rocky outcrops or scattered, partially-buried rocks. This species is 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.	Unlikely	Suitable habitat surrogates are absent from the study area. As such species is unlikely to use site on occasion. No recent records of species within locality (BioNet, 2020).	No
Apus pacificus	Fork-tailed Swift		M	The Apus pacificus is recorded in all regions of NSW. Occurring in riparian woodland., swamps, low scrub, heathland, saltmarsh, grassland, Spinifex sandplains, open farmland and inland and coastal sand-dunes. The species is thought to be highly mobile within Australia, moving across the country in search of food. They probably roost aerially.	Unlikely	No suitable habitat is present within the study area. No recent records of species within locality (BioNet, 2020). The potential impacts associated with the proposed works are unlikely to disrupt this highly mobile species.	No
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V		The Dusky Woodswallow is widespread in NSW from coast to inland including the western slopes of the Great Dividing Range and farther	Likely	Habitat for this species is present within the study area	Yes

				west. This species has also been recorded in southern and southwestern Australia. Often occurring in woodlands and dry open sclerophyll forest, usually eucalypts and mallee associations. Also have recordings in shrub and heathlands and various modified habitats, including regenerating forests. In western NSW, this species is primarily associated with River Red Gum/Black Box/Coolabah open forest/woodland and associated with larger river/creek systems. Breeding more commonly occurs on the western slopes of the Great Dividing Range. Nesting occurs between Sept and Jan in open shallow untidy cups in an open hollow, crevice or stump. With a clutch size is one to four with pairs possibly nesting twice per season. Diet consists mainly of invertebrates with occasional nectar, fruit and seed being consumed			
Botaurus poiciloptilus	Australasian Bittern	E	E	Australasian Bittern is found over most of NSW except for the far north-west. Occurring in permanent freshwater wetlands with tall, dense vegetation. This species will feed mainly at night on frogs, fish, yabbies, spiders, insects and snails. Feeding platforms may be constructed over deeper water from reeds trampled by the bird. Breeding occurs in summer from October to January; nests are built in secluded places in densely-vegetated wetlands on a platform of reeds.	Unlikley	Suitable habitat is known to occur within the study area. However, there are no recent records of the species within the locality (BioNet, 2020). As such this species is unlikely to use site on occasion. The potential impacts associated with the proposed works are unlikely to disrupt this highly mobile species.	No
Burhinus grallarius	Bush Stone-curlew	E		The Bush Stone-curlew in NSW is found sporadically in coastal areas and west of the divide throughout the sheep-wheat belt.	Likely	Suitable habitat and nesting sites are present within the study area	Yes

				Occurring in lowland grassy woodland and open forest. Foraging nocturnally in irrigated paddocks, grasslands, woodlands, domestic gardens and playing fields. Nest sites are typically in or near the edge of open grassy woodland or within a cleared paddock with breeding between early spring and early summer.			
Calidris acuminata	Sharp-tailed Sandpiper		M	The Sharp-tailed Sandpiper is a summer migrant, widespread in most regions of NSW, especially in coastal areas, but sparse in the south-central Western Plain and east Lower Western Regions. Often found in shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. Forages in wetlands or intertidal mudflats, inundated vegetation of saltmarsh, grass or sedges, sewage ponds. Roosting occurs at the edges of wetlands, on sandy beaches, stony shores or on rocks in water.	Unlikely	Suitable habitat surrogates are absent from the study area. As such species is unlikely to use site on occasion. No recent records of species within locality (BioNet, 2020).	No
Calidris ferruginea	Curlew Sandpiper	E	CE	The Curlew Sandpiper forage in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed. It roosts on shingle, shell or sand beaches; spits or islets on the coast or in wetlands; or sometimes in salt marsh, among beach-cast seaweed, or on rocky shores. Curlew Sandpipers are omnivorous, feeding on worms, molluscs, crustaceans, insects and some seeds.	Unlikely	Suitable habitat surrogates are absent from the study area. As such species is unlikely to use site on occasion. No recent records of species within locality (BioNet, 2020).	No

Calidris melanotos	Pectoral Sandpiper		M	The Pectoral Sandpiper is a summer migrant to Australia. Widespread but scattered in NSW. Found east of the Great Divide, recorded from Casino and Ballina, south to Ulladulla. West of the Great Divide, widespread in the Riverina and Lower Western regions. This species is found in shallow fresh to saline wetlands, including coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. Breeds in northern Russia and North America, migrates to non-breeding areas in South America. Recorded in Australia from September to June	Unlikely	Suitable habitat surrogates are absent from the study area. As such species is unlikely to use site on occasion. No recent records of species within locality (BioNet, 2020).	No
Calyptorhynchus lathami	Glossy Black-Cockatoo	V		The Glossy Black-Cockatoo in NSW is widespread along the coast and inland to the southern tablelands and central western plains. habitat consists of open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. Dependant on large hollow bearing eucalypts for nest sites and breeding occurs between March and May	Unlikely	No suitable habitat present in the study area however some hollow bearing trees are located in proximity to the study area.	No
Certhionyx variegatus	Pied Honeyeater	V		The Pied Honeyeater occurs in arid and semi-arid areas, and occasionally east to the slopes and plains and the Hunter Valley. In Acacia aneura (Mulga), mallee, spinifex and eucalypt woodlands. This species feeds on nectar from various species of Eremophila spp. (emu-bushes), mistletoes and various other shrubs; also eats saltbush fruit, berries, seed, flowers and insects. This is a Highly nomadic species, following the erratic flowering of shrubs; can be	Potential	Habitat for this species is present within the study area	Yes

				locally common at times. Constructs a relatively large cup-shaped nest, usually robust, although occasionally loose, constructed of grasses and fine twigs, bound with spider webs, in the fork of a shrub or tree up to 5 m above the ground.			
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	The Large-eared Pied Bat is recorded from Rockhampton in Qld south to Ulladulla in NSW. The largest concentrations of populations occur in the sandstone escarpments of the Sydney basin and the NSW north-west slopes. This species occurs in wet and dry sclerophyll forests, Cyprus Pine dominated forest, woodland, sub-alpine woodland, edges of rainforests and sandstone outcrop country. The Large-eared Pied Bat roosts in caves, rock overhangs and disused mine shafts and as such is usually associated with rock outcrops and cliff faces. The species is thought to require roosting habitat that is adjacent to higher fertility sites which are used for foraging. This species probably forages for small, flying insects below the forest canopy. Likely to hibernate through the coolest months. It is uncertain whether mating occurs early in winter or in spring.	Unlikely	Suitable habitat surrogates are absent from the study area. As such species is unlikely to use site on occasion. No recent records of species within locality (BioNet, 2020).	No

Chthonicola sagittata	Speckled Warbler	V	The Speckled Warbler is found from south-eastern Qld, the eastern half of NSW and into Victoria, as far west as the Grampians, mostly on hills and tablelands of the Great Dividing Range and rarely on coast. This species will occur in Eucalyptus-dominated communities with a grassy understorey and sparse shrub layer, often on rocky ridges or in gullies. The Speckled Warbler diet consists of 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.	Likely	Habitat for this species is present within the study area	Yes
Circus assimilis	Spotted Harrier	V	The Spotted Harrier is found throughout the Australian mainland, except in densely forested or wooded habitats, and rarely in Tasmania. Found in grassy open woodland, inland riparian woodland, grassland, shrub steppe, agricultural land and edges of inland wetlands. This species builds a stick nest in a tree and lays eggs in spring (or sometimes autumn), with young remaining in the nest for several months. Preys on terrestrial mammals (e.g. bandicoots, bettongs, and rodents), birds and reptile, occasionally insects and rarely carrion.	Likely	Habitat for this species is present within the study area	Yes

Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	The Brown Treecreeper is found from eastern through central NSW, west to Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell. Often found in Eucalypt woodlands and dry open forest. Up to 80% of the diet is comprised of ants. This species also feeds on other invertebrates (including spiders, insects larvae, moths, beetles, flies, hemipteran bugs, cockroaches, termites and lacewings), nectar from Mugga Ironbark (Eucalyptus sideroxylon) and paperbarks, and sap, along with lizards and food scraps. Hollows in standing dead or live trees and tree stumps are essential for nesting.	Likely	Habitat for this species is present within the study area	Yes
Daphoenositta chrysoptera	Varied Sittella	V	The Varied Sittella has a nearly continuous distribution from the coast to the far west. This species inhabits eucalypt forests and woodlands, mallee and Acacia woodland. Feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees and small branches and twigs in the tree canopy. This species will build a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years.	Likely	Habitat for this species is present within the study area	Yes

Dasyurus maculatus	Spotted-tailed Quoll	V	E	The Spotted-tailed Quoll is found on the east coast of NSW, Tasmania, eastern Victoria and north-eastern Qld. Occurring in rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. This species is mostly nocturnal, although will hunt during the day; spends most of the time on the ground, although also an excellent climber. The Spotted-tailed Quoll consumes gliders, possums, small wallabies, rats, birds, bandicoots, rabbits and insects; also eats carrion and takes domestic fowl. Females occupy home ranges up to about 750 hectares and males up to 3500 hectares; usually traverse their ranges along densely vegetated creeklines.	Unlikely	Suitable habitat surrogates are absent from the study area. As such species is unlikely to use site on occasion. No recent records of species within locality (BioNet, 2020).	No
Epthianura albifrons	White-fronted Chat	V		The White-fronted Chat occurs mostly in the southern half of the state, in damp open habitats along the coast, and near waterways in the western part of the state. This species is usually found in saltmarsh vegetation, open grasslands and sometimes low shrubs bordering wetland areas. The diet is insectivorous, feeding mainly on flies and beetles caught from or close to the ground.	Potential	Habitat in the form of open grasslands is present within the study area	Yes
Falco hypoleucos	Grey Falcon	E	V	In NSW, The Grey Falcon is found chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. Often occurring in shrubland, grassland and wooded watercourses, occasionally in open woodlands near the coast, and near wetlands. Preys primarily on birds, especially parrots and	Potential	Suitable habitat for foraging, feeding or related behaviour is likely to occur within the study area. However, no recent records of species within locality (BioNet, 2020).	yes

				pigeons; reptiles and mammals are also taken. This species utilises old nests of other birds of prey and ravens, usually high in a living eucalypt near water or a watercourse; peak laying season is in late winter and early spring.		The potential impacts associated with the proposed works are unlikely to disrupt this highly mobile species.	
Falco subniger	Black Falcon	V		The Black Falcon is sparsely distributed in NSW, occurring mostly in inland regions. Occurring in woodland, shrubland and grassland, especially riparian woodland and agricultural land. Often associated with streams or wetlands. Black Falcons nest in winter to late spring in the old stick nests of corvids or sometimes other raptor species. These tend to be located at the top of emergent trees in woodland, particularly riparian woodland. This species will feed mostly on other birds, especially ground-feeding granivores such as pigeons and parrots, but also small mammals, large insects and occasionally carrion.	Likely	Habitat for this species is present within the study area	Yes
Gallinago hardwickii	Latham's Snipe		M	The Latham's Snipe is a migrant to east coast of Australia, extending inland west of the Great Dividing Range in NSW. occurring in freshwater, saline or brackish wetlands up to 2000 m above sea-level; usually freshwater swamps, flooded grasslands or heathlands. This is a non-breeding migrant to Australia, arriving between July-November from its breeding grounds in Japan and far-eastern	Unlikely	Suitable habitat surrogates are absent from the study area. As such species is unlikely to use site on occasion. No recent records of species within locality (BioNet, 2020).	No
Glossopsitta pusilla	Little Lorikeet	V		In NSW, the Little Lorikeet is found from the coast westward as far as Dubbo and Albury. Occurring in dry, open eucalypt forests and woodlands, including remnant woodland patches and roadside vegetation.	Likely	Habitat for this species is present within the study area	

				Nomadic movements are common, influenced by season and food availability. Feeds mostly on nectar and pollen, occasionally on native fruits such as mistletoe, and only rarely in orchards. The Little Lorikeet roosts in treetops, often distant from feeding areas. Nests in proximity to feeding areas if possible, most typically selecting hollows in the limb or trunk of smooth-barked Eucalypts.			
Grantiella picta	Painted Honeyeater	V	V	The Painted Honeyeater is widely distributed in NSW, predominantly on the inland side of the Great Dividing Range but avoiding arid areas. Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. This species will also feed on Insects and nectar from mistletoe or eucalypts are occasionally eaten. Nests from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches.	Potential	Suitable habitat for foraging, feeding or related behaviour is likely to occur within the study area. However, no recent records of species within locality (BioNet, 2020). The potential impacts associated with the proposed works are unlikely to disrupt this highly mobile species.	Yes
Grus rubicunda	Brolga	V		Brolgas in NSW are sparsely distributed across the southern part of its range, which includes central NSW to western Victoria. Habitat consists of open wetlands, grassy plains, coastal mudflats and irrigated croplands and, on the coast, mangrove-studded creeks and estuaries. Brolgas often feed in dry grassland or ploughed paddocks or even desert claypans, they are dependent on wetlands too, especially shallow swamps, where they will forage with their head entirely submerged.	Unlikely	Suitable habitat in the form of wetlands are not present within the study area.	No

Haliaeetus leucogaster	White-bellied Sea-Eagle	V	The White-bellied Sea-Eagle is distributed along the coastline of mainland Australia and Tasmania, extending inland along some of the larger waterways, especially in eastern Australia. Often seen in freshwater swamps, rivers, lakes, reservoirs, billabongs, saltmarsh and sewage ponds and coastal waters. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, forest and urban areas. Breeding season extends from June to January (or sometimes February) in southern Australia. Breeding habitat is usually close to water but may occur up to a kilometre away. Nests are mainly located in tall open forest or woodland, but sometimes in other habitats such as dense forest, closed scrub or in remnant trees on cleared land. The White-bellied Sea-Eagle feeds opportunistically on a variety of fish, birds, reptiles, mammals and crustaceans, and on carrion and offal.	Potential	Habitat for this species is present within the study area	Yes
Hieraaetus morphnoides	Little Eagle	V	The Little Eagle is found throughout the Australian mainland, with the exception of the most densely-forested parts of the Dividing Range escarpment. occurring in open eucalypt forest, woodland or open woodland, including sheoak or Acacia woodlands and riparian woodlands of interior NSW. This species nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. Preys on birds, reptiles and mammals, occasionally adding large insects and carrion.	Likely	Habitat for this species is present within the study area	Yes

Hirundapus caudacutus	White-throated Needletail		M	The White-throated Needletail occurs in all coastal regions of NSW, inland to the western slopes and inland plains of the Great Divide. Occurring most often over open forest and rainforest, as well as heathland, and remnant vegetation in farmland. This species breeds in eastern Siberia, north-eastern China and Japan. The species arrives in Australia in September–October, and most depart by April. It almost always forages aerially. Recorded roosting in trees in forests and woodlands, both among dense foliage in the canopy or in hollows.	Unlikley	Suitable habitat surrogates are absent from the study area. As such species is unlikely to use site on occasion. No recent records of species within locality (BioNet, 2020).	No
Hydroprogne caspia	Caspian Tern		M	The Caspian Tern is a migratory species widespread in coastal and inland NSW. Habitat consists of coastal offshore waters, beaches, mudflats, estuaries, rivers, lakes. Breeds September to December in the south in colonies on sandspits and islands. They are mainly sedentary but numbers fluctuate seasonally in many areas.	Potential	Suitable habitat in the form of rivers and estuaries present in proximity to the study area, additionally past records within a 20km radius.	Yes
Lathamus discolor	Swift Parrot	E	CE	The Swift Parrot migrates from Tasmania to mainland in Autumn-Winter. In NSW, the species mostly occurs on the coast and south west slopes. Box-ironbark forests and woodlands. Favoured feed trees include winter flowering species such as Eucalyptus robusta (Swamp Mahogany), Corymbia maculata (Spotted Gum), Corymbia gummifera (Red Bloodwood), Eucalyptus sideroxylon (Mugga Ironbark), and Eucalyptus albens (White Box). Following winter they return to Tasmania where they breed from September to January.	Unlikely	Suitable habitat surrogates are absent from the study area. As such species is unlikely to use site on occasion. No recent records of species within locality (BioNet, 2020).	No

Leipoa ocellata	Malleefowl	E	V	The Malleefowl occurs in arid and semi-arid zones. In NSW, populations occur in the south west mallee centred on Mallee Cliffs NP and extending east to near Balranald; in the Scotia mallee west of the Darling River; and in the Goonoo forest near Dubbo. Recorded less recently in the Pilliga forests, around Cobar and Goulburn River NP. A pair may occupy a range of between 50 and 500 ha. Mainly forage in open areas on seeds of Acacias and other native shrubs (Cassia, Beyeria, Bossiaea), buds, flowers and fruits, insects, and cereals if available. This species will Incubate eggs in large mounds that contain considerable volumes of sandy soil. The male monitors the temperature within the egg chamber using its bill, and regularly works the mound during the breeding season to maintain a constant temperature around 34 degrees.	Unlikely	Suitable habitat surrogates are absent from the study area. As such species is unlikely to use site on occasion. No recent records of species within locality (BioNet, 2020).	No
Maccullochella macquariensis	Trout Cod	E	E	Found in relatively fast currents, especially in fairly deep water close to the bank, and often congregate around large woody debris (snags).	Potential	Suitable habitat is present in the Lachlan River, however, no recent records of species within locality (BioNet, 2020). Potential impacts may occur during the use of coffer dams to install the screen intake.	Yes
Maccullochella peelii	Murray Cod		V	Murray Cod is found throughout most of the Murray Darling Basin with the exception of some localised extinctions. Some translocated populations exist outside the species' natural distribution in impoundments and waterways (Cataract Dam and the Nepean River system in NSW). This species is found in clear rocky streams to slow flowing, turbid rivers and	Potential	Suitable habitat is present in the Lachlan River, however, no recent records of species within locality (BioNet, 2020). Potential impacts may occur during the use of coffer dams to install the screen intake.	Yes

				billabongs. Frequently found in the main river channel and larger tributaries; also, in floodplain channels when they contain water.			
Macquaria australasica	Macquarie Perch	E	E	The Macquarie perch is found in the Murray-Darling Basin (particularly upstream reaches) of the Lachlan, Murrumbidgee and Murray rivers, and parts of south-eastern coastal NSW, including the Hawkesbury and Shoalhaven catchments. River and lake habitats, especially the upper reaches of rivers and their tributaries. Feeds on aquatic insects, crustaceans and molluscs.	Potential	Suitable habitat is present in the Lachlan River, however, no recent records of species within locality (BioNet, 2020). Potential impacts may occur during the use of coffer dams to install the screen intake.	Yes
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V		The Hooded Robin is found throughout much of inland NSW, with the exception of the extreme north-west, where it is replaced by subspecies picata. Often occurring in open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. This species often perches on low dead stumps and fallen timber or on low-hanging branches, using a perch-and-pounce method of hunting insect prey. May breed any time between July and November, often rearing several broods. The nest is a small, neat cup of bark and grasses bound with webs, in a tree fork or crevice, from less than 1 m to 5 m above the ground.	Likely	Habitat for this species is present within the study area	Yes
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V		The Black-chinned Honeyeater is widespread in NSW from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. Also Richmond and Clarence River areas and a few scattered sites in the Hunter, Central Coast and Illawarra regions.	Likely	Habitat for this species is present within the study area	Yes

			This species occurs in open forests or woodlands dominated by box and ironbark eucalypts, or by smooth-barked gums, stringybarks, river sheoaks and tea-trees. Nectar is taken from flowers, and honeydew is gleaned from foliage. The Black-chinned Honeyeater breeds solitarily or co-operatively, with up to five or six adults, from June to December. The nest is placed high in the crown of a tree, in the uppermost lateral branches, hidden by foliage. It is a compact, suspended, cup-shaped nest.			
Motacilla flava	Yellow Wagtail	M	Yellow Wagtail is a regular summer migrant to mostly coastal Australia. In NSW recorded Sydney to Newcastle, the Hawkesbury and inland in the Bogan Local Government Area. This species occurs in swamp margins, sewage ponds, saltmarshes, playing fields, airfields, ploughed land, lawns. Breeds Europe to Siberia and west Alaska.	Unlikely	Suitable habitat surrogates are absent from the study area. As such species is unlikely to use site on occasion. No recent records of species within locality (BioNet, 2020).	No
Myiagra cyanoleuca	Satin Flycatcher	M	In NSW, the Satin flycatcher is widespread on and east of the Great Divide and sparsely scattered on the western slopes, with very occasional records on the western plains. Occurs in eucalypt-dominated forests, especially near wetlands, watercourses, and heavily-vegetated gullies. Satin Flycatchers move north in autumn to spend winter in northern Australia and new Guinea and returning south in spring. In NSW, they depart between February and March and return between September and October. In NSW, breeding occurs between November and March, with a nest usually built in the high, exposed outer branches of a tree.	Unlikely	Suitable habitat surrogates are absent from the study area. As such species is unlikely to use site on occasion. No recent records of species within locality (BioNet, 2020).	No

Neophema pulchella	Turquoise Parrot	V	The Turquoise Parrot occurs along the length of NSW from the coastal plains to the western slopes of the Great Dividing Range. In eucalypt and cypress pine open forests and woodlands, ecotones between woodland and grassland, or coastal forest and heath. This species prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants or browsing on vegetable matter. The Turquoise Parrot nests in tree hollows, logs or posts, from August to December. It lays four or five white, rounded eggs on a nest of decayed wood dust.	Likely	Habitat for this species is present within the study area	Yes
Ninox connivens	Barking Owl	V	The Barking Owl has a wide but sparse distribution in NSW, avoiding the most central arid regions. Core populations exist on the western slopes and plains and in some northeast coastal and escarpment forests, woodland and open forest, including fragmented remnants and partly cleared farmland, wetland and riverine forest. This species roosts in dense shaded foliage in large trees. Nesting occurs in hollows in large, old eucalypts, either living or dead. The nesting season is during mid-winter and spring but may vary between pairs and from year to year. The Barking Owl preferentially hunts small arboreal mammals such as Squirrel Gliders and Ringtail Possums, but also takes birds, invertebrates and terrestrial mammals.	Likely	Habitat for this species is present within the study area	Yes

Numenius madagascariensis	Eastern Curlew		CE, M	The Eastern Curlew is a summer migrant to Australia with a primarily coastal distribution in NSW, with some scattered inland records. Often occurring in estuaries, bays, harbours, inlets and coastal lagoons, intertidal mudflats or sandflats, ocean beaches, coral reefs, rock platforms, saltmarsh, mangroves, freshwater/brackish lakes, saltworks and sewage farms. Breeds in Russia and north-eastern China mainly forages on sheltered intertidal sandflats or mudflats, on saltflats and in saltmarsh, rockpools, coral reefs, and on ocean beaches. Roosts on sandy spits and islets, among saltmarsh or mangroves, on reef-flats, in the shallow water of near-coastal wetlands, and in trees	Unlikely	Suitable habitat surrogates are absent from the study area. As such species is unlikely to use site on occasion. No recent records of species within locality (BioNet, 2020).	No
Nyctophilus corbeni	Corben's Long-eared Bat	V	V	The Corbens Long-eared Bat distribution coincides approximately with the Murray Darling Basin. The Pilliga Scrub region is the distinct stronghold for this species. Mallee, Allocasuarina luehmannii (bulloke) and box eucalypt- dominated communities, especially box/ironbark/cypress-pine vegetation. This species roosts in tree hollows, crevices, and under loose bark. Slow flying agile bat, utilising the understorey to hunt non-flying prey - especially caterpillars and beetles and will even hunt on the ground. Mating takes place in autumn with one or two young born in late spring to early summer.	Unlikely	Suitable habitat surrogates are absent from the study area. As such species is unlikely to use site on occasion. No recent records of species within locality (BioNet, 2020).	No
Oxyura australis	Blue-billed Duck	V		The Blue-billed Duck is widespread in NSW but is most concentrated in the southern Murray-	Unlikely	There is no suitable habitat in the form of wetlands or swamps within the subject site	No

			Darling Basin area. Occurring in coastal and inland wetlands and swamps. Blue-billed Ducks usually nest solitarily in Cumbungi over deep water between September and February. Young birds disperse in April-May from their breeding swamps in inland NSW to non-breeding areas on the Murray River system and coastal lakes. They feed on the bottom of swamps eating seeds, buds, stems, leaves, fruit and small aquatic insects such as the larvae of midges, caddisflies and dragonflies.		
Pachycephala inornata	Gilbert's Whistler	V	In NSW, The Gilberts Whistler occurs across much of the semi-arid and arid regions, its range extending west from the western slopes. occurring in Timbered arid and semi-arid habitats, including mallee shrubland, box-ironbark woodlands, Cypress Pine and Belah woodlands and River Red Gum forests. The Gilberts Whistler forages on or near the ground in shrub thickets and in tops of small trees, its diet mainly consisting of spiders and insects and, occasionally, seeds and fruits. Breeding takes place between August and November. Nests are usually built in dense foliage of acacias or cypress pines. Sometimes birds use the old nests of other species, particularly disused babblers' nests.	Potential	Habitat for this species is present within the study area	Yes

Pandion haliaetus	Osprey		M	The Osprey is a medium-sized raptor, that occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia. They require extensive areas of open fresh, brackish or saline water for foraging. They frequent a variety of wetland habitats including inshore waters, reefs, bays, coastal cliffs, beaches, estuaries, mangrove swamps, broad rivers, reservoirs and large lakes and waterholes	Unlikely	Suitable habitat surrogates are absent from the study area. As such species is unlikely to use site on occasion. No recent records of species within locality (BioNet, 2020).	No
Petaurus norfolcensis	Squirrel Glider	V		The Squirrel glider is widely though sparsely distributed on both sides of the Great Dividing Range in eastern Australia, from northern Qld to western Victoria. Occuring in 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. They live in family groups of a single adult male one or more adult females and offspring. Require abundant tree hollows for refuge and nest sites. Diet varies seasonally and consists of Acacia gum, eucalypt sap, nectar, honeydew and manna, with invertebrates and pollen providing protein.	Unlikely	Suitable habitat in the form of mature or old growth forest not present within the study area.	No

Petroica boodang	Scarlet Robin	V	In NSW, the Scarlet robin occurs from the coast to the inland slopes. In dry eucalypt forests and woodlands, and occasionally in mallee, wet forest, wetlands and tea-tree swamps. The Scarlet Robin feeds on small insects and other invertebrates which are taken from the ground, or off tree trunks and logs; they sometimes forage in the shrub or canopy layer. They mainly breed between July and January. This species nest is an open cup made of plant fibres and cobwebs and is built in the fork of tree usually more than 2 metres above the ground; nests are often found in a dead branch in a live tree, or in a dead tree or shrub.	Unlikely	Suitable habitat in the form of forests and woodlands not present within the study area.	No
Petroica phoenicea	Flame Robin	V	In NSW, the flame robin breeds in upland areas, and in winter many birds move to the inland slopes and plains, or occasionally to coastal areas. Likely that there are two separate populations in NSW, one in the Northern Tablelands, and another ranging from the Central to Southern Tablelands. The Flame Robin breeds in upland tall moist eucalypt forests and woodlands. In winter uses dry forests, open woodlands, heathlands, pastures and native grasslands. Occasionally occurs in temperate rainforest, herbfields, heathlands, shrublands and sedgelands at high altitudes. They feed on small invertebrates which they take from the ground or off tree trunks, logs and other coarse woody debris. Breeds in spring to late summer. Nests are often near the ground and are built in sheltered sites, such as shallow cavities in trees, stumps or banks., and	Likely	Habitat for this species is present within the study area	Yes

				builds an open cup nest made of plant materials and spider webs.			
Phascolarctos cinereus	Koala	V	V	In NSW the Koala mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. There are sparse and possibly disjunct populations in the Bega District, and at several sites on the southern tablelands. 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. The Koala is Inactive for most of the day, feeding and moving mostly at night. Spends 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. Females breed at two years of age, with mating occurring between September and February	Unlikely	Suitable habitat surrogates are absent from the study area. As such species is unlikely to use site on occasion. No recent records of species within locality (BioNet, 2020).	No
Polytelis swainsonii	Superb Parrot	V	V	In NSW, the Superb Parrot occurs on inland slopes of the Great Divide and on adjacent plains, especially along the major river-systems. Found often in Box-gum woodland, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. This species nests in small colonies, often with more than one nest in a single tree. Feeds in trees and understorey shrubs and on the ground and their diet consists mainly of grass seeds and herbaceous plants. Also eaten are fruits, berries, nectar, buds, flowers, insects and grain.	Potential	Suitable habitat for foraging, feeding or related behaviour is likely to occur within the study area. However, no recent records of species within locality (BioNet, 2020). The potential impacts associated with the proposed works are unlikely to disrupt this highly mobile species.	Yes

Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	In NSW, the Grey-crowned Babbler occurs on the western slopes of the Great Dividing Range, and as far as Louth and Balranald on the western plains. Also occurs in woodlands in the Hunter Valley and in some locations on the north coast, in open woodland habitats; favours Box-gum woodlands on the slopes and Box-cypress and open Box woodlands on alluvial plains. The species is insectivorous and forages on trunks and branches of trees or on the ground. It builds conspicuous dome-shaped stick nests in shrubs or eucalypt saplings, which are also used for roosting each night. It breeds co-operatively in sedentary family groups of 2-13 birds. Breeding occurs between July and February.	Likely	Habitat for this species is present within the study area	Yes
Pseudomys novaehollandiae	New Holland Mouse	V	The New Holland Mouse has a fragmented distribution across eastern NSW. Habitat is consistent with open heathlands, woodlands and forests with a heathland understorey, vegetated sand dunes. It is a social animal, living predominantly in burrows shared with other individuals. Distribution is patchy in time and space, with peaks in abundance during early to mid-stages of vegetation succession typically induced by fire.	Unlikely	Distribution does not coincide with the study area	No

Pteropus poliocephalus	Grey-headed Flying-fox	V	V	The Grey-headed Flying fox is found along the eastern coast of Australia, from Bundaberg in Qld to Melbourne in Victoria. In Subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Annual mating commences in January and single young is born in October or November. Can travel up to 50 km from the camp to forage. Feed on the nectar and pollen of Eucalyptus, Melaleuca and Banksia species, and fruits of rainforest trees and vines.	Unlikely	Suitable habitat surrogates are absent from the study area. As such species is unlikely to use site on occasion. No recent records of species within locality (BioNet, 2020). No camps have been identified within the locality during the database search.	No
Rostratula australis	Australian Painted Snipe	E	E	In NSW Australian Painted Snipe records are from the Murray-Darling Basin. Other recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. Occurring in swamps, dams and nearby marshy areas. This species nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds. The nest consists of a scrape in the ground, lined with grasses and leaves. Breeding is often in response to local conditions; generally occurs from September to December. Forages nocturnally on mud-flats and in shallow water. Feeds on worms, molluscs, insects and some plant-matter	Unlikely	Suitable habitat surrogates are absent from the study area. As such species is unlikely to use site on occasion. No recent records of species within locality (BioNet, 2020).	No
Rhipidura rufifrons	Rufous Fantail		M	The Rufous Fantail is found in coastal and near coastal districts of northern and eastern Australia, including on and east of the Great	Unlikely	There is no suitable habitat in the form of wet sclerophyll	No

			Divide in NSW. Occurring in wet sclerophyll forests, subtropical and temperate rainforests. Sometimes drier sclerophyll forests and woodlands. The southern subspecies Rhipidura rufifrons rufifrons is migratory, being virtually absent from south-east Australia in winter. Departure from the breeding areas is usually March to early April, most moving to coastal lowlands and off-shore islands in south-east Queensland, north to Cape York Peninsula and Torres Strait Island. Birds arrive back in south-east Australia mostly in September to November, and breed September to February.		forests present within the study area
Stagonopleura guttata	Diamond Firetail	V	The Diamond Firetail is widely distributed in NSW, mainly recorded in the Northern, Central and Southern Tablelands, the Northern, Central and South Western Slopes and the North West Plains and Riverina, and less commonly found in coastal areas and further inland. Occurring in grassy eucalypt woodlands, open forest, mallee, Natural Temperate Grassland, secondary derived grassland, riparian areas and lightly wooded farmland. Diamond Firetails feeds exclusively on the ground, on ripe and partly-ripe grass and herb seeds and green leaves, and on insects. Groups separate into small colonies to breed, between August and January. Nests are globular structures built either in the shrubby understorey, or higher up, especially under hawk's or raven's nests. Birds roost in dense shrubs or in smaller nests built especially for roosting.	Likely	Habitat for this species is present within the study area	Yes

Stictonetta naevosa	Freckled Duck	V		The Freckled Duck occurs in inland river systems, occurring as far as coastal NSW in times of drought. Freshwater swamps and creeks, lakes, reservoirs, farm dams and sewage ponds. This species generally rest in dense cover during the day, usually in deep water. Feed at dawn and dusk and at night on algae, seeds and vegetative parts of aquatic grasses and sedges and small invertebrates. Nesting usually occurs between October and December but can take place at other times when conditions are favourable. Nests are usually located in dense vegetation at or near water level.	Possible	Habitat in the form of river system are present in the vicinity of the study area.	Yes
Tringa glareola	Wood Sandpiper		M	The Wod Sandpiper is a summer migrant to Australia. In NSW, recorded east of the Great Divide, from Stratheden and Casino, south to Nowra and elsewhere, mostly from the Riverina, but also from the Upper and Lower Western Regions. Habitat consists of well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes; inundated grasslands; floodplains; irrigated crops; sewage ponds; reservoirs; large farm dams; bore drains; rarely brackish wetlands and saltmarsh.	Unlikely	Suitable habitat in the forms of swamps and wetlands are not present within the study area.	No
Tringa nebularia	Common Greenshank		M	The Common Greenshank is a summer migrant to Australia. Recorded in most coastal regions of NSW; also widespread west of the Great Dividing Range, especially between the Lachlan and Murray Rivers and the Darling River drainage basin, including the Macquarie Marshes, and north-west regions.	Unlikely	Suitable habitat in the forms of swamps and wetlands are not present within the study area.	No

			Habitat consists of terrestrial wetlands (swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans, saltflats, sewage farms and saltworks dams, inundated rice crops and bores) and sheltered coastal habitats (mudflats, saltmarsh, mangroves, embayments, harbours, river estuaries, deltas, lagoons, tidal pools, rock-flats and rock platforms).			
Tringa stagnatilis	Marsh Sandpiper	M	The marsh Sandpiper is a summer migrant to Australia. Recorded in all regions of NSW but especially the central and south coasts and (inland) on the western slopes of Great Divide and western plains. Habitat consists of swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, pools on inundated floodplains, intertidal mudflats, sewage farms and saltworks, reservoirs, waterholes, soaks, bore-drain swamps and flooded inland lakes.	Unlikely	Suitable habitat in the forms of swamps and wetlands are not present within the study area.	No

Table 9-3: Threatened flora likelihood table

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence	Justification
Austrostipa metatoris	A spear-grass	V	V	Sandhills, sandridges, undulating plains and flat open mallee country, with red to red-brown clay-loam to sandy-loam soils.	None	No, the study area, which has previously been disturbed is unlikely to contain habitat for this species. No recent records of species within locality (BioNet, 2020).
Austrostipa wakoolica	A spear-grass	E	E	*Austrostipa wakoolica* is confined to the floodplains of the Murray River tributaries of central-western and south-western NSW. In open woodland on grey, silty clay or sandy loam soils. Associated species include *Callitris glaucophylla, Eucalyptus microcarpa, Eucalyptus populnea, Austrostipa eremophila, Austrostipa drummondii, Austrodanthonia eriantha* and *Einadia nutans*. Flowers from October to December, mainly in response to rain.	None	No, the study area, which has previously been disturbed is unlikely to contain habitat for this species. No recent records of species within locality (BioNet, 2020).
Commersonia procumbens	-	V	V	Endemic to NSW, mainly confined to the Dubbo-Mendooran-Gilgandra region, but also in the Pilliga and Nymagee areas. Recent collections made from the Upper Hunter region. Grows in sandy sites, often along roadsides. Recorded in Eucalyptus dealbata and *Eucalyptus sideroxylon* communities, *Melaleuca uncinata* scrub, under mallee eucalypts with a *Calytrix tetragona* understorey, and in a recently burnt Ironbark and Callitris area. Also, in *Eucalyptus fibrosa* subsp. *nubila*, *Eucalyptus dealbata, Eucalyptus albens* and *Callitris glaucophylla* woodlands north of Dubbo.	None	No, the study area, which has previously been disturbed is unlikely to contain habitat for this species. No recent records of species within locality (BioNet, 2020).

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution and Habitat	Likelihood of Occurrence	Justification
Tylophora linearis		V	E	In NSW, *Tylophora linearis* is found in the Barraba, Mendooran, Temora and West Wyalong districts in the northern and central western slopes. Records include Crow Mountain near Barraba, Goonoo, Pilliga West, Cumbil, and Eura State Forests, Coolbaggie Nature Reserve, Goobang National Park, and Beni Conservation Area. This species occurs in dry scrub, open forest, dry woodlands of *Eucalyptus fibrosa, Eucalyptus sideroxylon, Eucalyptus albens, Callitris endlicheri, Callitris glaucophylla* and *Allocasuarina luehmannii*. Also grows in association with *Acacia hakeoides, Acacia lineata, Melaleuca uncinata*, Myoporum species and Casuarina species. Flowers in spring, with flowers recorded in November or May with fruiting probably 2 to 3 months later.	None	No, the study area, which has previously been disturbed is unlikely to contain habitat for this species. No recent records of species within locality (BioNet, 2020).

Appendix C Assessment of Significance FM Act

C1 Assessment of Significance: Eel-tailed Catfish population of the Murray-Darling Basin, Western population of Olive Perchlet and Silver Perch

The Eel-tailed Catfish is an Australian endemic species that was once highly abundant throughout the Murray Darling River system in NSW. Although most riverine population have declined significantly since the 1970s. They are known to prefer sluggish or still waters and often build nests in still water for breeding. Areas of potential habitat within the development Site include the streams and small creeks during times of inundation. The closest known record of this species occurs approximately 11.5 km west of the study area in Lake Forbes (ALA, 2021).

The western population of Olive Perchlet were once widespread throughout the Murray-Darling system but has since suffered serious decline. The population is now restricted to a few sites in the Darling River drainage and an isolated population in the central Lachlan catchment. Olive Perchlet can inhabit creeks, rivers, swamps and ponds and are usually found in slow flowing or still waters. These fish use sheltered areas such as overhanging vegetation, logs, boulders, macrophyte beds, and usually disperse to feed at night.

Silver Perch were once widespread and abundant throughout most of the Murray-Darling river system. They have now declined to low numbers or disappeared from most of their former range. Only one remaining secure and self-sustaining population occurs in NSW in the central Murray River downstream of Yarrawonga weir, as well as several anabranches and tributaries.

FM Act	Question	Response
221ZV a)	In the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.	Life cycle can be impacted by habitat removal or reduced habitat quality. For the population to be at risk of being removed from the local area, impacts would have to be of a magnitude and duration that would inhibit the continual completion of the lifecycle stages. The proposed works will not remove or modify any critical habitat for potentially occurring threatened aquatic fauna species. Fish corridors within Lachlan River will however be briefly disturbed by the installation of the second screen intake and construction of the coffer dams. The installation of the River intake can lead to increased turbidity and sediment load. The installation of the River intake also has the potential to decrease water availability however, as the Lachlan River is regulated there will be no change in the existing and sustained water levels or flows. Potential impacts associated with the use of a coffer dam for the installation of the second river intake will be minimised by still allowing flow for half of the River at any given time. Where construction occurs during periods of flow, then an aquatic ecologist with the proper scientific collection permits, would need to be on-site to conduct pre-construction surveys If the

FM Act	Question	Response
		above measures are taken it is unlikely that the proposal will have a significant impact on the lifecycle of this species.
221ZV b)	In the case of an endangered population, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.	As above.
221ZV c) i	In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or	Not applicable
221ZV c) i	In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.	Not applicable
221ZV d) i	In relation to the habitat of a threatened species, population or ecological community: The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and	Impacts will be restricted to potentially modifying flow if coffer dams are installed.
221ZV d) ii	In relation to the habitat of a threatened species, population or ecological community: Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and	Construction that complies with DPI Water (2012) and Fairfull (2013) at periods of low flow will not temporarily or permanently fragment or isolate areas of potential habitat.
221ZV d) iii	In relation to the habitat of a threatened species, population or ecological community: The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the threatened species, population or ecological community in the locality.	Given that the nearest record is 6 km downstream, the amount of habitat on-site is likely to be unimportant to the long-term survival of these species.
221ZV e)	Whether the proposed development or activity is likely to have an adverse effect on any critical habitat (either directly or indirectly).	No areas of critical habitat have been registered for this species (accessed 04/03/20).
221ZV f)	Whether the proposed development or activity is consistent with a Priorities Action Statement.	The Priority Action Statement for the Eel-tailed Catfish population of the Murray-Darling Basin (DPI 2019), Western Olive Perchlet population and the Silver Perch all list the following recovery actions:

FM Act	Question	Response
		• Advice to consent and determining authorities • Collate and review existing information • Community and stakeholder liaison, awareness and education • Compliance / enforcement • Enhance, modify or implement NRM planning processes to minimize adverse impacts on threatened species • Habitat rehabilitation • Pest eradication and control • Research / monitoring • Stocking / translocation • Survey / mapping The proposed action does not contradict any of the recovery actions listed in the Priority Action Statements.
221ZV g)	Whether the proposed development constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.	The current proposal contains two key threatening processes that are relevant to these species and populations: • Degradation of native riparian vegetation along New South Wales water courses. • Installation and operation of instream structures and other mechanisms that alter natural flow regimes of rivers and streams. Once installed, the second intake will not alter natural flow to streams to the degree that will inhibit these species and populations. In addition, degradation to riparian vegetation is predicted to be minor, and restricted to an already cleared area.
Conclusion	**Is there likely to be a significant impact?**	There is unlikely to be a significant impact.

C2 Assessment of Significance: Lowland Lachlan River aquatic ecological community

The *Aquatic ecological community in the natural drainage system of the lowland catchment of the Lachlan River* is listed as an Endangered Ecological Community (EEC) under Schedule 4, Part 3 of the Fisheries Management Act 1994 (FM Act). The aquatic ecological community of the lowland Lachlan River catchment includes all native fish and aquatic invertebrates within all natural rivers, creeks, streams and associated lagoons, billabongs, lakes, wetlands, paleochannels, flood-runners, floodplains and effluent streams of the Lachlan River (DPI, 2006). This EEC provides important habitat to a range of vertebrate and invertebrate aquatic species including some listed as threatened under the FM and EPBC Acts.

FM Act	Question	Response
221ZV a)	In the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species	Not applicable – the Lowland Lachlan River aquatic ecological community is not a threatened species.

FM Act	Question	Response
	such that a viable local population of the species is likely to be placed at risk of extinction.	
221ZV b)	In the case of an endangered population, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.	Not applicable - the Lowland Lachlan River aquatic ecological community is not an endangered population.
221ZV c) i	In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or	Impacts to this EEC are to be contained to where the second intake is to be constructed within the site and immediately upstream and downstream of these crossings. As a result of this limited area of impact, the extent of this EEC within the site would be impacted only where these crossings are proposed. Impacts to this EEC would be limited and not significant, as watercourse crossings would be designed to prevent blockage of fish passage, in accordance with Policy and guidelines for fish habitat conservation and management (Fairfull, 2013) and Guidelines for watercourse crossings on waterfront land (DPI Water, 2012). The EEC covers a large extent of the Murray Darling Basin and therefore the limited area that the proposed works would impact would not result in risk of extinction of the local occurrence.
221ZV c) i	In the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.	The proposed works are unlikely to modify the composition of this EEC, as they will not change the geomorphological features of the watercourses (e.g. will not remove the pools and riffles and other habitat features that may exist within these watercourses). Therefore, this EEC is unlikely to be substantially and adversely modified by the proposed works.
221ZV d) i	In relation to the habitat of a threatened species, population or ecological community: The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and	The extent of direct modification to this habitat will be 0.02 ha in the form of new intake pump and screen. However, if these works are designed and constructed in accordance with appropriate guidelines, then the extent to which the habitats are modified is likely to be minimal.
221ZV d) ii	In relation to the habitat of a threatened species, population or ecological community: Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and	The proposed works are unlikely to fragment or isolate the habitat that is part of the Lowland Darling River EEC as the new structures do not extend across the whole width of the waterway. Therefore, the habitat within this EEC in the Site is unlikely to become fragmented or isolated from other areas of habitat.
221ZV d) iii	In relation to the habitat of a threatened species, population or ecological community: The importance of the habitat to be removed, modified, fragmented or isolated to the long-term	The habitat within the site has been described as in poor to moderate condition as a result of historical land use practices including agriculture. Therefore, the importance of any habitat that would be modified to the long-term survival of the EEC and the species which rely on it within the Site is unlikely to be high.

FM Act	Question	Response
	survival of the threatened species, population or ecological community in the locality.	
221ZV e)	Whether the proposed development or activity is likely to have an adverse effect on any critical habitat (either directly or indirectly).	No critical habitat has been identified for this EEC
221ZV f)	Whether the proposed development or activity is consistent with a Priorities Action Statement.	A priorities action statement has been prepared for the Lowland Darling River aquatic endangered ecological community. None of the recovery actions listed as part of this statement are relevant to the proposed development.
221ZV g)	Whether the proposed development constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.	Key threatening processes listed under Schedule 6 of the FM Act are as follows: • Degradation of native riparian vegetation along New South Wales water courses • Hook and line fishing in areas important for the survival of threatened fish species • Human-caused climate change • Installation and operation of instream structures and other mechanisms that alter natural flow regimes of rivers and streams • Introduction of fish to waters within a river catchment outside their natural range • Introduction of non-indigenous fish and marine vegetation to the coastal waters of New South Wales • Removal of large woody debris from New South Wales rivers and streams • The current shark meshing program in New South Wales waters. The proposed activities associated with the construction and operation of the proposed works do include the installation and operation of instream structures. However, they are to be closely located to existing structures and the impact on the EEC will be minimal. Installation of coffer dams during the construction stage will temporarily alter flow velocities within the subject site but they will return to normal once they are removed.
Conclusion	**Is there likely to be a significant impact?**	There is unlikely to be a significant impact on this EEC.

Appendix D Tests of Significance (NSW Biodiversity Conservation Act 2016)

Under Part 7, Division 1 of the BC Act, the test of significance is to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. This test has been applied to ecological communities listed under the BC Act that are considered to be potentially impacted by the proposal. The following threatened species and communities have been assessed:

- White Box-Yellow Box Blakely's Red Gum Grassy Woodland
- *Anseranas semipalmata* (Magpie Goose)
- *Anthochaera phrygia* (Regent Honeyeater)
- *Artamus cyanopterus cyanopterus* (Dusky Woodswallow)
- *Burhinus grallarius* (Bush Stone Curlew)
- *Certhionyx variegatus* (Pied Honeyeater)
- *Chthonicola sagittata* (Speckled Warbler)
- *Circus assimilis* (Spotted Harrier)
- *Climacteris picumnus victoriae* (Brown Treecreeper (eastern subspecies))
- *Daphoenositta chrysoptera* (Varied Sittella)
- *Epthianura albifrons* (White-fronted Chat)
- *Falco hypoleucos* (Grey Falcon)
- *Falco subniger* (Black Falcon)
- *Glossopsitta pusilla* (Little Lorikeet)
- *Grantiella picta* (Painted Honeyeater)
- *Haliaeetus leucogaster* (White-bellied Sea-eagle)
- *Hieraaetus morphnoides* (Little Eagle)
- *Lathamus discolor* (Swift Parrot)
- *Melanodryas cucullata cucullata* (Hooded Robin (south-eastern form)
- *Melithreptus gularis gularis* (Black-chinned Honeyeater (eastern subspecies))
- *Neophema pulchella* (Turquoise Parrot)
- *Ninox connivens* (Barking Owl)
- *Pachycephala inornata* (Gilbert's Whistler)
- *Petroica phoenicea* (Flame Robin)
- *Polytelis swainsonii* (Superb Parrot)
- *Pomatostomus temporalis temporalis* (Grey-crowned Babbler (eastern subspecies))
- *Stagonopleura guttata* (Diamond Firetail)
- *Stictonetta naevosa* (Freckled Duck)

The following questions are to be taken into account for the purposes of determining whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. The following questions have been answered for each vegetation community.

a. in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction
b. in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:
    i is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
    ii is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,
c. in relation to the habitat of a threatened species or ecological community:
    i the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and
    ii whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and
    iii the importance of the habitat to be removed, modified, fragmented or isolated to the long term survival of the species or ecological community in the locality,
d. whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly), e. whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process

Table D - 1: BC Act Test of Significance. Columns 'a' - 'e' refer to questions 'e' - 'e' listed above

Species / Community	A	B	C	D	E	Conclusion
Threatened ecological communities						
White Box-Yellow Box Blakely's Red Gum Grassy Woodland	N/A	As a worse-case scenario the proposed works will directly impact on 0.02 ha of this community and indirectly impact on 0.12 ha of this community. Detailed design will aim to avoid the removal of all canopy species, where feasible. It is considered unlikely that there will be an adverse effect on the extent of the ecological community such that its local occurrence would be placed at risk of extinction.	The habitat availability for this EEC will not change as a result of the proposed infrastructure. No trees will be removed and only branches will be lopped if required. It is unlikely that the ecological community will be fragmented or isolated from other areas of habitat.	N/A	The proposed activity could potentially contribute to the key threatening process of invasion of native plant communities by exotic perennial grasses. Implementation of mitigation measures (including biosecurity measures identified within the impact assessment) will minimise the impact of these processes.	No significant impacts on the threatened ecological community present
Threatened fauna						
Black-chinned Honeyeater (eastern subspecies) Brown Treecreeper (eastern subspecies) Diamond Firetail Dusky Woodswallow Flame Robin	The study area provides potential habitat for nesting woodland birds, including the Black-chinned Honeyeater, Brown Treecreeper, Diamond Firetail, Dusky Woodswallow, Flame Robin, Gilbert's Whistler, Grey-crowned	N/A	There will be no clearing of trees during the proposed activity. Due to the location of the infrastructure in a previously cleared agriculture area and the mobile nature of these species, the proposed activity will not result in	No declared area of outstanding biodiversity value is currently present in the study area.	The proposed activity constitutes one key threatened process relevant to these species, disturbance of ground litter. Due to the temporary nature of the proposed activity, it is unlikely that the proposed activity will	Overall, it has been determined that the activity is unlikely to have a significant impact on the bird species assessed.

Species / Community	A	B	C	D	E	Conclusion
Gilbert's Whistler Grey-crowned Babbler (eastern subspecies) Hooded Robin (south-eastern form) Painted Honeyeater Pied Honeyeater Regent Honeyeater Scarlet Robin Speckled Warbler Varied Sittella	Babbler, Hooded Robin, Painted Honeyeater, Pied Honeyeater, Regent Honeyeater, Scarlet Robin, Speckled Warbler and Varied Sittella. There will be no clearing of trees from the proposed activity, other than potential removal of branches. Due to this, and the suitable habitat present outside of the proposed disturbance area, it is unlikely that the proposed activity will impact upon habitat that is important to the long-term survival of these species.		habitat fragmentation. These species will likely continue to utilise areas of higher quality habitat present in areas surrounding the proposed study area.		increase the impact of this key threatening process on these species.	
Little Lorikeet Superb Parrot Swift Parrot Turquoise Parrot Barking Owl	The study area provides potential habitat for hollow dependent birds including the Little Lorikeet, Superb Parrot, Swift Parrot, Turquoise Parrot and Barking Owl. There will be no clearing of trees during the proposed activity. Due to this and the suitable habitat present outside of the proposed	N/A	There will be no clearing of trees during the proposed activity, other than potential pruning of branches. Due to the location of the infrastructure in a previously cleared agriculture area and the mobile nature of these species, the proposed activity will not result in habitat fragmentation.	No declared area of outstanding biodiversity value is currently present in the Study Area	The proposed activity constitutes one key threatening process relevant to these species, degradation of native vegetation, through disturbance of ground layer vegetation. As the majority of the proposed activity is within exotic dominated grassland, it is unlikely that the proposed	Overall, it has been determined that the activity is unlikely to have a significance impact on the bird species assessed.

Species / Community	A	B	C	D	E	Conclusion
	disturbance area, it is unlikely that the proposed activity will impact upon habitat that is important to the long-term survival of these species.		This species will likely continue to utilise areas of higher quality habitat present in areas surrounding the proposed study area.		activity will increase the impact of this key threatening process on these species.	
Black Falcon Grey Falcon Little Eagle Spotted Harrier White-bellied Sea-Eagle	The study area provides potential habitat for raptor species including the Black Falcon, Grey Falcon, Little Eagle, Spotted Harrier and White-Bellied Sea-Eagle. There will be disturbance to ground layer vegetation due to the construction of the infrastructure. However, these species will likely continue to utilise suitable, and higher quality, habitat present outside of the proposed disturbance area, it is unlikely that the proposed activity will impact upon habitat that is important to the long-term survival of these species.	N/A	There will be no clearing of potential nesting habitat, and small-scale disturbance to potential foraging habitat for these species. Due to the location of works and the mobile nature of these species, the proposed activity will not result in habitat fragmentation. These species will likely continue to utilise areas of higher quality habitat present in areas surrounding the study area.	No declared area of outstanding biodiversity value is currently present in the study area	The proposed activity constitutes one key threatening process relevant to these species, degradation of foraging habitat. Due to the presence of suitable foraging habitat in the surrounding landscape outside the disturbance area, it is unlikely that the proposed activity will increase the impact of this key threatening process on these species.	Overall, it has been determined that the activity is unlikely to have a significant impact on the bird species assessed.
Bush Stone Curlew	The study area provides potential foraging	N/A	Due to the disturbance to the ground layer	No declared area of outstanding biodiversity	The proposed activity constitutes a key	Overall, it has been determined that the

Species / Community	A	B	C	D	E	Conclusion
Magpie Goose White-fronted Chat	habitat for ground foraging bird species, including the Blue Stone Curlew, Magpie Goose and White-fronted Chat. There will be disturbance to ground layer vegetation, due to the construction of the infrastructure. However, these species will likely continue using surrounding suitable and higher quality habitat for foraging and in the case of the Blue Stone Curlew nesting locations. Due to these factors it is unlikely that the proposed activity will impact upon habitat that is important to the long-term survival of these species.		vegetation there will be potential impacts to the foraging habits of these species. In the case of Blue stone Curlews nesting habits, due to previous agricultural land use history the likelihood of nesting sites being located within the disturbance area is extremely unlikely, with individuals likely utilizing higher quality habitat in the surrounding area.	value is currently present in the study area.	threatening process relevant to these species, disturbance to foraging habitat. Due to the previous land use history, it is unlikely that the proposed activity will increase the impact of this key threatening process on these species.	activity is unlikely to have a significant impact on the bird species assessed.
Freckled Duck	The study area provides potential foraging area for the ground foraging Freckled Duck. There will be disturbance to the ground layer vegetation with the construction of the infrastructure however this species will	N/A	There will only be disturbance to the ground layer vegetation that provides foraging habitat, no nesting or roosting habitat will be impacted by the development. Due to the mobile nature of the	No declared area of outstanding biodiversity value is currently present in the study area.	The proposed activity constitutes one key threatening process relevant to these species, disturbance to foraging habitat. Due to the presence of suitable foraging habitat in the surrounding landscape	Overall, it has been determined that the activity is unlikely to have a significant impact on the bird species assessed

Species / Community	A	B	C	D	E	Conclusion
	likely continue using higher quality habitat within the river system that is adjacent to but not within the disturbance site of the study area. Due to these factors it is unlikely that the proposed activity will impact upon habitat that is important to the long-term survival of these species.		species and the contiguous nature of the surrounding habitat the proposed activity will not result in habitat fragmentation. These species will likely continue to utilise areas of higher quality habitat present in areas surrounding the study area.		outside the disturbance area, it is unlikely that the proposed activity will increase the impact of this key threatening process on these species.	

Appendix E EPBC Act Assessment of Significance

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

- Listed threatened species and ecological communities
- Listed migratory species
- Wetlands of International Importance
- The Commonwealth marine environment
- World Heritage properties
- National Heritage places
- Nuclear actions.

Specific 'Significant Impact Criteria' are provided for each matter of national environmental significance except for threatened species and ecological communities in which case separate criteria are provided for species listed as critically endangered, endangered and vulnerable under the EPBC Act. The relevant 'Significant Impact Criteria' have been applied to the following threatened communities:

- *Anthochaera phrygia* (Regent Honeyeater)
- *Falco hypoleucos* (Grey Falcon)
- *Grantiella picta* (Painted Honeyeater)
- *Hydroprogne caspia* (Caspian Tern)
- *Maccullochella macquariensis* (Trout Cod)
- *Maccullochella peelii* (Murray Cod)
- *Macquaria australasica* (Macquarie Perch)
- *Polytelis swainsonii* (Superb Parrot)

E1 *Anthochaera phyrigia* (Regent Honeyeater)

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

Lead to a long-term decrease in the size of a population

The minor vegetation removal (including potential pruning of overhead branches), will only impact a small area of potential habitat. Given this, and the areas of alternate habitat surrounding the study area, the proposed activity is unlikely to lead to a long-term decrease in the size of a population of the species.

Reduce the area of occupancy of the species

The proposed activity will impact a small area of potential habitat for the species. Areas of undisturbed and higher quality potential habitat for this species will remain outside the study area, in order to support the continuation of the population.

Fragment an existing population into two or more populations

The proposed activity will mainly occur within an already cleared area, with potential small-scale disturbance to habitat. Given this, the proposed activity will not increase fragmentation of the existing population into two or more populations.

Adversely affect habitat critical to the survival of a species

Habitat critical to the survival of this species includes:

- Any breeding or foraging areas where the species is likely to occur
- Any newly discovered breeding or foraging locations.

The proposed activity may involve minor vegetation removal (including pruning of overhead branches). Due to the highly disturbed nature of the vegetation within the study area, the surrounding areas of potential high-quality habitat that will remain undisturbed, and the highly mobile nature of this species, the proposed activity is unlikely to adversely affect habitat critical to the survival of this species.

Disrupt the breeding cycle of a population

There are no known breeding pairs within the study area. Due to the species being highly mobile, it is unlikely that the proposed activity will disrupt the breeding cycle of a population.

Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

The minor vegetation removal (including pruning of overhead branches) will impact upon only a small area of potential foraging habitat for this species. Due to this and the species being highly mobile, it is unlikely the proposed activity will modify, destroy, remove or decrease the availability or quality of habitat to the extent that the species is likely to decline.

Areas of intact, higher quality habitat will remain outside of the study area, undisturbed by the works.

Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat

The proposed potential minor vegetation removal (including pruning overhead branches) will not result in invasive species that are harmful to this species becoming established in the species' habitat.

Introduce disease that may cause the species to decline, or

The proposed activity is not likely to introduce a disease that may cause the species to decline or interfere substantially with the recovery of the species.

Interfere with the recovery of the species

The objectives of the Regent Honeyeater recovery plan are to:

- Reverse the long-term population trend of decline and increase the numbers of regent honeyeaters to a level where there is a viable, wild breeding population, even in poor breeding years; and to
- Enhance the condition of habitat across the regent honeyeaters range to maximise survival and reproductive success and provide refugia during periods of extreme environmental fluctuation.

Strategies to achieve this includes improving the extent and quality of habitat. Most of the Study Area is in a modified, degraded and fragmented state. The potential pruning will impact upon only a small area of potential foraging habitat for this species. Due to this, it is unlikely that the scale of clearing for the proposed activity will interfere substantially with the recovery of this species.

Is a significant impact on the species likely to result?

After considering the above statements, the proposed action is unlikely to have a significant impact on the Regent Honeyeater.

E2 *Falco hypoleucos* (Grey Falcon)

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

Lead to a long-term decrease in the size of an important population of a species

Given the small scale of disturbance associated with the proposed activity and the availability of alternative habitat outside the study area for this highly mobile species, it is unlikely that the proposed activity will lead to a long-term decrease in the size of an important population of this species.

Reduce the area of occupancy of an important population

The proposed activity will impact a small area of potential habitat for this species. As the proposed study area is primarily within the road corridor, the area of occupancy for any potential important populations that may occur within the area will not be reduced. Areas of undisturbed potential habitat for this species will remain outside the proposed study area, in order to support the continuation of the population.

Fragment an existing important population into two or more populations

The small scale of the disturbance associated with the proposed activity, combined with the high mobility of this species means that it is unlikely that an existing important population will be split into two or more populations.

Adversely affect habitat critical to the survival of a species

No critical habitat has been declared for this species, and given the small scale of the disturbance associated with the proposed activity, the degraded state of the habitat within the study area, and the availability of alternative habitat outside the study area, it is unlikely that the proposed activity will adversely impact upon habitat critical to the survival of this species.

Disrupt the breeding cycle of an important population

Due to the species being highly mobile, it is unlikely that the proposed activity will disrupt the breeding cycle of a population.

Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

Given the small scale of the disturbance associated with the proposed activity and the availability of alternative habitat outside the study area, it is unlikely that the proposed activity will affect habitat for this highly mobile species to the extent that it is likely to decline.

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat

No harmful invasive species are expected to become established in areas of potential habitat for this species as a result of the proposed activity.

Introduce disease that may cause the species to decline, or

The proposed activity is not likely to introduce a disease that may cause the species to decline or interfere substantially with the recovery of this species.

interfere substantially with the recovery of the species.

There is currently no Recovery Plan for this species. A key threatening process for this species is clearing of habitat. As much of the Subject Site is in a modified, degraded and fragmented state, it is unlikely that the proposed activity will interfere substantially with the recovery of this species.

Is a significant impact likely to result?

After considering the above statements, the proposed activity is unlikely to have a significant impact on the Grey Falcon.

E3 *Grantiella picta* (Painted Honeyeater)

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

Lead to a long-term decrease in the size of an important population of a species

The proposed potential minor vegetation removal (including pruning of overhead branches), will only impact a small area of potential habitat. Given this, and the areas of alternate higher quality habitat surrounding the study area and the high mobility of the species, the proposed activity are unlikely to lead to a long-term decrease in the size of an important population of the species.

Reduce the area of occupancy of an important population

The proposed activity will impact a small area of potential habitat for this species. As the proposed study area is primarily within cleared areas, the area of occupancy for any potential important populations that may occur within the area will not be reduced. Areas of undisturbed potential habitat for this species will remain outside the proposed study area, in order to support the continuation of the population.

Fragment an existing important population into two or more populations

As the proposed activity will occur primarily within cleared areas, and given the mobility of the species, the proposed activity will not increase fragmentation of any potential existing important populations into two or more populations.

Adversely affect habitat critical to the survival of a species

Habitat critical to the survival of this species includes:

- Any breeding or foraging habitat in areas where the species is likely to occur
- Any newly discovered breeding or foraging locations.

The proposed activity will impact a small area of potential habitat and will only potentially involve potential pruning of overhead branches. Due to the mobile nature of this species, and the surrounding areas of potential foraging habitat that will remain undisturbed, the proposed activity is unlikely to adversely affect habitat critical to the survival of this species.

Disrupt the breeding cycle of an important population

Due to the species being highly mobile, it is unlikely that temporary disturbance to the foraging habitat will disrupt the breeding cycle of a population.

Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

The proposed minor vegetation removal (including pruning of overhead branches) will impact upon only a small area of potential foraging habitat for this species. Due to this species being highly mobile, it is unlikely the clearing will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

Areas of intact equivalent habitat will remain outside of the study area, undisturbed by the works.

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat

Invasive species that are harmful to this species include weeds such as invasive grasses becoming established within the habitat. Much of the study area is in a degraded state, with a high level of exotic groundcover. Mitigation measures including washing down vehicles have been recommended to reduce the likelihood of weeds becoming further established within the study area. As such, the proposed activity is unlikely to result in invasive species that are harmful to this species becoming further established within the species' habitat.

Introduce disease that may cause the species to decline, or

The proposed activity is not likely to introduce a disease that may cause the species to decline or interfere substantially with the recovery of the species.

Interfere substantially with the recovery of the species

There is currently no Recovery Plan for this species. A key threatening process for this species is habitat loss or degradation at a landscape scale. As much of the study area is in a modified, degraded and fragmented state, it is unlikely that the proposed activity will interfere substantially with the recovery of this species.

Is a significant impact likely to result?

After considering the above statements, the proposed activity is unlikely to have a significant impact on the Painted Honeyeater.

E4 *Hydroprogne caspia* (Caspian Tern)

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

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

The potential minor vegetation removal will impact upon only a small area of potential foraging habitat for this species. Due to the species being highly mobile, it is unlikely the clearing will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. Areas of intact equivalent habitat will remain outside of the study area, undisturbed by the works.

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

The potential minor vegetation removal (including potential pruning of branches) will not result in invasive species that are harmful to this species becoming established in the species habitat.

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

There is no breeding habitat for this species within the proposed disturbance area, and therefore it is unlikely that disturbance to potential foraging habitat will disrupt the lifecycle of a population.

E5 *Maccullochella macquariensis* (Trout cod)

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

Lead to a long-term decrease in the size of a population

The proposed activity will involve the construction of a coffer dam, which will partially restrict flow to the river, and partially block access for fish species during construction. There have been no records of this species in the locality, and therefore the proposed activity is unlikely to lead to a long-term decrease in the size of a population.

Reduce the area of occupancy of the species

The proposed activity will impact a small area of potential habitat for the species. Areas of undisturbed potential habitat for this species will remain outside the study area, in order to support the continuation of the population.

Fragment an existing population into two or more populations

The proposed activity will partially block the river during construction. However, given the absence of records within the locality, it is unlikely that the proposed activity will fragment an existing population into two or more populations.

Adversely affect habitat critical to the survival of a species

No critical habitat has been declared for this species, and given the small scale of disturbance associated with the proposed activity combined with the absence of records of this species within the locality, it is unlikely that the proposed activity will adversely affect habitat critical to the survival of this species.

Disrupt the breeding cycle of a population

There are no records for this species in the locality. Due to this, it is unlikely that the proposed activity will disrupt the breeding cycle of a population.

Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

Given the absence or records within the locality, and the temporary nature of the proposed activity, it is unlikely the proposed activity will affect habitat for this species to the extent that it is likely to decline.

Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat

No harmful invasive species are expected to become established in areas of potential habitat for this species as a result of the proposed activity.

Introduce disease that may cause the species to decline, or

The proposed activity is not likely to introduce a disease that may cause the species to decline or interfere substantially with the recovery of the species.

Interfere with the recovery of the species

A key threatened process for this species is habitat degradation through removal of woody debris, and modification of waterways. The proposed activity will partially restrict flow to the river, and partially block the river during construction. However, given the absence of records within the locality, it is unlikely that the proposed activity will interfere substantially with the recovery of this species.

Is a significant impact on the species likely to result?

After considering the above statements, the proposed action is unlikely to have a significant impact on the Trout Cod.

E6 *Maccullochella peelii* (Murray Cod)

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

Lead to a long-term decrease in the size of an important population of a species

The proposed activity will involve building a coffer dam to allow for construction, which will partially restrict water flow to the river and partially block the river during construction. However, given the small scale of disturbance associated with the proposed activity and the availability of alternative habitat outside the study area for this highly mobile species, it is unlikely that the proposed activity will lead to a long-term decrease in the size of an important population of this species.

Reduce the area of occupancy of an important population

The proposed activity will impact a small area of potential habitat for this species. The proposed activity will involve partially restricting water flow to the river and partially blocking the river during construction. Areas of undisturbed potential habitat for this species will remain outside the proposed study area, in order to support the continuation of the population.

Fragment an existing important population into two or more populations

The small scale of the potential disturbance associated with the proposed activity, combined with the mobility of this species means that it is unlikely that an existing important population will be split into two or more populations.

Adversely affect habitat critical to the survival of a species

No critical habitat has been declared for this species, and given the small scale of the disturbance associated with the proposed activity and the availability of alternative habitat outside the study area, it is unlikely that the proposed activity will adversely impact upon habitat critical to the survival of this species.

Disrupt the breeding cycle of an important population

Due to the small scale of the disturbance associated with the proposed activity, and the availability of alternative habitat outside the study area, it is unlikely that the proposed activity will disrupt the breeding cycle of this species.

Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

Given the small scale of the disturbance associated with the proposed activity and the availability of alternative habitat outside the study area, it is unlikely that the proposed activity will affect habitat for this species to the extent that it is likely to decline.

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat

No harmful invasive species are expected to become established in areas of potential habitat for this species as a result of the proposed activity.

Introduce disease that may cause the species to decline, or

The proposed activity is not likely to introduce a disease that may cause the species to decline or interfere substantially with the recovery of this species.

interfere substantially with the recovery of the species.

There is currently no Recovery Plan for this species. A key threatening process for this species is changes to habitat, particularly through the construction of dams and weirs. The proposed activity will involve the construction of a coffer dam, which will partially restrict the flow of water to the river and partially block the river during construction. However, given the low numbers of records within the locality, it is unlikely that the proposed activity will interfere substantially with the recovery of this species.

Is a significant impact likely to result?

After considering the above statements, the proposed activity is unlikely to have a significant impact on the Murray Cod.

E7 *Macquaria australasica* (Macquarie perch)

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

Lead to a long-term decrease in the size of a population

The proposed activity will involve the construction of a coffer dam, which will partially restrict flow to the river, and partially block access for fish species during construction. There have been no records of this species in the locality, and therefore the proposed activity is unlikely to lead to a long-term decrease in the size of a population.

Reduce the area of occupancy of the species

The proposed activity will impact a small area of potential habitat for the species. Areas of undisturbed potential habitat for this species will remain outside the study area, in order to support the continuation of the population.

Fragment an existing population into two or more populations

The proposed activity will partially block the river during construction. However, given the absence of records within the locality, it is unlikely that the proposed activity will fragment an existing population into two or more populations.

Adversely affect habitat critical to the survival of a species

No critical habitat has been declared for this species, and given the small scale of disturbance associated with the proposed activity combined with the absence of records of this species within the locality, it is unlikely that the proposed activity will adversely affect habitat critical to the survival of this species.

Disrupt the breeding cycle of a population

There are no records for this species in the locality. Due to this, it is unlikely that the proposed activity will disrupt the breeding cycle of a population.

Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

Given the absence or records within the locality, and the temporary nature of the proposed activity, it is unlikely the proposed activity will affect habitat for this species to the extent that it is likely to decline.

Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat

No harmful invasive species are expected to become established in areas of potential habitat for this species as a result of the proposed activity.

Introduce disease that may cause the species to decline, or

The proposed activity is not likely to introduce a disease that may cause the species to decline or interfere substantially with the recovery of the species.

Interfere with the recovery of the species

A key threatened process for this species is habitat degradation through removal of rocks or woody debris, and barriers to fish movement. The proposed activity will partially restrict flow to the river, and partially block the river during construction. However, given the absence of records within the locality, it is unlikely that the proposed activity will interfere substantially with the recovery of this species.

Is a significant impact on the species likely to result?

After considering the above statements, the proposed action is unlikely to have a significant impact on the Macquarie Perch.

E8 *Polytelis swainsonii* (Superb Parrot)

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

Lead to a long-term decrease in the size of an important population of a species

The potential minor vegetation removal (including pruning of overhead branches), will only impact a small area of potential habitat. Given this, and the areas of alternate higher quality habitat surrounding the study area and the high mobility of the species, the proposed activity are unlikely to lead to a long-term decrease in the size of an important population of the species.

Reduce the area of occupancy of an important population

The proposed activity will impact a small area of potential habitat for this species. As the proposed study area is primarily within cleared areas, the area of occupancy for any potential important populations that may occur within the area will not be reduced. Areas of undisturbed potential habitat for this species will remain outside the proposed study area, in order to support the continuation of the population.

Fragment an existing important population into two or more populations

As the proposed activity will occur primarily within cleared areas, and given this, as well as the mobility of the species, the proposed activity will not increase fragmentation of any potential existing important populations into two or more populations.

Adversely affect habitat critical to the survival of a species

Habitat critical to the survival of this species includes any breeding or foraging habitat

The proposed activity will impact a small area of potential habitat and will only involve potential pruning of overhead branches. Due to the mobile nature of this species, and the surrounding areas of potential foraging habitat that will remain undisturbed, the proposed activity is unlikely to adversely affect habitat critical to the survival of this species.

Disrupt the breeding cycle of an important population

Due to the species being highly mobile, it is unlikely that temporary disturbance to the foraging habitat will disrupt the breeding cycle of a population.

Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

The proposed minor vegetation removal (including pruning of overhead branches) will impact upon only a small area of potential foraging habitat for this species. Due to this species being highly mobile, it is unlikely the clearing will modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

Areas of intact equivalent habitat will remain outside of the Subject Site, undisturbed by the works.

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat

Invasive species that are harmful to this species include weeds such as invasive grasses becoming established within the habitat. Much of the Subject Site is in a degraded state, with a high level of exotic groundcover. Mitigation measures including washing down vehicles have been recommended to reduce

the likelihood of weeds becoming further established within the Subject Site. As such, the proposed activity is unlikely to result in invasive species that are harmful to this species becoming further established within the species' habitat.

Introduce disease that may cause the species to decline, or

The proposed activity is not likely to introduce a disease that may cause the species to decline or interfere substantially with the recovery of the species.

Interfere substantially with the recovery of the species

The objectives of the Superb Parrot records plan are to:

- Minimise the probability of extinction of the Superb Parrot in the wild, and to
- Increase the probability of important populations becoming self-sustaining in the long term.

Most of the study area is in a modified, degraded and fragmented state. The proposed clearing will impact upon only a small area of potential foraging habitat for this species. Due to this, it is unlikely that the scale of disturbance for the proposed activity will interfere substantially with the recovery of this species.

Is a significant impact likely to result?

After considering the above statements, the proposed activity is unlikely to have a significant impact on the Superb Parrot.

Appendix F AHIMS Search Results

Office of Environment & Heritage

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 16141-P1b

Client Service ID : 528034

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
43-3-0038	Bundaburrah Creek Massacre	AGD	55	590000	6303000	Open site	Valid	Conflict : -	Massacre	
	Contact	Recorders	Ms.Adrienne Howe-Piening					Permits		
43-5-0062	Back Marsden Road 7	AGD	55	587758	6290356	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders	Rosemary Stapleton					Permits		
43-5-0053	Back Marsden Road	AGD	55	587934	6290142	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders	Miss.Rebeeca Ogden-Brunell					Permits		
43-5-0054	Back Marsden Road 2	AGD	55	587925	6290299	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders	Miss.Rebeeca Ogden-Brunell					Permits		
43-5-0055	Back Marsden Road 3	AGD	55	587881	6290311	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders	Miss.Rebeeca Ogden-Brunell					Permits		
43-5-0056	Back Marsden Road 4	AGD	55	587892	6290345	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders	Miss.Rebeeca Ogden-Brunell					Permits		
43-6-0081	Dunns Lane 1	AGD	55	621413	6286562	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders	Miss.Rebeeca Ogden-Brunell					Permits		
43-6-0082	Bandon Road South 1	AGD	55	619960	6286688	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders	Miss.Rebeeca Ogden-Brunell					Permits		
43-2-0046	BURIAL	AGD	55	583472	6299220	Open site	Valid	Burial : -		
	Contact	Recorders	Randelle Blair					Permits		
43-2-0047	Morebain Burial	AGD	55	586655	6307004	Open site	Valid	Burial : 1		98707
	Contact	Recorders	Allen Hutchins					Permits		
43-2-0048	Morebain Man (relocated)	AGD	55	586626	6306918	Open site	Valid	Burial : 1		98707
	Contact	Recorders	Allen Hutchins					Permits		
43-2-0055	Dog & Duck Lagoon	AGD	55	588088	6298313	Open site	Valid	Hearth : -		
	Contact T Russell	Recorders	Mr.Larry Towney					Permits		

Report generated by AHIMS Web Service on 17/08/2020 for Declan Coman for the following area at Datum :GDA, Zone : 55, Eastings : 581335 - 626559, Northings : 6280266 - 6324898 with a Buffer of 0 meters. Additional Info : REF. Number of Aboriginal sites and Aboriginal objects found is 94

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Office of Environment & Heritage

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 16141-P1b

Client Service ID : 528034

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
43-2-0056	Dog & Duck Lagoon 1	AGD	55	588088	6298316	Open site	Valid	Modified Tree (Carved or Scarred) : 2		
	Contact: T Russell	Recorders: Mr.Larry Towney						Permits		
43-2-0057	Dog & Duck Lagoon 3	AGD	55	588057	6298179	Open site	Valid	Artefact : -		
	Contact: T Russell	Recorders: Mr.Larry Towney						Permits		
43-2-0058	Dog & Duck Lagoon 5	AGD	55	589520	6298131	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact: T Russell	Recorders: Mr.Larry Towney						Permits		
43-3-0031	C-IF-1 (Forbes)	AGD	55	596140	6310810	Open site	Valid	Artefact : -	Isolated Find	3543
	Contact	Recorders: Central West Archaeological and Heritage Services Pty Ltd						Permits		
43-3-0103	Parkes-Manildra Open Site 42 (PM-OS42)	GDA	55	623788	6323177	Open site	Partially Destroyed	Artefact : -		102488
	Contact	Recorders: Doctor.Jodie Benton						Permits		
43-2-0063	Forbes-Jemalong Scarred Tree 1	GDA	55	590261	6306043	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders: OzArk Environmental and Heritage Management,Mr.Toivo Kim Tuovinen						Permits		
43-2-0074	Forbes Gunningblne TSR	GDA	55	591130	6320914	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders: Mr.Larry Towney,Central Tablelands Local Land Services						Permits		
43-4-0012	MD 18	AGD	55	583030	6296740	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	Recorders: Mr.Kelvin Officer						Permits		
43-4-0013	MD 17	AGD	55	583020	6296730	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	Recorders: Mr.Kelvin Officer						Permits		
43-4-0018	MD 33	AGD	55	604720	6324450	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	Recorders: Mr.Kelvin Officer						Permits		
43-6-0072	R-ST-1	AGD	55	621500	6291750	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	Recorders: Central West Archaeological and Heritage Services Pty Ltd						Permits		

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 16141-P1b

Client Service ID : 528034

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
43-6-0073	R-ST-2	AGD	55	621800	6292100	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	Recorders	Central West Archaeological and Heritage Services Pty Ltd					Permits		
43-6-0074	R-ST-3	AGD	55	621800	6292300	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	Recorders	Central West Archaeological and Heritage Services Pty Ltd					Permits		
43-3-0041	RB-ST-1	AGD	55	595590	6301200	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	Recorders	Central West Archaeological and Heritage Services Pty Ltd					Permits		
43-2-0031	GS-IF-1	AGD	55	589910	6303550	Open site	Valid	Artefact : -	Isolated Find	97833
	Contact	Recorders	Central West Archaeological and Heritage Services Pty Ltd					Permits		
43-2-0032	GS-ST-1	AGD	55	591530	6303650	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	97833
	Contact	Recorders	Central West Archaeological and Heritage Services Pty Ltd					Permits		
43-3-0039	RB-ST-2	AGD	55	595600	6301100	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	Recorders	Central West Archaeological and Heritage Services Pty Ltd					Permits		
43-3-0040	RB-ST-3	AGD	55	595500	6301000	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	Recorders	Central West Archaeological and Heritage Services Pty Ltd					Permits		
43-3-0032	C-ST-1;	AGD	55	595370	6310330	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	Recorders	Central West Archaeological and Heritage Services Pty Ltd					Permits		
43-3-0033	C-ST-3;	AGD	55	595370	6310330	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	Recorders	Central West Archaeological and Heritage Services Pty Ltd					Permits		
43-3-0034	C-ST-2;	AGD	55	595480	6310330	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	Recorders	Central West Archaeological and Heritage Services Pty Ltd					Permits		

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Office of Environment & Heritage NSW GOVERNMENT

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 16141-P1b

Client Service ID : 528034

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
43-3-0035	Toms Lagoon;	AGD	55	597210	6305380	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	Recorders	L Woods					Permits		
43-5-0001	Ena Ooma Creek;Wheogo;	AGD	55	586261	6291211	Open site	Valid	Burial : -	Burial/s	715,1216
	Contact	Recorders	ASRSYS					Permits		
43-5-0008	Scarred Tree 3;	AGD	55	585500	6299950	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	Recorders	Ms.Jillian Comber,Allan Goodwin,Mr.Steve Woodhall					Permits		
43-5-0009	Scarred Tree 2;	AGD	55	585200	6299600	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	Recorders	Ms.Jillian Comber,Allan Goodwin					Permits		
43-5-0010	Scarred Tree 1;	AGD	55	584900	6299600	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	Recorders	Ms.Jillian Comber,Allan Goodwin					Permits		
43-2-0020	SW1;	AGD	55	584400	6298800	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	Recorders	Mr.Steve Woodhall					Permits		
43-2-0022	A-IF-2;	GDA	55	592122	6308349	Open site	Valid	Artefact : -	Isolated Find	3082
	Contact	Recorders	Central West Archaeological and Heritage Services Pty Ltd,OzArk Environmental a					Permits		
43-2-0023	A-IF-3;	AGD	55	591170	6306200	Open site	Valid	Artefact : -	Isolated Find	3082
	Contact	Recorders	Central West Archaeological and Heritage Services Pty Ltd					Permits		
43-2-0024	A-IF-4;	AGD	55	591300	6305800	Open site	Valid	Artefact : -	Isolated Find	3082
	Contact	Recorders	Central West Archaeological and Heritage Services Pty Ltd					Permits		
43-2-0025	A-OS-1;	GDA	55	591381	6306991	Open site	Valid	Artefact : -	Open Camp Site	3082
	Contact	Recorders	Central West Archaeological and Heritage Services Pty Ltd,OzArk Environmental a					Permits		
43-2-0026	A-IF-1;	AGD	55	592030	6308170	Open site	Valid	Artefact : -	Isolated Find	3082
	Contact	Recorders	Central West Archaeological and Heritage Services Pty Ltd					Permits		
43-2-0028	Toms Lagoon ST 2;	AGD	55	597230	6305320	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	Recorders	Bill Allen					Permits		
43-2-0029	Bogabigal Burial	AGD	55	584650	6304900	Open site	Valid	Burial : -, Artefact : -	Burial/s,Isolated Find	

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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 16141-P1b

Client Service ID : 528034

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	Recorders	Bill Allen					Permits		
43-2-0030	MD 24;Bundaburrah Creek 3;	AGD	55	581930	6296180	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	Recorders	Kerry Navin,Mr.Kelvin Officer					Permits		
43-3-0001	Red Bend;Forbes;	AGD	55	595763	6300898	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	Recorders	ASRSYS					Permits		
43-3-0006	Crooked Creek/WF17;Kyneton;	AGD	55	597800	6321990	Open site	Valid	Artefact : -	Open Camp Site	975,102769
	Contact	Recorders	Mr.Allan Lance					Permits		
43-3-0007	Hoopers Road/WF 18;Allens Road;Forbes;	AGD	55	597750	6316300	Open site	Valid	Artefact : -	Open Camp Site	975
	Contact	Recorders	Mr.Allan Lance					Permits		
43-2-0059	Forbes scar tree	GDA	55	591592	6303739	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Peter Peckham					Permits		
43-3-0084	Parked Manildra-Open Site 1 (PM-OS1)	GDA	55	622883	6323061	Open site	Partially Destroyed	Artefact : 3		102488
	Contact	Recorders	OzArk Environmental and Heritage Management,OzArk Environmental and Herita					Permits	3346	
43-3-0085	Parked Manildra-Open Site 2 (PM-OS2)	GDA	55	623661	6323331	Open site	Valid	Artefact : -		102488
	Contact	Recorders	OzArk Environmental and Heritage Management					Permits		
43-3-0086	Parked Minildra-Open Site 3 (PM-OS3)	GDA	55	624158	6323281	Open site	Partially Destroyed	Artefact : -		102488
	Contact	Recorders	OzArk Environmental and Heritage Management					Permits	3346	
43-3-0087	Parked Manildra-Open Site 8 with PAD (PM-OS8)	GDA	55	625399	6323026	Open site	Valid	Potential Archaeological Deposit (PAD) : -		102488
	Contact	Recorders	OzArk Environmental and Heritage Management					Permits		
43-3-0088	Parked Manildra-Open Site 9 (PM-OS9)	GDA	55	625932	6323088	Open site	Partially Destroyed	Artefact : 2		102488
	Contact	Recorders	OzArk Environmental and Heritage Management					Permits		
43-3-0089	Parked Manildra-Scarred Tree 1 (PM-ST1)	GDA	55	616299	6324129	Open site	Valid	Modified Tree (Carved or Scarred) : -		102488
	Contact	Recorders	OzArk Environmental and Heritage Management					Permits		
43-2-0067	NHVB-IF1	GDA	55	591940	6310576	Open site	Valid	Artefact : 1		
	Contact	Recorders	OzArk Environmental and Heritage Management,Ms.Morgan Wilcox					Permits		
43-2-0068	NHVB-IF2	GDA	55	591652	6310618	Open site	Valid	Artefact : 1		
	Contact	Recorders	OzArk Environmental and Heritage Management,Ms.Morgan Wilcox					Permits		
43-2-0069	NHVB-IF3	GDA	55	590610	6310705	Open site	Valid	Artefact : 1		

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Office of Environment & Heritage

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 16141-P1b

Client Service ID : 528034

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	Recorders	OzArk Environmental and Heritage Management,Ms.Morgan Wilcox					Permits		
43-3-0108	Lachlan River PSC Pump OS1 PAD	GDA	55	605849	6304754	Open site	Partially Destroyed	Artefact : -, Potential Archaeological Deposit (PAD) : -		
	Contact	Recorders	Ms.Morgan Wilcox					Permits	3844	
43-3-0107	Forbes North2	GDA	55	602023	6300801	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Mr.Larry Towney,Central Tablelands Local Land Services					Permits		
43-2-0081	Mickeys Plain Creek OS-1	GDA	55	587068	6307735	Open site	Valid	Artefact : -		
	Contact	Recorders	OzArk Environmental and Heritage Management,Doctor.Alyce Cameron					Permits		
43-2-0082	Mickeys Plain Creek IF-1	GDA	55	587253	6307612	Open site	Valid	Artefact : -		
	Contact	Recorders	OzArk Environmental and Heritage Management,Doctor.Alyce Cameron					Permits		
43-3-0042	Gk-9(refer to site 39-3-0024)	AGD	55	614737	6305265	Open site	Deleted	Hearth : -, Artefact : -, Stone Quarry : -		
	Contact	Recorders	Dan Witter					Permits		
43-3-0043	Gk-8(refer to 39-3-0023)	AGD	55	613450	6308620	Open site	Deleted	Artefact : 20		
	Contact	Recorders	Dan Witter					Permits		
43-3-0044	Gk-7(refer to 39-3-0022)	AGD	55	613189	6308575	Open site	Deleted	Artefact : 24		
	Contact	Recorders	Dan Witter					Permits		
43-3-0045	Gk-6(refer to site 39-3-0009)	AGD	55	613037	6308519	Open site	Deleted	Habitation Structure : 1, Artefact : 24		
	Contact	Recorders	Dan Witter					Permits		
43-3-0046	Gk-5(refer to 39-3-0010)	AGD	55	612230	6300058	Open site	Deleted	Hearth : 2, Artefact : 73		
	Contact	Recorders	Dan Witter					Permits		
43-3-0047	Gk-4(refer to 39-3-0011)	AGD	55	612793	6308315	Open site	Deleted	Hearth : 7, Artefact : 122		
	Contact	Recorders	Dan Witter					Permits		
43-3-0048	Gk-3(refer to 39-3-0012)	AGD	55	612803	6308659	Open site	Deleted	Hearth : 1, Artefact : 7		
	Contact	Recorders	Dan Witter					Permits		
43-3-0049	Gk-29(refer to 39-3-0013)	AGD	55	611264	6308787	Open site	Deleted	Shell : 1, Artefact : 4		
	Contact	Recorders	Dan Witter					Permits		
43-3-0050	Gk-1(refer to 39-3-0014)	AGD	55	612360	6308774	Open site	Deleted	Artefact : 24		
	Contact	Recorders	Dan Witter					Permits		
43-2-0033	Cg-5(refer to 39-2-0038)	AGD	55	588309	6308831	Open site	Deleted	Hearth : 1		
	Contact	Recorders	Dan Witter					Permits		

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Office of Environment & Heritage

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 16141-P1b

Client Service ID : 528034

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
43-2-0034	Cg-4(refer to site 39-2-0039)	AGD	55	588358	6308740	Open site	Deleted	Hearth : 1		
	Contact	Recorders	Dan Witter					Permits		
43-2-0035	Cg-3(refer to 39-2-0040)	AGD	55	588153	6308806	Open site	Deleted	Hearth : 2, Artefact : 17		
	Contact	Recorders	Dan Witter					Permits		
43-2-0036	Cg-29(refer to site 39-2-0041)	AGD	55	587110	6308928	Open site	Deleted	Artefact : 9		
	Contact	Recorders	Dan Witter					Permits		
43-2-0037	Cg-1(refer to 39-2-0042)	AGD	55	587832	6309424	Open site	Deleted	Hearth : 1, Artefact : 6		
	Contact	Recorders	Dan Witter					Permits		
26-3-0015	A-OS-2;Anglesey;	AGD	55	591300	6307100	Open site	Valid	Artefact : -	Open Camp Site	
	Contact	Recorders	Central West Archaeological and Heritage Services Pty Ltd					Permits		
43-6-0092	Grenfell ST	AGD	55	613000	6283800	Open site	Valid	Modified Tree (Carved or Scarred) : 2		
	Contact T Russell	Recorders	Unknown Author					Permits		
43-3-0064	GT scar tree 1	AGD	55	597318	6304878	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact S Scanlon	Recorders	Mr.Graeme Towney					Permits		
43-3-0069	Forbes/Titchbourn TSR	AGD	55	601097	6318088	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact T Russell	Recorders	Mr.Graeme Towney					Permits		
43-3-0070	Forbes-Titchbourn TSR	AGD	55	601280	6318426	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact T Russell	Recorders	Mr.Graeme Towney					Permits		
43-3-0071	Forbes - Titchbourn TSR	AGD	55	601693	6318972	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact T Russell	Recorders	Mr.Graeme Towney					Permits		
43-3-0072	Parkes TSR	AGD	55	603440	6322660	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact T Russell	Recorders	Mr.Graeme Towney					Permits		
43-3-0073	scar tree 73	AGD	55	602064	6320561	Open site	Valid	Modified Tree (Carved or Scarred) : -		

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Office of Environment & Heritage

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 16141-P1b

Client Service ID : 528034

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact T Russell	Recorders	Mr.Graeme Towney					Permits		
43-3-0074	TSR74	AGD	55	602054	6320587	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact T Russell	Recorders	Mr.Graeme Towney					Permits		
43-3-0075	Grenfell Rd TSR	AGD	55	596167	6300184	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact T Russell	Recorders	Mr.Graeme Towney					Permits		
43-3-0076	Grenfell Forbes RD	AGD	55	597291	6297962	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact T Russell	Recorders	Mr.Graeme Towney					Permits		
43-3-0077	Forbes Grenfell Rd	AGD	55	597515	6297542	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact T Russell	Recorders	Mr.Graeme Towney					Permits		
43-3-0078	Grenfell Forbes TSR	AGD	55	597836	6296372	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact T Russell	Recorders	Mr.Graeme Towney					Permits		
43-6-0094	Forbes Grenfell TSR	AGD	55	599391	6280802	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact T Russell	Recorders	Mr.Graeme Towney					Permits		
43-3-0105	Laura	GDA	55	595950	6302290	Closed site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Mr.Larry Towney,Central Tablelands Local Land Services					Permits		
43-3-0106	Forbes South	GDA	55	595972	6302030	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Mr.Larry Towney,Central Tablelands Local Land Services					Permits		

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