Review of Environmental Factors

New Grafton Correctional Centre Water Main

GeoLINK
environmental management and design

PO Box 119
Lennox Head NSW 2478
T 02 6687 7666

PO Box 1446
Coffs Harbour NSW 2450
T 02 6651 7666

PO Box 1267
Armidale NSW 2350
T 02 6772 0454

PO Box 229
Lismore NSW 2480
T 02 6621 6677

info@geolink.net.au

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GeoLINK has been engaged by Infrastructure New South Wales through Umow Lai to prepare a Review of Environmental Factors (REF) for the installation of a water supply delivery main for the New Grafton Correctional Centre located approximately 12 km east of Grafton, NSW (the Proposal). The proposed water supply delivery main would connect to the existing Clarence Valley water reticulation system at Ulmarra.

Need for the Proposal

The proposed water supply delivery main would supply water to the New Grafton Correctional Centre. The proposed water main would, if required also provide water services to adjacent properties along the route.

Statutory and Planning Framework

All relevant statutory planning instruments have been examined in relation to the Proposal. Development consent is not required for the subject activity by virtue of Clause 125 of State Environmental Planning Policy (infrastructure) 2007 (ISEPP). The Proposal, however, becomes an 'activity' for the purposes of Part 5 of the EP&A Act hence a Review of Environmental Factors (REF), assessing the Proposal and any associated environmental impacts is required.

Consultation

Since the inception of the Proposal for the New Grafton Correctional Centre, there has been ongoing consultation with Clarence Valley Council including the proposed water supply delivery main. A letter was also sent to Council on 16 May 2017 to formalise consultation for this specific activity under Part 5 of the EP&A Act, as required under Clauses 13 and 15 of ISEPP.

Targeted consultation would also occur with affected landowners. No additional/ broader community consultation is considered necessary.

Environmental Assessment

This REF provides an assessment of the Proposal that takes into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the Proposal as is required under the EP&A Act. The main potential negative environmental impacts of the Proposal include:

- Removal of vegetation.
- Localised short term disturbance from construction activities such as possible noise impacts.

Other potential environmental impacts would generally be minor in nature and are documented within the REF. A variety of safeguards have been developed to avoid and/ or minimise the risk of potential impacts posed by the Proposal to the environment.

Justification and Conclusion

The proposed water supply delivery main is an important element of infrastructure to support the New Grafton Correctional Centre. The potential environmental impacts posed by the Proposal have been thoroughly examined through this REF. Some minor impacts would occur locally; however, it is unlikely that any significant or long-term adverse impacts would eventuate. To help ensure that the extent of impacts is limited and that unavoidable impacts are managed and minimised, mitigation measures and safeguards have been developed and would be implement and monitored. The Proposal is considered justifiable taking into account the potential environmental impacts and subsequent mitigation measures and safeguards. The Proposal supports the establishment and operation of the New Grafton Correctional Centre. The Proposal is in accordance with ESD principles and consistent with the objectives of the EP&A Act.

1. Introduction

1.1 Proposal Identification

The Proposal involves installation of a water supply delivery main for the New Grafton Correctional Centre located approximately 12 km east of Grafton, NSW. This water main would connect to the existing Clarence Valley Water Reticulation System at Ulmarra. The water main would extend via public road reserves and easements within private properties in a south-easterly direction to the New Grafton Correctional Centre on Avenue Road. The proposed water main would, if required also provide water services to adjacent properties along the route. The proposed installation works include trenching and installation of approximately 13 km of pipe including under-boring of the existing Pacific Highway and Deep Creek.

All construction and operational activities associated with the installation of the water main are referred to herein as 'the Proposal'.

1.2 Purpose of this Report

This REF has been prepared by GeoLINK on behalf of engineering consultants Umow Lai who have been engaged by Infrastructure NSW (INSW) to manage the works. For the purposes of these works, INSW is the proponent and the determining authority under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Construction of the water main and associated works would be undertaken by contractors of behalf of Umow Lai.

The purpose of the REF is to describe the Proposal, to document the likely impacts of the Proposal on the environment, and to detail safeguard/ mitigation measures to be implemented.

The description of the Proposal and associated environmental impacts have been undertaken in context of clause 228 of the Environmental Planning and Assessment Regulation 2000, the *Threatened Species Conservation Act 1995* (TSC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). In doing so, the REF helps to fulfil the requirements of Section 111 of the EP&A Act, which requires INSW to examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

The findings of the REF would be considered when assessing:

- whether the Proposal is likely to have a significant impact on the environment and therefore the necessity to prepare an Environmental Impact Statement (EIS) under Part 5 of the EP&A Act;
- the significance of any impact on threatened species, populations or ecological communities, or their habitats as defined by the TSC Act and/ or FM Act, in Section 5A of the EP&A Act and therefore the requirement for a Species Impact Statement; and
- the potential for the Proposal to significantly impact a matter of national environmental significance or Commonwealth land and the need to make a referral to the Department of the Environment and Energy for a decision by the Commonwealth Minister on whether assessment and approval is required under the EPBC Act.

2. Description of the Proposal

2.1 Site Location

The water main would extend from the New Grafton Correctional Centre on Avenue Road, approximately 12 km east of Grafton, NSW to the existing Clarence Valley water reticulation system at Ulmarra (approximately 10 km north-east of Grafton) (refer to **Illustration 2.1**). The water main would traverse in a south-easterly direction to the New Grafton Correctional Centre on Avenue Road (refer to **Illustration 2.2**). Where the route is within road reserves, it would be generally within 4-5 m of the centreline of existing roads. The locality is low-lying with large areas of wetland. The northern portion of the route follows Deep Creek which ultimately flows into Glenugie Creek. Large areas of swamp to the east of the route flow into the Coldstream River. Portions of both of these areas comprise State Environmental Planning Policy (SEPP) 14 Coastal Wetlands. Ulmarra is adjacent the Clarence River.

2.2 The Proposal

Infrastructure NSW proposes to install a water supply delivery main for the New Grafton Correctional Centre, approximately 12 km east of Grafton, NSW which would connect to the existing Clarence Valley water reticulation system at Ulmarra. The proposed water main would, if required also provide water services to adjacent properties along the route.

Constraints considered during the route selection include the occurrence of underground services (water and Telstra) and above ground services (powerlines), as well as ecological features including the following:

- Hollow-bearing trees (HBTs) and fauna habitat features.
- Endangered Ecological Communities (EECs).
- Threatened plants.

The proposed works are described as follows:

- Removal of vegetation within a maximum 3 m either side of the water main centre line would be required to facilitate installation (to be confirmed once contractor is appointed). This would require removal of 20-30 native trees ranging in size 0.1-0.55 m DBH. The exact installation location of the water main may vary in several locations due to constraints such as services; hence several route options within wide areas of the road reserve and easements were assessed to provide some flexibility in terms of installation options. Removal of exotic vegetation including:
  - Radiata Pine (*Pinus radiata*): 4-8 trees 0.30-0.55m DBH.
  - White Poplar (*Populus alba*): 10-20 trees 0.15-0.3m DBH.
  - Camphor Laurel (*Cinnamomum camphora*): 1-3 trees 0.10-0.2 m DBH.
- Trenching and installation of approximately 6.5 km of 225 mm diameter PVC (except for under-bored sections where the pipe would be polyethylene) pipe (including under-boring of the existing Pacific Highway and Deep Creek).
- Lay pipe with a minimum of 600 mm cover except for the following situations:
  - When traversing an access to a property and where the pipeline crosses under a formed road, the cover would be 750 mm and 900 mm respectively.

- When under-boring creeks and the highway, the cover would be at least 1.2 m.

- Generally depths of excavation of trenches would be 1 m below ground except at property accesses (1.1 m) and road crossings (1.3 m). Under-bores would be variable but as a minimum 1.8 m below the ground surface.
- Trenches would be generally 750 mm – 900 mm wide.
- The actual under-bore would be approximately 400 mm in diameter; however under-bores require a connection point at either end which would require a maximum excavation of approximately 4 m x 2.5 m x maximum depth of 2 m.
- Restore the works site to an acceptable standard upon completion of the works.

2.2.1 Proposal Objectives

The objectives of the Proposal are to:

- Install a water main to provide water to the New Grafton Correctional Centre.
- Provide water services to adjacent properties along the route, if required.
- Avoid as far as possible impacts on utilities and services, property and access and ecological features including fauna habitat features, EECs and threatened plants.

2.3 Construction Activities

2.3.1 Plant and Equipment

The main plant and equipment required for the works may include (but not be limited to):

- Backhoe or small excavator.
- Small crane.
- Chainsaw.
- Mulcher.
- Light vehicles/ trucks.
- Hand tools (angle grinder, electric saw, driller/ driver etc).

2.3.2 Working Hours

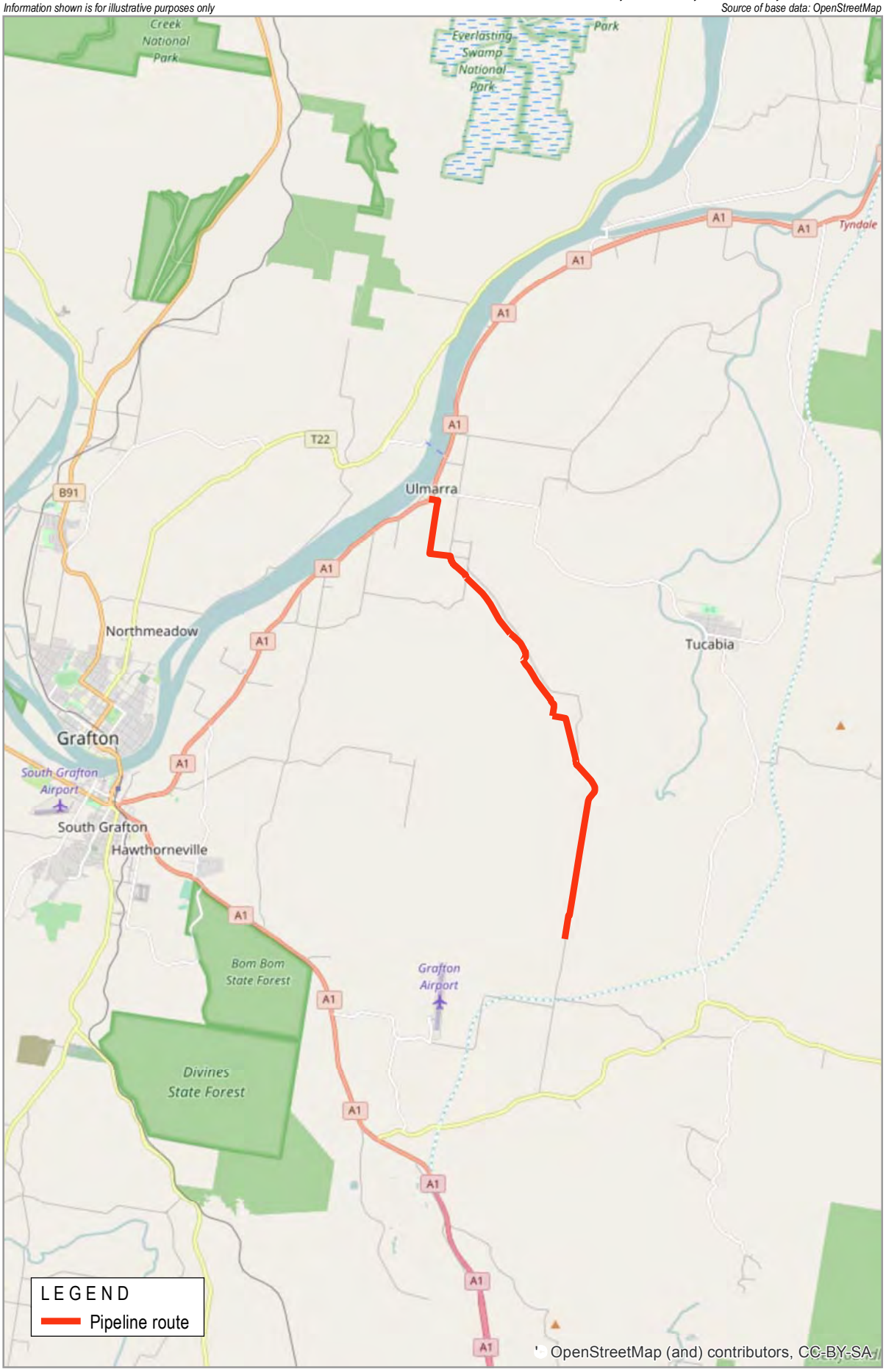
Construction activities would be undertaken in accordance with standard construction work hours, i.e. Monday to Friday: 7:00 am to 6:00 pm and Saturday 8:00 am to 1:00 pm.

2.4 Ancillary Facilities

Given the nature and limited scope of the Proposal, ancillary facilities are not expected to be substantial, and would fall within the overall scope and environmental considerations undertaken as part of this assessment. The impact assessment and recommended mitigation measures in this REF would also be applicable to any ancillary facilities. Once determined, if the ancillary facilities were to affect a substantially different locality or notably departed from the scope of this assessment, a review of this component may be necessary.

Information shown is for illustrative purposes only

Drawn by: AB Checked by: RE Reviewed by: JC Date: 16/05/2017
Source of base data: OpenStreetMap



0 3 Km

North

Site Locality

Information shown is for illustrative purposes only

Drawn by: AB Checked by: RE Reviewed by: JC Date: 16/05/2017
Source of base data: SIX Maps

0 1,200

North

The Site

3. Statutory and Planning Framework

3.1 Planning Approval Pathway

The Proposal involves installation of a water supply delivery main for the New Grafton Correctional Centre which would connect to the existing Clarence Valley water reticulation system at Ulmarra. As part of this project, the applicable environmental planning and legislative requirements were reviewed and the appropriate planning approval is outlined as follows.

Section 76 of the EP&A Act states that if an environmental planning instrument (EPI) provides that development may be carried out without the need for development consent, a person may carry the development out, in accordance with the EPI, on land to which the provision applies. However the environmental assessment of the development is required under Part 5 of the EP&A Act.

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) applies to the State and aims to facilitate the effective delivery of infrastructure across NSW. This policy overrides other EPIs, including Local Environmental Plans, and provides specific planning provisions and development controls relating to nominated types of infrastructure. Division 24 of the ISEPP outlines the approval requirements for water supply systems. The division defines a water supply system as a water reticulation system, water storage facility, water treatment facility, or any combination of these. The division defines a water reticulation system as a facility for the transport of water, including pipes.

The Proposal is for the installation of a pipe for the transport of water and is therefore part of an infrastructure facility under ISEPP and is subject to the development control provisions of Part 3, Division 24 of ISEPP. Clause 125 (Development permitted without consent), under Division 24 of the ISEPP states that (as relevant to the Proposal):

(1) Development for the purpose of water reticulation systems may be carried out by or on behalf of a public authority without consent on any land.

(5) *In this Division, a reference to development for the purpose of a water supply system of any kind includes a reference to development for any of the following purposes if the development is in connection with the water supply system:*

(e) water intakes, pumping stations, pipelines, channels, tunnels, canals and aqueducts,

Hence, the ISEPP allows for the installation of the proposed water main by INSW without consent under Part 5 of the EP&A Act. The Proposal therefore requires preparation of an environmental assessment (Review of Environmental Factors) for approval by the determining authority, in this case INSW.

3.2 Environmental Planning and Assessment Act 1979

Although the Proposal does not require development consent under Part 4 of the EP&A Act, Section 111 of the EP&A Act requires determining authorities, when assessing activities under Part 5, to examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity. To ensure the Proposal adequately addresses the requirements of Section 111, an assessment of the Proposal's consistency with relevant EPIs including State Environmental Planning Policies (SEPPs) and Local Environmental Plans (LEPs) has been completed.

3.3 State Environmental Planning Policies

3.3.1 State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) aims to facilitate the effective delivery of infrastructure across the State. Development consent is not required for the subject activity by virtue of Clause 125 of ISEPP. Clause 125 of ISEPP permits development for the purpose of water reticulation systems to be carried out by or on behalf of a public authority without consent on any land.

As the Proposal is for the installation of a water supply delivery main for the New Grafton Correctional Centre the works can be assessed under Part 5 of the EP&A Act. Part 2, Division 1 of the ISEPP contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development (refer to **Section 4**).

3.3.2 State Environmental Planning Policy 14 – Coastal Wetlands

SEPP 14 aims to ensure that coastal wetlands are preserved and protected in the environmental and economic interests of the state. The nearest mapped SEPP 14 Coastal Wetland is SEPP 14 No. 292 located approximately 430 m east of the site. It is not expected the Proposal would impact this wetland. Safeguards would be in place to ensure the activity does not indirectly affect areas outside of the project footprint.

3.3.3 State Environmental Planning Policy 26 – Littoral Rainforest

SEPP 26 aims to provide a mechanism for the consideration of applications for development that is likely to damage or destroy littoral rainforest areas with a view to the preservation of those areas in their natural state. It is not expected that the Proposal would impact on any areas of SEPP 26 Littoral Rainforest. There are no SEPP 26 Littoral Rainforests within 10 km of the site.

3.3.4 State Environmental Planning Policy 44 - Koala Habitat Protection

SEPP 44 aims to encourage the conservation and management of natural vegetation areas that provide habitat for Koalas, to ensure permanent free-living populations would be maintained over their present range. Clause 6 of SEPP 44 states that the SEPP applies only to land 'in relation to which a development application has been made'. Clause 125 of ISEPP precludes the Proposal from requiring consent therefore Part 2 of SEPP 44 does not apply to the Proposal. However, in order to consider environmental issues to the fullest extent possible, it is prudent to assess the potential impacts on Koalas in accordance with SEPP 44.

One Schedule 2 feed tree species (Forest Red Gum; *Eucalyptus tereticornis*) occurs as isolated paddock trees adjacent to Deep Creek and in the southern portion of the site in the vicinity of Wants Lane (refer to **Appendix A**). It does not comprise >15% of the canopy therefore the site does not comprise potential Koala habitat. Only four Forest Red Gum trees were detected within the road reserve, three of which were <15 cm DBH in size. None of these trees will be impacted by the works.

3.4 Local Environmental Plan

Clarence Valley Local Environmental Plan 2011

Name: Clarence Valley Local Environmental Plan 2011 (CVLEP 2011).

Southern portion of the route: RU2 Rural Landscape

Northern portion of the route: RU1 Primary Production

Permissibility: A *Water Supply System* is technically prohibited within RU2 Rural Landscape and RU1 Primary Production as it is not listed under the land use table as being permitted without consent or permitted with consent.

The standard template definition provided within the CVLEP 2012 defines *Water Supply System* as:

(a) ***a water reticulation system****,*

(b) a water storage facility,

(c) a water treatment facility,

(d) a building or place that is a combination of any of the things referred to in paragraphs (a)–(c).

and defines water reticulation system as:

a building or place used for the transport of water, including ***pipes****, tunnels, canals, pumping stations, related electricity infrastructure, dosing facilities and water supply reservoirs.*

The objectives of the RU1 Primary Production zone are:

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
- *To encourage diversity in primary industry enterprises and systems appropriate for the area.*
- *To minimise the fragmentation and alienation of resource lands.*
- *To minimise conflict between land uses within the zone and land uses within adjoining zones.*
- *To prevent dispersed rural settlement.*
- *To ensure that development does not unreasonably increase the demand for public services or public facilities.*
- *To ensure development is not adversely impacted by environmental hazards.*

The objectives of the RU2 Rural Landscape zone are:

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
- *To maintain the rural landscape character of the land.*
- *To provide for a range of compatible land uses, including extensive agriculture.*
- *To provide land for less intensive agricultural production.*
- *To prevent dispersed rural settlement.*
- *To minimise conflict between land uses within the zone and with adjoining zones.*

- *To ensure that development does not unreasonably increase the demand for public services or public facilities.*
- *To ensure development is not adversely impacted by environmental hazards.*

ISEPP overrides the CVLEP and development without consent connected with a water supply system is permitted on any land under Clause 125 of ISEPP (by or on behalf of a public authority). The Proposal becomes an 'activity' for the purposes of Part 5 of the EP&A Act and is subject to an environmental assessment (Review of Environmental Factors).

3.5 Development Control Plans

The Clarence Valley Council Development Control Plans – Development in Rural Zones 2011 is to encourage development of land in rural zones that complements the rural character of a locality and is at an appropriate scale and form to minimise land use conflicts. Clarence Valley Council DCP - Development in Rural Zones applies to land within the following rural zones:

- RU1 Primary Production.
- RU2 Rural Landscape.
- RU3 Forestry.

The Proposal does not require development consent and is therefore not subject to the requirements of the DCP. However the Proposal would not limit or hinder the achievement of the DCPs general objectives.

3.6 Other State and Commonwealth Legislation

3.6.1 Other NSW Legislative Acts

Table 3.1 lists and describes other NSW State legislation and comments on its applicability in relation to the Proposal.

Table 3.1 NSW Legislation

Legislation	*Section(s)*	*Comment*
Fisheries Management Act 1994	Section 199	Concurrence/ or a permit is required from the Minister for Primary Industries for dredge and reclamation works, or the obstruction of fish passage, on land that is periodically inundated by water and constitutes key fish habitat, in accordance with s199 of the *Fisheries Management Act 1994*. Deep Creek would be under-bored to avoid potential impacts to this waterway. The proposed pipeline route would not undertake dredge or reclamation works on any land that constitutes key fish habitat.
Protection of the Environment Operations Act 1997		No Protection of the Environment Policies (PEPs) are relevant to the Proposal. No licences would be required pursuant to the *Protection of the Environment Operations Act 1997* (POEO Act). The appointed contractor/ s are required to notify EPA when a 'pollution incident' occurs that is likely to impact upon the environment.
	Section 120	It is an offence to pollute any waters of the State. This REF includes mitigations measures to minimise potential impacts that may result in pollution of waters.
	Section 115	It is an offence to negligently dispose of waste in a manner that harms the environment. Waste would be managed in accordance with the *Waste Avoidance and Resource Recovery Act 2001*. The Proposal would aim to reduce the environmental impact of waste and include mechanisms to recover resources and reduce the production of waste where possible.
National Parks and Wildlife Act 1974	Sections 118D(2)(b)(ii)	It is an offence to cause damage to habitat of threatened species, endangered populations or EECs unless it was essential for the carrying out of an activity in accordance with an approval of a determining authority within the meaning of Part 5 of the EP&A Act if the determining authority has complied with that Part. This REF forms the Part 5 assessment however every measure would be implemented to minimise impacts to habitat of threatened species, endangered populations or endangered ecological communities.

Legislation	Section(s)	Comment
	Sections 84, 90	The *National Parks and Wildlife Act 1974* (NPW Act) provides the basis for the legal protection and management of Aboriginal sites within NSW. Sections 84 and 90 of the NPW Act provide statutory protection for any physical/ material evidence of Aboriginal occupation of NSW and places of cultural significance to the Aboriginal community. The key principles of the Act in relation to Aboriginal heritage are the prevention of unnecessary or unwarranted destruction of Aboriginal objects, and the active protection and conservation of objects which are of high cultural significance. It is an offence to knowingly disturb an Aboriginal object, irrespective of its nature or significance, without the prior consent of the Director-General of the NSW OEH. An Aboriginal Heritage Information Management System (AHIMS) search was undertaken (refer to **Section 5.6** and **Appendix B** for further detail). Two recorded sites were identified within the search of the southern section of the pipeline route; however an extensive search revealed that these are 370 m west and 230 m south-west of the proposed pipeline. No known Aboriginal sites or places of cultural significance have been registered within the proposed works footprint. As such, and given the extent of existing disturbance at the site, the Proposal is considered to present low risk to Aboriginal heritage and no additional consultation is required. Works would cease if an artefact or place of significance is disturbed or encountered during the Proposal and the Local Aboriginal Land Council (LALC) and OEH Cultural Heritage Division notified immediately.
Threatened Species Conservation Act 1995	Schedules 1, 1A, 2 and 3	Schedules of threatened species, populations and ecological communities were confirmed prior to site assessment. Based on field assessment, the Proposal has little potential to impact on habitat for threatened species or communities. The Proposal would incrementally contribute to Anthropogenic Climate Change, through the generation of carbon dioxide during operation of machinery and vehicles and associated fuel consumption. No other KTPs would be noticeably contributed to by the Proposal.
Heritage Act 1977	Section 31 - 38A Section 170	Searches of the OEH State Heritage Branch database and Schedule 5 of the CVLEP 2011 were undertaken on 19 April 2017 in relation to the Proposal. No heritage items have been identified at or in close proximity to the site.
Native Vegetation Act 2003	Section 25	Provisions of the Act do not apply to any clearing that is, or is part of, an activity carried out by a determining authority within the meaning of Part 5 of the EP&A Act if the determining authority has complied with that Part.

3.6.2 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

Under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), any action that has, or is likely to have, a significant impact on matters of national environmental significance or other aspects of the environment, such as on commonwealth land, may progress only with approval of the Commonwealth Minister for the Environment and Energy under Part 9 of the EPBC Act. There are no matters of national environmental significance that would be affected by the Proposal and therefore no Commonwealth referral or approval is necessary for the proposed works (also refer to **Section 7**).

3.7 Confirmation of Statutory Position

An assessment of the relevant statutory provisions and planning instruments has concluded that the Proposal can be carried out as development without consent under ISEPP and can be assessed under Part 5 of the EP&A Act.

4. Stakeholder Consultation

4.1 ISEPP Consultation

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) aims to facilitate the effective delivery of infrastructure across the State. Part 2 of the ISEPP contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development.

In relation to Clauses 13 and 15 of ISEPP, the Proposal would involve connection to and use of Council related water infrastructure and the development occurs on flood liable land. Excavation of or adjacent to Council road infrastructure would also be required. Hence consultation with Council is required.

Since the inception of the Proposal and planning and environmental assessment for the New Grafton Correctional Centre, there has been ongoing consultation with CVC regarding various elements of the Correctional Centre project. This includes on-going consultation regarding the subject pipeline. However as the proposed pipeline works are separate from the correctional centre approval process, and are to occur under the ISEPP as development without consent, a letter was sent to Council to formalise consultation for this specific activity under Part 5 of the EP&A Act, as required under Clauses 13 and 15 of ISEPP. Council's response included:

To be completed once response from Council received – their comments to be incorporated into the REF as relevant.

In relation to Clauses 13 (other sub-clauses) and 14 of ISEPP, the Proposal would not have a substantial impact on the other listed Council infrastructure, nor local heritage. Consultation in this regard was not required.

The Proposal is not classified as specified development under the provisions of Clause 16 (2) of ISEPP; therefore consultation with relevant state government agencies was not required.

4.2 Community

Although separate to this project and REF, the EIS prepared for the New Grafton Correctional Centre also identified essential services/ infrastructure that would be required for the development. An Infrastructure Management Plan was also prepared and accompanied the EIS which gives an overview of the likely proposed infrastructure requirements and requisite upgrades associated with the New Grafton Correctional Centre project. These documents identified the need for the provision of water reticulation services from existing Council mains to the site of the New Grafton Correctional Centre. These documents were publically exhibited during the EIS and approval process and it would have been well known in the community that some level or type of infrastructure upgrade or extension would be required and reasonably expected as part of the New Grafton Correctional Centre project.

Nonetheless, the preliminary mains connection and pipeline route identified in the Infrastructure Management Plan that accompanied the EIS has changed and now a pipeline would extend from Ulmarra, north-west of the site, rather than from the original potential option of South Grafton (south-west of the New Grafton Correctional Centre site). Despite this, the pipeline subject to this report is not part of the New Grafton Correctional Centre approval, but is rather being proposed and assessed as

an Activity under Part 5 of the EP&A Act (development without consent). It would be constructed adjacent to existing road infrastructure as well as traversing a number of private properties. Given the nature of the Proposal subject to this REF and the localised potential impacts, targeted consultation with affected land holders has/ would occur. On-going consultation with affected private land holders and standard notification/ management measures during the works would continue. Local road users would also be advised of the proposed works in sections where traffic would be affected.

4.3 Aboriginal Community

Two Aboriginal Heritage Information Management System (AHIMS) searches were undertaken; one for the northern portion of the pipeline route and one for the southern portion (refer to **Appendix B**).

Two recorded sites were identified within the search of the southern section of the pipeline route; however an extensive search revealed that these are 370 m west and 230 m south-west of the proposed pipeline. No known Aboriginal sites or places of cultural significance have been registered within the proposed works footprint. As such, and given the extent of existing disturbance at the site and nature of the works, the Proposal is considered to present low risk to Aboriginal heritage and no additional consultation is required at this stage.

5. Environmental Assessment

5.1 Ecology

5.1.1 Existing Environment

5.1.1.1 Vegetation

The proposed pipeline route comprises five broad vegetation communities:

1. Spotted Gum dry grassy open forest.
2. Forest Red Gum – Swamp Box forest (EEC when on floodplain).
3. Swamp Oak Forest (EEC).
4. Freshwater Wetland (EEC).
5. Disturbed Grassland.

A detailed description of the vegetation present within the proposed route is provided in **Appendix A**.

5.1.1.2 Fauna Habitat

The ecological assessment (refer to **Appendix A**) identified the following fauna habitats within or in the vicinity of the proposed route including:

- Koala food trees.
- Hollow-bearing trees.
- Vegetation connectivity.
- Freshwater wetland/ sedgeland/ open water.

5.1.1.3 Threatened Flora

One threatened flora species, Weeping Paperbark (*Melaleuca irbyana*) occurs within the road reserve along the proposed pipeline route (refer to **Appendix A**). This species is listed as Endangered under the TSC Act however is not listed under the EPBC Act. Nine Weeping Paperbarks were recorded along the route at three locations. This species was also observed on private land adjacent to the road reserve.

No other threatened flora species were detected along the proposed route.

5.1.1.4 Threatened Ecological Communities

A number of threatened ecological communities were identified along the proposed route.

Table 5.1 (extracted from the ecological assessment in **Appendix A**) presents vegetation communities identified along the proposed pipeline route including threatened ecological communities. An area of disturbed Freshwater EEC occurs where the water main intersects with Deep Creek. Swamp Oak Forest EEC occurs as scatted remnants and regrowth stands within the road reserve.

Table 5.1 Vegetating Communities along the Proposed Pipeline Route

Vegetation Type	*TSC Act EEC*	*EPBC Act TEC*	*Condition*
Spotted Gum dry grassy open forest	No	No	Moderate-good
Forest Red Gum – Swamp Box forest (EEC) (on floodplain)	Yes	No	Moderate-good
Forest Red Gum – Swamp Box forest (not on floodplain)	No	No	Moderate-good
Swamp Oak Forest (EEC)	Yes	No	Poor-moderate
Freshwater Wetland	Yes	No	Poor-moderate
Disturbed Grassland	No	No	Poor

5.1.1.5 Threatened and Significant Fauna

The ecological assessment (refer to **Appendix A**) considered the presence of local records identified in the BioNet search, habitat requirements of these threatened species and available habitat, which identified the following threatened fauna species as potentially occurring along the proposed pipeline route:

- Black-necked Stork (*Ephippiorhynchus asiaticus*).
- Bush Stone-curlew (*Burhinus grallarius)*.
- Black-chinned Honeyeater (eastern subspecies) (*Melithreptus gularis gularis)*.
- Grey-crowned Babbler (eastern subspecies) (*Pomatostomus temporalis temporalis)*.
- Diamond Firetail (*Stagonopleura guttata)*.
- Rufous Bettong (*Aepyprymnus rufescens)*.
- Hoary Wattled Bat *Chalinolobus nigrogriseus)*.
- Northern Freetail-bat (*Mormopterus lumsdenae)*.
- Eastern Freetail-bat (*Mormopterus norfolkensis)*.
- Large-footed Myotis (*Myotis macropus)*.
- Eastern Long-eared Bat (*Nyctophilus bifax)*.
- Koala (*Phascolarctos cinereus)*.
- Grey-headed Flying-fox (*Pteropus poliocephalus)*.
- Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris)*.
- Greater Broad-nosed Bat (*Scoteanax rueppellii)*.
- Emu (*Dromaius novaehollandiae*) population in the New South Wales North Coast Bioregion and Port Stephens local government area.

Seven-part tests of significance in accordance with Section 5A of the EP&A Act were prepared for the above species.

A number of other species not listed above may use the site for foraging, or on an opportunistic or seasonal basis and these species would complete the majority of their life-cycle off-site.

5.1.2 Potential Impacts

The Proposal would require removal of approximately 20-30 native trees (>10 cm DBH), ten of which occur in a small stand of Swamp Oak EEC. The majority of the works however would disturb lower stratum vegetation only, most of which is already disturbed to highly disturbed roadside vegetation. No hollow-bearing trees would be removed as part of the works.

Under-boring of Deep Creek would avoid any potential impacts to this wetland area, which comprises a disturbed example of Freshwater EEC. The route has been selected to avoid impacts on hollow-bearing trees and three stands of the threatened (TSC Act) plant Weeping Paperbark (*Melaleuca irbyana*). The route has been aligned on the opposite side of the road to avoid two of the stands, and passes within 4-5 m of the third stand.

A number of threatened fauna species are likely to utilise various habitats along the proposed route. Impacts on these habitat features, in particular hollow-bearing trees, have been avoided where possible at the design stage. Seven-part tests of significance in accordance with Section 5A of the EP&A Act were undertaken for all species either known to occur along the route, or likely to utilise portions of the route for a significant part of their lifecycle (refer to **Appendix A**). The seven-part tests concluded that the proposed works is unlikely to result in a significant impact on any TSC Act listed threatened species, populations or endangered communities and therefore preparation of a Species Impact Statement is not required.

Similarly, the proposed works is unlikely to result in significant impacts to any threatened species, communities or migratory species listed under the EPBC Act and referral to DoEE and approval by the Minister is not required.

5.1.3 Safeguards and Management Measures

The following mitigation measures will be implemented in order to prevent adverse ecological impacts:

1. A suitably qualified ecologist will be in attendance during the removal of the large Forest Red Gum (location: 506365: 6709717) to inspect the tree prior to and post clearing for any fauna.
2. If a Koala or threatened fauna is found to be occupying a tree at the site, a flagged exclusion zone will be established (minimum 50 m) in which works will not proceed until the individual has moved from the site.
3. No plant or equipment will enter or be placed into wetland areas, particularly those associated with Deep Creek.
4. Temporary erosion and sediment control devices such as silt fencing will be installed and maintained, where required.
5. A spill containment kit, including equipment to address both terrestrial and aquatic spills, will be kept on site at all times during the proposed works. Staff will also be trained in the effective deployment of the spill containment kit.
6. No-go flagging will be placed around existing vegetation where it occurs within 4 m of the trenching work area.
7. Ground disturbance outside of that required to undertake the proposed works will be minimised.
8. Damage to trees outside of those that require clearing will be avoided at all times.
9. A suitably qualified ecologist is to install no-go flagging around Weeping Paperbark trees (location: 506914: 6713134) prior to works commencing in this location and inspect trees at the conclusion of the works.

10. Stockpiling will not occur under the crown of existing native trees (i.e. the crown comprises the full width of the branches).
11. Stockpiling will not occur near drainage lines or on overland flow paths, and where necessary will be bunded or covered to reduce sediment runoff.
12. Trees will be felled in a way that minimises disturbance to adjacent retained native vegetation.
13. Works will be completed sensitively to ensure minimal disturbance occurs.
14. All vegetation removed will be chipped and removed from the site; no vegetation waste will be burnt.
15. Any materials to be removed from the site will be taken to a licensed waste facility for disposal or recycling.
16. All plant, equipment and personnel will be free of soil and potential weed propagules prior to being brought to the site.
17. Should injured fauna be found on the site, local wildlife care groups and/ or local veterinarians will be contacted immediately and arrangements made for the immediate welfare of the animal. The phone number of the local WIRES group (ph: 1800 094 737) will be known to the project foremen.
18. Environmental safeguards will be communicated to all construction personnel as part of an Environmental Site Induction, and repeated where appropriate at toolbox sessions prior to commencement of relevant work components.

5.2 Traffic and Access

5.2.1 Existing Environment

The route would generally be accessed from adjacent public roads including Avenue Road, Deep Creek Road and Goodgers Lane. Private property easements would be accessed via Avenue Road from the south or Deep Creek Road from the north.

5.2.2 Potential Impacts

The pipeline would be under-bored at its intersection with Deep Creek Road and thus no significant impacts to traffic are envisioned. Where the route intersects private property access unencumbered access would be maintained (unless otherwise agreed in advance with the landowner) throughout the works.

The works would not require excessive vehicle movements and use of heavy vehicles is likely to be minimal. Traffic would be generated by the Proposal during construction through:

- Construction employees entering and leaving the site;
- Truck deliveries to the site for construction purposes;
- Equipment and plant being delivered to the site for construction purposes; and
- Periodic deliveries to the site for construction materials.

The existing volume and frequency of traffic to and from the site and on the nearby road network would render any additional traffic movements associated with the construction of the Proposal as low. Additional traffic movements would be generated during a temporary construction period. The impact of additional traffic movements associated with the proposed construction activities would represent a small and temporary increase compared to existing traffic movements. Post construction, traffic

movements would be consistent with existing levels. Given the location of the works, current accessibility and the temporary nature of the construction period, no significant traffic impacts would result.

5.2.3 Safeguards and Management Measures

The following mitigation measures will be implemented in order to prevent adverse impacts relating to traffic and access:

19. Unencumbered access will be maintained to private properties along the route (unless otherwise agreed in advance with the landowner) throughout the works.
20. In the unlikely event of a requirement to alter existing access to a site or close a road, sufficient and appropriate notification will be provided to the affected traffic users.
21. Regard to public safety will be maintained at all times.

5.3 Soils, Erosion and Sedimentation

5.3.1 Existing Environment

The proposed route traverses flat to mildly undulating land. The Atlas of Australian Soils (Northcote *et. al.* 1960-1968) classifies the northern portion of the route as Dermosol soils and the southern portion of the route as Kurosol soils. The majority of the northern portion of the route is mapped as having a high probability of Acid Sulfate Soil.

A search of the NSW DPI Cattle Dip Site Locator (http://www.dpi.nsw.gov.au/content/agriculture/livestock/health/images/information-by-species/cattle/ticks/cattle-dip-site-locator) was undertaken 19 April 2017 to determine if any cattle dip sites are recorded in proximity to the site. The following cattle dip stations were identified in the vicinity of the route:

- Cashman Dip Site on Deep Creek Road, Ulmarra
  - Location (AGD66 AMG zone 56):
    - Northing: 6720190.
    - Easting: 503150.
  - Distance from route: 0.15 km.
- Colletts Island Dip Site on Deep Creek Road, Colletts Island
  - Location (AGD66 AMG zone 56):
    - Northing: 6714580.
    - Easting: 509400.
  - Distance from route: 2.6 km.

A search of the NSW EPA Contaminated Land Register (http://www.epa.nsw.gov.au/prclmapp/searchregister.aspx) was undertaken 19 April 2017 to determine if any areas of contaminated land occur in proximity to the site. There are two known records of contamination within the Clarence Valley LGA (the Ashby Dry Dock, approximately 35 km north east of Ulmarra and the Former Koolkhan Power Station,>10 km west of Ulmarra) however neither are proximate to the Proposal.

5.3.2 Potential Impacts

The Proposal would intersect areas that are likely to contain acid sulfate soil (potential and/ or actual). Trenching, minor excavations (associated with launch and recovery areas for under-boring) and under-boring have the potential to disturb these acid sulfate soils and there is a subsequent risk to soil and water resources (including Deep Creek) associated with low pH runoff as well as contamination of areas associated with inappropriate management of excavated acid sulfate material.

There is also risk from erosion and sedimentation as a result of the ground disturbance. Whilst the local topography along the route is very flat to gently undulating there are a number of watercourses that traverse or are located adjacent to the works area; the proposed works therefore present a (manageable) risk to these watercourses from erosion and sedimentation.

There is no apparent risk associated with contaminated land. Cattle dip sites are not proximate to the route. Regardless, safeguards will be in place should unexpected contamination be encountered during the works.

5.3.3 Safeguards and Management Measures

The following mitigation measures will be implemented in order to prevent adverse impacts relating to soil, erosion and sedimentation:

22. Works will be carefully managed in accordance with an Acid Sulfate Soils Management Plan, to manage risks associated with exposure of actual and/or potential acid sulfate material, especially in proximity to waterways. A key component of this plan is that trenches are back-filled within the same day to minimise time of exposure and oxidation.
23. Any unsuitable excavated material/ waste will be classified, managed appropriately (in accordance with the Construction Environmental Management Plan [CEMP]) including placement in approved stockpile locations, approved landfill facilities or Acid Sulfate Soil treatment facilities as appropriate.
24. Progressive, site-specific erosion and sediment control plan will be developed and approved prior to commencement of the works.
25. An Environmental Work Method Statement (EWMS) will address the management of risks associated with under-boring and will be approved prior to commencement of works; the EWMS will include the following measures:
    - All launch/ recovery areas will be re-instated to a similar condition to that of the surrounding ground.
    - Care shall be taken to control, contain and manage the effects of ingress of any groundwater.
    - All pits and excavation will be dewatered will be managed in accordance with a CEMP.
    - All drilling fluid and cuttings will be managed and disposed of in accordance with a CEMP.
26. In the event that unexpected contaminated land is encountered during the works, works will stop immediately and relevant procedures outlined in a CEMP will be followed.
27. Only clean equipment and vehicles will be used, with equipment being cleaned down before being brought to the site.
28. Upon completion of the works, disturbed areas will be re-established to similar existing conditions.

5.4 Water Quality

5.4.1 Existing Environment

The Proposal locality is low-lying with large areas of wetland (refer to **Illustration 5.1**), some of which is classified under the EPBC Act as 'Nationally Important Wetlands' (refer to **Section 7.2** for further discussion on this listing). The northern portion of the route follows Deep Creek which ultimately flows into Glenugie Creek. Large areas of swamp to the east of the route flow into the Coldstream River. Portions of both of these areas comprise SEPP 14 Coastal Wetlands. A number of wetlands that are listed on the Register of the National Estate (refer to Section **5.5.1** for further information on the Register listings) are intersected by the Proposal. The proposed route intersects Deep Creek and a number of cane drains and ephemeral drainage lines associated with nearby dams on private property and wetland areas. The proposed route also intersects a water diversion channel (approximately 250 m north of Casuarina Place). The entire northern portion of the proposed route is within the 1:20 ARI flood zone.

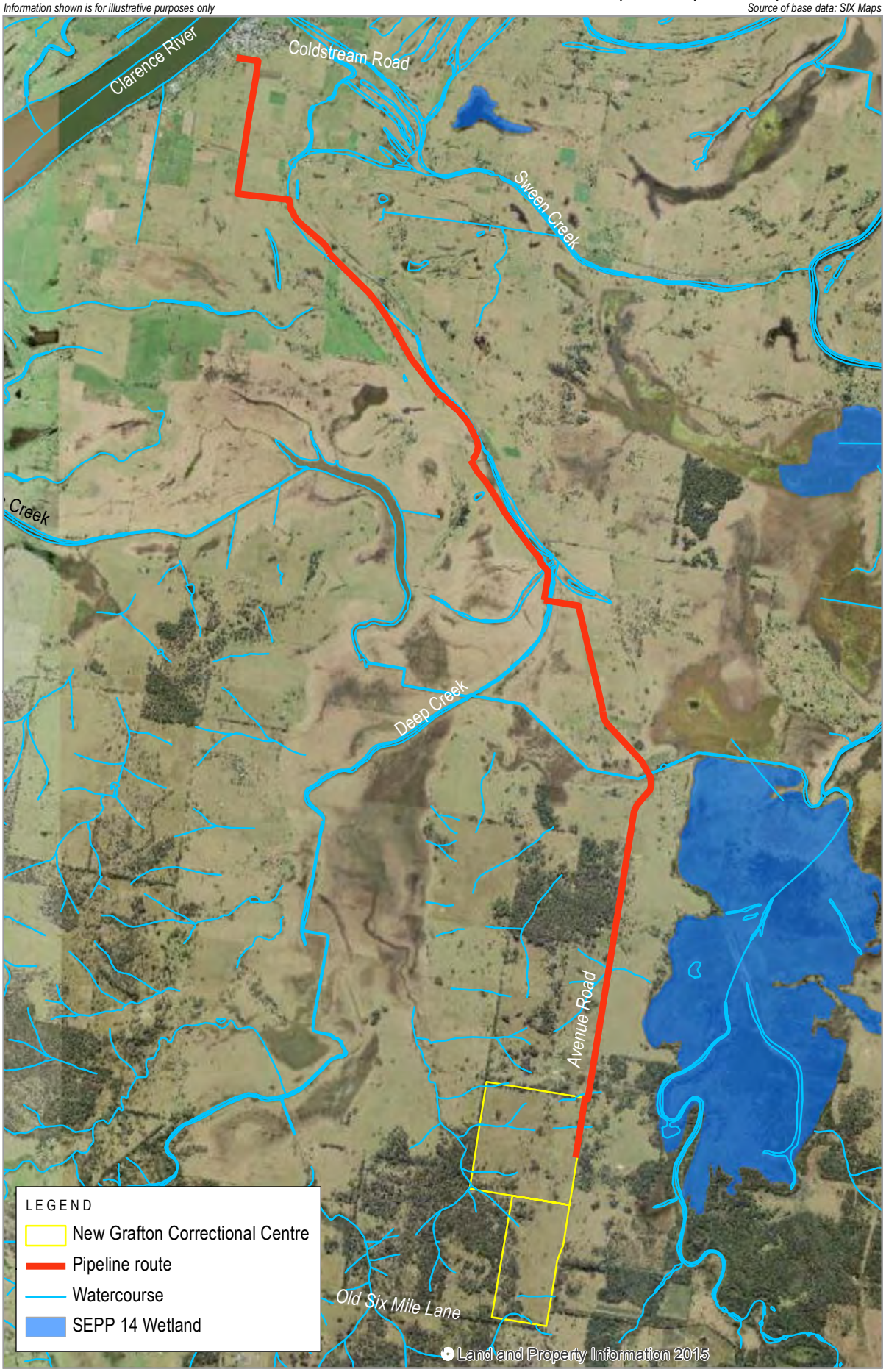
5.4.2 Potential Impacts

The Proposal presents risks to the waterways and wetland areas that are adjacent to and intersected by the proposed route. There is potential for impact to water quality of waterways and wetlands from erosion and sedimentation caused by trenching and minor earthworks. For the most part, use of under-boring techniques employing appropriate environmental controls would mitigate these risks. Construction activities that could present a risk to waterways or sensitive environments in the broader landscape include ground disturbance, erosion and sedimentation and accidental chemical spills such as fuels, oils and solvents from use of plant and equipment on-site.

With appropriate mitigation measures in place during construction, the Proposal is considered unlikely to present significant risk to waterways and wetlands in the area. Post construction, the Proposal would not have any potential to negatively impact water quality above or beyond the current situation.

Information shown is for illustrative purposes only

Drawn by: AB Checked by: RE Reviewed by: JC Date: 16/05/2017
Source of base data: SIX Maps



North

0 1,200

Hydrology

GeoLINK environmental management and design

Review of Environmental Factors - New Grafton Correctional Centre Water Main
2736-1025

Illustration 5.1

5.4.3 Safeguards and Management Measures

The following measures will be implemented in order to prevent adverse impacts relating to water quality:

29. Under-boring methods will be used to cross any water way (including drainage lines) that is identified as containing surface (or near surface) water to minimise risk to hydrology/ aquatic ecology values.
30. The CEMP will include measures (including planning steps) to avoid impacts to waterways during flood events
31. A spill containment kit will be available at all times. All personnel will be made aware of the location of the kit and trained in its effective deployment.
32. Any required fuels and other liquids will be stored in self-safe chemical storage containers.
33. All refuelling of plant and equipment will in appropriately designated areas.
34. Cleaning of tools and equipment will occur off site.
35. All equipment will be maintained in good working order and operated according to manufacturer's specification.
36. No waste and/or wastewater will be discharged directly or indirectly in drains or waterways.
37. The EPA will be notified immediately in response to incidents causing or threatening actual or potential harm to the environment in accordance with section 148 of the POEO Act (via EPA Environment Line on 131 555).

5.5 Non-Aboriginal Heritage

5.5.1 Existing Environment

Searches of the Department of Environment and Energy Australian Heritage database, OEH State Heritage Branch database and Schedule 5 of the CVLEP 2011 were undertaken on 19 April 2017 in relation to the Proposal. Searches of the Clarence Valley local government area were undertaken via these databases; **Appendix C** provides search results however only those results within or proximate to the proposed route are discussed below.

The Australian Heritage database lists the following Register of the National Estate wetland areas intersecting and/ or adjacent to the proposed route:

- Lower Clarence River Area (class: natural; legal status: indicative place). The register describes this site as follows: *'The Lower Clarence River Area is flat and low lying and is composed of rich alluvium, which has been washed down the river. The area includes the lower 40 km of the sinuous and branching Clarence River, and the major freshwater and brackish wetlands of the surrounding floodplain, together with the river mouth and estuarine areas'.*
- Ulmarra Flood Refuge Reserve (class: natural; legal status: indicative place). The register notes that this site '*adjoins a major wetland system and therefore has a high diversity of birdlife and mammals'.*
- Crowsnest Swamp Area, Deep Creek Road ((class: natural; legal status: indicative place). The register notes that this site is *'extensive wetland in good condition'.*

5.5.2 Potential Impacts

As described in **Section 5.4**, the Proposal presents some (manageable) risks to wetlands that intersect and are located adjacent to the proposed route.

The Proposal is considered to present low risk to Non-Aboriginal heritage; the Proposal would not represent a risk to any known heritage sites.

5.5.3 Safeguards and Management Measures

The following mitigation measures will be implemented in order to prevent adverse impacts to any items of non-Aboriginal heritage:

38. If any suspected archaeological items are uncovered during the Proposal, all works will cease in the vicinity of the material/ find. Contact with NSW OEH Heritage Branch will be made immediately.

5.6 Aboriginal Heritage

5.6.1 Existing Environment

Searches of the Office of the Environment and Heritage AHIMS were undertaken on 19 April 2017. An initial 'basic search' covering the area of proposed works plus a 50 m buffer indicated that two Aboriginal sites are known in or near the search area. An 'extensive search' of the same areas was subsequently undertaken which indicated that the aforementioned sites are greater than 400 m and greater than 150 m west of the proposed route. The AHIMS searches are provided in **Appendix B**.

5.6.2 Potential Impacts

The Proposal is considered to present low risk to Aboriginal heritage, given there are no proximal registered items or objects of Aboriginal cultural heritage.

5.6.3 Safeguards and Management Measures

The following mitigation measures will be implemented in order to prevent adverse impacts to any items of Aboriginal heritage:

39. If Aboriginal cultural material is identified on site, a Stop Work Procedure will be followed, which includes:
    - Works will cease immediately.
    - A temporary exclusion zone established.
    - Land Aboriginal Land Council contacted immediately.
    - OEH contacted immediately.
40. Should skeletal material be exposed during ground disturbance, work will cease immediately and contact made with NSW Police, National Parks and Wildlife and the Local Aboriginal Land Council as per OEH requirements.

41. Notifying OEH – it is a legislative requirement that cultural heritage materials uncovered as a result of the Proposal are registered as Aboriginal sites with OEH on the AHIMS database within the required timeframe.

5.7 Noise and Vibration

5.7.1 Existing Environment

The majority of the route traverses rural areas predominantly used for agriculture. A section of land west of Avenue Road will be the site of the proposed New Grafton Correctional Centre. The existing background noise is typical for a rural area and includes local vehicle traffic noise and agricultural noises associated with farm machinery and livestock. Sensitive receivers within Ulmarra include approximately six residences within approximately 100 m radius of the route. Ulmarra Public School is approximately 450 m from the nearest point of the route. Outside of Ulmarra, sensitive receivers include approximately 15 – 20 residences within approximately 200 m of the proposed route.

5.7.2 Potential Impacts

Noise from the Proposal would be typical of that associated with construction work and would be generated by machinery and equipment, vehicles and tree removal. This would result in noise and possible vibration emissions within the immediate area and has potential to affect nearby residences, particularly those located within approximately 200 m of the proposed route. However, because the Proposal is linear, residents would tend to only experience construction noise over short periods as work progresses along the route. The works would be temporary and are not considered to be of a significant scale or constitute major construction work. It is estimated that installation would typically progress at a rate of around 100 m per day on average so that any effect on nearby residences would be expected to be very short lived.

Construction traffic would use the existing local road network, with traffic numbers likely to be small enough to be absorbed into general traffic numbers without an audible change in noise level.

Under the EPA's Interim Construction Noise Guidelines:

- the noise management level for works during the recommended standard hours is background + 10 dB(A). Above this noise level, the proponent needs to implement all feasible and reasonable work practices, as defined in the Guideline, to minimise noise impacts;
- for works outside the recommended standard hours, the noise management level is background + 5 dB(A); and
- the highly noise-affected level of LAeq 75 dB(A) represents the point above which there may be strong community reaction to noise and indicates a need to consider other feasible and reasonable ways to reduce noise, such as restricting the times of very noisy works to provide respite to affected residences.

The NSW EPA website suggests that review of predicted noise levels for some recent major construction projects indicated that a level of 75 dB(A) would not likely be triggered on many projects. Given the scale, location and methodology of the proposed works, it is unlikely that the Proposal would result in a highly noise-affected level of LAeq 75 dB(A) at any local sensitive receiver locations.

There is potential for vibration associated with under-boring to impact nearby built structures, however it is considered that these risks can be managed effectively using the proposed controls in **Section 5.7.3**.

Overall, no significant short term or long term adverse noise and vibration impacts are expected to result from the Proposal and reasonable safeguard and management measures can be implemented to ensure no adverse impacts.

5.7.3 Safeguards and Management Measures

The following mitigation measures will be implemented in order to address adverse impacts relating to noise and vibration:

42. Construction activities will be undertaken in accordance with EPA recommended standard construction hours:
    - Monday to Friday 7 am to 6 pm;
    - Saturday 8 am to 1 pm;
    - No work on Sundays or public holidays.
43. Where under-boring works are required within 100 m of any existing dwelling, farm, commercial building, facility or constructed roadway, the contractor will prepare a preconstruction dilapidation report.
44. Prior to commencement of works in the vicinity of the potentially impacted sensitive receivers (i.e. residences within 200 m of the route), the landholder will be notified and consulted regarding the upcoming works.
45. Any noise complaints will be recorded and include suitable identification/ description of the noise source (e.g. continual/ impulsive) and general location of the complaint. Any noise complaints will be investigated and actioned as required.
46. The CEMP will include controls relevant to management of noise and vibration specific to the proposed works.
47. All vehicles and equipment will be turned off and not left idling when not required for work uses.
48. All plant will be fitted with appropriate exhaust systems to ensure compliance with pollution and noise emission standards.

5.8 Air Quality

5.8.1 Existing Environment

The Proposal is located in a predominantly rural context. Potential airborne particles within the locality are largely restricted to agricultural activities, vehicle emissions and minor dust generated by vehicle movements in the broader landscape.

5.8.2 Potential Impacts

The Proposal may temporarily affect air quality through exhaust emissions from machinery and associated transportation. There may also be minor dust generated during trenching and minor excavations and the removal of trees. There is potential that emissions and dust generated from the works may result in air quality impacts to sensitive receivers. However, given the temporary duration

of the works and nature of the Proposal, the level of potential impact is not considered significant and can be managed or minimised through implementation of safeguards and management measures.

5.8.3 Safeguards and Management Measures

The following mitigation measures will be implemented in order to prevent adverse impacts relating to air quality:

49. Vegetation or other materials will not to be burnt on site.
50. Vehicles transporting waste or other materials that may produce odours or dust will be covered during transportation.
51. Construction works will not be carried out during strong winds or in weather conditions where high levels of dust or air borne particulates are likely.
52. Machinery and vehicles not in use during construction will be turned off and not left to unnecessarily run idle.
53. Vehicles, machinery and equipment will be maintained in accordance with manufacturer's specifications in order to meet the requirements of the *Protection of the Environment Operations Act 1997* and associated regulation.

5.9 Visual Environment

5.9.1 Existing Environment

The proposed route traverses predominantly gently undulating flood plains. The visual environment along much of the route is predominantly of a rural landscape except for the northern extreme of the route which enters a semi-urban area associated with the township of Ulmarra.

5.9.2 Potential Impacts

During construction there may be minor visual impacts associated with views of construction plant equipment and construction site activities. Given the water main would be trenched, there would be negligible visual changes or impacts to the landscape associated with the proposed infrastructure post-construction. There would be some visual impact associated with the removal of approximately 20-30 native trees along the route, ten of which occur in a small stand of Swamp Oak EEC. Removal of these trees would thin out the existing roadside trees along some sections of the route. The trees do not provide a continuous well-defined natural screening effect for any particular receiver (e.g. residence), nor do they represent an important scenic context of vista. Their removal is not expected to contribute to any long term visual issues.

5.9.3 Safeguards and Management Measures

The following measures will be implemented in order to prevent and/or minimise adverse impacts relating to visual amenity:

54. Vegetation will only be cleared to the minimum extent necessary to undertake the proposed works.
55. Upon completion of the works, any works areas will be restored to an acceptable visual state.

56. All sites will be maintained, kept free of rubbish and cleaned up at the end of each work day.

5.10 Socio-economic

5.10.1 Existing Environment

The proposed route traverses predominantly agricultural areas; the northern extreme of the route enters a semi-urban area associated with the township of Ulmarra. The land to the west of Avenue Road (at the southern extent of the pipeline) would be the site of the New Grafton Correctional Centre.

5.10.2 Potential Impacts

The Proposal is unlikely to cause any negative socio-economic impacts. There is unlikely to be any significant disruption to businesses, traffic or access during construction.

The Proposal would result in positive socio-economic outcomes as it would support the operation of the New Grafton Correctional Centre. Given the nature of the Proposal, the site context and temporary construction period, no adverse long-term socio-economic impacts are anticipated.

5.10.3 Safeguards and Management Measures

The following mitigation measures will be implemented in order to prevent adverse socio-economic impacts:

57. Contractors/ workers will be mindful of the needs of the local community.
58. Any potentially impacted parties or landholders will be consulted prior to construction with a goal of minimising or eliminating any adverse impacts.
59. Any changes to public or private roads (including private driveways) as a result of the works will be reinstated to an acceptable standard upon completion of the works.

5.11 Waste

5.11.1 Potential Impacts

The Proposal would be undertaken to ensure minimal impacts are generated from waste produced on site by ensuring that all waste is managed appropriately. Waste generated from the Proposal may include, but is not limited to:

- Packaging materials.
- General site rubbish.
- Oils and grease from machinery.
- Plastic pipe cut offs and scrap metal.
- Soil spoils.
- General building materials waste.

5.11.2 Safeguards and Management Measures

Measures to prevent adverse impacts in relation to generated waste will include:

60. Working areas will be maintained, kept free of rubbish and cleaned up at the end of each day.
61. Waste material will not be left on site once the works have been completed.
62. Ensure the responsible environmental management of wastes that cannot be avoided and promote opportunities for the re-use of waste products where appropriate.
63. Waste will be disposed of at a licensed waste or recycling facility as appropriate.

5.12 Climate Change

5.12.1 Existing Environment

Climate change associated with global warming resultant from human activities and the creation of greenhouse gases affects the environment.

5.12.2 Potential Impacts

The Proposal would contribute to carbon emissions and climate change to a minor extent via the emissions of carbon dioxide by construction equipment and traffic as well as the consumption of materials requiring carbon emissions and the removal of vegetation that may otherwise act as a carbon sink. Given the scale of the works however, the influence on climate change would be negligible. However, it is appropriate to implement measures that can reduce or minimise such effects.

5.12.3 Safeguards and Management Measures

Mitigation measures to prevent adverse impacts in relation to climate change will include:

64. Vehicles and equipment will be switched off when not required for direct construction activities.
65. Waste will be minimised and is otherwise to be recycled or disposed of appropriately.

5.13 Cumulative Impacts

Under Clause 228 of the EP&A Regulation 2000, any cumulative environmental effect with other existing or likely future activities must be taken into account when assessing the impact of an activity for the purposes of Part 5 of the EP&A Act.

The Proposal is expected to add to a number of cumulative impacts including resource consumption, vegetation clearing and generation of greenhouse gas emissions (eg. through operation of vehicles and equipment). However, the mitigation measures stated within **Section 5** and the methodology for completion of the Proposal aim to minimise the extent to which the Proposal contributes to cumulative adverse environmental impacts.

5.14 Ecologically Sustainable Development

The principles of ecologically sustainable development are outlined in Schedule 2 of the Environmental Planning and Assessment Regulation 2000, in relation to EIS requirements. Whilst an EIS is not required for this project, a consideration of these principles is useful.

5.14.1 Precautionary Principle

Schedule 2 of the Environmental Planning and Assessment Regulation 2000 states that "the 'precautionary principle', namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:

i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and
ii) an assessment of the risk-weighted consequences of various options".

To satisfy the precautionary principle, this REF has conducted a thorough analysis of potential environmental, economic and social concerns. This assessment has identified and examined potential impacts and developed appropriate mitigation measures and safeguards to help avoid and/or minimise any impacts and safeguard the environment. Considering this assessment's findings, the Proposal is unlikely to impose significant and/ or long-term adverse impacts on the environment, economy, or community. The mitigation measures and safeguards outlined in this REF would be implemented to ensure sound environmental outcomes in all aspects of the Proposal.

5.14.2 Intergenerational Equity

Schedule 2 of the Environmental Planning and Assessment Regulation 2000 defines inter-generational equity as "the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations".

The Proposal would not significantly affect the viability of local or threatened species, or any EECs. Therefore local biodiversity values would not be substantially adversely affected by the Proposal and would be maintained for future generations

5.14.3 Conservation of Biological Diversity and Ecological Integrity

Schedule 2 of the Environmental Planning and Assessment Regulation 2000 requires the "conservation of biological diversity and ecological integrity", namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration.

The impacts to ecological integrity and conservation of biological diversity at the site have been thoroughly assessed as part of this REF. No threatened species, endangered populations or EECs are likely to be significantly affected by the Proposal. No populations of native species are likely to be made locally rare or unviable as a result of the Proposal. Consequently the ecological integrity and biological diversity would be maintained at the site.

5.14.4 Improved Valuation, Pricing and Incentive Mechanisms

The following principles of valuation, pricing and incentive as per Schedule 2 of the Environmental Planning and Assessment Regulation 2000 are acknowledged as part of this review:

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

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

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

It is difficult, however, to assign a monetary value to the environment of a locality or to environmental resources not considered for commercial use. The proponent has taken an approach to manage the potential environmental impacts of the Proposal by identifying appropriate safeguards to avoid or mitigate adverse environmental effects. This would ensure that the integrity of the environment is not degraded, is managed and enhanced.

6. Environmental Management

Table 6.1 provides a summary of the mitigation measures and safeguards detailed in this report that would be implemented.

Table 6.1 Summary of Mitigation Measures and Safeguards

Environmental Attribute	*Mitigation Measures/ Safeguards*
Ecology	1. A suitably qualified ecologist will be in attendance during the removal of the large Forest Red Gum (location: 506365: 6709717) to inspect the tree prior to and post clearing for any fauna. 2. If a Koala or threatened fauna is found to be occupying a tree at the site, a flagged exclusion zone will be established (minimum 50 m) in which works will not proceed until the individual has moved from the site. 3. No plant or equipment will enter or be placed into wetland areas, particularly those associated with Deep Creek. 4. Temporary erosion and sediment control devices such as silt fencing will be installed and maintained, where required. 5. A spill containment kit, including equipment to address both terrestrial and aquatic spills, will be kept on site at all times during the proposed works. Staff will also be trained in the effective deployment of the spill containment kit. 6. No-go flagging will be placed around existing vegetation where it occurs within 4 m of the trenching work area. 7. Ground disturbance outside of that required to undertake the proposed works will be minimised. 8. Damage to trees outside of those that require clearing will be avoided at all times. 9. A suitably qualified ecologist is to install no-go flagging around Weeping Paperbark trees (location: 506914: 6713134) prior to works commencing in this location and inspect trees at the conclusion of the works. 10. Stockpiling will not occur under the crown of existing native trees (i.e. the crown comprises the full width of the branches). 11. Stockpiling will not occur near drainage lines or on overland flow paths, and where necessary will be bunded or covered to reduce sediment runoff. 12. Trees will be felled in a way that minimises disturbance to adjacent retained native vegetation. 13. Works will be completed sensitively to ensure minimal disturbance occurs. 14. All vegetation removed will be chipped and removed from the site; no vegetation waste will be burnt. 15. Any materials to be removed from the site will be taken to a licensed waste facility for disposal or recycling. 16. All plant, equipment and personnel will be free of soil and potential weed propagules prior to being brought to the site. 17. Should injured fauna be found on the site, local wildlife care groups and/ or local veterinarians will be contacted immediately and arrangements made for the immediate welfare of the animal. The phone number of the local WIRES group (ph: 1800 094 737) will be known to the project foremen.

Environmental Attribute	*Mitigation Measures/ Safeguards*
	18. Environmental safeguards will be communicated to all construction personnel as part of an Environmental Site Induction, and repeated where appropriate at toolbox sessions prior to commencement of relevant work components.
Traffic and access	19. Unencumbered access will be maintained to private properties along the route (unless otherwise agreed in advance with the landowner) throughout the works. 20. In the unlikely event of a requirement to alter existing access to a site or close a road, sufficient and appropriate notification will be provided to the affected traffic users. 21. Regard to public safety will be maintained at all times.
Soils, erosion and sedimentation	22. Works will be carefully managed in accordance with an Acid Sulfate Soils Management Plan, to manage risks associated with exposure of actual and/or potential acid sulfate material, especially in proximity to waterways. A key component of this plan is that trenches are back-filled within the same day to minimise time of exposure and oxidation. 23. Any unsuitable excavated material/ waste will be classified, managed appropriately (in accordance with the Construction Environmental Management Plan [CEMP]) including placement in approved stockpile locations, approved landfill facilities or Acid Sulfate Soil treatment facilities as appropriate. 24. Progressive, site-specific erosion and sediment control plan will be developed and approved prior to commencement of the works. 25. An Environmental Work Method Statement (EWMS) will address the management of risks associated with under-boring and will be approved prior to commencement of works; the EWMS will include the following measures: ▪ All launch/ recovery areas will be re-instated to a similar condition to that of the surrounding ground. ▪ Care shall be taken to control, contain and manage the effects of ingress of any groundwater. ▪ All pits and excavation will be dewatered will be managed in accordance with a CEMP. ▪ All drilling fluid and cuttings will be managed and disposed of in accordance with a CEMP. 26. In the event that unexpected contaminated land is encountered during the works, works will stop immediately and relevant procedures outlined in a CEMP will be followed. 27. Only clean equipment and vehicles will be used, with equipment being cleaned down before being brought to the site. 28. Upon completion of the works, disturbed areas will be re-established to similar existing conditions.
Water quality	29. Under-boring methods will be used to cross any water way (including drainage lines) that is identified as containing surface (or near surface) water to minimise risk to hydrology/ aquatic ecology values. 30. The CEMP will include measures (including planning steps) to avoid impacts to waterways during flood events 31. A spill containment kit will be available at all times. All personnel will be made aware of the location of the kit and trained in its effective

Environmental Attribute	Mitigation Measures/ Safeguards
	deployment. 32. Any required fuels and other liquids will be stored in self-safe chemical storage containers. 33. All refuelling of plant and equipment will in appropriately designated areas. 34. Cleaning of tools and equipment will occur off site. 35. All equipment will be maintained in good working order and operated according to manufacturer's specification. 36. No waste and/or wastewater will be discharged directly or indirectly in drains or waterways. 37. The EPA will be notified immediately in response to incidents causing or threatening actual or potential harm to the environment in accordance with section 148 of the POEO Act (via EPA Environment Line on 131 555).
Non-Aboriginal heritage	38. If any suspected archaeological items are uncovered during the Proposal, all works will cease in the vicinity of the material/ find. Contact with NSW OEH Heritage Branch will be made immediately.
Aboriginal heritage	39. If Aboriginal cultural material is identified on site, a Stop Work Procedure will be followed, which includes: ▪ Works will cease immediately. ▪ A temporary exclusion zone established. ▪ Land Aboriginal Land Council contacted immediately. ▪ OEH contacted immediately. 40. Should skeletal material be exposed during ground disturbance, work will cease immediately and contact made with NSW Police, National Parks and Wildlife and the Local Aboriginal Land Council as per OEH requirements. 41. Notifying OEH – it is a legislative requirement that cultural heritage materials uncovered as a result of the Proposal are registered as Aboriginal sites with OEH on the AHIMS database within the required timeframe.
Noise and vibration	42. Construction activities will be undertaken in accordance with EPA recommended standard construction hours: ▪ Monday to Friday 7 am to 6 pm; ▪ Saturday 8 am to 1 pm; ▪ No work on Sundays or public holidays. 43. Where under-boring works are required within 100 m of any existing dwelling, farm, commercial building, facility or constructed roadway, the contractor will prepare a preconstruction dilapidation report. 44. Prior to commencement of works in the vicinity of the potentially impacted sensitive receivers (i.e. residences within 200 m of the route), the landholder will be notified and consulted regarding the upcoming works. 45. Any noise complaints will be recorded and include suitable identification/ description of the noise source (e.g. continual/ impulsive) and general location of the complaint. Any noise complaints will be investigated and actioned as required. 46. The CEMP will include controls relevant to management of noise and vibration specific to the proposed works.

Environmental Attribute	*Mitigation Measures/ Safeguards*
	47. All vehicles and equipment will be turned off and not left idling when not required for work uses. 48. All plant will be fitted with appropriate exhaust systems to ensure compliance with pollution and noise emission standards.
Air quality	49. Vegetation or other materials will not to be burnt on site. 50. Vehicles transporting waste or other materials that may produce odours or dust will be covered during transportation. 51. Construction works will not be carried out during strong winds or in weather conditions where high levels of dust or air borne particulates are likely. 52. Machinery and vehicles not in use during construction will be turned off and not left to unnecessarily run idle. 53. Vehicles, machinery and equipment will be maintained in accordance with manufacturer's specifications in order to meet the requirements of the *Protection of the Environment Operations Act 1997* and associated regulation.
Visual environment	54. Vegetation will only be cleared to the minimum extent necessary to undertake the proposed works. 55. Upon completion of the works, any works areas will be restored to an acceptable visual state. 56. All sites will be maintained, kept free of rubbish and cleaned up at the end of each work day.
Socio-economic	57. Contractors/ workers will be mindful of the needs of the local community. 58. Any potentially impacted parties or landholders will be consulted prior to construction with a goal of minimising or eliminating any adverse impacts. 59. Any changes to public or private roads (including private driveways) as a result of the works will be reinstated to an acceptable standard upon completion of the works.
Waste	60. Working areas will be maintained, kept free of rubbish and cleaned up at the end of each day. 61. Waste material will not be left on site once the works have been completed. 62. Ensure the responsible environmental management of wastes that cannot be avoided and promote opportunities for the re-use of waste products where appropriate. 63. Waste will be disposed of at a licensed waste or recycling facility as appropriate.
Climate change	64. Vehicles and equipment will be switched off when not required for direct construction activities. 65. Waste will be minimised and is otherwise to be recycled or disposed of appropriately.

7. Summary of Consideration of Environmental Factors

7.1 Clause 228 Checklist (NSW Legislation)

As part of its obligation under Section 111 of the EP&A Act, the determining authority is required to take into account, to the fullest extent possible, all matters likely to affect the environment. The determining authority is required by Clause 228 of the Environmental Planning and Assessment Regulations 2000 to give consideration to a number of factors that are listed below. **Table 7.1** provides a summary of the key issues relevant to each factor and the key mitigation measures proposed.

Table 7.1 Clause 228 Checklist (NSW Legislation)

	Factor	*Impact*
a	**Any Environmental Impact on a Community**	
	The community would not be affected through declines in the local environment as a result of the Proposal. Mitigation measures have been designed to reduce environmental impacts on the community to negligible levels (refer to **Section 5**).	Nil
b	**Any Transformation of a Locality**	
	Transformation of the locality is not expected. The proposed works involve installation of a trenched pipeline. Tree removal would be the main visual change; however, the visual impacts of the Proposal are not expected to be significant.	Minor
c	**Any Environmental Impact on the Ecosystems of the Locality**	
	The ecosystems of the locality would not be affected through declines in local environmental values (e.g. biodiversity, physical environment) as a result of the Proposal. Extensive mitigation measures have been designed to reduce environmental impacts (refer to **Section 5**).	Nil
d	**Any Reduction of the Aesthetic, Recreational, Scientific or Other Environmental Quality or Value of a Locality**	
	It is not expected that a reduction in the scientific quality of the locality would occur due to the Proposal in the long term. No reduction in the quality of the environment would occur due to the mitigation measures detailed in **Section 5** of this REF. No significant changes of the locality are expected to occur.	Nil Nil
e	**Any Effect on A Locality, Place or Building Having Aesthetic, Anthropological, Archaeological, Architectural, Cultural, Historical, Scientific or Social Significance or Other Special Value for Present or Future Generations**	
	The site is within predominately agricultural area. The Proposal would not impact the existing land uses. There would be no significant impacts to heritage, visual amenity or social significance and as such impacts are therefore considered to be negligible.	Negligible
f	**Any Impact on the Habitat of Protected Fauna (Within the Meaning of the National Parks and Wildlife Act 1974)**	
	With effective implementation of the safeguards provided in **Section 5** of	Nil

	Factor	*Impact*
	this REF, the Proposal is not considered likely to have a significant negative impact on the habitat of any other protected fauna.	
g	**Any Endangering of any Species of Animal, Plant or Other Form of Life Whether Living on Land, in Water or in the Air**	
	With effective implementation of the safeguards provided in **Section 5** of this REF, the Proposal is not considered likely to significantly endanger any species of animal, plant or other form of life.	Nil
h	**Any Long Term Effects on the Environment**	
	No negative long term impacts would occur in the locality given the implementation of the proposed safeguards and measures in **Section 5** of this REF.	Nil:
i	**Any Degradation of the Quality of the Environment**	
	Degradation of the quality of the environment is not expected. Given the safeguards in **Section 5** of this REF, any impacts are considered unlikely.	Nil
j	**Any Risk to the Safety of the Environment**	
	No negative long term impacts would occur in the locality given the implementation of the proposed measures in **Section 5** of this REF.	Nil
k	**Any Reduction in the Range of Beneficial Uses of the Environment**	
	The proposed works would not result in any reduction in the range of beneficial uses of the environment.	Nil
l	**Any Pollution of the Environment**	
	The proposed works may adversely affect air quality during construction. The mitigation measures determined in **Section 5** would minimise the duration and impact. Once construction is complete, the installation is not expected to adversely impact on air quality. No reduction in the quality of the environment associated with water is expected due to the mitigation measures detailed in **Section 5** of this REF. Waste materials, fuel spills and particulate matter have the potential to cause pollution to the environment. However, given the proposed safeguards detailed in **Section 5** of this REF and all waste being disposed within an appropriate/approved waste disposal facility, pollution to the environment would be minimised.	Minor Nil Minor
m	**Any Environmental Problems Associated with the Disposal of Waste**	
	Any wastes would be disposed of in a manner which would not damage or disturb any native flora or fauna or the physical environment. The disposal of such waste would be within a waste management facility in accordance with OEH approved methods of waste disposal. Safeguards detailed in Section 5 of this REF would protect the environment from problems associated with waste disposal.	Nil
n	**Any Increased Demands on Resources (Natural or Otherwise) that are likely to Become in Short Supply**	
	The project does not create any demand for resources that are in short supply nor is it likely to result in an increased demand on any natural resources that are likely to become in short supply.	Nil
o	**Any Cumulative Environmental Effect with Other Existing or Likely Future Activities**	
	The proposed works are unlikely to have any significant impact on the environment, therefore would not contribute to any cumulative impacts.	Nil

7.2 EPBC Act 1999 (Commonwealth Legislation)

The EPBC Act protects/ regulates matters of national environmental significance (MNES), including:

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

Under the EPBC Act, a referral is required to the Australian Government for proposed 'actions that have the potential to significantly impact on matters of national environmental significance or the environment of Commonwealth land'. Database searches were completed in April 2017 encompassing a 10 km radius search area from the route (refer to **Appendix A**). Search results following the site assessment are considered in **Table 7.2**.

Table 7.2 EPBC Act Considerations

Matter	*Impact*
Any impact on a World Heritage property?	
No World Heritage properties occur within 10 km of the site.	Nil
Any impact on a National Heritage place?	
No National Heritage places occur within 10 km of the site.	Nil
Any impact on a wetland of international importance?	
No wetlands of international importance (Ramsar Sites) occur within 10 km of the site.	Nil
Any impact on nationally threatened species and ecological communities?	
Habitat for one threatened ecological community, 36 threatened species (15 flora and 42 fauna species) and 20 marine species is identified within 10 km of the site. The vegetation present does not conform to the definition of any federally listed threatened ecological communities, and no federally listed threatened flora or fauna species were recorded. Based on the minor nature of the works, no listed threatened species or communities are likely to be significantly affected by the Proposal.	Negligible
Any impact on a Nationally Important Wetland?	
The proposed route intersects an area of Nationally Important Wetland. These wetlands are unlikely to be significantly impacted given the route primarily traverses disturbed road reserve. Risks of impact adjacent to the route are to be managed via controls to reduce risk of sediment runoff and erosion as well as reduce risk of water quality impacts via pollution events. The wetlands are not likely to be significantly affected by the Proposal.	Negligible
Any impact on Migratory species?	
Habitat for 13 migratory species is identified within 10 km of the site. Based on the minor nature of the works, no listed migratory species are likely to be significantly affected by the Proposal (refer to **Section 5**).	Negligible
Any impact on a Commonwealth marine area?	
No Commonwealth marine areas occur within 10 km of the site.	Nil

Matter	*Impact*
Any impact on the Great Barrier Reef Marine Park?	
The Great Barrier Reef Marine Park is distant from the site.	Nil
Does the Proposal involve a nuclear action (including uranium mining)?	
The Proposal does not involve a nuclear action.	Nil
Any impact on a water resource, in relation to coal seam gas development and large coal mining development?	
The Proposal does not involve any impact on a water resource, in relation to coal seam gas development and large mining development.	Nil

The assessment of the impact of the Proposal on MNES and the environment of Commonwealth land found that there is unlikely to be a significant impact on relevant MNES. Accordingly, the Proposal has not been referred to the Australian Government Department of the Environment and Energy.

8. Conclusion

All relevant statutory planning instruments have been examined in relation to the Proposal. Based on the review undertaken, the Proposal does not require development consent and is subject to environmental impact assessment under Part 5 of the EP&A Act.

The Proposal is an important element of infrastructure to support the New Grafton Correctional Centre. The proposed water main would, if required also provide water services to the adjacent properties along the route. The potential environmental impacts posed by the Proposal have been thoroughly examined through this REF. Some minor impacts would occur locally along the route; however, it is unlikely that any significant or long-term adverse impacts would eventuate. To help ensure that the extent of impacts is limited and that unavoidable impacts are managed and minimised, mitigation measures and safeguards have been developed and would be implement and monitored.

The Proposal is considered justifiable taking into account the potential environmental impacts and subsequent mitigation measures and safeguards. The Proposal supports the establishment and operation of the New Grafton Correctional Centre. The Proposal is in accordance with ESD principles and consistent with the objectives of the EP&A Act.

Certification

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

Signature:

Veronica Silver

Senior Ecologist/ Planner/ Project Manager

GeoLINK

Date: 18 May 2017

I have examined this Review of Environmental Factors and the certification by Veronica Silver and accept the Review of Environmental Factors on behalf of CVC.

Signature:

Name:

Title:

Date:

References

Northcote, K. H. with Beckmann, G. G., Bettenay, E., Churchward, H. M., Van Dijk, D. C., Dimmock, G. M., Hubble, G. D., Isbell, R. F., McArthur, W. M., Murtha, G. G., Nicolls, K. D., Paton, T. R., Thompson, C. H., Webb, A. A. and Wright, M. J. (1960-1968). *Atlas of Australian Soils*, *Sheets 1 to 10*. With explanatory data (CSIRO Aust. and Melbourne University Press: Melbourne).

NSW EPA (2009). *Interim Construction Noise Guideline* [Online]. Available (http://www.epa.nsw.gov.au/resources/noise/09265cng.pdf) [Assessed March 2017].

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Appendix A

Ecological Assessment

Ecological Assessment

New Grafton Correctional Centre Water Main

PO Box 119
Lennox Head NSW 2478
T 02 6687 7666

PO Box 1446
Coffs Harbour NSW 2450
T 02 6651 7666

PO Box 1267
Armidale NSW 2350
T 02 6772 0454

PO Box 229
Lismore NSW 2480
T 02 6621 6677

info@geolink.net.au

Prepared for: Infrastructure NSW

UPR	*Description*	*Date Issued*	*Issued By*
2736-1001	First issue	18/05/2017	VJS

Table of Contents

1. Introduction

1.1 Background

GeoLINK has been engaged by Infrastructure NSW through Umow Lai to undertake an ecological assessment along the route of a proposed water main. Initially the water main will service a temporary concrete batching plant associated with the Woolgoolga to Ballina (W2B) Pacific Highway Upgrade, however in the longer term, the water main will service the proposed New Grafton Correctional Centre that will be located approximately 12 km east of Grafton, NSW (refer to **Illustration 1.1**).

1.2 Legislation

This assessment investigates the potential ecological impacts of the works in relation to the following legislation:

- *Environmental Planning and Assessment Act 1979* (EP&A Act).
- *Threatened Species Conservation Act 1995* (TSC Act).
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

1.3 Route Description

The connection point of the water main will be at the existing Clarence Valley water reticulation system main located underground at the intersection of the existing Pacific Highway and George Street in the village of Ulmarra. The route extends to the east and south for approximately 13 km, and connect within the site that will be occupied by the temporary concrete batching plant and the proposed New Grafton Correctional Centre. This location is on Avenue Road in the vicinity of the intersection with Wants Lane (refer to **Illustration 1.2**).

The route will be confined predominantly to existing road reserves already occupied by other underground and above ground services including water, Telstra and powerlines. Where the route deviates from existing road reserves it will traverse 'old paper road reserves' located within private property. A number of under-bores will be required to cross obstacles such as the Pacific Highway and various drainage lines.

Vegetation within the road reserve in the northern portion of the route generally comprises disturbed grassland consisting predominantly of introduced grasses and herbaceous/ woody weeds. Much of this vegetation is either grazed or mown on a regular basis. Vegetation within the 'old paper road reserves' consists of predominantly open paddock grassland. Scattered mature native and introduced tree species occur in the vicinity of the pipeline route; however the route has been selected to avoid impacts to these trees.

The southern portion of the route is wholly within the road reserve and vegetation generally comprises disturbed road-edge grassland associated with a range of native forest types including several Endangered Ecological Communities (EECs). One threatened flora species, Weeping Paperbark (*Melaleuca irbyana*) occurs within the road reserve along the route as well as numerous hollow-bearing trees (HBTs).

Landform in the broader locality is low-lying, with large areas of wetland occurring to the east and west of the route. The northern portion of the route follows Deep Creek which ultimately flows into Glenugie Creek. Large areas of swamp to the east of the route flow into the Coldstream River. Portions of both of these areas comprise State Environmental Planning Policy (SEPP) 14 Coastal Wetlands.

1.4 Description of Works

Standard trenching excavation methods using plant such as a backhoe or excavator will be employed for the majority of the installation. Under-boring will be required at the following two locations:

- The existing Pacific Highway.
- Intersection with Deep Creek.

Additional under-bores may be required, depending on the outcome of the cadastral survey which was not complete at the time of report completion.

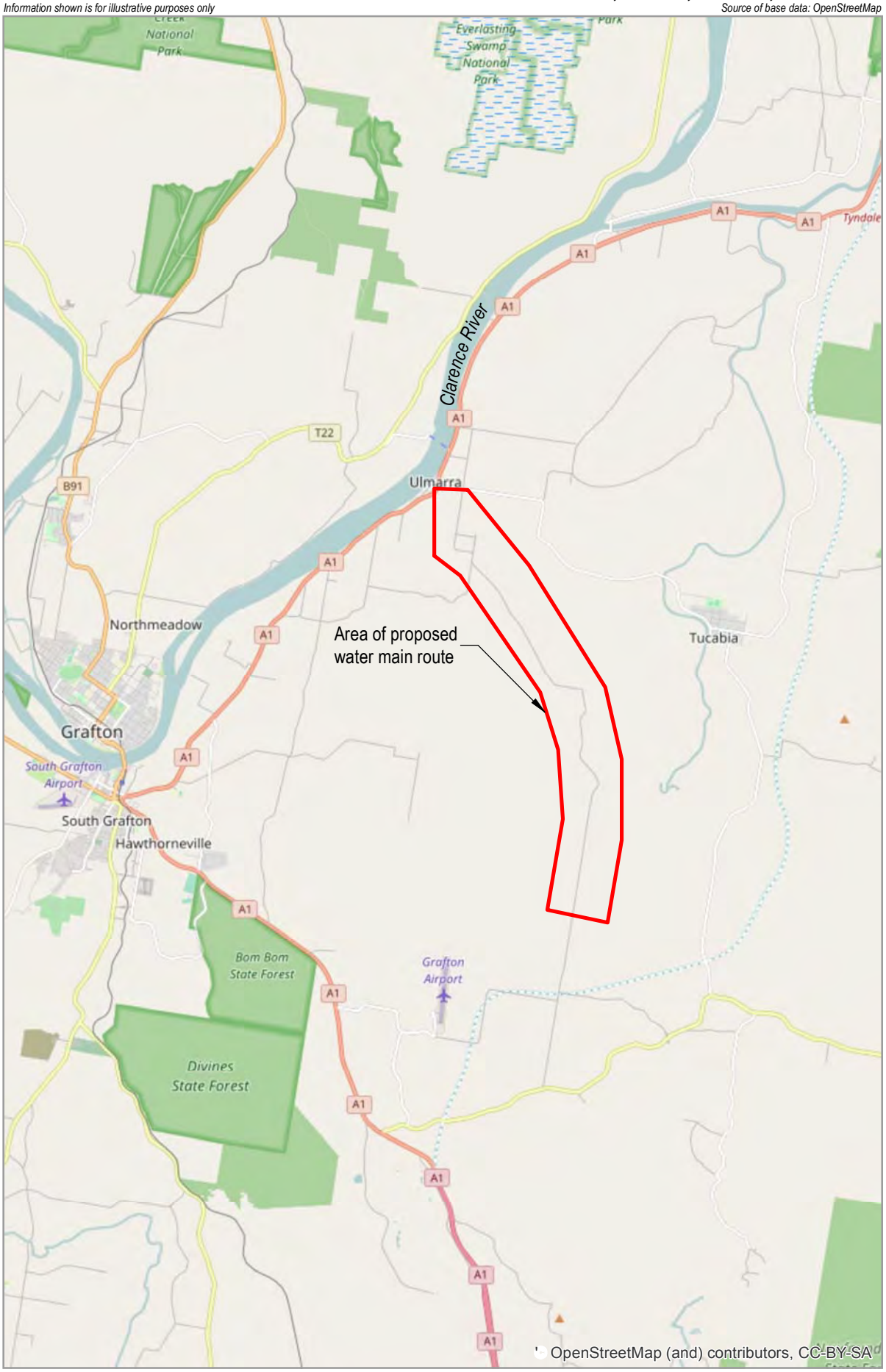
Where the route occurs within a road reserve, it will generally be within 4-5 m of the centreline of existing roads. Constraints considered during the route selection in the road reserves include the occurrence of underground (water and Telstra) and above ground services (powerlines), as well as ecological features including the following:

- HBTs and fauna habitat features.
- EECs.
- Threatened plants.

Where the route occurs within an 'old paper road reserve,' it will occur within the 10 m wide reserve. Constraints considered during the route selection in the 'old paper road reserves' include the occurrence of a number of mature HBTs.

Information shown is for illustrative purposes only

Drawn by: AB Checked by: RE Reviewed by: TMC Date: 15/05/2017
Source of base data: OpenStreetMap



0 3 Km

North

Site Locality

GeoLINK environmental management and design

Ecological Assessment
New Grafton Correctional Centre Water Main
2736-1029

Illustration 1.1

Information shown is for illustrative purposes only

Drawn by: AB Checked by: RE Reviewed by: TMC Date: 16/05/2017
Source of base data: SixMap

0 1.2 Km

North

The Proposal

GeoLINK environmental management and design

Ecological Assessment
New Grafton Correctional Centre Water Main
2736-1030

Illustration 1.2

2. Methodology

2.1 Overview

The methodology for this assessment consisted of the following components:

- Desktop review.
- Two site visits with design engineer to identify ecological constraints including threatened fauna, EECs and fauna habitat value (i.e. HBTs).
- Assess the ecological impacts.
- Outline mitigation measures to reduce potential impacts.

2.2 Desktop Review

A desktop review was undertaken to determine the flora and fauna species and vegetation communities of conservation significance recorded previously, or potentially occurring, along the route. The results of the desktop review were used to assist with consideration of species to be targeted during field surveys.

The desktop review consisted of searches of the following online resources and background documents:

- NSW Office of Environment and Heritage (OEH) BioNet Atlas of NSW Wildlife (search undertaken on 13 October 2016; available at http://www.bionet.nsw.gov.au/) for threatened flora and fauna species and endangered populations recorded within a 10 x 10 km area centred on the northern and southern extents of the route.
- Federal Department of Environment and Energy (DoEE) Protected Matters Search Tool (PMST) for EPBC Act listed threatened plant species, communities or species habitat likely to occur within a 10 km radius of the northern and southern extents of the route (search undertaken on 13 October 2016; available at http://www.environment.gov.au/epbc/pmst/index.html).
- NSW Department of Primary Industries (DPI) search of noxious weeds in the Clarence Valley Council Local Government Area (LGA) listed under the *Noxious Weeds Act 1993* (NW Act) (search undertaken on 13 October 2016; available at http://www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/noxweed/).
- OEH Critical Habitat register (search undertaken on 13 October 2016); available at http://www.environment.nsw.gov.au/criticalhabitat/criticalhabitatprotectionbydoctype.htm).
- PlantNET online search for RoTAP plant species in the Clarence Valley Council LGA (search undertaken on 13 October 2016); available at (http://plantnet.rbgsyd.nsw.gov.au/)
- Review of OEH Corridors and Key Habitats mapping (Scotts 2003).

2.3 Field Surveys

A site inspection was undertaken on 10 October 2016 to record ecological features within the vicinity of the proposed works. The site inspection involved traversing the proposed route with the project design engineer. Ecological constraints relative to the preferred design options were noted and a preliminary route that minimised potential ecological impacts whilst maintaining effective design was confirmed. The ecological assessment totalled seven person hours.

An additional site inspection was undertaken in the northern portion of the route on 2 May 2017 to record ecological features within the vicinity of the amended route design in this area. The ecological assessment totalled three person hours.

2.4 Survey Limitations

Ecological surveys were conducted within the area of direct impact (the proposal footprint) and adjacent areas likely to be subjected to indirect impacts from the proposal. Surveys in surrounding areas of habitat that are unlikely to be impacted by the proposal were not conducted as part of this assessment. However, the expected habitat values within these surrounding areas were considered when assessing the likelihood of threatened fauna potentially utilising the site.

The survey methodology employed and survey effort is believed to be adequate for the proposed works. Nevertheless some species may have avoided detection due to their rarity, cryptic nature or sporadic utilisation of the site.

3. Results

3.1 Desktop Review

3.1.1 OEH BioNet

Results of the OEH BioNet Atlas of NSW Wildlife indicated records of 42 threatened fauna species, three threatened flora species and one endangered fauna population within the search area (refer to **Appendix A**).

3.1.2 DoEE PMST

The DoEE PMST listed 42 threatened fauna species, 15 threatened flora species and 34 migratory species or their habitat that are known to occur, are likely to occur, or may occur within the search area (refer to **Appendix A**).

The PMST listed two threatened ecological communities (TEC) as likely to occur within the search area: Lowland Rainforest of Subtropical Australia, and White Box – Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

3.1.3 Rare or Threatened Australian Plants (RoTAP)

A search of the PlantNET website (Royal Botanical Gardens and Domain Trust 2016) of RoTAP listed flora within the Clarence Valley LGA returned one species (*Boronia chartacea*), which is known to occur in moist gullies and is restricted to the Wauchope-Grafton-Copmanhurst areas.

3.1.4 OEH Critical Habitat Register

No areas of critical habitat listed under the TSC Act occur within Clarence Valley LGA.

3.1.5 OEH Corridors and Key Habitats Mapping

The route occurs approximately 3 km west of a north-south regional wildlife corridor that incorporates a series of continuously vegetated areas including State Forests and areas of National Park estate.

3.1.6 Surrounding Land Uses

Landuse along the majority of the route comprises open grassland used for cattle grazing. A number of rural residential dwellings occur along the route, several of which are associated with cattle grazing.

The locality is generally low-lying and a number of wetlands and creek lines occur adjacent to the route. Deep Creek runs parallel to a portion of the northern section, and expanses of wetland in the northern section are mapped as SEPP 14 Coastal Wetlands.

3.1.7 Clarence Valley Council Biodiversity Management Strategy 2010

Areas of biodiversity importance in the Clarence Valley are described in Appendix 1 of the CVC Biodiversity Management Plan (CVC 2010). The wetland areas in the broader locality supporting the route are described as being of regional significance in terms of providing important habitat for a large number of waterbirds. These wetland areas will not be affected by the proposed works.

3.1.8 Comprehensive Koala Plan of Management for Ashby, Woombah and Illuka Localities in the Clarence Valley LGA

The Comprehensive Koala Plan of Management for Ashby, Woombah and Illuka localities in the Clarence Valley LGA (CVC 2015) describes the distribution of Koalas in the Clarence Valley LGA as occurring as two distinct populations as follows:

> *'south and west of the LGA around Shannon Creek, Waterview Heights, Clouds Creek State Forest, and north of Nymboida; and those in the north of the LGA in the Ashby, Woombah and Iluka localities'.*

The route does not occur in any of these localities.

SEPP 44 encourages the conservation and management of natural vegetation areas that provide habitat for Koalas to ensure permanent free-living populations would be maintained over their present range. Clause 6 of SEPP 44 however states that the SEPP applies only to land 'in relation to which a DA has been made'. Clause 125 of ISEPP precludes the proposal from requiring consent therefore Part 2 of SEPP 44 does not apply to the proposal.

3.2 Field Surveys

3.2.1 Flora

The route was traversed in vehicle and on foot to enable quantification of vegetation removal, to search for threatened fauna habitat such as HBTs, and to search for threatened flora and weeds.

Areas surveyed include open grassland areas within the 'paper road reserves' and vegetation within the road corridor on either side of the existing road reserves. These areas comprise five broad vegetation communities:

1. Spotted Gum dry grassy open forest.
2. Forest Red Gum – Swamp Box forest (EEC when on floodplain).
3. Swamp Oak Forest (EEC).
4. Freshwater Wetland (EEC).
5. Disturbed Grassland.

Location of EECs along the route are illustrated in **Appendix B**. **Table 3.1** provides a summary of vegetation communities identified within the current surveys.

Table 3.1 Vegetation Communities along the Route

Vegetation Type	*TSC Act EEC*	*EPBC Act TEC*	*Condition*
Spotted Gum dry grassy open forest	No	No	Moderate-good
Forest Red Gum – Swamp Box forest (on floodplain)	Yes	No	Moderate-good
Forest Red Gum – Swamp Box forest (not on floodplain)	No	No	Moderate-good
Swamp Oak Forest	Yes	No	Poor-moderate
Freshwater Wetland	Yes	No	Poor-moderate
Disturbed Grassland	No	No	Poor

The floristic composition, location within the route, evidence of disturbance and conservation status of each community is described below.

3.2.1.1 Spotted Gum dry grassy open forest

BioMetric (Gibbons *et al*. 2005) equivalent: NR250 Spotted Gum dry grassy open forest of the foothills of the northern North Coast (refer to **Plate 3.1**).

The overstorey is dominated by Spotted Gum (*Corymbia variegata*), Large-leaved Spotted Gum (*C. henryi*), with occasional Grey Ironbark (*Eucalyptus siderophloia*), Forest Red Gum (*E. tereticornis*) and Grey Box (*E. moluccana*). The midstorey is sparse, and where present includes species such as Red Ash (*Alphitonia excelsa*), Salwood (*Acacia disparrima* subsp*. disparrima*), Dogwood (*Jacksonia scoparia*), Breynia (*Breynia oblongifolia*), and Black She-oak (*Allocasuarina littoralis*).

The understorey of this community is sparse, consisting of a mixture of leaf-litter and grasses. Common native grasses include Blady Grass (*Imperata cylindrica*), as well as scattered occurrences of exotic species such as Whisky Grass (*Andropogon virginicus*) and Rhodes Grass (*Chloris gayana*) and occasional small native shrubs such as *Daviesia* and *Hibbertia* spp.

Location
Only occurs in the southern portion of the route, south of Casuarina Place.

Condition/ Disturbance
This community generally occurs as individual small to mature trees with little or no midstorey, and a grassy understorey.

Conservation Status
Vegetation within this area is not consistent with any state or federally listed TECs.

Plate 3.1 Small and large Spotted Gums with very little understorey is typical of this community within the road reserve

3.2.1.2 Forest Red Gum – Swamp Box forest (EEC) (on floodplain)

BioMetric (Gibbons *et al*. 2005) equivalent: NR161 Forest Red Gum - Swamp Box of the Clarence Valley lowlands of the North Coast (refer to **Plate 3.2**).

The overstorey is dominated by Forest Red Gum and Swamp Box (*Lophostemon suaveolens*) with lesser occurrences of Grey Ironbark and Grey Box. Typical midstorey species include Red Ash, Salwood, Curracabah (*Acacia leiocalyx*), Hairy Bush-pea (*Pultenaea villosa*), Dogwood, Breynia and Black She-oak.

The understorey of this community generally consists of native grasses such as Blady Grass, Speargrass (*Aristida warburgii*) and Kangaroo Grass, as well as scattered occurrences of exotic species such as Whisky Grass, Rhodes Grass and Vasey Grass (*Paspalum urvillei*).

This community occurs both on the coastal floodplain and on slightly elevated and sloping land adjacent to the coastal floodplain.

Location
Only occurs in the southern portion of the route. Locations of EECs along the route are illustrated in **Appendix B**.

Condition/ Disturbance

This community generally occurs as individual small to mature trees with little or no midstorey, and a grassy understorey.

Conservation Status

Where this vegetation occurs on the floodplain, this community corresponds with the following EEC:

> *Subtropical Coastal Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions includes vegetation occurring as part of the Forest Red Gum – Swamp Box of the Clarence Valley lowlands of the North Coast*

Where the Forest Red Gum – Swamp Box community occurs on slightly elevated and sloping land adjacent to the coastal floodplain this community is not representative of the Subtropical Coastal Floodplain Forest EEC.

Plate 3.2 Trees representing this community generally occur as small stands or individual trees within the road reserve

3.2.1.3 Swamp Oak Forest (EEC)

BioMetric (Gibbons *et al*. 2005) equivalent: NR255 Swamp Oak swamp forest of the coastal lowlands of the North Coast (refer to **Plate 3.3**).

Dominated by Swamp Oak (*Casuarina glauca*) within the canopy and midstorey with occasional Broad-leaved Paperbark (*Melaleuca quinquenervia*), Weeping Bottlebrush (*Callistemon viminalis*) and Tuckeroo (*Cupaniopsis anacardiodes*), with Common Silkpod (*Parsonsia straminea*) ascending into the canopy. A very sparse understorey is present.

Location
Occurs in the low-lying portions of the route, predominantly in the central portion south of Deep Creek Road. Location of EECs along the route are illustrated in **Appendix B**.

Condition/ Disturbance
Variable condition. Commonly small linear stands of vegetation with or without understorey vegetation and varying levels of weedy grasses and vines present.

Conservation Status
This community corresponds with the following EEC:

> *Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions*

Plate 3.3 Swamp Oak community commonly occurs as linear stands of small trees along the road edge

3.2.1.4 Freshwater Wetland

BioMetric (Gibbons *et al*. 2005) equivalent: NR150 Coastal freshwater meadows and forb lands of lagoons and wetlands (refer to **Plate 3.4**).

The route crosses a portion of Deep Creek that is highly disturbed by cattle and where wetland vegetation is reduced to areas of adjoining marshland. Vegetation composition within this community would change periodically relative to water levels and season, and better quality examples of this community occur elsewhere along Deep Creek. This community does not occur within the road reserve as such; rather it occurs directly upstream and downstream of the route. The community was not surveyed in detail due in part to it occurring on private property. Regardless, the vegetation composition of the community is a mix of native and introduced grasses and wetland plants.

Location
Generally parallel with the route in numerous locations from Fullers Road south to Avenue Road. Location of EECs along the route are illustrated in **Appendix B**.

Condition/ Disturbance
Highly disturbed by cattle.

Conservation Status
This community corresponds with the following EEC:

> *Freshwater wetlands on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions*

Plate 3.4 Coastal freshwater wetland adjacent to Deep Creek and adjoining low-lying marshlands

3.2.1.5 Disturbed Grassland

BioMetric (Gibbons *et al*. 2005) equivalent: none (refer to **Plate 3.5**).

Open paddock areas generally support Kikuyu (*Cenchrus clandestinus*) and *Paspalum* spp. Road reserve areas include a disturbed zone that is slashed regularly and supports common exotic grasses such as Parramatta Grass (*Sporobolus africanus*), Feathertop Rhodes Grass (*Chloris virgata*) and Paspalum (*Paspalum mandiocanum*). In areas that are not slashed, a suite of grass species similar to that found in the understorey of the surrounding dry sclerophyll forest communities is present, along with regrowth Eucalyptus and *Acacia* spp.

Location
Dominates the northern portion of the route from George Street south and east along Deep Creek Road, open paddocks and the northern portion of Avenue Road. In the southern portion of the route, it occurs underneath isolated small to large trees that are generally representative of the adjacent or nearby forested vegetation occurring outside of the road reserve.

Condition/ Disturbance
Highly disturbed, generally grazed or mown or slashed regularly.

Conservation Status
Vegetation within this area is not consistent with any state or federally listed TECs.

Plate 3.5 Disturbed grassland community along Goodgers Lane

3.2.2 Fauna

Fauna surveys (other than opportunistic observations) comprised an assessment of fauna habitat along the route. Opportunistic fauna observations noted by GeoLINK are provided in **Table 3.2**.

Table 3.2 Fauna Species Recorded at the Site

Class	*Scientific Name*	*Common Name*	*Observation Type*
Aves	*Corvus orru*	Torresian Crow	Heard and Seen
	Dacelo novaeguineae	Laughing Kookaburra	Heard and Seen
	Gymnorhina tibicen	Australian Magpie	Heard and Seen
	Rhipidura leucophrys	Willie Wagtail	Seen
	Strepera graculina	Pied Currawong	Heard and Seen
	Trichoglossus haematodus	Rainbow Lorikeet	Seen

3.2.3 Koala Scat Searches

No Koala scats were found under any of the preferred Koala food trees (Forest Red Gum) that were inspected along the route.

3.2.4 Habitat Assessment

A habitat assessment of the site was conducted and fauna habitat features identified (refer to **Table 3.3**).

Table 3.3 Site Habitat Values

Fauna Habitat Feature	*Details*	*Value Rating (low to high)*
Koala food trees	Preferred Koala food trees (Forest Red Gum) occur as isolated paddock trees adjacent to Deep Creek and in the southern portion of the site in the vicinity of Wants Lane. Only four Forest Red Gum trees were detected within the road reserve, three of which were <15 cm DBH. None of these trees will be impacted by the works.	Low-medium
Hollow-bearing trees	Numerous HBTs occur along the route within the road corridor and within the forested areas adjacent to the road corridor. HBTs are considered a valuable resource for nesting/ breeding by common and threatened bird, mammal and microbat species.	High
Vegetation connectivity	The site is not mapped as part of any regional or subregional corridor (Scotts 2003). Forested vegetation in the locality includes stands of trees or individual trees within the road reserve, a large block of forested vegetation that occurs to the west of Avenue Road and scattered remnant paddock trees or stands of trees in paddocks either side of the road reserve. Combined, these trees provide connectivity to larger more extensive stands of forested vegetation that occurs to the east and south of the route.	Medium – high
Nectar-foraging resource	Eucalypts along the route provide a nectar foraging resource for a range of common and potentially occurring threatened fauna species (including Little Lorikeet, Swift Parrot, and Grey-	Medium

Fauna Habitat Feature	Details	Value Rating (low to high)
	headed Flying-fox).	
Insect foraging resource	Insects on and around vegetation along the route would provide an insect foraging resource for a range of common and potentially occurring threatened fauna species (including a range of microbats, Grey-crowned Babbler, Speckled Warbler).	Low – medium
She-oak feed trees for Glossy Black-cockatoo feeding	Black She-oak (*Allocasuarina littoralis*) occurs occasionally in the sparse midstorey of Spotted Gum dry grassy open forest and Forest Red Gum - Swamp Box	Low
Understorey shelter and foraging for small mammals	Well- developed and diverse understorey vegetation within the road reserve is very limited, hence holds limited value for shelter and foraging of small mammals.	Low
Existing pipe culverts	Numerous pipe culverts occur along the route which offer potential roosting habitat for a number of microbat species. This is somewhat limited due to the small size of the pipes (i.e. 600 mm)	Low
Freshwater wetland/ sedgeland/ open water	Emergent and riparian vegetation along Deep Creek is heavily disturbed by cattle, although some patches are potentially utilised by a number of wetland birds.	Low

3.3 Threatened Species

3.3.1 Threatened Flora

Considering the presence of local records identified in the BioNet search, habitat requirements of the threatened species (OEH 2016) and the available habitats present, it is considered that the following threatened flora species are potential occurrences within habitat along the route (refer to **Appendix C** for further details of potential occurrence of threatened species at the site):

- Weeping Paperbark *(Melaleuca irbyana*)
- Maundia (*Maundia triglochinoides*)

Nine Weeping Paperbarks were recorded along the route at three locations (refer to Illustrations in **Attachment B**). This species was also observed as occurring on private land adjacent to the road reserve.

3.3.2 Threatened Fauna

Considering the presence of local records identified in the BioNet search, habitat requirements of the threatened species (OEH 2016) and the available habitats present, it is considered that the following threatened fauna species are potential occurrences in habitat along the route (refer to **Appendix C** for further details of potential occurrence of threatened species at the site):

- Black-necked Stork (*Ephippiorhynchus asiaticus*).
- Bush Stone-curlew (*Burhinus grallarius)*.
- Black-chinned Honeyeater (eastern subspecies) (*Melithreptus gularis gularis)*.
- Grey-crowned Babbler (eastern subspecies) (*Pomatostomus temporalis temporalis)*.
- Diamond Firetail (*Stagonopleura guttata)*.
- Rufous Bettong (*Aepyprymnus rufescens)*.
- Hoary Wattled Bat *Chalinolobus nigrogriseus)*.
- Northern Freetail-bat (*Mormopterus lumsdenae)*.
- Eastern Freetail-bat (*Mormopterus norfolkensis)*.
- Large-footed Myotis (*Myotis macropus)*.
- Eastern Long-eared Bat (*Nyctophilus bifax)*.
- Koala (*Phascolarctos cinereus)*.
- Grey-headed Flying-fox (*Pteropus poliocephalus)*.
- Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris)*.
- Greater Broad-nosed Bat (*Scoteanax rueppellii)*.
- Emu (*Dromaius novaehollandiae*) population in the New South Wales North Coast Bioregion and Port Stephens local government area.

The potential impacts on these species and their habitats is provided below (refer also to **Appendix C**).

A number of other species not listed above may only use the site for foraging on rare occasions (refer to **Appendix C**) and these species would complete the majority of their life-cycle off-site. DEC (2008) states that: "*a species does not have to be considered as part of the assessment of significance if adequate surveys or studies have been carried out that clearly show that the species:*

- *Does not occur in the study area, or*
- *Will not use on-site habitats on occasion, or*
- *Will not be influenced by off-site impacts of the proposal".*

Considering this, seven-part tests of significance were not required to be completed for these potential occasionally occurring species.

4. Impact Assessment

4.1 Direct Impacts

4.1.1 Vegetation/ Habitat Removal

The route has been selected to minimise the removal of vegetation and associated fauna habitat, in particular HBTs. The primary impact of the proposed works relates to clearing of a number of trees and associated fauna habitat along the route alignment. The proposal would involve the removal of approximately 20-30 native trees ranging in size 0.1-0.55 m DBH. None of these trees are hollow-bearing trees or Koala feed trees.

The exact location of where the water main will be installed may vary in several locations due to constraints such as services; hence several route options within wide areas of the road reserve were assessed to provide some flexibility in terms of installation options. Details of the native trees proposed for removal are shown in **Table 4.1**. Trees that will potentially be removed depending on the actual route option selected are also included.

Table 4.1 Details of Native Trees Proposed for Removal

Location		*DBH Range (cm)*	*Scientific Name*	*Common Name*	*Number to be Removed (Potentially)*
Easting	*Northing*				
506838	6715925	35-50	*Casuarina glauca*	Swamp Oak	7
		20-40	*Lophostemon suaveolens*	Swamp Box	3
506821	6715907	30-55	*Lophostemon suaveolens*	Swamp Box	2 (P)
506914	6713134	65	*Eucalyptus siderophloia*	Grey Ironbark	1
506912	6713015	40	*Lophostemon suaveolens*	Swamp Box	1
506889	6712838	10-60	*Corymbia variegata*	Spotted Gum	2
506814	6712382	60	*Corymbia variegata*	Spotted Gum	1(P)
506797	6712286	55	*Corymbia variegata*	Spotted Gum	1(P)
506786	6712250	20	*Corymbia variegata*	Spotted Gum	1
506779	6712184	25	*Corymbia variegata*	Spotted Gum	1
506600	6711081	15-25	*Eucalyptus siderophloia*	Grey Ironbark	3(P)
506594	6711054	40	*Corymbia variegata*	Spotted Gum	1(P)
506580	6710976	10-25	*Corymbia variegata*	Spotted Gum	4
Total					**20 and 8 (P)**

Introduced Trees to be Removed

In addition to the native trees listed in **Table 4.1** proposed for removal from within the project footprint, a number of Radiata Pine (*Pinus radiata*), White Poplar (*Populus alba*) and a Camphor Laurel (*Cinnamomum camphora*) would also require removal consisting of:

- Radiata Pine: 4-8 trees 30-55 cm DBH.
- White Poplar: 10-20 trees 15-30 cm DBH.
- Camphor Laurel: 1-3 trees 10-20 cm DBH.

Understory Vegetation/ Habitat

Understorey vegetation along the route provides potential foraging habitat for a range of fauna. The proposed works will result in the removal of areas of understorey vegetation, however the disturbance will be temporary only, as the vegetation would be expected to recover over a relatively short period of time post-disturbance. Due to the occurrence of the proposed route within the road reserve, the areas of understorey vegetation are generally already quite disturbed, and in some instance devoid of any vegetation.

Swamp Oak Forest EEC

Clearing of approximately ten trees from within the Swamp Oak Forest EEC would be required as part of the proposal. A seven-part test in accordance with Section 5A of the EP&A Act has been prepared to ascertain the potential impacts of the proposal on this EEC (refer to **Appendix D**). This assessment has determined that the proposed works would not have a significant impact on this community.

Threatened Flora

One threatened flora species, Weeping Paperbark (*Melaleuca irbyana*), occurs along the route. This species is listed as Endangered under the TSC Act however is not listed under the EPBC Act.

Nine Weeping Paperbarks were recorded along the route at three locations (refer to **Appendix B**). This species was also observed as occurring on private land adjacent to the road reserve. The route was selected to minimise potential impact on this species, hence the route occurs on the opposite side of the road to two of the stands. The route passes within 4-5 m of the third stand, however no direct impacts are likely to occur to these trees.

A seven-part test in accordance with Section 5A of the EP&A Act has been prepared to ascertain the potential impacts of the proposal on this Weeping Paperbark (refer to **Appendix D**). This assessment has determined that the proposed works would not have a significant impact on the species. Mitigation measures described in **Section 5.1** would be implemented to avoid any potential impacts on Weeping Paperbark.

No other threatened flora species were detected along the proposed route.

Hollow-bearing trees

A number of HBTs that would potentially be significant nesting/ roosting sites for hollow-dependent fauna occur within the road reserve along the proposed route, as well as in some sections of adjoining forest.

No HBTs will be removed as part of the proposed works. There will be some disturbance in the vicinity of HBTs for a short period of time during the installation of the water main; however this will

occur during daylight hours and will last for 1-2 days only. Mitigation measures described in **Section 5.1** would be implemented to avoid any potential impacts on these trees.

Road Culvert Habitat

Work will be required at a number of road culverts which will involve excavation at one end or the other, depending on which side of the road the water main is installed. Initial inspections for microbats were undertaken from either end of each of the culverts and no bats were detected. Microbats do not generally use such small culverts (600 mm), which are highly flood prone hence are unlikely to be present. Regardless, mitigation measures described in **Section 5.1** would be implemented to avoid any potential impacts.

4.1.2 Under-boring

An area of Freshwater EEC occurs where the water main intersects with Deep Creek. Deep Creek is highly disturbed from cattle in this location, with scant riparian vegetation and highly turbid water. This part of the route will be under-bored; hence no direct impact on the EEC from the water main installation is expected. Mitigation measures described in **Section 5.1** would be implemented to avoid any potential impacts.

4.1.3 Habitat Fragmentation

Habitat removal will generally comprise the removal of either individual trees or small groups of trees within the road reserve. The extent of the removal is such that it will not affect any mapped OEH regional or sub-regional forest fauna corridor.

4.1.4 Edge Effects

The occurrence of the road reserve through existing forested areas in itself has created some existing edge effects. The extent of clearing, comprising either individual trees or small groups of trees scattered along the route, is such that minimal increase in edge effects is expected.

4.1.5 Death or Injury During Clearing and Construction

During ground disturbance, including vegetation clearing and construction, there is a minor risk of mortality or injury to fauna, particularly ground-dwelling fauna such as common reptiles and frog species.

Safeguards are consequently required to ensure the risk of the fauna mortality/ injury is minimised during trenching and vegetation clearing associated with the proposal. Mitigation measures described in **Section 5.1** would be implemented to avoid any potential impacts.

4.2 Indirect Impacts

Indirect impacts of the proposed works are possible such as weed infiltration, and disturbance to threatened flora, HBTs and EECs. None of these indirect impacts are expected to be significant at this site and mitigation measures provided in **Section 5.1** would be implemented to successfully reduce these potential impacts.

4.2.1 Habitat Connectivity

It is acknowledged that suitable habitat is available within both the road reserve and adjacent forested areas for a range of threatened species. However, the extent of clearing associated with the proposal is minimal relative to the extent of forested vegetation and individual trees that will remain within the road reserve. It is not expected that connectivity for fauna would be impacted due to the limited and scattered extent of clearing associated with the proposed works.

4.3 Threatened Species

The key findings of the assessments of significance for the potentially occurring threatened flora and fauna species listed in **Section 3.3** (refer to **Appendix D**) is that, despite the proposal having some minor adverse impacts on local habitat values for these threatened species (both directly and indirectly), the degree of impact was considered unlikely to result in a significant impact to any of the subject threatened species such that a local population would become extinct.

This is reliant on the effective implementation of appropriate mitigation measures as detailed in **Section 5.1**. Therefore, preparation of a Species Impact Statement (SIS) would not be required. Furthermore, relating to the bilateral agreement under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) between the Commonwealth and the State of New South Wales relating to environmental assessment and approval, the results of the assessment of significance for dually listed State and Federal threatened species that could potentially occur at the site (e.g. Koala, and Grey-headed Flying-fox) are adequate to indicate that referral of the proposal to the Federal environment minister is not required.

Discussion of specific impacts on threatened species follows.

4.3.1 Threatened Birds – Black-necked Stork, Bush stone-curlew, Black-chinned Honeyeater, Grey-crowned Babbler, Diamond Firetail and the Emu population in the New South Wales North Coast Bioregion

The proposal would remove a relatively small area of potential foraging habitat for each of the subject threatened bird species. The site comprises disturbed to highly disturbed areas of predominantly roadside vegetation including areas of open forest that occurs in narrow bands adjacent to the formed road. Impacts associated with the removal of foraging habitat in the form of trees >10 cm DBH is considered minor due to the small number of trees to be removed (i.e. in total along the length of the route), and the generally small size of trees to be removed. Disturbance to lower-stratum habitat will be temporary, as any lower-stratum vegetation that is removed will likely regrow over time.

Consequently, it is considered unlikely that removal of this foraging habitat would result in a significant impact on any of the subject threatened bird species.

The proposal is also considered unlikely to result in a significant impact on these threatened bird species in relation to connectivity or fragmentation. This is due to the proposal only removing a relatively small area of habitat in relation to that which occurs in the broader locality, as well as the high mobility of the subject species with the capacity to reach and utilise alternative habitat post-works.

4.3.2 Threatened Microbats – Hoary Wattled Bat, Northern Freetail-bat, Eastern Freetail-bat, Large-footed Myotis, Eastern Long-eared Bat, Yellow-bellied Sheathtail-bat, Greater Broad-nosed Bat

The proposal would remove a small number of trees (<30 trees, age class range: young to very mature) that occur as scattered individuals or small groups of trees across the length of the route. None of these trees support hollows which would otherwise provide potential roosting sites for these bats. The trees to be removed contribute to the overall open forest structure that would provide potential foraging habitat for the various threatened microbat species. Despite the removal of this area of potential foraging habitat, similar quality habitat is available widely in the broader locality, and this would remain post works.

Additionally some potential exists for microbat species such as the Large-footed Myotis to inhabit only one of the road culverts that will be extended as part of the work. Microbats are not known to utilise culverts as small as 600 mm, hence the likelihood of their occurrence is considered limited.

Consequently, provided that safeguards are implemented during the works to minimise the risk of direct impacts (e.g. injury or mortality; refer to mitigation measures in **Section 5.1**) it is considered unlikely that removal of this foraging habitat would result in a significant impact on any of the subject threatened microbat species.

4.3.3 Grey-headed Flying-fox

The proposal involves the removal of trees that are a potential nectar foraging resources for the Grey-headed Flying-fox. In particular, trees proposed for removal include ten Spotted Gum, four Grey Ironbark, six Swamp Box and one Forest Red Gum, all of which except for Swamp Box, are recognised as key foraging resource for Grey-headed Flying-fox on the North Coast of NSW (Eby and Law 2008). While a minor negative incremental effect, the proposal is considered unlikely to have a significant effect to the local Grey-headed Flying-fox population as:

- No known roosting habitat for this species would be impacted.
- The locality includes extensive areas of similar quality potential foraging habitat for this species containing the same key foraging resources which would not be directly or substantially indirectly affected by the proposal.
- The Grey-headed Flying-fox is highly mobile and would continue to be able to move between local habitats post works.
- Other threats to the Grey-headed Flying-fox (e.g. power line collision) would not be increased by the proposal.

4.3.4 Koala

No Koala food trees will be removed as part of the works; however a number of other trees that occur within the same forest community as Koala food trees will be removed.

While a minor negative incremental effect, the proposal is considered unlikely to have a significant effect on the local population of the Koala as:

- Substantial areas of intact forest in the broader locality also support a higher density of Koala feed trees. Considering that the site consists of a relatively small area of habitat in the context of much larger stands of suitable nearby habitat which would not be impacted by the proposal, the overall reduction in Koala foraging resource is considered to be minor.

- Provided that mitigation measures detailed in **Section 5.1** are followed including; pre-clearing inspections are undertaken, exclusion zones are established if a Koala is located, protocol for rescuing an injured animal are adhered to, the risk of injury or mortality directly relating to the works is considered to be low.
- Provided that mitigation measures detailed in **Section 5.1** are followed no additional impacts relating to fragmentation of habitat and increased risk of vehicle strike would be expected related to the works.
- Other threats to the Koala (e.g. dog attack) would not be increased by the proposal.

Overall, while the proposal may impose some minor incremental and cumulative negative effects, it is considered unlikely to have an adverse effect on the life cycle of the Koala such that a viable local population is likely to be placed at significant risk of extinction.

4.3.5 Weeping Paperbark (*Melaleuca irbyana*)

- The works will be undertaken within 4-5 m of a small stand of Weeping Paperbark (Location: 506914, 6713134). The stand of trees comprises generally saplings and small individuals, with the nearest tree to the works having a DBH<3 cm. Provided that mitigation measures detailed in **Section 5.1** are followed including establishing 'no-go flagging' around the stand of trees and felling a nearby Grey Ironbark away from the trees, the risk of damage directly relating to the works is considered to be low.

5. Biodiversity Management

5.1 Mitigation Measures

The mitigation methods outlined below would be implemented in order to minimise any potential impacts resulting from the proposed works.

5.1.1 Vegetation Clearing

- If a Koala is found to be occupying any tree at the site, a flagged exclusion zone will be established (minimum 50 m) in which works are not to proceed until the individual has moved from the site.
- All trees to be felled will be inspected for bird nests and possum dreys prior to clearing. If bird nests are present and occupied by chicks or eggs, they will be relocated to a nearby tree by a qualified Ecologist and monitored to ensure that they are attended to by the parent birds. If the parent birds do not re-attend the nest the chicks/ eggs will need to be taken to a WIRES carer and the location of collection provided for post-care release.
- If any fauna is injured during the works, a suitably qualified Ecologist will remove the animal and the local WIRES or a local veterinarian contacted to arrange for appropriate care.
- Trees will be directionally felled away from adjacent vegetation to avoid damage.

5.1.2 Under-boring and Works Near Drainage Lines

- No plant equipment will enter or be placed into/ wetland areas, particularly those associated with Deep Creek.
- Temporary erosion and sediment control devices such as silt fencing will be provided, where required.
- A spill containment kit, including equipment to address both terrestrial and aquatic spills, will be kept on site at all times during the proposed works. Staff will also be trained in the effective deployment of the spill containment kit.

5.1.3 Works in Proximity to Existing Vegetation

- No-go flagging will be placed around existing vegetation where it occurs within 4 m of the trenching work area in order to minimise disturbance and impacts.
- Ground disturbance outside of that required to undertake the proposed works will be minimised.
- Damage to trees outside of those that require clearing will be avoided at all times.

5.1.4 Works In Proximity to Weeping Paperbark

- A suitably qualified ecologist will install no-go flagging around Weeping Paperbark trees (location: 506914, 6713134) prior to works commencing in this location and inspect trees at the conclusion of the works.

5.1.5 Stockpiling and Material Laydown Areas

- Stockpiling will not occur under the crown of existing native trees (i.e. the crown comprises the full width of the branches).
- Stockpiling will not occur near drainage lines or on overland flow paths, and where necessary will be bunded or covered to reduce sediment runoff.

5.1.6 Culverts

- Culverts will be inspected internally prior to commencing any construction work on a particular culvert.

5.1.7 Other

- All rubbish and wastes will be collected and disposed of at an approved disposal depot, or recycled during and upon completion of the works.

6. Summary and Conclusion

Installation of the proposed water main would require removal of approximately 20-30 native trees (>10 cm DBH), ten of which occur in a small stand of Swamp Oak EEC. The majority of the works however will disturb lower stratum vegetation only, most of which is already disturbed to highly disturbed roadside vegetation. No HBTs will be removed as part of the works.

Under-boring of Deep Creek will avoid any potential impacts to a wetland area, which comprises a highly disturbed example of Freshwater EEC. Mitigation measures to ensure any indirect impacts through sediment/ erosion and spills in this location have been recommended.

The route has been selected to avoid impacts on HBTs and three stands of the threatened (TSC Act) Weeping Paperbark (*Melaleuca irbyana*). The route has been aligned on the opposite side of the road to avoid two of the stands, and passes within 4-5 m of the third stand. Mitigation measures have been recommended to minimise any impacts to this stand of trees.

A number of threatened fauna species are likely to utilise various habitats along the course of the proposed route. Impacts on these habitat features, in particular HBTs, have been avoided where possible at the design stage. Additional mitigation measures have been recommended to further reduce any potential impacts on these species.

Seven-part tests of significance were undertaken for all species either known to occur along the route, or likely to utilise portions of the route for a significant part of their lifecycle.

It is concluded that the proposed works is unlikely to result in a significant impact on any TSC Act listed threatened species, populations or endangered communities and therefore preparation of a Species Impact Statement is not required. Similarly, the proposed works is unlikely to result in significant impacts to any threatened species, communities or migratory species listed under the EPBC Act and referral to DoEE and approval by the Minister is not required.

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Appendix A

Biodiversity Search Results

Australian Government
Department of the Environment and Energy

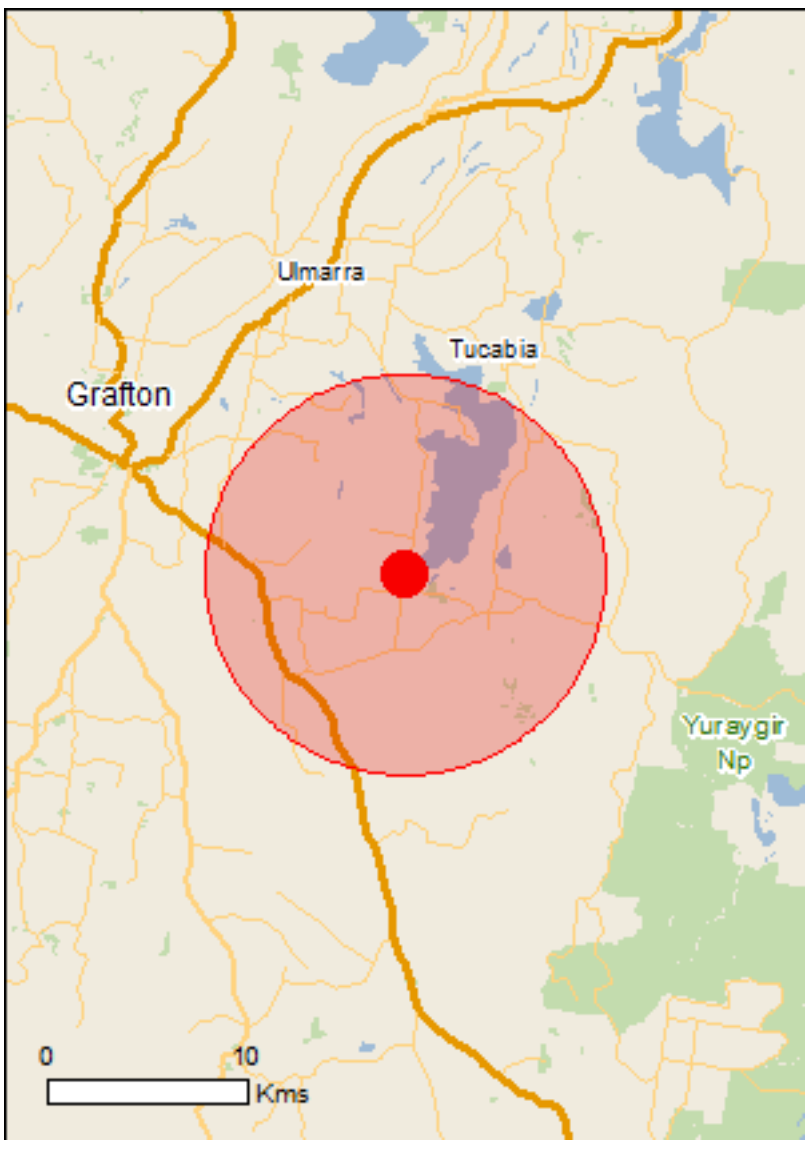
EPBC Act Protected Matters Report

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

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

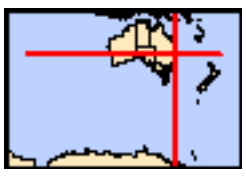
Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 13/10/16 14:05:52



Coordinates

Buffer: 10.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	35
Listed Migratory Species:	13

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	20
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

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

State and Territory Reserves:	4
Regional Forest Agreements:	1
Invasive Species:	37
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities		[Resource Information]
For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.		
Name	Status	Type of Presence
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community likely to occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat likely to occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat may occur within area
Frogs		

Name	Status	Type of Presence
Mixophyes balbus		
Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat likely to occur within area
Mixophyes iteratus		
Giant Barred Frog, Southern Barred Frog [1944]	Endangered	Species or species habitat known to occur within area
Mammals		
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
Petauroides volans		
Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area
Petrogale penicillata		
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Plants		
Allocasuarina defungens		
Dwarf Heath Casuarina [21924]	Endangered	Species or species habitat may occur within area
Angophora robur		
Sandstone Rough-barked Apple [56088]	Vulnerable	Species or species habitat likely to occur within area
Arthraxon hispidus		
Hairy-joint Grass [9338]	Vulnerable	Species or species habitat may occur within area
Corynocarpus rupestris subsp. rupestris		
Glenugie Karaka [19303]	Vulnerable	Species or species habitat known to occur within area
Cryptostylis hunteriana		
Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Eucalyptus tetrapleura		
Square-fruited Ironbark [7490]	Vulnerable	Species or species habitat likely to occur within area
Grevillea quadricauda		
[64651]	Vulnerable	Species or species habitat likely to occur within area
Macadamia integrifolia		
Macadamia Nut, Queensland Nut, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat may occur within area
Macadamia tetraphylla		
Rough-shelled Bush Nut, Macadamia Nut, Rough-shelled Macadamia, Rough-leaved Queensland	Vulnerable	Species or species habitat likely to occur

Name	Status	Type of Presence
Nut [6581]		within area
Marsdenia longiloba		
Clear Milkvine [2794]	Vulnerable	Species or species habitat likely to occur within area
Melichrus sp. Newfoundland State Forest (P.Gilmour 7852)		
Hairy Melichrus [82048]	Endangered	Species or species habitat likely to occur within area
Phaius australis		
Lesser Swamp-orchid [5872]	Endangered	Species or species habitat likely to occur within area
Samadera sp. Moonee Creek (J.King s.n. Nov. 1949)		
[86885]	Endangered	Species or species habitat likely to occur within area
Thesium australe		
Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area
Tylophora woollsii		
[20503]	Endangered	Species or species habitat likely to occur within area
Reptiles		
Saiphos reticulatus		
Three-toed Snake-tooth Skink [88328]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

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

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus		
Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus		
White-throated Needletail [682]		Species or species habitat known to occur within area
Monarcha melanopsis		
Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus		
Spectacled Monarch [610]		Species or species habitat known to occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat likely to occur within area
Rhipidura rufifrons		
Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land - Airservices Australia

Listed Marine Species [Resource Information]

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

Name	Threatened	Type of Presence
Birds		
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Breeding known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Cuculus saturatus Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Arandin	NSW
FMAs in GRAFTON	NSW
Glenugie Peak	NSW
UNE Special Management Zone No1	NSW

Regional Forest Agreements	[Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
North East NSW RFA	New South Wales

Invasive Species

[Resource Information]

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

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species habitat likely to occur within area
Dolichandra unguis-cati Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Protasparagus plumosus Climbing Asparagus-fern, Ferny Asparagus [11747]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii		
Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta		
Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis		
Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area

Nationally Important Wetlands

[Resource Information]

Name	State
Upper Coldstream	NSW

Caveat

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

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

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

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

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-29.74942 153.06477

Acknowledgements

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

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Parks and Wildlife Commission NT, Northern Territory Government
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Other groups and individuals

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

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

Department of the Environment
GPO Box 787
Canberra ACT 2601 Australia
+61 2 6274 1111

Data from the BioNet Atlas of NSW Wildlife website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1Â°; ^^ rounded to 0.01Â°). Copyright the State of NSW through the Office of Environment and Heritage. Search criteria : Public Report of all Valid Records of Threatened (listed on TSC Report generated on 13/10/2016 1:37 PM

Kingdom	Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Info
Animalia	Reptilia	Elapidae	*Cacophis*	White-crowned	V,P		1	
Animalia	Aves	Casuariidae	*Dromaius novaehollandiae*	Emu population in the New South Wales North Coast Bioregion and Port Stephens local	E2,P		4	
Animalia	Aves	Anseranatidae	*Anseranas semipalmata*	Magpie Goose	V,P		1	
Animalia	Aves	Ciconiidae	*Ephippiorhynchus asiaticus*	Black-necked Stork	E1,P		238	
Animalia	Aves	Accipitridae	*^^Lophoictinia*	Square-tailed Kite	V,P,3		3	
Animalia	Aves	Accipitridae	*^^Pandion*	Eastern Osprey	V,P,3		10	
Animalia	Aves	Gruidae	*Grus rubicunda*	Brolga	V,P		8	
Animalia	Aves	Haematopodidae	*Haematopus longirostris*	Pied Oystercatcher	E1,P		3	
Animalia	Aves	Jacanidae	*Irediparra*	Comb-crested	V,P		8	
Animalia	Aves	Cacatuidae	*^Calyptorhynchus lathami*	Glossy Black-Cockatoo	V,P,2		1	
Animalia	Aves	Psittacidae	*^^Pezoporus wallicus wallicus*	Eastern Ground Parrot	V,P,3		1	
Animalia	Aves	Acanthizidae	*Chthonicola*	Speckled Warbler	V,P		1	
Animalia	Aves	Pomatostomidae	*Pomatostomus temporalis*	Grey-crowned Babbler (eastern	V,P		8	
Animalia	Mammalia	Dasyuridae	*Dasyurus*	Spotted-tailed Quoll	V,P	E	2	
Animalia	Mammalia	Petauridae	*Petaurus*	Squirrel Glider	V,P		2	
Animalia	Mammalia	Pteropodidae	*Pteropus poliocephalus*	Grey-headed Flying-fox	V,P	V	13	
Animalia	Mammalia	Molossidae	*Mormopterus norfolkensis*	Eastern Freetail-bat	V,P		2	
Animalia	Mammalia	Vespertilionidae	*Miniopterus australis*	Little Bentwing-bat	V,P		1	
Animalia	Mammalia	Vespertilionidae	*Nyctophilus bifax*	Eastern Long-eared Bat	V,P		1	
Plantae	Flora	Myrtaceae	*Melaleuca*	Weeping Paperbark	E1,P		3	

Data from the BioNet Atlas of NSW Wildlife website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1Â°; ^^ rounded to 0.01Â°). Copyright the State of NSW through the Office of Environment and Heritage. Search criteria : Public Report of all Valid Records of Threatened (listed on TSC

Report generated on 13/10/2016 1:42 PM

Kingdom	Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records	Info
Animalia	Amphibia	Myobatrachidae	*Crinia tinnula*	Wallum Froglet	V,P		1	
Animalia	Aves	Casuariidae	*Dromaius novaehollandiae*	Emu population in the New South Wales North Coast Bioregion and Port Stephens local government area	E2,P		87	
Animalia	Aves	Anseranatidae	*Anseranas semipalmata*	Magpie Goose	V,P		6	
Animalia	Aves	Columbidae	*Ptilinopus magnificus*	Wompoo Fruit-Dove	V,P		2	
Animalia	Aves	Ciconiidae	*Ephippiorhynchus asiaticus*	Black-necked Stork	E1,P		118	
Animalia	Aves	Ardeidae	*Botaurus poiciloptilus*	Australasian Bittern	E1,P	E	1	
Animalia	Aves	Accipitridae	*Circus assimilis*	Spotted Harrier	V,P		1	
Animalia	Aves	Accipitridae	*^^Lophoictinia isura*	Square-tailed Kite	V,P,3		1	
Animalia	Aves	Gruidae	*Grus rubicunda*	Brolga	V,P		11	
Animalia	Aves	Burhinidae	*Burhinus grallarius*	Bush Stone-curlew	E1,P		8	
Animalia	Aves	Jacanidae	*Irediparra gallinacea*	Comb-crested Jacana	V,P		3	
Animalia	Aves	Cacatuidae	*^Calyptorhynchus lathami*	Glossy Black-Cockatoo	V,P,2		4	
Animalia	Aves	Psittacidae	*Glossopsitta pusilla*	Little Lorikeet	V,P		18	
Animalia	Aves	Psittacidae	*^^Lathamus discolor*	Swift Parrot	E1,P,3	CE	2	
Animalia	Aves	Strigidae	*^^Ninox connivens*	Barking Owl	V,P,3		2	
Animalia	Aves	Strigidae	*^^Ninox strenua*	Powerful Owl	V,P,3		2	
Animalia	Aves	Tytonidae	*^^Tyto novaehollandiae*	Masked Owl	V,P,3		4	
Animalia	Aves	Climacteridae	*Climacteris picumnus victoriae*	Brown Treecreeper (eastern subspecies)	V,P		15	

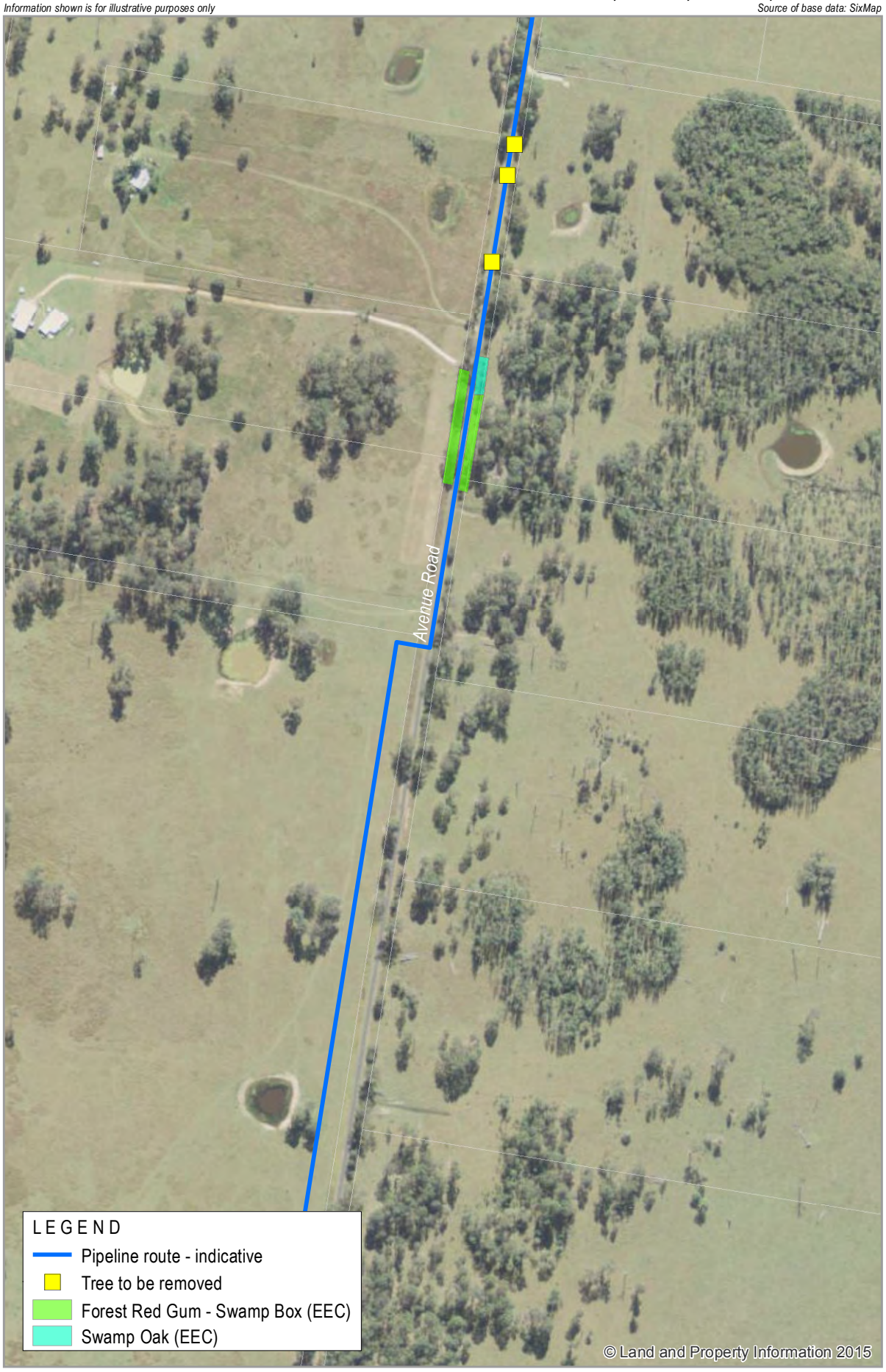
Animalia	Aves	Acanthizidae	*Chthonicola sagittata*	Speckled Warbler	V,P		1
Animalia	Aves	Meliphagidae	*Melithreptus gularis gularis*	Black-chinned Honeyeater (eastern	V,P		15
Animalia	Aves	Pomatostomidae	*Pomatostomus temporalis temporalis*	Grey-crowned Babbler (eastern subspecies)	V,P		25
Animalia	Aves	Artamidae	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	V,P		4
Animalia	Aves	Estrildidae	*Stagonopleura guttata*	Diamond Firetail	V,P		7
Animalia	Mammalia	Dasyuridae	*Dasyurus maculatus*	Spotted-tailed Quoll	V,P	E	3
Animalia	Mammalia	Dasyuridae	*Phascogale tapoatafa*	Brush-tailed Phascogale	V,P		13
Animalia	Mammalia	Phascolarctidae	*Phascolarctos cinereus*	Koala	V,P	V	3
Animalia	Mammalia	Petauridae	*Petaurus australis*	Yellow-bellied Glider	V,P		4
Animalia	Mammalia	Petauridae	*Petaurus norfolcensis*	Squirrel Glider	V,P		4
Animalia	Mammalia	Pseudocheiridae	*Petauroides volans*	Greater Glider	P	V	3
Animalia	Mammalia	Potoroidae	*Aepyprymnus rufescens*	Rufous Bettong	V,P		45
Animalia	Mammalia	Pteropodidae	*Pteropus poliocephalus*	Grey-headed Flying-fox	V,P	V	11
Animalia	Mammalia	Emballonuridae	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V,P		2
Animalia	Mammalia	Molossidae	*Mormopterus lumsdenae*	Northern Free-tailed Bat	V		1
Animalia	Mammalia	Molossidae	*Mormopterus norfolkensis*	Eastern Freetail-bat	V,P		4
Animalia	Mammalia	Vespertilionidae	*Chalinolobus nigrogriseus*	Hoary Wattled Bat	V,P		5
Animalia	Mammalia	Vespertilionidae	*Myotis macropus*	Southern Myotis	V,P		2
Animalia	Mammalia	Vespertilionidae	*Scoteanax rueppellii*	Greater Broad-nosed Bat	V,P		1
Plantae	Flora	Juncaginaceae	*Maundia triglochinoides*		V,P		14
Plantae	Flora	Myrtaceae	*Angophora robur*	Sandstone Rough-barked Apple	V,P	V	15
Plantae	Flora	Myrtaceae	*Melaleuca irbyana*	Weeping Paperbark	E1,P		10

Appendix B

EECs, Threatened Flora and Trees to be Removed

Information shown is for illustrative purposes only

Drawn by: AB Checked by: RE Reviewed by: TMC Date: 16/05/2017
Source of base data: SixMap



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North

EECs, Threatened Flora and Trees to be Removed

Information shown is for illustrative purposes only

Drawn by: AB Checked by: RE Reviewed by: TMC Date: 16/05/2017
Source of base data: SixMap

North

0 100

EECs, Threatened Flora and Trees to be Removed

Information shown is for illustrative purposes only

Drawn by: AB Checked by: RE Reviewed by: TMC Date: 16/05/2017
Source of base data: SixMap

0 100

North

EECs, Threatened Flora and Trees to be Removed

Information shown is for illustrative purposes only

North

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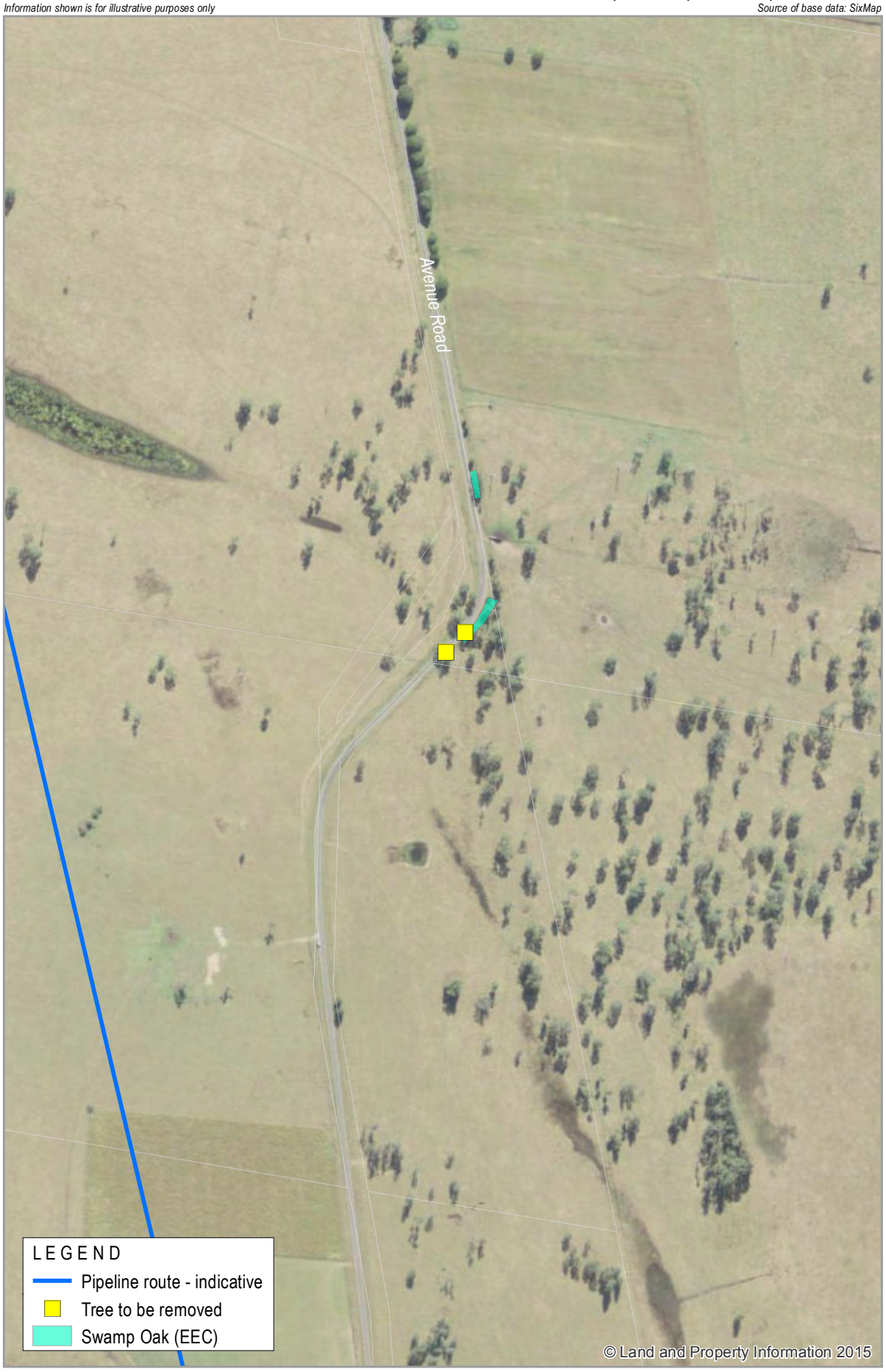
EECs, Threatened Flora and Trees to be Removed



North

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EECs, Threatened Flora and Trees to be Removed

North

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EECs, Threatened Flora and Trees to be Removed

Information shown is for illustrative purposes only

Drawn by: AB Checked by: RE Reviewed by: TMC Date: 16/05/2017
Source of base data: SixMap

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North

EECs, Threatened Flora and Trees to be Removed

Appendix C

Threatened Species Potential Occurrence Table

Table C.1 Potential Occurrence for Threatened Species

Scientific Name	*Common Name*	*Status*		*Habitat Requirement*	*Suitability of Site Habitat*	*Records within vicinity of site (<5.0 km)*	*Potential Occurrence and Requirement for Assessment of Significance*
		TSC Act	*EPBC Act*				
Amphibia							
Crinia tinnula	Wallum Froglet	V	-	Acid swamps and swamp sclerophyll forest	No suitable habitat present	1	Unlikely
Aves							
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	Woodlands and dry open sclerophyll forests usually dominated by eucalypts, although has been recorded in shrublands, regenerating forest and moist forest types including rainforest. Breeds predominantly on the western slopes of the Great Dividing Range	Dry open forest is suitable for the species, however forging habitat only, as breeding generally occurs on the western slopes of the Great Dividing Range,	4	Possible Foraging habitat only, hence a seven-part test of significance is not considered necessary (DEC 2008).
Anseranas semipalmata	Magpie Goose	V	-	Shallow wetlands (<1 m deep), large swamps and dams with dense growth of rushes or sedges.	Suitable habitat is located within the wetland vegetation associated with Deep Creek, however this vegetation occurs outside of the road corridor and will not be directly or indirectly impacted.	6	Possible Suitable roosting habitat will not be directly or indirectly impacted, hence a seven-part test of significance is not considered necessary (DEC 2008).

Scientific Name	Common Name	Status		Habitat Requirement	Suitability of Site Habitat	Records within vicinity of site (<5.0 km)	Potential Occurrence and Requirement for Assessment of Significance
		TSC Act	EPBC Act				
Botaurus poiciloptilus	Australasian Bittern	E	E	Permanent freshwater wetlands with tall dense vegetation, particularly bullrushes and spikerushes.	Extent of wetland vegetation adjacent to the Site in the vicinity of Deep Creek is too limited to support this species.	1	Unlikely
Burhinus grallarius	Bush Stone-curlew	E	-	Lightly timbered open forest and woodland, and partly cleared farmland with woodland remnants, preferring areas with dry leaf-litter, fallen timber and sparse ground cover.	Generally suitable, particularly the areas supporting Spotted Gum forest.	8	**Possible** Seven-part test of Significance undertaken to assess potential impacts (refer to **Appendix D**).
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	-	Sheoaks in coastal forests and woodlands, timbered watercourses, and moist and dry eucalypt forests of the coast and the Great Divide up to 1,000 m.	Very few, immature feed trees occur in the moist open forest at the site. No nesting hollows are present.	4	Marginally possible However, as this species would only use the habitat on-site to forage on occasion, a seven-part test of significance is not required (DEC 2008).

Scientific Name	Common Name	Status		Habitat Requirement	Suitability of Site Habitat	Records within vicinity of site (<5.0 km)	Potential Occurrence and Requirement for Assessment of Significance
		TSC Act	EPBC Act				
Circus assimilis	Spotted Harrier	V	-	Grassy open woodland, inland riparian woodland, grassland and shrub steppe.	Suitable foraging habitat occurs adjacent to the route in the open grassland adjacent to the nearby creeklines. Potential foraging and nesting habitat will not be impacted.	1	Possible Extent of suitable habitat on site is minimal, hence a seven-part test of significance is not required (DEC 2008).
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	-	Eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range, and less commonly on coastal plains and ranges.	The dry open forest is generally suitable for this species. Suitable hollows on site for breeding will not be impacted.	15	Possible As this species would only use the habitat on-site to forage on occasion, and any potential breeding hollows will not be impacted a seven-part test of significance is not required (DEC 2008).
Chthonicola sagittata	Speckled Warbler	V	-	Eucalyptus dominated communities with sparse shrubs and grassy understorey.	Lack of native grassy understorey would preclude this species from occurring.	1	Unlikely

Scientific Name	Common Name	Status		Habitat Requirement	Suitability of Site Habitat	Records within vicinity of site (<5.0 km)	Potential Occurrence and Requirement for Assessment of Significance
		TSC Act	EPBC Act				
Dromaius novaehollandiae	Emu population in the New South Wales North Coast Bioregion and Port Stephens local government area			Occurs in a range of open lowland habitats including grasslands, heathlands, shrubland, open and shrubby woodlands, forest and swamp and sedgeland communities.	Could occur in the forested areas of the route.	87	**Possible** Seven-part test of significance undertaken to assess potential impacts (refer to **Appendix D**).
Ephippiorhynchus asiaticus	Black-necked Stork	E	-	Swamps, mangroves, mudflats, dry floodplains.	Suitable habitat is located within the wetland vegetation associated with Deep Creek, however this vegetation occurs outside of the road corridor and will not be directly or indirectly impacted.	118	Possible Suitable habitat occurs adjacent to the Site and would not be impacted by the proposed works hence a seven-part test of significance is not required (DEC 2008).
Glossopsitta pusilla	Little Lorikeet	V	V	Distributed in forests and woodlands from the coast to the western slopes of the Great Dividing Range, extending westwards to the vicinity of Albury, Parkes, Dubbo and Narrabri.	On-site habitat is broadly suitable for foraging. Suitable hollows on site for breeding will not be impacted.	18	Possible As this species would only use the habitat on-site to forage on occasion, and any potential breeding hollows will not be impacted a seven-part test of significance is not required (DEC 2008).

Scientific Name	Common Name	Status		Habitat Requirement	Suitability of Site Habitat	Records within vicinity of site (<5.0 km)	Potential Occurrence and Requirement for Assessment of Significance
		TSC Act	EPBC Act				
Grus rubicunda	Brolga	V	-	Shallow swamps, floodplains, grasslands and pastoral lands, usually in pairs or parties.	Suitable habitat is located within the wetland vegetation associated with Deep Creek, however this vegetation occurs outside of the road corridor and will not be directly or indirectly impacted.	11	Possible Suitable habitat occurs adjacent to the site and would not be impacted by the proposed works hence a seven-part test of significance is not required (DEC 2008).
Irediparra gallinacea	Comb-crested Jacana	V	-	Among vegetation floating on slow-moving rivers and permanent lagoons, swamps, lakes and dams.	Suitable habitat is located within the wetland vegetation associated with Deep Creek, however this vegetation occurs outside of the road corridor and will not be directly or indirectly impacted.	3	Possible Suitable habitat occurs adjacent to the site and would not be impacted by the proposed works hence a seven-part test of significance is not required (DEC 2008).
Lathamus discolor	Swift Parrot	E	E	Forests, woodlands, plantations, and banksias.	On-site habitat is broadly suitable for foraging. No breeding habitat is present (breeds in Tasmania).	2	Marginally possible As this species would only use the habitat on-site to forage on occasion, a seven-part test of significance is not required (DEC 2008).

Scientific Name	Common Name	Status		Habitat Requirement	Suitability of Site Habitat	Records within vicinity of site (<5.0 km)	Potential Occurrence and Requirement for Assessment of Significance
		TSC Act	EPBC Act				
Lophoictinia isura	Square-tailed Kite	V	-	Dry woodland and open forest, particularly along major rivers and belts of trees in urban or semi-urban areas. Home range can extend over at least 100 km^2.	On-site habitat is only marginally suitable for occasional foraging. The site is unlikely to offer breeding habitat, with nests of this species typically occurring along or near waterways.	2	Unlikely
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V	-	Drier open forests or woodlands dominated by box and ironbark eucalypts, and open forests of smooth-barked gums, stringybarks, ironbarks and paperbarks.	Suitable nesting and foraging habitat present in the dry open forest community.	15	**Possible** Seven-part test of significance undertaken to assess potential impacts (refer to **Appendix D**).
Ninox connivens	Barking Owl	V	-	Eucalypt woodland, open forest, swamp woodlands and timber along watercourses.	The site may comprise part of a larger foraging habitat. Suitable nesting habitat present in the dry open forest community.	2	Possible As no nesting habitat is present on site, a seven-part test of significance is not required (DEC 2008).

Scientific Name	Common Name	Status		Habitat Requirement	Suitability of Site Habitat	Records within vicinity of site (<5.0 km)	Potential Occurrence and Requirement for Assessment of Significance
		TSC Act	EPBC Act				
Ninox strenua	Powerful Owl	V	-	Woodland and open forest to tall moist forest and rainforest, common along drainage lines.	The site may comprise part of a larger foraging habitat. No suitably large tree hollows present on site for nesting.	2	Possible As no nesting habitat is present on site, a seven-part test of significance is not required (DEC 2008).
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	-	Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains.	Nesting and foraging habitat present.	25	**Known to occur**
Ptilinopus magnificus	Wompoo Fruit-Dove	V	-	Rainforests, low-elevation moist eucalypt forest, and Brush Box forests.	No suitable habitat	2	Unlikely
Tyto novaehollandiae	Masked Owl	V	-	Dry eucalypt forest and woodlands.	The site may comprise part of a larger foraging habitat. No suitably large tree hollows present on site for nesting.	4	Possible As no nesting habitat is present on site, a seven-part test of significance is not required (DEC 2008).

Scientific Name	Common Name	Status		Habitat Requirement	Suitability of Site Habitat	Records within vicinity of site (<5.0 km)	Potential Occurrence and Requirement for Assessment of Significance
		TSC Act	EPBC Act				
Stagonopleura guttata	Diamond Firetail	V	-	Grassy eucalypt woodlands, open forest, mallee, temperate grassland, and secondary grassland derived from other communities, riparian areas, and sometimes in lightly wooded farmland.	Potential nesting and foraging habitat present.	7	**Possible** Seven-part-test of significance undertaken to assess potential impacts (refer to **Appendix D**).
Mammalia							
Aepyprymnus rufescens	Rufous Bettong	V	-	Tall moist eucalypt forest to open woodland with tussock grass understorey.	Potential habitat occurs in the areas supporting tall grasses associated with areas of native forest	45	**Possible** Seven-part-test of significance undertaken to assess potential impacts (refer to **Appendix D**).
Chalinolobus nigrogriseus	Hoary Wattled Bat	V	-	Dry open eucalypt forest dominated by spotted gum, boxes and ironbarks. Also healthy coastal forests where Red Bloodwood and Scribbly Gum are common. Naturally sparse understorey is favourable.	Suitable roosting and foraging habitat present within the areas of dry open forest.	1	**Possible** Seven-part-test of significance undertaken to assess potential impacts (refer to **Appendix D**).

Scientific Name	Common Name	Status		Habitat Requirement	Suitability of Site Habitat	Records within vicinity of site (<5.0 km)	Potential Occurrence and Requirement for Assessment of Significance
		TSC Act	EPBC Act				
Dasyurus maculatus maculatus	Spotted-tailed Quoll	V	E	Dry and moist eucalypt forests and rainforests, fallen hollow logs, large rocky outcrops.	Habitat is only marginally suitable for foraging. Habitat on-site lacks key habitat features such as fallen hollow logs and large rocky outcrops.	3	Unlikely
Mormopterus lumsdenae	Northern Freetail-bat	V	-	Occurs in rainforests through to open forests and woodlands. Roosts in tree hollows.	Broadly suitable foraging habitat. Hollows occur on site for non-breeding.	1	**Possible** Seven-part-test of significance undertaken to assess potential impacts (refer to **Appendix D**).
Mormopterus norfolkensis	Eastern Freetail-bat	V	-	Occurs in dry sclerophyll forest and woodland east of the Great Dividing Range. Roosts in tree hollows.	Broadly suitable foraging habitat. Hollows occur on site for non-breeding.	4	**Possible** Seven-part-test of significance undertaken to assess potential impacts (refer to **Appendix D**).
Myotis macropus	Large-footed Myotis	V	-	Bodies of water, rainforest streams, large lakes, reservoirs.	Suitable foraging habitat occurs in Deep Creek which is adjacent to the Site. The pipe culverts on the Site are generally considered too small for microbats to utilise.	2	**Possible** Seven-part-test of significance undertaken to assess potential impacts (refer to **Appendix D**).

Scientific Name	Common Name	Status		Habitat Requirement	Suitability of Site Habitat	Records within vicinity of site (<5.0 km)	Potential Occurrence and Requirement for Assessment of Significance
		TSC Act	EPBC Act				
Nyctophilus bifax	Eastern Long-eared Bat	V	-	Lowland subtropical rainforest and wet and swamp eucalypt forest, extending to adjacent moist eucalypt forest.	No mist forest types present, hence unlikely to occur.	2	Unlikely
Phascolarctos cinereus	Koala	V	V	Appropriate food trees in forests and woodlands, and treed urban areas.	Forest Red Gums (primary food tree) occur as isolated paddock trees adjacent to Deep Creek and in the southern portion of the site in the road reserve and adjacent forested vegetation.	3	**Possible** No scats found in site inspection but habitat on site is suitable. Seven-part test of significance undertaken to assess potential impacts (refer to **Appendix D**).
Petauroides volans	Greater Glider	-	V	It is typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows	Suitably tall moist forest not present.	3	Unlikely

Scientific Name	Common Name	Status		Habitat Requirement	Suitability of Site Habitat	Records within vicinity of site (<5.0 km)	Potential Occurrence and Requirement for Assessment of Significance
		TSC Act	EPBC Act				
Petaurus norfolcensis	Squirrel Glider	V	-	Blackbutt, bloodwood and ironbark eucalypt forest with heath understorey in coastal areas, and box-ironbark woodlands and River Red Gum forest inland.	Foraging habitat within the route itself is very limited due to the absence of understorey/ midstorey vegetation. Nesting habitat present, however this will not be impacted.	4	Possible As no HBTs will be removed, a seven-part test of significance is not required (DEC 2008).
Phascogale tapoatafa	Brush-tailed Phascogale	V	-	Drier forests and woodlands with hollow-bearing trees and sparse ground cover.	Suitable foraging and nesting habitat present within the road reserve and elsewhere in adjoining habitat.	13	Possible As no HBTs will be removed, a seven-part test of significance is not required (DEC 2008).
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.	Suitable foraging habitat only. No camps located within or adjacent to the proposed route.	11	**Possible** Seven-part test of significance undertaken to assess potential impacts (refer to **Appendix D**).
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	Various forest types for foraging and roost in tree hollows.	Broadly suitable foraging habitat and roosting habitat is present at the site and adjacent to the site.	2	**Possible** Seven-part test of significance undertaken to assess potential impacts (refer to **Appendix D**).

Scientific Name	Common Name	Status		Habitat Requirement	Suitability of Site Habitat	Records within vicinity of site (<5.0 km)	Potential Occurrence and Requirement for Assessment of Significance
		TSC Act	EPBC Act				
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	Woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest.	Broadly suitable foraging habitat and roosting habitat is present at the site and adjacent to the site.	1	**Possible** Seven-part test of significance undertaken to assess potential impacts (refer to **Appendix D**).
Reptilia							
Cacophis harriettae	White-crowned Snake	V	-	Low to mid-elevation dry eucalypt forest and woodland with well-developed litter layer.	Generally low-levels of leaf litter ad ground cover within the road reserve.	1	Unlikely
Flora							
Angophora robur	Sandstone Rough-barked Apple	V	-	Dry open forest in sandy or skeletal soils	No suitable habitat present	15	Not detected
Melaleuca irbyana	Weeping Paperbark	E	-	Open eucalypt forest in poorly drained often clay soils	Suitable habitat present	10	**Known** Seven-part test of significance undertaken to assess potential impacts (refer to **Appendix D**).
Maundia triglochinoides	A herb	V	-	Swamps, lagoons, dams, channels, creeks or shallow freshwater	Suitable habitat present near creek crossings along the pipeline.	14	Not detected

Appendix D

Section 5A Assessment of Significance

The following endangered ecological community, threatened fauna species and threatened population are variably considered potential occurrences on site, hence require Seven-part Tests of Significance:

- Swamp oak forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions.
- Weeping Paperbark

- Emu population in the New South Wales North Coast Bioregion and Port Stephens local government area

• *Burhinus grallarius*	Bush Stone-curlew
• *Melithreptus gularis gularis*	Black-chinned Honeyeater (eastern subspecies)
• *Pomatostomus temporalis temporalis*	Grey-crowned Babbler (eastern subspecies)
• *Stagonopleura guttata*	Diamond Firetail
• *Aepyprymnus rufescens*	Rufous Bettong
• *Chalinolobus nigrogriseus*	Hoary Wattled Bat
• *Mormopterus lumsdenae*	Northern Freetail-bat
• *Mormopterus norfolkensis*	Eastern Freetail-bat
• *Myotis macropus*	Large-footed Myotis
• *Nyctophilus bifax*	Eastern Long-eared Bat
• *Phascolarctos cinereus*	Koala
• *Pteropus poliocephalus*	Grey-headed Flying-fox
• *Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat
• *Scoteanax rueppellii*	Greater Broad-nosed Bat

Swamp Oak Floodplain Forest

Seven-part Test of Significance for Swamp Oak Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregion

The Scientific Committee, established by the TSC Act, has made Final Determinations to list Swamp Oak Floodplain Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregion, and Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions as EEC in Part 3 of Schedule 1 of the Act.

NSW Scientific Committee generally describe Swamp Oak Floodplain Forest EEC as being associated with grey-black clay-loams and sandy loams, where the groundwater is saline or sub-saline, on waterlogged or periodically inundated flats, drainage lines, lake margins and estuarine fringes associated with coastal floodplain. The structure of the community may vary from open forests to low woodlands, scrubs or reedlands with scattered trees. Typically these forests, scrubs, fernlands, reedlands and sedgelands form mosaics with other floodplain forest communities and treeless wetlands, and often they fringe treeless floodplain lagoons or wetlands with semi-permanent standing water.

The main recognised threats to this community are:

- clearing for urban and rural development, and the subsequent impacts from fragmentation;
- flood mitigation and drainage works;
- management of water and tidal flows;
- landfilling and earthworks associated with urban and industrial development;
- grazing and trampling by stock and feral animals (particularly pigs);
- changes in water quality, particularly increased nutrients and sedimentation;
- weed invasion;
- climate change;
- activation of ASS;
- removal of dead wood;
- rubbish dumping; and
- frequent burning which reduces the diversity of woody plant species (DECCW undated).

Site and Local Occurrence

Swamp Oak Forest EEC occurs as scatted small linear stands within the road reserve.

(a) in the case of a threatened species, whether the action proposed 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,

No consideration under this part of the assessment is required.

(b) in the case of an endangered population, whether the action proposed 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,

No consideration under this part of the assessment is required.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(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,

Swamp Oak Floodplain Forest is widespread in the locality due to the low-lying nature of the area. The extend of Swamp Oak Forest to be impacted is the removal of up to 10 trees within one small stand, which is a very small amount relative to the extent of the community in the locality.

Overall, the incremental impacts of the proposal are not considered likely to adversely affect the extent or adversely modify the composition of Swamp Oak Floodplain Forest EEC such that its local occurrence is likely to be placed at significant risk of extinction.

(d) in relation to the habitat of a threatened species, population or ecological community:

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

As mentioned in response to (c), the proposal requires the removal of approximately 10 trees from within the EEC.

Other local areas of these communities would not be directly affected and would not be substantially indirectly affected with effective implementation of the mitigation measures detailed in Section 5.

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

Swamp Oak Floodplain EEC occurs as scattered remnants and regrowth stands throughout the locality. The removal of 10 trees from one stand will not cause any fragmentation or isolation of this community.

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

The proposal is not expected to substantially indirectly affect other EEC areas located outside the proposal footprint with effective implementation of the mitigation measures provided in Section 5. With consideration of the above; and the existing extent of habitat fragmentation and modification locally, the proposal is considered unlikely to remove, modify, fragment or isolate any habitat significant to the long-term survival of the subject EECs locally.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No areas of critical habitat are listed under the TSC Act within the site nor are there any areas of critical habitat for Swamp Oak Floodplain Forest EEC listed under the TSC Act.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

No recovery plan or threat abatement plan has been prepared for Swamp Oak Floodplain Forest EEC. The recovery planning process has now been incorporated into Priority Action Statements (PAS). The proposal would not create barriers to the implementation of the PAS for these communities.

(g) whether the action proposed 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.

A key threatening process (KTP) is defined under the TSC Act as a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities. The current list of KTPs under TSC Act and whether the proposed development is recognised as a KTP is shown in **Table D.1**.

Table D.1 Key Threatening Processes

Listed Key Threatening Process (as described in the final determination of the Scientific Committee to list the threatening process)	*TSC Act*	*EPBC Act*	*Is the development or activity proposed of a class of development or activity that is recognised as a threatening process?*		
			Likely	*Possible*	*Unlikely*
Alteration of habitat following subsidence due to longwall mining	✓				✓
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	✓				✓
Anthropogenic climate change	✓	✓			✓
Bush rock removal	✓				✓
Clearing of native vegetation	✓	✓	✓		
Competition and grazing by the feral European Rabbit (*Oryctolagus cuniculus*)	✓	✓			✓
Competition and habitat degradation by feral goats (*Capra hircus*)	✓	✓			✓
Competition from feral honeybees (*Apis mellifera*)	✓				✓
Death or injury to marine species following capture in shark control programs on ocean beaches	✓				✓
Entanglement in or ingestion of anthropogenic debris in marine and estuarine environments	✓	✓			✓
Forest Eucalypt dieback associated with over-abundant psyllids and bell miners	✓				✓
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	✓				✓
Herbivory and environmental degradation caused by feral deer	✓				✓
Incidental catch (bycatch) of Sea Turtle during coastal otter-trawling operations within Australian waters north of 28 degrees South		✓			✓
Incidental catch (or bycatch) of seabirds during oceanic longline fishing operations		✓			✓
Importation of red imported fire ants (*Solenopsis invicta*)	✓	✓			✓
Infection by *Psittacine circoviral* (beak and feather) disease affecting endangered psittacine species and populations	✓	✓			✓

Listed Key Threatening Process (as described in the final determination of the Scientific Committee to list the threatening process)	*TSC Act*	*EPBC Act*	*Is the development or activity proposed of a class of development or activity that is recognised as a threatening process?*		
			Likely	*Possible*	*Unlikely*
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	✓	✓			✓
Infection of native plants by *Phytophthora cinnamomi*	✓	✓			✓
Introduction and Establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae	✓				✓
Introduction of the large earth bumblebee (*Bombus terrestris*)	✓				✓
Invasion and establishment of exotic vines and scramblers	✓				✓
Invasion and establishment of Scotch broom (*Cytisus scoparius*)	✓				✓
Invasion and establishment of the Cane Toad (*Bufo marinus*)	✓	✓			✓
Invasion, establishment and spread of *Lantana camara*	✓				✓
Invasion of native plant communities by African Olive (*Olea europaea L. subsp. cuspidata*)	✓				✓
Invasion of native plant communities by *Chrysanthemoides monilifera* (bitou bush and boneseed)	✓				✓
Invasion of native plant communities by exotic perennial grasses	✓	✓		✓	
Invasion of the yellow crazy ant (*Anoplolepis gracilipes* (Fr. Smith)) into NSW	✓				✓
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants		✓		✓	
Loss of biodiversity and ecosystem integrity following invasion by the Yellow Crazy Ant (*Anoplolepis gracilipes*) on Christmas Island, Indian Ocean		✓			✓
Loss of hollow-bearing trees	✓				✓
Loss or degradation (or both) of sites used for hill-topping by butterflies	✓				✓
Predation and hybridisation of feral dogs (*Canis lupus familiaris*)	✓				✓
Predation by exotic rats on Australian offshore islands of less than 1,000 km^2 (100,000 ha)		✓			✓
Predation by the European red fox (*Vulpes vulpes*)	✓				✓
Predation by the feral cat (*Felis catus*)	✓	✓			✓

Listed Key Threatening Process (as described in the final determination of the Scientific Committee to list the threatening process)	*TSC Act*	*EPBC Act*	*Is the development or activity proposed of a class of development or activity that is recognised as a threatening process?*		
			Likely	*Possible*	*Unlikely*
Predation by *Gambusia holbrooki* Girard, 1859 (Plague Minnow or Mosquito Fish)	✓				✓
Predation by the Ship Rat (*Rattus rattus*) on Lord Howe Island	✓				✓
Predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*)	✓	✓			✓
Removal of dead wood and dead trees	✓			✓	

The main KTP listed under the TSC Act which the proposal may contribute to include clearing of native vegetation.

Clearing of native vegetation is defined as the destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation so as to result in the loss, or long term modification, of the structure, composition and ecological function of stand or stands (DECCW undated). The proposal would contribute to this process by requiring the removal of up approximately 10 native trees from within the project footprint.

However the extent to which the proposal contributes to this threatening process is not considered likely to place the local occurrence of this EECs at significant risk of local extinction.

Removal of dead wood and dead trees includes: the removal of forest and woodland waste left after timber harvesting, collecting fallen timber for firewood, burning on site, mulching on site, the removal of fallen branches and litter as general tidying up, and the removal of standing dead trees. The incremental extent to which the proposal may contribute to this impact is unlikely to place the local occurrence of the subject EEC and associated fauna at significant risk of local extinction.

Anthropogenic climate change is evidence that modification of the environment by humans may result in future climate change. Human induced activities as a result of energy use, industrial processes, solvent and other product use, agriculture, land use change and forestry, and waste cause greenhouse gas emissions (DECCW undated). The incremental extent to which the proposal may contribute to anthropogenic climate change is unlikely to alone put the local population of the subject EECs at significant risk of local extinction.

The proposal is not considered likely to significantly contribute to any other KTP, especially with effective implementation of the safeguards provided in Section 5.

Conclusion

The proposal would result in the direct removal of Swamp Oak Floodplain Forest EEC. However relative to the extent of this community locally and existing habitat degradation and threats imposed by historic disturbances and landuse activities locally (such as weed invasion); the proposal is considered unlikely to have a significant impact on the local occurrence of the subject EEC with effective implementation of the mitigation measures detailed in this report.

Weeping Paperbark

a) in the case of a threatened species, whether the action proposed 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,

Weeping Paperbark has a restricted distribution in NSW and occurs in open eucalypt forest on poorly drained soils (usually clay, sandstone or alluvial soils). Flowering occurs between spring and summer.

Threatening processes for this species include:

- Clearing of habitat for agriculture and development.
- Fire, particularly when too frequent to allow regeneration.
- Grazing by domestic stock.
- Invasion of habitat by weeds particularly introduced grasses.
- Plantation development and logging activities.
- Road-works, including grading and slashing.
- Risk of local extinction because populations are small and may also lack genetic diversity.

Potential Impacts from the Proposal

No Weeping Paperbark will be directly removed for the proposed works; additional isolated trees and small patches of Weeping Paperbark on private land adjacent to the works are isolated from the works footprint and there is little chance of any direct or indirect impacts to these trees. On this basis it would be highly unlikely that an adverse effect on the life cycle of Weeping Paperbark would occur 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 population, whether the action proposed 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,

No endangered populations are likely to occur; consideration under this part of the assessment is not required.

c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(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,

Impacts on endangered ecological communities occur are addressed in a separate assessment.

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

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

No Weeping Paperbark will be removed for the proposed works.

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

The proposal would not further fragment available habitat for Weeping Paperbark in the locality.

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

The habitat to be removed is of minor value for the life cycle requirements of Weeping Paperbark.

e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No areas of critical habitat listed under the TSC Act occur within the locality.

f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

Part 4 of the TSC Act states *"The object of a recovery plan is to promote the recovery of the threatened species, population or ecological community to which it relates to a position of viability in nature."* Any action which adversely affects threatened species or their habitat, or contributes to relevant key threatening processes (KTP) may be interpreted as being inconsistent with this general objective. Specific recovery and threat abatement strategies are discussed below.

An approved recovery plan has not been prepared under the TSC Act for the Weeping Paperbark. The proposal does not affect the aims or proposed actions of any threat abatement plan or recovery actions in the *Save our Species* program prepared for Weeping Paperbark.

g) whether the action proposed 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.

A threatening process is defined under the TSC Act as a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities. The current list of key threatening processes under the TSC Act, and whether the proposal is recognised as a threatening process is shown in **Table D.2**.

Table D.2 Key Threatening Processes

Listed Key Threatening Process (as described in the final determination of the Scientific Committee to list the threatening process)	*Is the development or activity proposed of a class of development or activity that is recognised as a threatening process?*		
	Likely	*Possible*	*Unlikely*
Alteration of habitat following subsidence due to longwall mining			✓
Aggressive exclusion of birds by noisy miners			✓
Alteration of habitat following subsidence due to longwall mining			✓
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands			✓
Anthropogenic climate change			✓
Bush rock removal			✓
Clearing of native vegetation	✓		
Competition and grazing by the feral European Rabbit			✓
Competition and habitat degradation by feral goats			✓
Competition from feral honeybees			✓
Death or injury to marine species following capture in shark control programs on ocean beaches			✓
Entanglement in or ingestion of anthropogenic debris in marine and estuarine environments			✓
Forest Eucalypt dieback associated with over-abundant psyllids and bell miners			✓
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition			✓
Herbivory and environmental degradation caused by feral deer			✓
Importation of red imported fire ants			✓
Infection by *Psittacine circoviral* (beak and feather) disease affecting endangered psittacine species and populations			✓
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis			✓
Infection of native plants by *Phytophthora cinnamomi*			✓
Introduction and Establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae			✓
Introduction of the large earth bumblebee			✓
Invasion and establishment of exotic vines and scramblers			✓
Invasion and establishment of Scotch broom			✓
Invasion and establishment of the Cane Toad			✓
Invasion, establishment and spread of *Lantana camara*			✓
Invasion of native plant communities by African Olive			✓
Invasion of native plant communities by *Chrysanthemoides monilifera* (bitou bush and boneseed)			✓
Invasion of native plant communities by exotic perennial grasses			✓
Invasion of the yellow crazy ant into NSW			✓
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants			✓
Loss of hollow-bearing trees		✓	
Loss or degradation of sites used for hill-topping by butterflies			✓
Predation and hybridisation of feral dogs			✓
Predation by the European red fox			✓

Listed Key Threatening Process (as described in the final determination of the Scientific Committee to list the threatening process)	*Is the development or activity proposed of a class of development or activity that is recognised as a threatening process?*		
	Likely	*Possible*	*Unlikely*
Predation by the feral cat			✓
Predation by *Gambusia holbrooki*			✓
Predation by the Ship Rat on Lord Howe Island			✓
Predation, habitat degradation, competition and disease transmission by feral pigs			✓
Removal of dead wood and dead trees	✓		

KTPs that the proposal may contribute to include the clearing of native vegetation, loss of hollow-bearing trees and removal of dead wood and dead trees (as ground litter). Clearing is defined under the TSC Act as *'the destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation so as to result in the loss, or long-term modification, of the structure, composition and ecological function of stand or stands'*.

No Weeping Paperbark will be removed. The degree that the proposal would contribute to any threatening process is not considered likely to place the local population of Weeping Paperbark at significant risk of extinction.

Conclusion

It is considered unlikely that the local population of Weeping Paperbark would be placed at significant risk of extinction as a result of the proposal.

Emu population in the New South Wales North Coast Bioregion and Port Stephens local government area

Species Profile

The current known range of this population continues to contract and the species now appears to be absent from Broadwater National Park, there are few recent sightings from its former stronghold in Bundjalung National Park and it is not known whether a natural population continues to persist in the Port Stephens area.

Emus occur in a range of predominantly open lowland habitats, including grasslands, heathland, shrubland, open and shrubby woodlands, forest, and swamp and sedgeland communities, as well as the ecotones between these habitats. They also occur in plantations of tea-tree and open farmland, and occasionally in littoral rainforest. Emus are omnivorous, taking a wide range of seeds and fruits, invertebrates (mainly insects) and foliage and other plant material. They take material directly from plants or bend down to take items from the ground, picking up the food and tossing them back in the throat before swallowing.

Site and Local Occurrence

Emus are known to occur in the broader locality and utilise a wide range of habitats including open forested and grassland communities, both of which occur along the route.

(a) in the case of a threatened species, whether the action proposed 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,

No consideration under this part of the assessment is required.

(b) in the case of an endangered population, whether the action proposed 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,

The extent of clearing associated with the project comprises approximately 20-30 trees scattered along the length of the route. A small amount of understorey vegetation that would potentially provide foraging habitat for the Emu will also be disturbed. The extent of disturbance is such however that there will not be any adverse effects on the life cycle of the Emu.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(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,

No consideration under this part of the assessment is required.

(d) in relation to the habitat of a threatened species, population or ecological community:

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

The extent of clearing associated with the project comprises approximately 20-30 trees scattered along the length of the route. A small amount of understorey vegetation that would potentially provide foraging habitat for the Emu will also be disturbed. The extent of disturbance is such however that there will not be any adverse effects on the life cycle of the Emu.

Other local areas of these communities would not be directly affected and would not be substantially indirectly affected with effective implementation of the mitigation measures detailed in Section 5.

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

The extent of vegetation to be removed is such that no fragmentation of existing habitats will occur.

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

The vegetation to be removed contributes to the overall open forest structure that occurs in the immediate vicinity of the route. This forest structure is however varied and generally very open, thus the loss of 20-30 trees along the length of the route is not likely to have a significant impact on the survival of the Emu population in the locality.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No areas of critical habitat are listed under the TSC Act within the site.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

No recovery plan or threat abatement plan has been prepared for subject Emu population. The recovery planning process has now been incorporated into Priority Action Statements (PAS). The proposal would not create barriers to the implementation of the PAS for these communities.

(g) whether the action proposed 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.

A key threatening process (KTP) is defined under the TSC Act as a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities. The current list of KTPs under TSC Act and whether the proposed development is recognised as a KTP is shown in **Table D.2**.

Table D.2 Key Threatening Processes

Listed Key Threatening Process (as described in the final determination of the Scientific Committee to list the threatening process)	***TSC Act***	***EPBC Act***	***Is the development or activity proposed of a class of development or activity that is recognised as a threatening process?***		
			Likely	***Possible***	***Unlikely***
Alteration of habitat following subsidence due to longwall mining	✓				✓
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	✓				✓
Anthropogenic climate change	✓	✓			✓

Listed Key Threatening Process (as described in the final determination of the Scientific Committee to list the threatening process)	*TSC Act*	*EPBC Act*	*Is the development or activity proposed of a class of development or activity that is recognised as a threatening process?*		
			Likely	*Possible*	*Unlikely*
Bush rock removal	✓				✓
Clearing of native vegetation	✓	✓	✓		
Competition and grazing by the feral European Rabbit (*Oryctolagus cuniculus*)	✓	✓			✓
Competition and habitat degradation by feral goats (*Capra hircus*)	✓	✓			✓
Competition from feral honeybees (*Apis mellifera*)	✓				✓
Death or injury to marine species following capture in shark control programs on ocean beaches	✓				✓
Entanglement in or ingestion of anthropogenic debris in marine and estuarine environments	✓	✓			✓
Forest Eucalypt dieback associated with over-abundant psyllids and bell miners	✓				✓
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	✓				✓
Herbivory and environmental degradation caused by feral deer	✓				✓
Incidental catch (bycatch) of Sea Turtle during coastal otter-trawling operations within Australian waters north of 28 degrees South		✓			✓
Incidental catch (or bycatch) of seabirds during oceanic longline fishing operations		✓			✓
Importation of red imported fire ants (*Solenopsis invicta*)	✓	✓			✓
Infection by *Psittacine circoviral* (beak and feather) disease affecting endangered psittacine species and populations	✓	✓			✓
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	✓	✓			✓
Infection of native plants by *Phytophthora cinnamomi*	✓	✓			✓
Introduction and Establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae	✓				✓
Introduction of the large earth bumblebee (*Bombus terrestris*)	✓				✓
Invasion and establishment of exotic vines and scramblers	✓				✓
Invasion and establishment of Scotch broom (*Cytisus scoparius*)	✓				✓

Listed Key Threatening Process (as described in the final determination of the Scientific Committee to list the threatening process)	*TSC Act*	*EPBC Act*	*Is the development or activity proposed of a class of development or activity that is recognised as a threatening process?*		
			Likely	*Possible*	*Unlikely*
Invasion and establishment of the Cane Toad (*Bufo marinus*)	✓	✓			✓
Invasion, establishment and spread of *Lantana camara*	✓				✓
Invasion of native plant communities by African Olive (*Olea europaea L. subsp. cuspidata*)	✓				✓
Invasion of native plant communities by *Chrysanthemoides monilifera* (bitou bush and boneseed)	✓				✓
Invasion of native plant communities by exotic perennial grasses	✓	✓		✓	
Invasion of the yellow crazy ant (*Anoplolepis gracilipes* (Fr. Smith)) into NSW	✓				✓
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants		✓		✓	
Loss of biodiversity and ecosystem integrity following invasion by the Yellow Crazy Ant (*Anoplolepis gracilipes*) on Christmas Island, Indian Ocean		✓			✓
Loss of hollow-bearing trees	✓				✓
Loss or degradation (or both) of sites used for hill-topping by butterflies	✓				✓
Predation and hybridisation of feral dogs (*Canis lupus familiaris*)	✓				✓
Predation by exotic rats on Australian offshore islands of less than 1,000 km^2 (100,000 ha)		✓			✓
Predation by the European red fox (*Vulpes vulpes*)	✓				✓
Predation by the feral cat (*Felis catus*)	✓	✓			✓
Predation by *Gambusia holbrooki* Girard, 1859 (Plague Minnow or Mosquito Fish)	✓				✓
Predation by the Ship Rat (*Rattus rattus*) on Lord Howe Island	✓				✓
Predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*)	✓	✓			✓
Removal of dead wood and dead trees	✓			✓	

The main KTP listed under the TSC Act which the proposal may contribute to includes clearing of native vegetation.

Clearing of native vegetation is defined as the destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation so as to result in the loss, or long term modification, of the structure, composition and ecological function of stand or stands (DECCW undated). The proposal would contribute to this process by requiring the removal of up between 20-30 native trees from within the project footprint.

However the extent to which the proposal contributes to this threatening process is not considered likely to place the local occurrence of the emu population at significant risk of local extinction.

Removal of dead wood and dead trees includes: the removal of forest and woodland waste left after timber harvesting, collecting fallen timber for firewood, burning on site, mulching on site, the removal of fallen branches and litter as general tidying up, and the removal of standing dead trees. The incremental extent to which the proposal may contribute to this impact is unlikely to place the local occurrence of the subject Emu population at significant risk of local extinction.

Anthropogenic climate change is evidence that modification of the environment by humans may result in future climate change. Human induced activities as a result of energy use, industrial processes, solvent and other product use, agriculture, land use change and forestry, and waste cause greenhouse gas emissions (DECCW undated). The incremental extent to which the proposal may contribute to anthropogenic climate change is unlikely to alone put the local population of the subject Emu population at significant risk of local extinction.

The proposal is not considered likely to significantly contribute to any other KTP, especially with effective implementation of the safeguards provided in Section 5.

Conclusion

The proposal would result in the direct removal of 20-30 trees from within the road reserve area and a limited amount of understorey vegetation. The limited extent of vegetation removal is such that the proposal is considered unlikely to have a significant impact on the local occurrence of the endangered emu population, particularly with the effective implementation of the mitigation measures detailed in this report.

Threatened Species

The study area habitat values and extent of local population per species/ species group are detailed below. To minimise repetition, the responses to the seven-part tests are structured as follows:

- Part (a), (d), (f) and (g) are answered per species or as a collective group of species depending on the nature of impacts.
- Part (b) deals specifically with Endangered Populations and is only relevant to the subject threatened species listings.
- Part (c) deals specifically with EECs, hence is not relevant to this threatened fauna species assessment.
- Part (e) deals with Critical Habitat which is not relevant to the subject species/ proposed works.

The following information on the subject species is summarised from the OEH threatened species profiles (OEH 2016), unless otherwise referenced.

Aves

Bush Stone-curlew *(Burhinus grallarius)*

The Bush Stone-curlew is listed as an endangered species under Schedule 2 of the TSC Act.

The Bush Stone-curlew occurs in all but the most arid locations of Australia and does not occur in Tasmania. It inhabits open forest and grassy woodlands. It forages at night for insects and small vertebrates including lizards, frogs, snakes and mice.

The Bush Stone-curlew breeds in spring and summer and nests on the ground at this time. It lays up to two eggs and the chicks can fly after about 9 weeks. Its main threats are foxes, cats, trampling of eggs by cattle, clearance of woodlands and the modification of suitable habitats.

Black-chinned Honeyeater (eastern subspecies) *(Melithreptus gularis gularis)*

The range of the Black-chinned Honeyeater (eastern subspecies) extends south from central Queensland, through NSW, Victoria into south eastern South Australia. In NSW it is rarely recorded east of the Great Dividing Range, although regularly observed from the Richmond and Clarence River areas.it is widespread, it is however widespread west of the Great Dividing Range.

River sheoaks are considered nesting habitat, otherwise it occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (*Eucalyptus sideroxylon*), White Box (*E. albens*), Inland Grey Box (*E. microcarpa*), Yellow Box (*E. melliodora*), Blakely's Red Gum (*E. blakelyi*) and Forest Red Gum (*E. tereticornis*).

Grey-crowned Babbler (eastern subspecies) (*Pomatostomus temporalis temporalis)*

In NSW, the eastern sub-species occurs on the western slopes of the Great Dividing Range, and on the western plains reaching as far as Louth and Balranald. It also occurs in woodlands in the Hunter Valley and in several locations on the north coast of NSW. It may be extinct in the southern, central and New England tablelands.

Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Woodlands on fertile soils in coastal regions. The species lives in family groups that consist of a breeding pair and young from previous breeding seasons. A group may consist of up to fifteen birds. They feed on invertebrates, either by foraging on the trunks and branches of eucalypts

and other woodland trees or on the ground, digging and probing amongst litter and tussock grasses. The Grey-crowned Babbler builds and maintain several conspicuous, dome-shaped stick nests about the size of a football. A nest is used as a dormitory for roosting each night. Nests are usually located in shrubs or sapling eucalypts.

Diamond Firetail *(Stagonopleura guttata)*

The Diamond Firetail is endemic to south-eastern Australia, extending from central Queensland to the Eyre Peninsula in South Australia. It is widely distributed in NSW, with a concentration of records from the Northern, Central and Southern Tablelands, the Northern, Central and South Western Slopes and the North West Plains and Riverina and often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland.

Found in grassy eucalypt woodlands, open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Nests are globular structures built either in the shrubby understorey, or higher up, especially under hawk's or raven's nests.

Study Area Habitat Values

All subject species

Habitat values offered by vegetation within the site is provided primarily by the mature forest trees that occur. Understorey and low-stratum vegetation is generally limited to introduced grasses and herbs, although some areas do have occasional native shrubs and regrowth trees.

Being mobile, each of the subject species would forage on resources within a broad area, including suitable habitats along the route. The local population of each of the subject species would therefore include all individuals within the region that are capable of incorporating the site within their foraging range and breeding with each other. This local population extent is likely to extend into suitable habitats >10 km from the site (i.e. well outside of the study area).

Grey-headed Flying-fox (*Pteropus poliocephalus*)

The following information on the subject species is summarised rom the OEH threatened species profiles (OEH 2016), unless otherwise referenced.

The Grey-headed Flying-fox is listed as a vulnerable species under Schedule 2 of the TSC Act and Federally under the EPBC Act.

Grey-headed Flying-foxes have a distribution that typically extends approximately 200 km from the coast of Eastern Australia, from Rockhampton in Queensland to Adelaide in South Australia.

Foraging areas include subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. They feed on the nectar and pollen of native trees, in particular *Eucalyptus, Melaleuca* and *Banksia*, and fruits of rainforest trees and vines, as well as from cultivated gardens and orchards. 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. Individual camps may have tens of thousands of animals and are used for mating, and for giving birth and rearing young. Annual mating commences in January and conception occurs in April or May; a single young is born in October or November. Site fidelity to camps is high; some camps have been used for over a century. Can travel up to 50 km from the camp to forage; commuting distances are more often <20 km.

Eby and Law (2008) have identified 10 trees that are key foraging resource for the Grey-headed Flying-fox in north-east NSW, consisting of Swamp Mahogany (*Eucalytus robusta*), Coastal Blackbutt (*E. pilularis*), Grey Ironbark (*E. siderophloia*), Forest Red Gum (*E. tereticornis*), Spotted Gum (*Corymbia variegata*), Large-leaved Spotted Gum (*C. henryi*), Red Bloodwood (*C. gummifera*), Pink Bloodwood (*C. intermedia*), Broad-leaved Paperbark (*Melaleuca quinquenervia*) and Silky Oak (*Grevillea robusta*).

Study Area Habitat Values

The dry open forest community along the route provides potential foraging habitat for the local Grey-headed Flying-fox population. This species has an extensive foraging range and would utilise flowering resources throughout the broader locality on an opportunistic basis, dependent on local resource availability. The dry open forest community along the route is not known or likely to constitute significant permanent or temporary roosting habitat for this species.

There are no separate or distinct populations of Grey-headed Flying-fox due to the constant genetic exchange and movement between camps throughout the species' entire geographic range. This indicates that there is one single interbreeding population (DoE 2015).

Eastern Freetail Bat (*Mormopterus norfolkensis)*, Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris),* Greater Broad nosed Bat *(Scoteanax rueppellii),* Hoary Wattled Bat *(Chalinolobus nigrogriseus),* Northern Freetail-bat *(Mormopterus lumsdenae),* Large-footed Myotis (*Myotis macropus),* Eastern Long-eared Bat *(Nyctophilus bifax)*

The following information on the subject species is summarised rom the OEH threatened species profiles (OEH 2016), unless otherwise referenced.

Eastern Freetail Bat

The Eastern Freetail Bat is listed as a vulnerable species in Schedule 2 of the TSC Act.

The Eastern Freetail Bat is found along the east coast of Australia from southern Queensland to southern New South Wales. Primary habitat is dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in man-made structures. Usually solitary but also recorded roosting communally, probably insectivorous.

Yellow-bellied Sheathtail-bat

The Yellow-bellied Sheathtail-bat is listed as a vulnerable species in Schedule 2 of the TSC Act.

The Yellow-bellied Sheathtail-bat roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, it flies high and fast over the forest canopy, but lower in more open country. It forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. Breeding has been recorded from December to mid-March, when a single young is born. Seasonal movements are unknown; there is speculation about a migration to southern Australia in late summer and autumn.

Greater Broad-nosed Bat

The Greater Broad-nosed Bat is listed as a vulnerable species in Schedule 2 of the TSC Act.

The Greater Broad-nosed Bat is distributed from north-eastern Victoria to the Atherton Tableland, occurring in coastal and sub-coastal regions (below 500 m elevation). This species utilises a variety of

habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings. Forages after sunset, flying slowly and directly along creek and river corridors at an altitude of 3 - 6 m. Open woodland habitat and dry open forest suits the direct flight of this species as it searches for beetles and other large, slow-flying insects; this species has been known to eat other bat species. Little is known of its reproductive cycle, however a single young is born in January; prior to birth, females congregate at maternity sites located in suitable trees, where they appear to exclude males during the birth and raising of a single young.

Hoary Wattled Bat

In New South Wales the species occurs from lower Richmond and Clarence River areas extending from near Murwillumbah in the north.

It occurs in dry open forest favouring forest dominated by Spotted Gum, boxes and ironbarks. It prefers forest types with naturally low levels of understorey development.

Northern Free-tail Bat

The Northern Freetail-bat is widely distributed across northern Australia from Western Australia to Queensland, extending south to the north-east corner of NSW. The only confirmed record in NSW is of a colony found in the roof of a house in Murwillumbah, however, calls have been detected from a few other locations in the far north east of the State.

The species occurs in a range of vegetation types in northern Australia, from rainforests to open forests and woodlands, and are often recorded along watercourses. They can also occur in towns and cities. The Northern Free-tail Bat roost mainly in tree hollows but relatively large colonies have been found under house roofs in urban areas in Queensland.

Large-footed Myotis

This species distribution is primarily coastal and has been recorded from a wide variety of habitats provided they are in close proximity to water. This species has been recorded from Mangroves, *Melaleuca* swamps, rainforest, open woodland and wet and dry sclerophyll forest (Churchill 1998). Large-footed Myotis utilise bodies of water where they forage individually or hunt together over the water. Colonies roost during the day in caves, mines, tunnels, tree-hollows, disused bird nests, and under bridges and buildings.

Eastern Long-eared Bat

The Eastern Long-eared Bat is listed as a vulnerable species in Schedule 2 of the TSC Act.

In NSW, the Eastern Long-eared Bat appears to be confined to the coastal plain and nearby coastal ranges, extending south to the Clarence River area, with a few records further south around Coffs Harbour. The species can be locally common within its restricted range. They inhabit lowland subtropical rainforest and wet and swamp eucalypt forest, extending into adjacent moist eucalypt forest. Coastal rainforest and patches of coastal scrub are particularly favoured. They roost in tree hollows, the hanging foliage of palms, in dense clumps of foliage of rainforest trees, under bark and in shallow depressions on trunks and branches, among epiphytes, in the roots of strangler figs, among dead fronds of tree ferns and less often in buildings.

Study Area Habitat Values

All subject species

Dry open forest community that occurs particularly in the southern portion of the route. Hollow bearing trees within the road reserve and adjacent forest.

Koala

The Koala is listed as a vulnerable species under Schedule 2 of the TSC Act and Federally under the EPBC Act. The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In New South Wales it mainly occurs on the central and north coasts, with populations on the western side of the Great Dividing Range.

Habitat consists of eucalypt woodlands and forests, in which the Koala feeds on more than 70 eucalypt species and 30 non-eucalypt species. Preferred browse species are differ across regions. Koalas are inactive for most of the day and do most of their feeding and moving during the night. Although predominantly arboreal, Koalas will descend and traverse open ground to move between trees. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size. Generally solitary, the Koala has complex social hierarchies based on a dominant male with a territory that overlaps that of several females, with sub-ordinate males on the periphery. Females breed at two years of age and produce one young per year.

Within the Clarence Valley Council LGA there are two distinct koala populations as follows (CVC 2015):

'south and west of the LGA around Shannon Creek, Waterview Heights, Clouds Creek State Forest, and north of Nymboida; and those in the north of the LGA in the Ashby, Woombah and Iluka localities'.

Study Area Habitat Values

Various locations along the route support Forest Red Gum Swamp Box Forest which is considered primary koala habitat. The species is very unlikely to occur elsewhere along the route.

Rufous Bettong *(Aepyprymnus rufescens)*

The Rufous Bettong has a patchy distribution from Cooktown, Queensland, to north-eastern NSW as far south as Mt Royal National Park. They inhabit a variety of forests from tall, moist eucalypt forest to open woodland, with a tussock grass understorey. A dense cover of tall native grasses is the preferred shelter. They sleep during the day in cone-shaped nests constructed of grass in a shallow depression at the base of a tussock or fallen log and feed at night on grasses, herbs, seeds, flowers, roots, tubers, fungi and occasionally insects.

Study Area Habitat Values

Areas of open forest with tussocky grassy. These occur in southern portion of the route only.

(a) in the case of a threatened species, whether the action proposed 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,

Ecological Impacts of the Works

The primary ecological impact of the proposal is associated with the removal of approximately 20-30 native trees from within the road reserve. A complete list of these trees is provided in **Table 4.1**.

Of these trees, specific ecological values that would be impacted include:

- the removal of these trees would see the removal of a nectar resource for the Grey-headed Flying Fox, Black-chinned Honeyeater and a range of insects species that would comprise prey for threatened microbats and birds such as the Grey-crowned Babbler and Bush-stone Curlew.
- removal of a small area of potential foraging habitat for insectivorous threatened birds and microbats on and around the canopy of the trees.

Impacts per species/ species group are detailed below:

Black-chinned Honeyeater (eastern subspecies), Grey-crowned Babbler, Bush Stone-curlew, Diamond Firetail

The trees that are proposed for removal provide a nectar resource for the Black-chinned Honeyeater. The canopies of these trees also provide habitat for insects that are a foraging resource for the Grey-crowned Babbler. The understorey vegetation provides habitat for the Grey-crowned Babbler, Bush Stone-curlew and the Diamond Firetail. While a minor negative incremental effect, the proposal is considered unlikely to have a significant effect on the local population of any of these subject species as:

- the trees proposed for removal represent only a small fraction of similar quality foraging and roosting habitat that occurs in adjacent areas of forest at the locality that would not be impacted by the proposal and therefore available for foraging and roosting/ breeding post works;
- the subject bird species are mobile and would continue to be able to move between local habitats post works; and
- provided that the mitigations measures detailed in Section 5 of the assessment are followed, injury or mortality to any individuals of the subject birds at the site would be unlikely.

Grey-headed Flying-fox

The proposal involves the removal of trees that are a potential nectar foraging resources for the Grey-headed Flying-fox. In particular, trees proposed for removal include Spotted Gum (E. maculate) and Grey Ironbark (*E. siderophloia*), which are both recognised as key foraging resource for Grey-headed Flying-fox on the North Coast of NSW (Eby and Law 2008). While a minor negative incremental effect, the proposal is considered unlikely to have a significant effect to the local Grey-headed Flying-fox population as:

- no known roosting habitat for this species would be impacted;
- the locality includes extensive areas of similar quality potential foraging habitat for this species which would not be directly or substantially indirectly affected by the proposal;
- the Grey-headed Flying-fox is highly mobile and would continue to be able to move between local habitats post works; and

- other threats to the Grey-headed Flying-fox (e.g. power line collision) would not be increased by the proposal.

Eastern Freetail Bat (*Mormopterus norfolkensis)*, Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris),* Greater Broad nosed Bat *(Scoteanax rueppellii),* Hoary Wattled Bat *(Chalinolobus nigrogriseus),* Northern Freetail-bat *(Mormopterus lumsdenae),* Large-footed Myotis (*Myotis macropus),* Eastern Long-eared Bat *(Nyctophilus bifax)*

The trees that are proposed for removal provide habitat within and around the canopy for insects that are a foraging resource for the subject microbats. No hollow-bearing trees are proposed for removal. While a minor negative incremental effect, the proposal is considered unlikely to have a significant effect on the local population of the subject microbats as:

- the trees proposed for removal represent only a small fraction of similar quality foraging and roosting habitat for microbats that occurs in adjacent areas of forest at the locality that would not be impacted by the proposal and therefore available for foraging and roosting/ breeding post works;
- the subject microbats are mobile and would continue to be able to move between local habitats post works; and
- provided that the mitigations measures detailed in Section 5 of the assessment are followed, injury or mortality to any individuals of the subject microbats at the site would be unlikely.

Koala

The trees that are proposed for removal do not include any preferred Koala food trees, although potential exists that some of the trees to be removed may be as utilised as a 'shelter trees' on the basis that primary food trees do occur in the vicinity of the proposed route. While a minor negative incremental effect, the proposal is considered unlikely to have a significant effect on the local population of the Koala as:

- provided that mitigation measures detailed in Section 5 are followed the risk of injury or mortality directly relating to the works is considered to be low and no additional impacts relating to fragmentation of habitat and increased risk of vehicle strike would be expected related to the works; and
- other threats to the Koala (e.g. dog attack) would not be increased by the proposal.
- Overall, while the proposal may impose some minor incremental and cumulative negative effects, it is considered unlikely to have an adverse effect on the life cycle of the Koala such that a viable local population is likely to be placed at significant risk of extinction.

Rufous Bettong

The Rufous Bettong may inhabit the taller grassy understorey within the road reserve where it occurs.

These areas of habitat are fairly restricted within the road reserve due to the highly disturbed nature of this zone, however more suitable habitat does occur immediately adjacent to the road reserve in some locations.

Overall, while the proposal may impose some minor incremental and cumulative negative effects, it is considered unlikely to have an adverse effect on the life cycle of the Rufous Bettong such that a viable local population is likely to be placed at significant risk of extinction as:

- the marginal habitat proposed for removal represent only a small fraction of similar quality habitat that occurs in adjacent areas at the locality that would not be impacted by the proposal and therefore available post works; and
- provided that the mitigations measures detailed in Section 5 of the assessment are followed, injury or mortality to any individuals at the site would be unlikely.

(b) in the case of an endangered population, whether the action proposed 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,

All Subject Species

No consideration under this part of the assessment is required.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(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,

All Subject Species

No consideration under this part of the assessment is required.

(d) in relation to the habitat of a threatened species, population or ecological community:

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

All Subject Species

The extent of clearing associated with the project comprises approximately 20-30 trees scattered along the length of the route. A small amount of understorey vegetation will also be removed, however this is likely to grow back within a short space of time post works.

Other local areas of these communities would not be directly affected and would not be substantially indirectly affected with effective implementation of the mitigation measures detailed in Section 5.

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

All Subject Species

Vegetation to be removed occurs as scattered individual trees or small stands of trees along the length of the route. Although this amount of vegetation removal is considered an incremental negative effect and to some degree does contribute to fragmentation of habitats, overall, the proposal is considered unlikely to result in significant habitat fragmentation or isolation for the subject species.

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

All Subject Species

The proposal is considered unlikely to result in a significant decrease in the availability of habitat locally. Considering this and that the proposal is considered unlikely to have an adverse effect on the life cycle of any of the subject species such that a viable local population is likely to be placed at risk of extinction (refer to response to *(a)*); the habitat affected by the proposal is not considered significant to the long-term survival of the subject species in the locality.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

All Subject Species

None of the subject species have areas of critical habitat listed under the TSC Act. In addition to this, no areas of critical habitat are listed under the TSC Act that occur within the study area.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

All Subject Species - Introduction

Part 4 of the TSC Act states "*The object of a recovery plan is to promote the recovery of the threatened species, population or ecological community to which it relates to a position of viability in nature*." Any development which adversely affects threatened species or their habitat, or contributes to relevant key threatening processes may be interpreted as being inconsistent with this general objective. However the extent to which the proposal contributes to threats of the subject species is unlikely to interfere with the recovery of any of the subject species. Specific recovery and threat abatement strategies are discussed below.

Grey-headed Flying-fox

A draft recovery plan currently exists for the Grey-headed Flying-fox (DECCW 2009). The specific objectives and actions of this plan are not likely to be affected by the proposal. The proposal would not have a significant negative effect on any of the management actions for this species associated the Saving our Species program (OEH website: http://www.environment.nsw.gov.au/threatenedspeciesapp/).

Overall, the proposal is not considered significantly inconsistent with the specific objectives or actions of the relevant recovery plan or identified management actions.

Koala

An approved recovery plan currently exists for the Koala (DECC 2008). The specific objectives and actions of this plan are not likely to be affected by the proposal. The proposal would not have a significant negative effect on any of the management actions for this species associated the Saving our Species program (OEH website: http://www.environment.nsw.gov.au/threatenedspeciesapp/).

Overall, the proposal is not considered significantly inconsistent with the specific objectives or actions of the relevant recovery plan or identified management actions.

All Other Subject Species

No draft or approved recovery plans currently exists for the subject species (other than Koala and Grey-headed Flying-fox). The proposal would not have a significant negative effect on any of the

management actions for this species associated the Saving our Species program (OEH website: http://www.environment.nsw.gov.au/threatenedspeciesapp/).

Overall, the proposal is not considered significantly inconsistent with the specific objectives or actions of the relevant recovery plan or identified management actions.

(g) whether the action proposed 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.

All Subject Species

A key threatening process (KTP) is defined under the TSC Act as a process that threatens, or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities. The current list of KTPs under TSC Act, and whether the proposal is recognised as a threatening process is shown in **Table D.3**.

Table D.3 Key Threatening Processes

Listed Key Threatening Process (as described in the final determination of the Scientific Committee to list the threatening process)	***TSC Act***	***EPBC Act***	***Is the development or activity proposed of a class of development or activity that is recognised as a threatening process?***		
			Likely	***Possible***	***Unlikely***
Alteration of habitat following subsidence due to longwall mining	✓				✓
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	✓				✓
Anthropogenic climate change	✓	✓	✓		
Bush rock removal	✓				✓
Clearing of native vegetation	✓	✓	✓		
Competition and grazing by the feral European Rabbit (*Oryctolagus cuniculus*)	✓	✓			✓
Competition and habitat degradation by feral goats (*Capra hircus*)	✓	✓			✓
Competition from feral honeybees (*Apis mellifera*)	✓				✓
Death or injury to marine species following capture in shark control programs on ocean beaches	✓				✓
Entanglement in or ingestion of anthropogenic debris in marine and estuarine environments	✓	✓			✓
Forest Eucalypt dieback associated with over-abundant psyllids and bell miners	✓				✓
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	✓				✓
Herbivory and environmental degradation caused by feral deer	✓				✓

Listed Key Threatening Process (as described in the final determination of the Scientific Committee to list the threatening process)	*TSC Act*	*EPBC Act*	*Is the development or activity proposed of a class of development or activity that is recognised as a threatening process?*		
			Likely	*Possible*	*Unlikely*
Incidental catch (bycatch) of Sea Turtle during coastal otter-trawling operations within Australian waters north of 28 degrees South		✓			✓
Incidental catch (or bycatch) of seabirds during oceanic longline fishing operations		✓			✓
Importation of red imported fire ants (*Solenopsis invicta*)	✓	✓			✓
Infection by *Psittacine circoviral* (beak and feather) disease affecting endangered psittacine species and populations	✓	✓			✓
Infection of frogs by amphibian chytrid causing the disease chytridiomycosis	✓	✓			✓
Infection of native plants by *Phytophthora cinnamomi*	✓	✓			✓
Introduction and Establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae	✓				✓
Introduction of the large earth bumblebee (*Bombus terrestris*)	✓				✓
Invasion and establishment of exotic vines and scramblers	✓				✓
Invasion and establishment of Scotch broom (*Cytisus scoparius*)	✓				✓
Invasion and establishment of the Cane Toad (*Bufo marinus*)	✓	✓			✓
Invasion, establishment and spread of *Lantana camara*	✓				✓
Invasion of native plant communities by African Olive (*Olea europaea L. subsp. cuspidata*)	✓				✓
Invasion of native plant communities by *Chrysanthemoides monilifera* (bitou bush and boneseed)	✓				✓
Invasion of native plant communities by exotic perennial grasses	✓	✓		✓	
Invasion of the yellow crazy ant (*Anoplolepis gracilipes* (Fr. Smith)) into NSW	✓				✓
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants		✓			✓
Loss of biodiversity and ecosystem integrity following invasion by the Yellow Crazy Ant (*Anoplolepis gracilipes*) on Christmas Island, Indian Ocean		✓			✓

Listed Key Threatening Process (as described in the final determination of the Scientific Committee to list the threatening process)	*TSC Act*	*EPBC Act*	*Is the development or activity proposed of a class of development or activity that is recognised as a threatening process?*		
			Likely	*Possible*	*Unlikely*
Loss of hollow-bearing trees	✓				✓
Loss or degradation (or both) of sites used for hill-topping by butterflies	✓				✓
Predation and hybridisation of feral dogs (*Canis lupus familiaris*)	✓				✓
Predation by exotic rats on Australian offshore islands of less than 1000 km2 (100,000 ha)		✓			✓
Predation by the European red fox (*Vulpes vulpes*)	✓				✓
Predation by the feral cat (*Felis catus*)	✓	✓			✓
Predation by *Gambusia holbrooki* Girard, 1859 (Plague Minnow or Mosquito Fish)	✓				✓
Predation by the Ship Rat (*Rattus rattus*) on Lord Howe Island	✓				✓
Predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*)	✓	✓			✓
Removal of dead wood and dead trees	✓		✓		

Clearing of native vegetation is defined as the destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation so as to result in the loss, or long term modification, of the structure, composition and ecological function of stand or stands (OEH undated). The proposal would contribute to this KTP through removal of approximately 20-30 trees >10 cm DBH. The extent to which the proposal contributes to this KTP is not considered likely to place the local population of any of the subject species at significant risk of local extinction.

Anthropogenic Climate Change is evidence that modification of the environment by humans may result in future climate change. Human induced activities as a result of energy use, industrial processes, solvent and other product use, agriculture, land use change and forestry, and waste cause greenhouse gas emissions (OEH undated). The incremental extent to which the proposal contributes to anthropogenic climate change is unlikely to be significant.

Removal of dead wood and dead trees is a KTP which includes the removal of forest and woodland waste left after timber harvesting, collecting fallen timber for firewood, burning on site, mulching on site, the removal of fallen branches and litter as general tidying up, and the removal of standing dead trees. The proposal may be interpreted as contributing to this process during the removal of trees, either stags or living trees with dead limbs. The extent to which the proposal contributes to this threatening process is not considered likely to place the local population of any of the subject species at significant risk of local extinction.

Overall, the proposal is not considered likely to contribute significantly towards any listed KTP.

Conclusion

While the proposal would impose some negative (incremental and cumulative) effects, it is considered unlikely that the proposal would significantly adversely affect the local population viability of any of the subject species.

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Appendix B

Aboriginal Heritage Database Search (AHIMS)

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : Watermain Nth

Client Service ID : 277234

GeoLINK Consulting Pty Ltd

PO Box 1446
Coffs Harbour New South Wales 2450

Attention: Jeremy Clifford

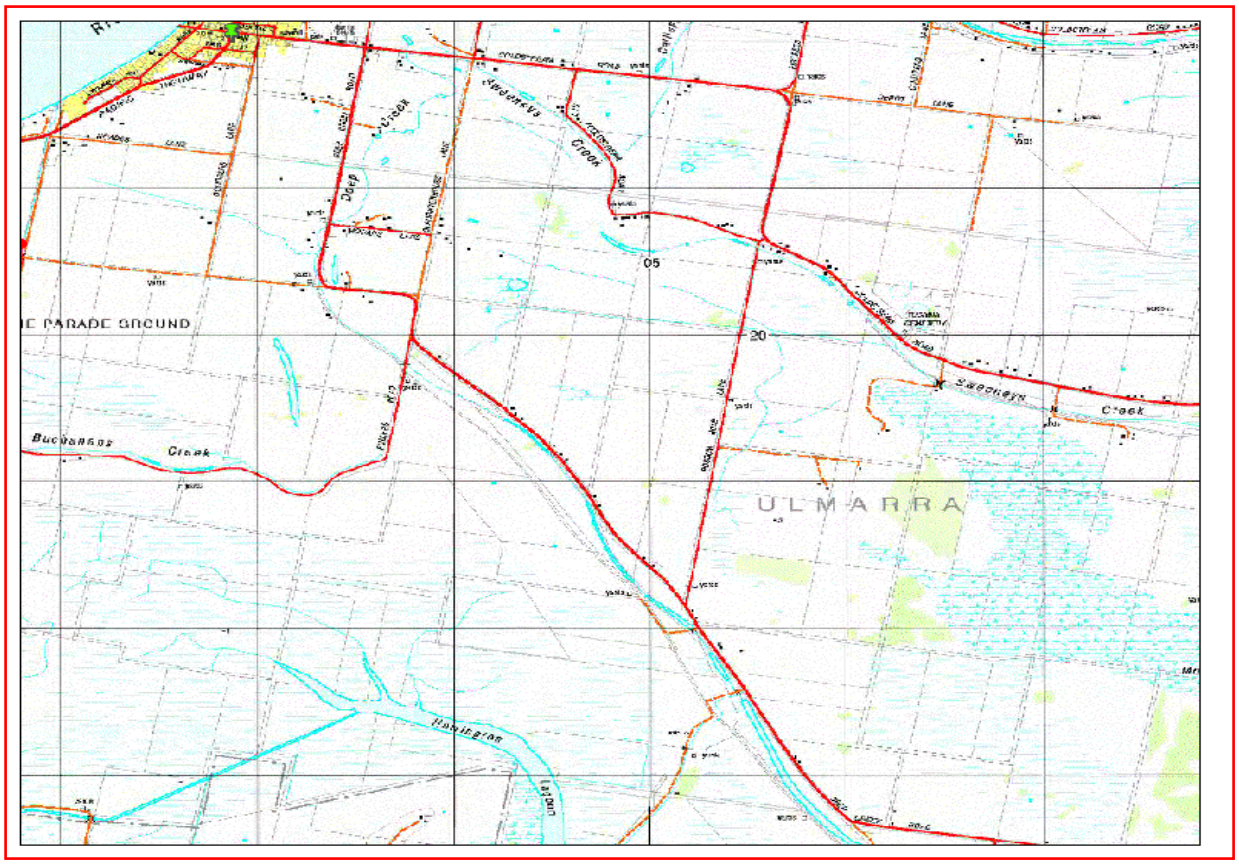
Email: jeremy.clifford@gmail.com

Date: 19 April 2017

Dear Sir or Madam:

AHIMS Web Service search for the following area at Datum :GDA, Zone : 56, Eastings : 502556 - 507015, Northings : 6716575 - 6722091 with a Buffer of 50 meters, conducted by Jeremy Clifford on 19 April 2017.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Office of Environment and Heritage and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date .Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

3 Marist Place, Parramatta NSW 2150
Locked Bag 5020 Parramatta NSW 2220
Tel: (02) 9585 6380 Fax: (02) 9873 8599

ABN 30 841 387 271
Email: ahims@environment.nsw.gov.au
Web: www.environment.nsw.gov.au

AHIMS Web Services (AWS)
Search Result

Purchase Order/Reference : Watermain south

Client Service ID : 277231

GeoLINK Consulting Pty Ltd

PO Box 1446
Coffs Harbour New South Wales 2450

Attention: Jeremy Clifford

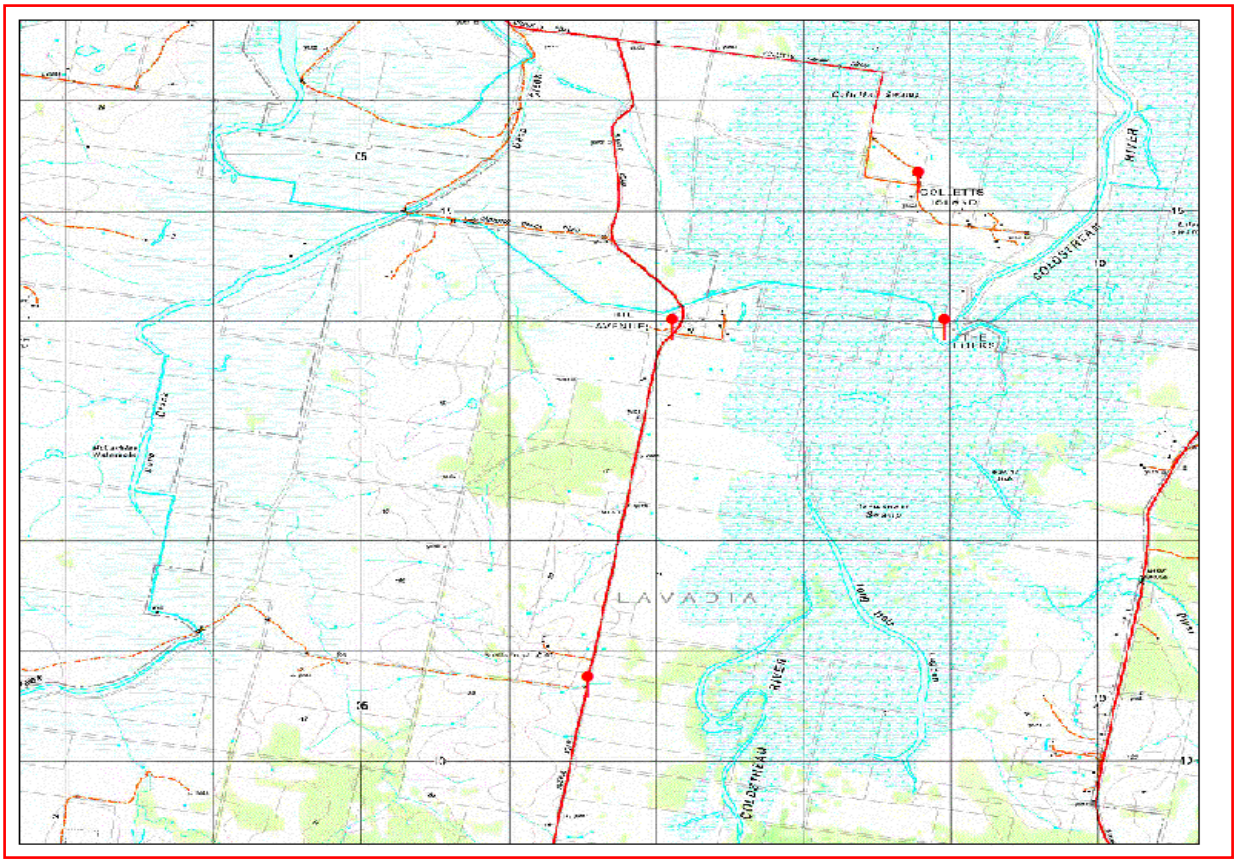
Email: jeremy.clifford@gmail.com

Date: 19 April 2017

Dear Sir or Madam:

AHIMS Web Service search for the following area at Datum :GDA, Zone : 56, Eastings : 505710 - 507643, Northings : 6709296 - 6716680 with a Buffer of 50 meters, conducted by Jeremy Clifford on 19 April 2017.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of the Office of the Environment and Heritage AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

2	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (http://www.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Office of Environment and Heritage's Aboriginal Heritage Information Unit upon request

Important information about your AHIMS search

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- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
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AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : NGCC Watermain

Client Service ID : 278584

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
13-4-0193	New Grafton Corr. Centre 1	GDA	56	506089	6710493	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Jacobs Group (Australia) Pty Ltd - Melbourne,Mr.Andrew Wilkinson					**Permits**		
13-4-0192	New Grafton Corr. Centre 2	GDA	56	506208	6709859	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Jacobs Group (Australia) Pty Ltd - Melbourne,Mr.Andrew Wilkinson					**Permits**		

Report generated by AHIMS Web Service on 28/04/2017 for Jeremy Clifford for the following area at Datum :GDA, Zone : 56, Eastings : 505710 - 507643, Northings : 6709296 - 6716680 with a Buffer of 50 meters. Additional Info : As information for a Review of Environmental Factors. Number of Aboriginal sites and Aboriginal objects found is 2