# Appendix Y

## Pipeline development biodiversity development assessment report

REGIS RESOURCES LTD

# BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT

## MCPHILLAMYS GOLD PROJECT: PIPELINE DEVELOPMENT

LITHGOW, BATHURST AND BLAYNEY LGAS

JULY 2019

**Report prepared by**

**OzArk Environment & Heritage**

**for Blakely's Environment on behalf of LFB Resources NL**


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**Acknowledgement**

OzArk acknowledge Traditional Owners of the area on which this assessment took place and pay respect to their beliefs, cultural heritage and continuing connection with the land. We also acknowledge and pay respect to the post-contact experiences of Aboriginal people with attachment to the area and to the elders, past and present, as the next generation of role models and vessels for memories, traditions, culture and hopes of local Aboriginal people.

## EXECUTIVE SUMMARY

LFB Resources NL is seeking development consent for the construction and operation of the McPhillamys Gold Project (the project), a greenfield open cut gold mine and associated water supply pipeline in the Central West of New South Wales (NSW).

Water will be supplied to the mine via a pipeline approximately 90 km long, transferring surplus water from Centennial's Angus Place Colliery (Angus Place) and Springvale Coal Services Operations (SCSO), and Energy Australia's (EA) Mt Piper Power Station (MPPS) near Lithgow, to the mine.

This Biodiversity Development Assessment Report (BDAR) relates to the pipeline development component of the project, and forms part of the Environmental Impact Statement (EIS) for the project. It documents the assessment methods, results and the initiatives built into the pipeline design to avoid, minimise and mitigate impacts to biodiversity, including entry into the Biodiversity Offset Scheme and the additional mitigation and management measures proposed to address residual impacts which cannot be avoided.

The BDAR has been prepared in accordance with the Biodiversity Assessment Methodology (BAM), and comprises three stages:

1) Desktop review of available resources;

2) Field survey, including vegetation surveys and targeted threatened species searches in accordance with the BAM; and

3) Impact assessment.

The pipeline alignment has been refined to reduce the extent of native vegetation and threatened species habitat impacted by following existing road corridors, tracks and disturbed areas. The alignment traverses cleared agricultural land and timber plantations for much of its length. The alignment also avoids hollow-bearing trees. Underboring will occur at two river crossings, The Macquarie River and Queen Charlottes Creek. This will avoid any impact to highly sensitive key fish habitat and aquatic habitat within these watercourses.

Following the application of avoidance and minimisation measures, the proposal will result in the following residual and unavoidable impacts:

- 8.51 ha of native vegetation, including 12 Plant Community Types (PCT) will be directly impacted by the proposal;
- Direct impacts on 1.17 ha of one BC Act listed endangered ecological community (White Box Yellow Box Blakely's Red Gum Woodland) and 0.28 ha of one EPBC Act listed critically endangered ecological community (CEEC) (White Box Yellow Box Blakely's Red Gum Grassy Woodland CEEC);
- Potential of direct impacts on 10 candidate threatened species, assumed to be present due to suitable habitat characteristics.

Environmental safeguards have been proposed to further mitigate the impacts associated with this proposal, including an adaptive management approach. Unavoidable impacts to native vegetation, threatened species habitat and threatened species will be offset by entering the

Biodiversity Offset Scheme. The BDAR establishes the offset obligations, in the form of biodiversity credits, of the development.

Assessments of significance were completed in accordance with the relevant criteria in EPBC Act significant impact guidelines 1.1: Matters of National Environmental Significance for the CEEC listed above and 10 EPBC Act listed threatened species. The assessments concluded that the project would not result in significant impacts.

One threatened fish listed under the FM Act has the potential to be impacted by the pipeline development, namely the Purple-spotted Gudgeon. Section 220Z of the FM Act requires the 7-part test be completed for this species. This was applied, finding no significant impact.

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# 1 INTRODUCTION

*This chapter provides the background and overview to the McPhillamys Gold Project and outlines the purpose and structure of this* Biodiversity Development Assessment Report.

## 1.1 BACKGROUND

LFB Resources NL is seeking development consent for the construction and operation of the McPhillamys Gold Project (the project), a greenfield open cut gold mine and associated water supply pipeline in the Central West of New South Wales (NSW). The project application area is illustrated at a regional scale in Figure 1-1. LFB Resources NL is a 100% owned subsidiary of Regis Resources Limited (herein referred to as Regis).

The mine development component of the project (mine development) is approximately 8 km north-east of Blayney within the Blayney and Cabonne local government areas (LGAs). This locality has a long history of alluvial and hard rock mining, with exploration for gold and base metals occurring since the mid to late 19$^{th}$ century. The mine development project boundary is illustrated in Figure 1-1 and covers the Mining Lease (ML) application area for the project as well as the parts of the project that do not require a ML. The mine development is in the upper reaches of the Belubula River catchment, within the greater Lachlan River catchment.

Water will be supplied to the mine via a pipeline approximately 90 km long, transferring surplus water from Centennial's Angus Place Colliery (Angus Place) and Springvale Coal Services Operations (SCSO), and Energy Australia's (EA) Mt Piper Power Station (MPPS) near Lithgow, to the mine. The supply of water from Angus Place, SCSO and MPPS will enable a beneficial use of otherwise surplus water and provide a reliable water source for the project. The alignment of the water supply pipeline (the pipeline development) is illustrated in Figure 1-1**.** The pipeline development traverses the LGAs of Lithgow, Bathurst and Blayney.

This Biodiversity Development Assessment Report (BDAR) relates to the pipeline development component of the project, and forms part of the Environmental Impact Statement (EIS) for the project. It documents the assessment methods, results and the initiatives built into the pipeline design to avoid, minimise and mitigate impacts to biodiversity, including entry into the Biodiversity Offset Scheme and the additional mitigation and management measures proposed to address residual impacts which cannot be avoided. The biodiversity assessment of the mine development is assessed in a separate study by EMM Consulting Pty Limited (EMM 2019).

## 1.2 PROJECT OVERVIEW

A full description of the project for which approval is sought, comprising both the mine and pipeline development, is provided in Chapter 2 of the EIS (EMM 2019). In relation to the mine development, the project is seeking approval for the development and operation of an open cut gold mine and associated infrastructure, comprising one to two years of pre-development works

and construction, approximately 10 years of mining and processing, and a closure period (including the final rehabilitation phase) of approximately two to three years, leading to a total project life of approximately 15 years. The project will involve the extraction and processing of ore to produce on average 200,000 ounces and up to 250,000 ounces per annum of product gold.

As explained in Section 1.1, this BDAR relates to the pipeline development component of the project, which comprises the construction and operation of a water supply pipeline between the mine and the Western Coalfields (Figure 1-2 to 1-9). The pipeline development will include four pumping station facilities, a pressure reducing system and communication system. Approximately 13 ML/day (up to a maximum of 15.6 ML/day) will be transferred for mining and processing operations.

**Figure 1-1: Project application area – regional setting.**

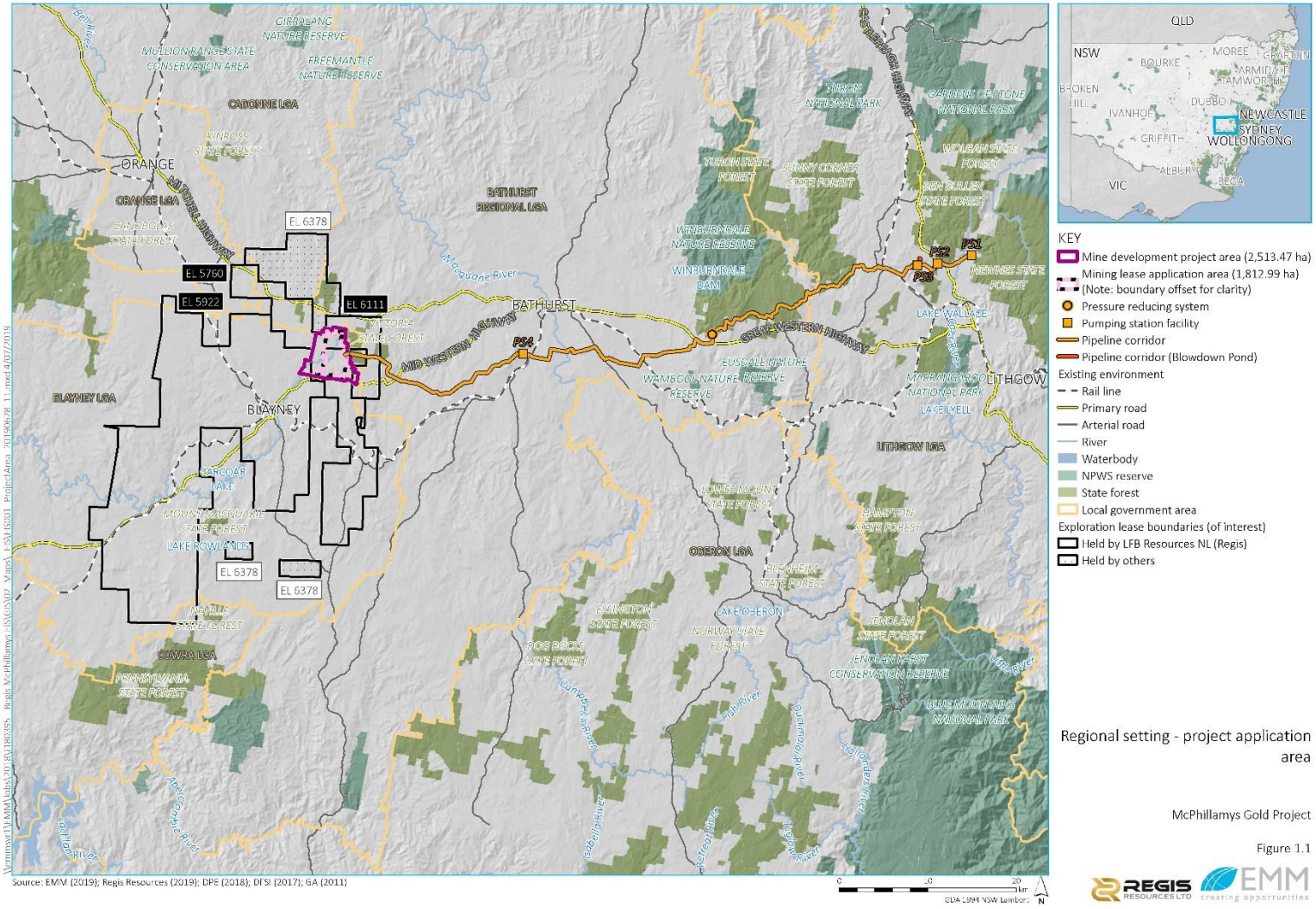


**Figure 1-2. Pipeline development overview, Map 1.**

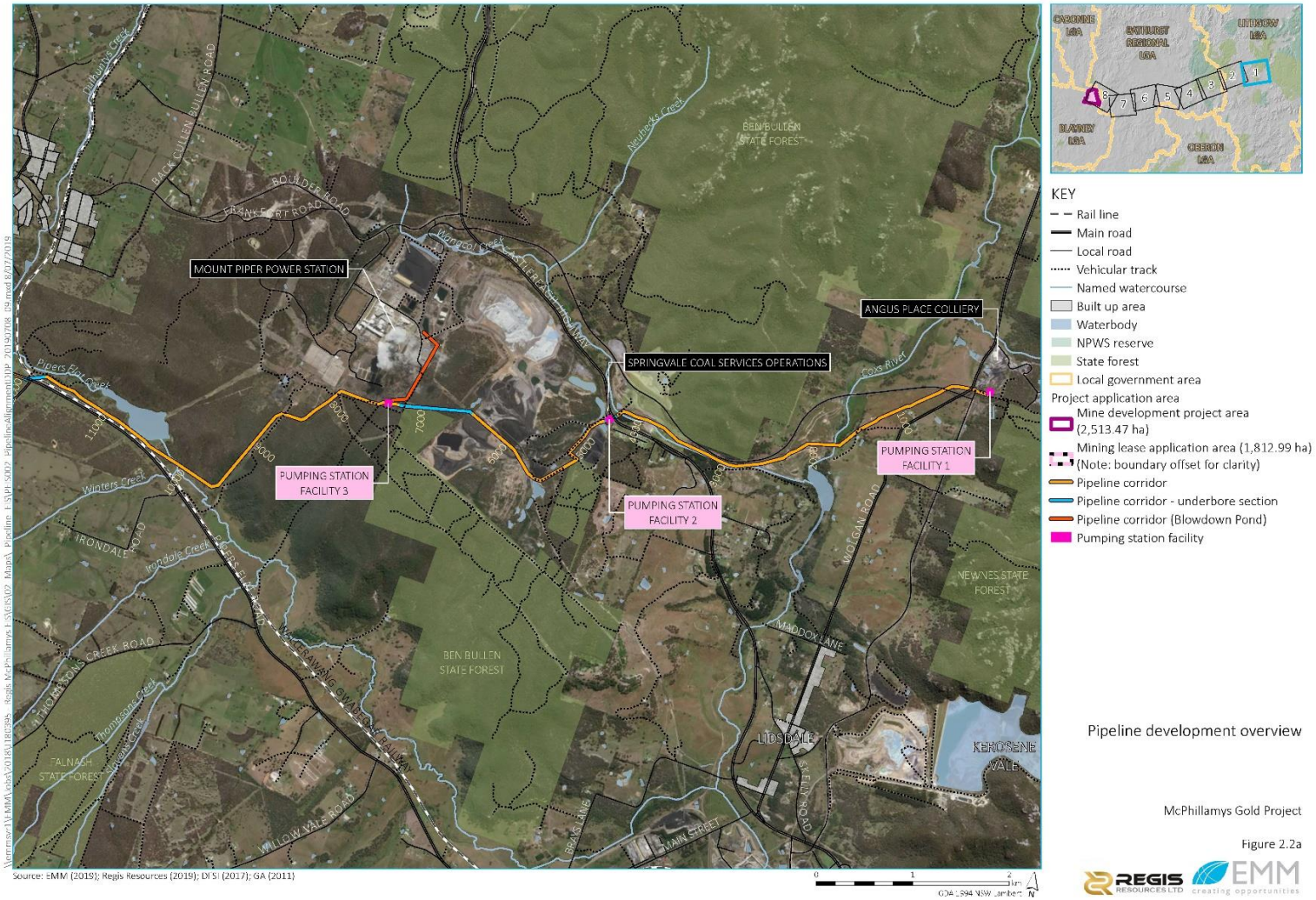


**Figure 1-3. Pipeline development overview, Map 2.**

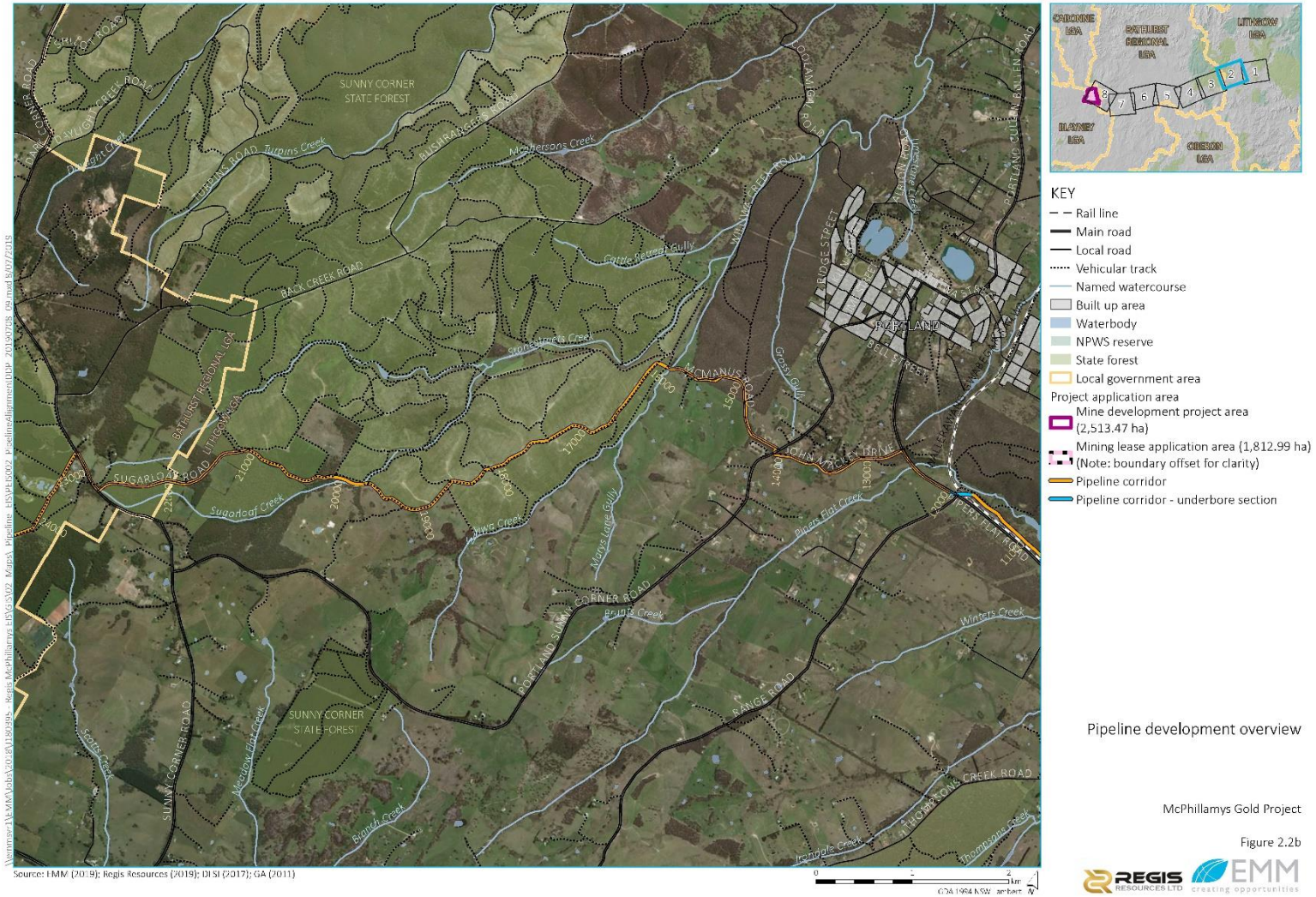


**Figure 1-4. Pipeline development overview, Map 3.**

**Figure 1-5. Pipeline development overview, Map 4.**

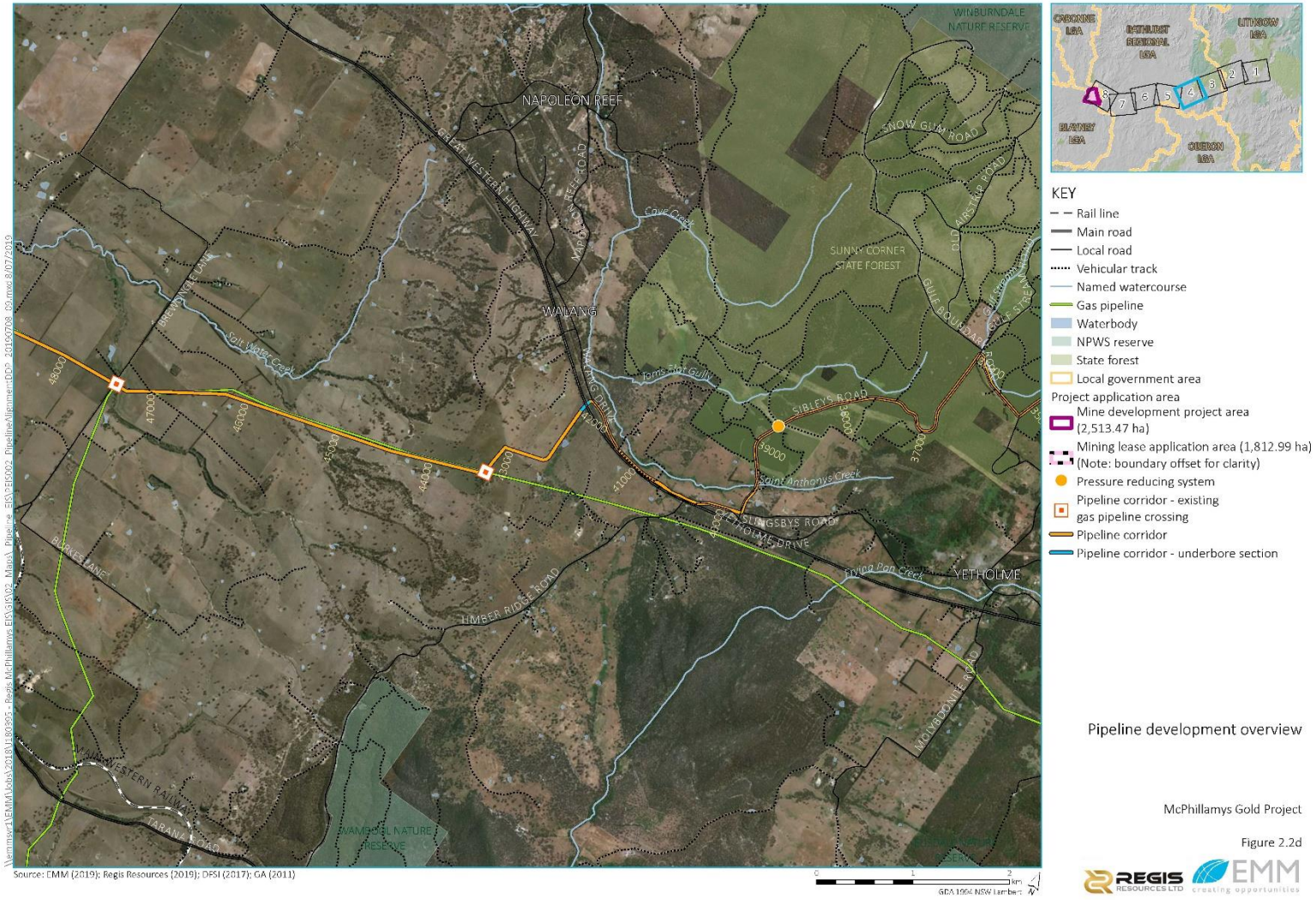


**Figure 1-6. Pipeline development overview, Map 5.**

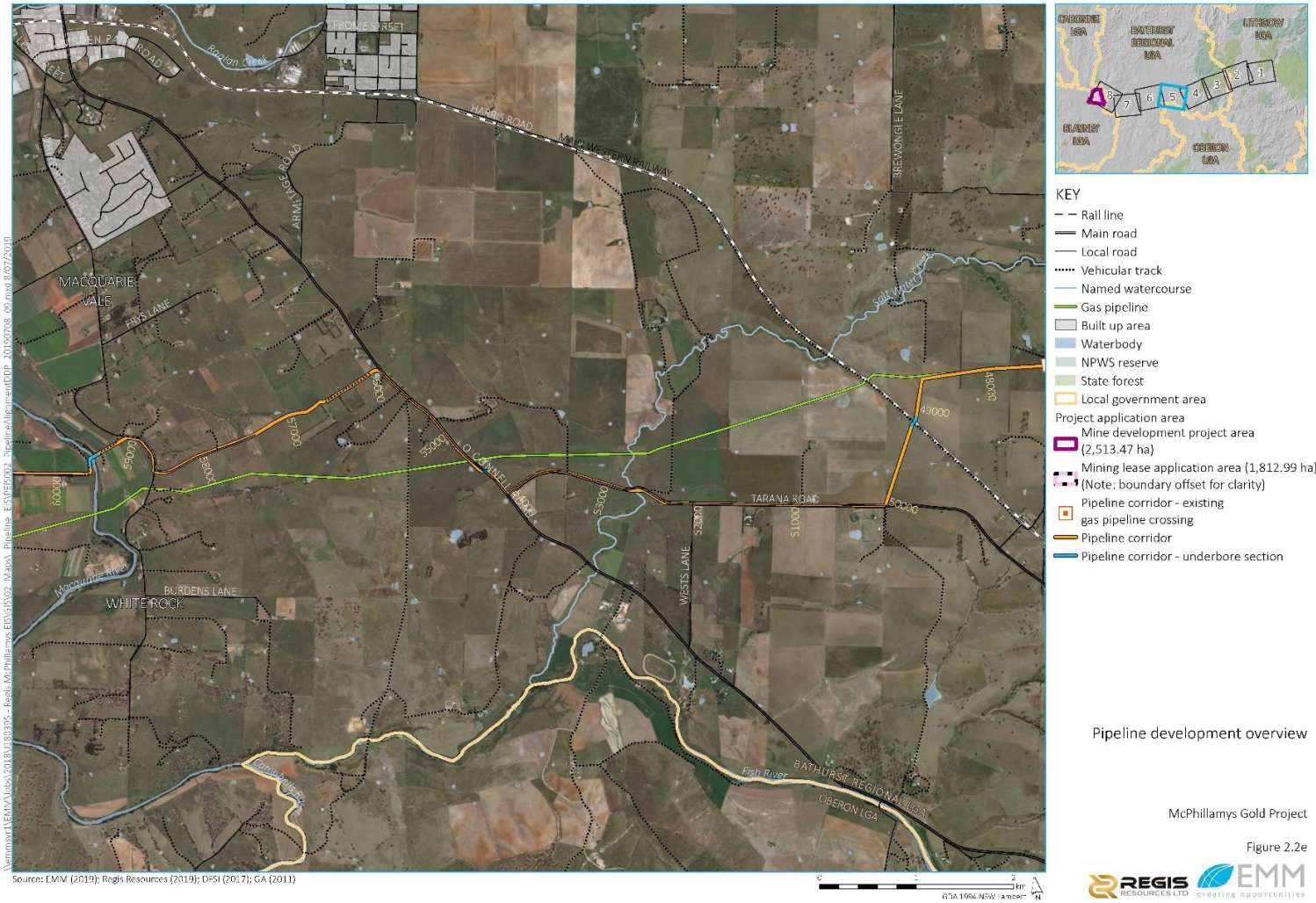


**Figure 1-7. Pipeline development overview, Map 6.**

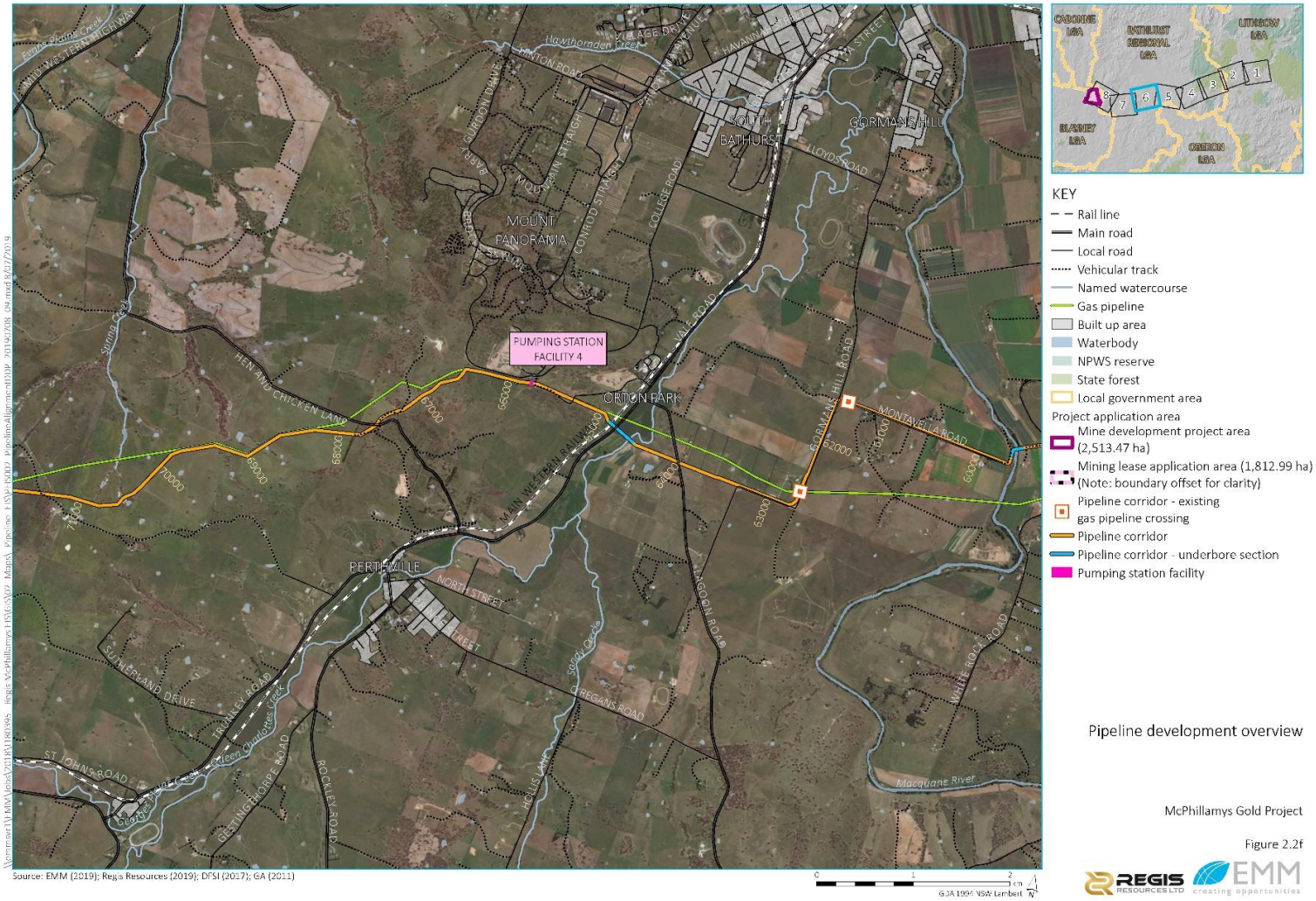


**Figure 1-8. Pipeline development overview, Map 7.**

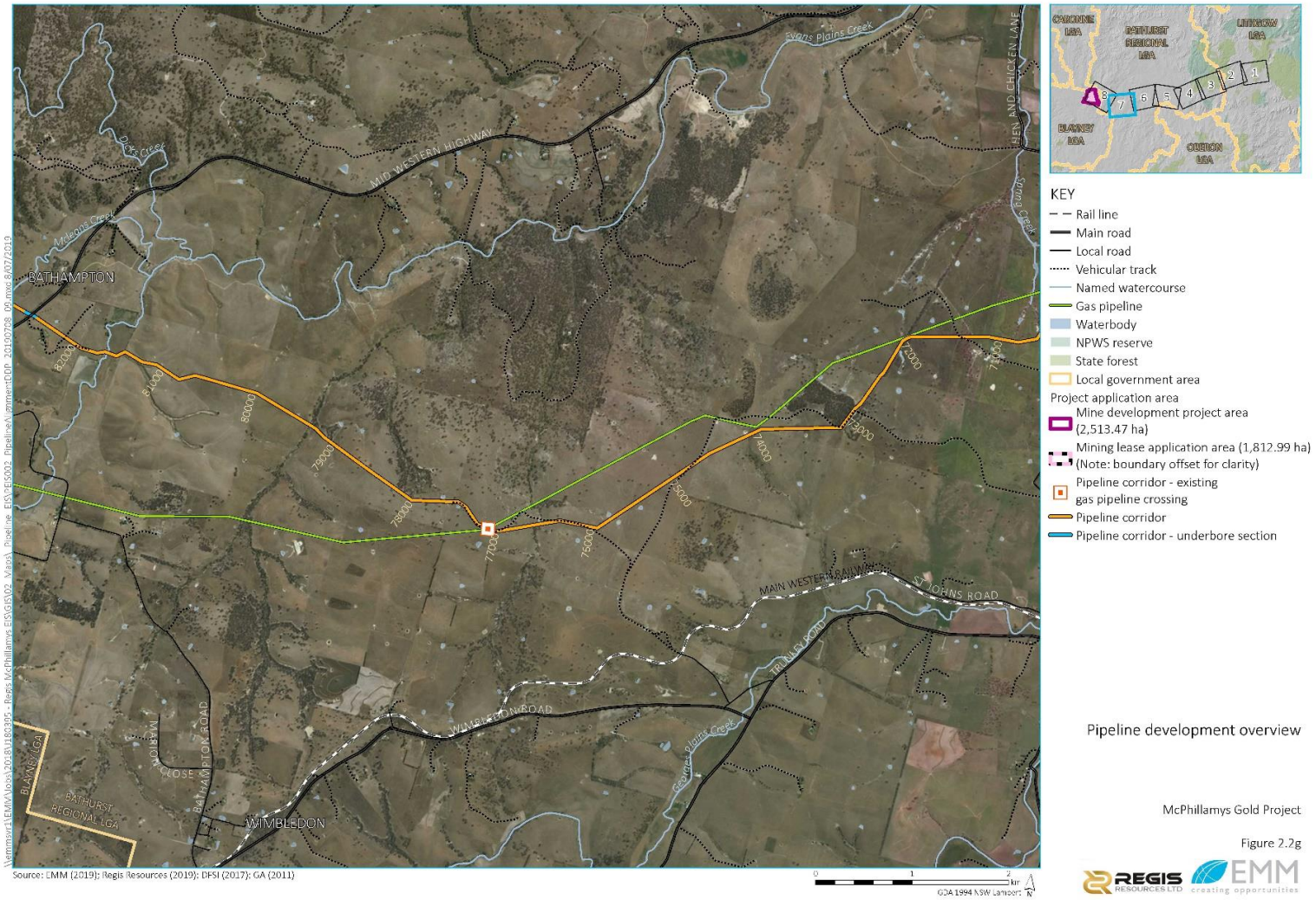
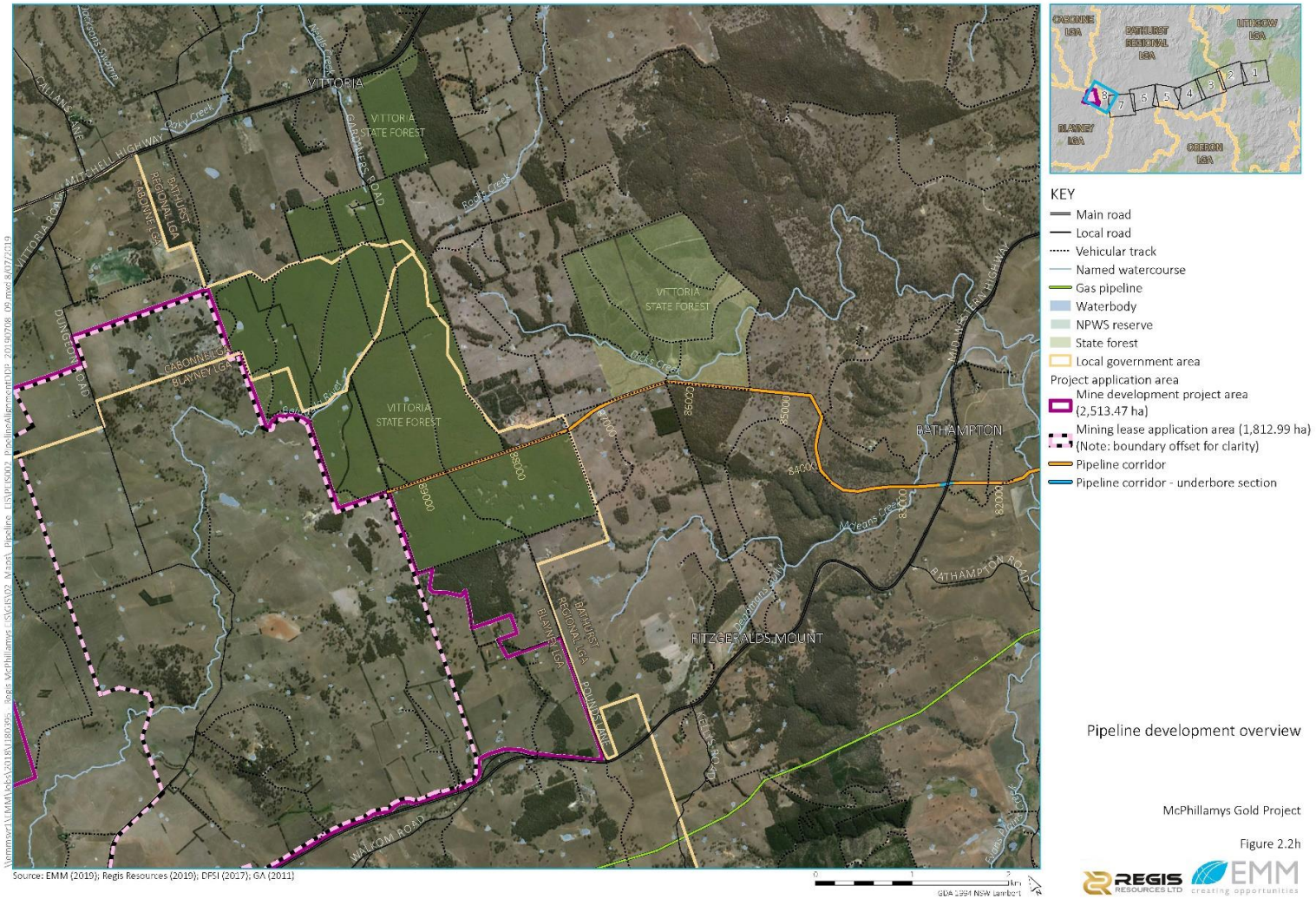


**Figure 1-9. Pipeline development overview, Map 8.**



## 1.3 ASSESSMENT REQUIREMENTS

This Biodiversity Development Assessment Report has been prepared in accordance with the following guidelines, policies and industry requirements:

- *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act)
- *Environmental Planning and Assessment Act 1979* (EP&A Act).
- *Biodiversity Conservation Act 2016* (BC Act).
- *Biodiversity Conservation Regulation 2017.*
- *Fisheries Management Act 1994* (FM Act).
- *Water Management Act 2000.*
- *Biosecurity Act 2015.*

This assessment has been prepared in accordance with requirements of the NSW Department of Planning and Environment (DPE). General requirements were set out in DPE's Environmental Assessment Requirements (EARs) for the Project, issued on 24 July 2018 and revised on 19 December 2018. The EARs identify matters which must be addressed in the EIS and essentially form its terms of reference. Table 1-1 lists individual requirements relevant to this Biodiversity Development Assessment Report and where they are addressed in this report.

Specific requirements from other government agencies are listed in Table 1-2.

**Table 1-1: Biodiversity related EARs**

| General Requirement | Section addressed |
|---|---|
| Biodiversity Development Assessment Report in accordance with s7.9 of the *Biodiversity Conservation Act 2016* (BC Act), the *Biodiversity Assessment Method* (BAM). | This report |
| Strategy to offset any residual impacts in accordance with the BC Act. | 9 |
| Assessment of the likely impacts of the development on aquatic ecology and key Fisheries issues, including aquatic biodiversity and Key Fish Habitats | 3.4, 6.2 |
| An assessment of impacts to koalas and koala habitat in accordance with *State Environmental Planning Policy No. 44 – Koala Habitat Protection* (SEPP 44) | 7.2 |
| Detailed description of the proposed regime for minimising, managing and reporting on the biodiversity impacts of the development over time | 8 |

**Table 1-2. Specific agency requirements.**

| Agency | Requirement | Section addressed |
|---|---|---|
| Department of Industry – Crown Lands and Water | Assessment of the ecological value of the riparian areas and any groundwater dependent ecosystems to be impacted within the disturbance footprint and potential impact zone of the project | 3.4<br>3.7<br>6.2 |
| Environment Protection Authority | Whether the project will significantly adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a | 3.4<br>6.1<br>6.2 |

| Agency | Requirement | Section addressed |
|---|---|---|
| | reduction in the stability of river banks or watercourses. | 8 |
| Office of Environment and Heritage | Biodiversity impacts related to the proposed McPhillamys Gold Project are to be assessed in accordance with the Biodiversity Assessment Method and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must include information in the form detailed in the Biodiversity Conservation Act 2016 (s 6.12), Biodiversity Conservation Regulation 2017 (s 6.8) and Biodiversity Assessment Method including details of the measures proposed to address the offset obligation. | All sections |
| Department of Industry – Crown Lands and Water<br>DPI Fisheries | The EIS should address impacts on Key Fish Habitats (Third order streams or larger under the Strahler Stream Order System) such as the Belubula River (Strahler fifth order stream), Tributary F (Strahler fourth order stream), and an unnamed Tributary (Strahler third order stream). | 3.4<br>3.5<br>5.1<br>6.2 |

## 1.4 STUDY AREA

The study area for this BDAR covers the pipeline corridor from Angus Place to the mine development project area. The pipeline corridor traverses various types of land including state forests, road reserves and private agricultural land.

The corridor will accommodate all components of the pipeline development including pumping station facilities and associated pipeline infrastructure. The pipeline corridor also accommodates required construction ancillary areas such as compounds, laydown and stockpile areas as well as allowance for the movement of construction machinery, equipment delivery and personal vehicles along the corridor.

The corridor width varies from approximately 6 m up to approximately 20 m in width, excluding the four pumping stations facilities. At these facilities, the corridor width extends to an area of up to 75 m by 75 m to accommodate the construction and operation of these facilities. The width of the corridor has been carefully defined in consideration of property and environmental constraints. Where there are property constraints, such as the need to avoid an existing easement, or environmental constraints such as the presence of a listed endangered ecological community (EEC), the width of the corridor has been narrowed to avoid these constraints as far as practicable to a minimum width of 6 m. In areas where there are no identified constraints the pipeline corridor is up to 20 m wide to allow the flexibility to refine the pipeline alignment during detailed design as well as to accommodate ancillary areas, such as construction compounds, during the construction phase.

The pipeline corridor and therefore the maximum direct disturbance footprint assessed in the BDAR is approximately 127 ha. The following terms are used throughout the BDAR to contextualise the study area:

- **Subject land** – is the pipeline corridor, comprising approximately 127 ha; and
- **Study area** – the buffer area within 500 m either side of the centreline of the pipeline corridor, as required under the Biodiversity Assessment Method (BAM) for linear developments.
- **Pipeline disturbance footprint:** this is the same as the pipeline corridor and represents the maximum area directly impacted by the pipeline construction, approximately 127 ha.

The pipeline corridor and study area are shown on all maps throughout this report.

## 1.5 PROPOSED PIPELINE DEVELOPMENT

The development of the pipeline between Angus Place and the mine project area will include the following aspects:

- A water supply pipeline approximately 90 km long with a nominal diameter between 300 millimetres (mm) to 650 mm. Most of the pipeline will be laid underground in a trench ranging from 1.5 to 2 m deep
- Four pumping station facilities, including water storage tanks to be located at Angus Place, SCSO, MPPS, and near Bathurst Waste Management Centre
- Blowdown pipeline, from the MPPS Blowdown Pond to the pumping station facility No.3 (MPPS). This will be approximately 800 m in length with a nominal diameter between 300 mm to 650 mm
- Pressure reducing system
- A telemetry system

Key construction activities of the pipeline development include:

- Clearing vegetation and removing and stockpiling topsoil
- Excavation of trench and preparation for pipework installation
- Casting and pouring of concrete supports and installation of valves
- Excavation of footings for pumping station facilities and pressure reducing system
- Under boring of selected road, rail and river crossings
- Erecting the structures and installation of mechanical and electrical equipment
- Backfill trench and site restoration

Key operational activities of the pipeline development would include:

- Operation and maintenance of the pumping station facilities
- Maintenance of the pipeline, the pressure reducing system and valves
- Other infrequent maintenance of the pipeline.

Note that the area covered by the Blowdown Pipeline has been previously assessed as part of the State Significant Development (SSD) consent for the Veolia Springvale Mount Piper Power Station Water Treatment Plant and subsequent modifications (SSD – 591). It has since been cleared of vegetation, although this is not shown on aerial imagery used in the mapping.

Recent imagery of the area is shown in Figure 1-2.

**Figure 1-10. Current imagery showing pumping station 2 (green square) and the Blowdown Pipeline (red line). The blowdown pipeline is located on the cleared edge of the Mount Piper Power Station Water Treatment Plant.**

# 2 METHODOLOGY

## 2.1 ASSESSMENT METHODOLOGY

This BDAR has been prepared in accordance with the NSW Biodiversity Assessment Method (BAM) (NSW Government 2017).

The assessment has been carried out in three stages:

1. Desktop assessment. Existing information sources were reviewed to contextualise the study area, identify entities for targeted surveys, predict possible constraints, refine field survey methodology and assist with assessing the impacts of the pipeline development. Information sources consulted included:

    - Spatial information and site layout information provided by the proponent;
    - State Vegetation Type Map: Central Tablelands Region V1.0;
    - Directory of Important Wetlands Australia (https://www.environment.gov.au/water/wetlands/australian-wetlands-database/directory-important-wetlands)
    - NSW Government Web Map Service (WMS) layers for NSW Imagery (compiled imagery, NSW Property, NSW Base Map and NSW Topographic Map) (http://spatialservices.finance.nsw.gov.au);
    - NSW BioNet Vegetation Classification (http://www.environment.nsw.gov.au/research/Visclassification.htm);
    - NSW Threatened Biodiversity Data Collection, including the profiles of predicted threatened species (http://www.environment.nsw.gov.au/threatenedspeciesapp/);
    - NSW BioNet Atlas (http://www.environment.nsw.gov.au/wildlifeatlas/about.htm);
    - NSW Biodiversity Values Map (https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BOSETMap);
    - Register of Declared Areas of Outstanding Biodiversity Value (AOBV) (http://www.environment.nsw.gov.au/criticalhabitat/CriticalHabitatProtectionByDoctype.htm);
    - Flora of NSW (Harden 1991-2002) and Flora NSW Online (www.plantnet.rbgsyd.nsw.gov.au);
    - Guidance to assist the decision-maker to determine a significant and irreversible impact (https://www.environment.nsw.gov.au/resources/bcact/guidance-decision-makers-determine-serious-irreversible-impact-170204.pdf);
    - Water Management (General) Regulation 2018 Hydro Line spatial data 1.0.
    - Important area mapping for Swift Parrot and Regent Honeyeater (available on request from NSW Office of Environmental and Heritage)

2. Field survey. Vegetation was surveyed according to the BAM and native vegetation classified as a Plant Community Type. Targeted surveys for a number of predicted threatened flora and fauna species were also carried out. Field survey methods are described in detail in Section 4 and Section 5. Surveys were conducted in August, September, October and December 2018 and January and May 2019.
3. Impact assessment. Data gathered in the field and desktop review was used to assess the impact of the pipeline development on native vegetation and threatened species and ecological communities. The BAM calculator was used to calculate the biodiversity credits that must be offset by the proponent.

## 2.2 SURVEY LIMITATIONS

At the time of the survey climatic conditions were dryer than average. The Bathurst Agricultural Station (Bureau of Meteorology station 63005) had received below average annual rainfall of 458 mm and 508 mm in both 2017 and 2018 respectively. This compares to the long-term average of 637 mm (Bureau of Meteorology, 2019).

Vegetation condition was symptomatic of these dry conditions, particularly during the August and September survey periods. There were few ground layer plants with low diversity of both native and non-native species. Many grasses were severely grazed, making identification difficult. As a result, detection of cryptic grasses and forbs and annual plants was difficult and vegetation integrity calculations may have been influenced by the apparent low diversity of ground layer plants present.

Although targeted surveys were carried out for some threatened fauna species, time and logistical constraints meant that adequate survey effort for some species was not possible. For example, no nocturnal searches were undertaken for amphibian species of mammals such as the Squirrel Glider. As a result, some species have been assumed as present where habitat exists on the pipeline corridor.

## 2.3 PERSONNEL

This assessment has been prepared by the personnel shown in Table 2-1.

**Table 2-1. Personnel involved in the assessment.**

| Name | Position | Qualifications / Experience |
|---|---|---|
| **Jesse Carpenter** | Senior Ecologist | • Biodiversity Assessment Methodology (BAM) accredited assessor (Certification No.: BAAS18122; Valid From: 18/07/2018 to 17/07/2021).<br>• Practising member of the NSW Ecological Consultants Association.<br>• 10 years ecological research and consulting experience in the public and private sector in New South Wales and the Northern Territory.<br>• Bachelor of Applied Science majoring in Environmental Management (University of South Australia). |
| **Dr Emma Gray** | Ecologist | • Doctor of Philosophy.<br>• Bachelor of Applied Science – Ecology – Queensland University of Technology.<br>• 4WD Training.<br>• WH&S Induction Training for Construction Work. |

# 3 LANDSCAPE FEATURES

The following section describes landscape features relevant to the pipeline development to provide context for the BDAR. Landscape features present within the study area are shown on the location and site maps (Figures 3-1 and 3.2).

## 3.1 BIOREGIONS AND MITCHELL LANDSCAPES

The study area falls predominately within the South Eastern Highlands Bioregion with a very small portion at the eastern end within the Sydney Basin Bioregion (refer to Location Maps, Figures 3.1 to 3-3), according to the Interim Biogeographic Regionalisation of Australia V7 (IBRA). This includes a total of five sub-regions across the two bioregions.

The pipeline corridor is located entirely within the South Eastern Highlands across four subregions as outlined in Table 3-1 and mapped in Figures 3-1 to 3-3. A brief description of each subregion is also given in Table 3-1.

Areas of largely homogenous landscape characteristics in NSW have been further classified by Mitchell (2002). Referred to as the Mitchell Landscapes, there are eight of these units within the study area, and six in the pipeline corridor, as described in Table 3-2 The Mitchell Landscapes of the study area are mapped in Figures 3-1 to 3-3.

**Table 3-1. Bioregions of the pipeline corridor (Thackway & Cresswell, 1995).**

| Bioregion | Subregion | Description | Area within Pipeline Corridor (ha) |
|---|---|---|---|
| South Eastern Highlands | Orange | Low hilly to hilly plateau. Yellow Box and Blakely's Red Gum with Red Stringybark and Broad-leaved Peppermint across the plateau. Ribbon Gum on lower slopes and Snow Gum in cold areas. River Oak along main streams. | 12 |
| | Bathurst | Rounded hills in granite basin surrounded by steep slopes. Streams in wide, flat valley floors. Apple Box, Yellow Box and Red Stringybark. Ribbon Gum on lower slopes. River Oak along streams. | 76 |
| | Hill End | Plateau with hilly to mountainous edges. Yellow Box, Red Box, Blakely's Red Gum on lower areas. Red Stringybark, Broad-leaved Peppermint on hills. River Oak along main streams | 61 |
| | Capertee Uplands | Not described in the literature | 31 |

**Table 3-2. Mitchell Landscapes of the study area and pipeline corridor (Mitchell, 2002).**

| Mitchell Landscape | Description | Area within pipeline corridor (ha) |
|---|---|---|
| Capertee Plateau | Wide valleys and low rolling hills below sandstone cliffs. Woodlands of Rough-barked Apple, Red Stringybark, Red Box, Yellow Box, Blakely's Red Gum with shrubby understorey in open valleys. Scribbly Gum, Red Stringybark, Red Box and Broad-leaved Ironbark on slopes. | 31 |
| Newnes Plateau | Undulating high level plateau. Woodland of stunted Scribbly Gum, Snow Gum, Blue Mountains Ash, Silvertop Ash, Grey Ironbark and Red Bloodwood. Patches of Dwarf Casuarina heath on very exposed aspects. | 0 |
| Upper Macquarie Channels and Floodplains | Narrow floodplain benches and terraces. River Oak along the channel, with open grassland with sparse Yellow Box and Blakely's Red Gum on the hills. | 6 |
| Mount Horrible Plateau | Dissected plateau and undulating hills with steep ridges. Snow Gum above 1000m. Apple Box, Mountain Gum and White Box on slopes. Red Stringybark, Broad-leaved Peppermint, Candle Bark and Brittle Gum on ridges. Yellow Box, Blakely's Red Gum and Manna Gum along watercourses. | 49 |
| Macquarie Valley Basalts | Discontinuous flat-topped peaks. Open woodland with Long-leaved Box, Mountain Gum, Red Stringybark and Narrow-leaved Peppermint. | 1 |
| Bathurst Granites | Undulating to steep hills. Woodland to open forest of Yellow Box, Broad-leaved Peppermint, Red Stringybark and White Box on ridges and slopes. Manna Gum and River Oak in valleys. Grasslands with patches of Snow Gum in cold air drainage hollows. | 81 |
| Rockley Plains | Low rolling hills on plateau surface. Mixed Eucalyptus forest and woodland including peppermints, stringybarks, Candle Bark, Brittle Gum and Snow Gum. | 12 |
| Mullion Slopes | Steep hills and strike ridges, general elevation 500 to 830m, local relief 200m. Stony uniform sand and loam in extensive rock outcrop along crests, stony red and brown texture-contrast soil on slopes, yellow harsh texture-contrast soil in valleys with some evidence of salinity. Open forest to woodland of; white gum (Eucalyptus rossii), brittle gum (Eucalyptus mannifera), broad-leaved peppermint (Eucalyptus dives), red box (Eucalyptus polyanthemos), mountain grey gum (Eucalyptus cypellocarpa), white box (Eucalyptus albens) with yellow box (Eucalyptus melliodora) on | 0 |

| Mitchell Landscape | Description | Area within pipeline corridor (ha) |
|---|---|---|
| | lower slopes and river oak (Casuarina cunninghamiana) along the streams. | |

**Figure 3-1. Location maps of the pipeline development, map 1.**

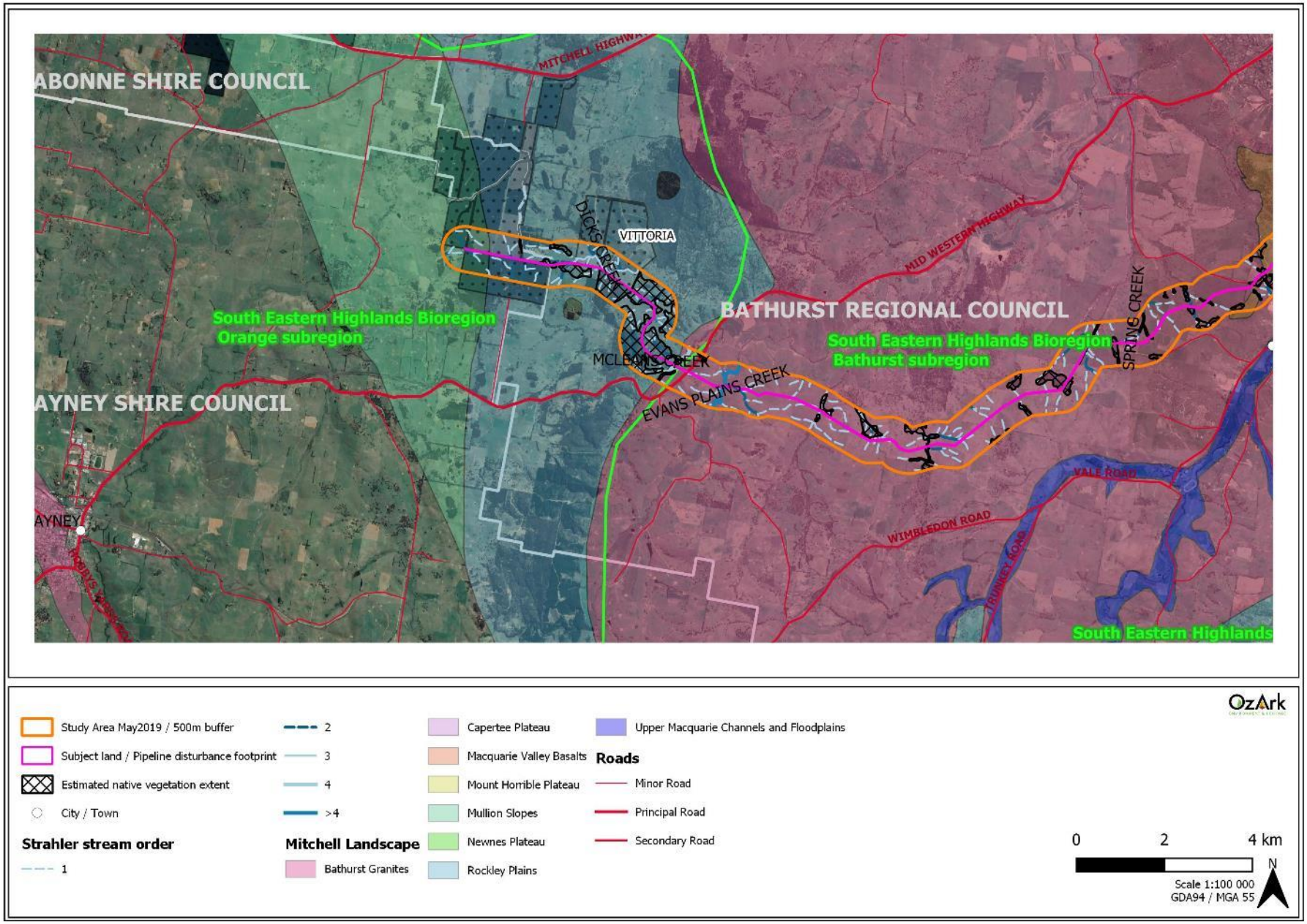


**Figure 3-2. Location maps of the pipeline development, map 2.**

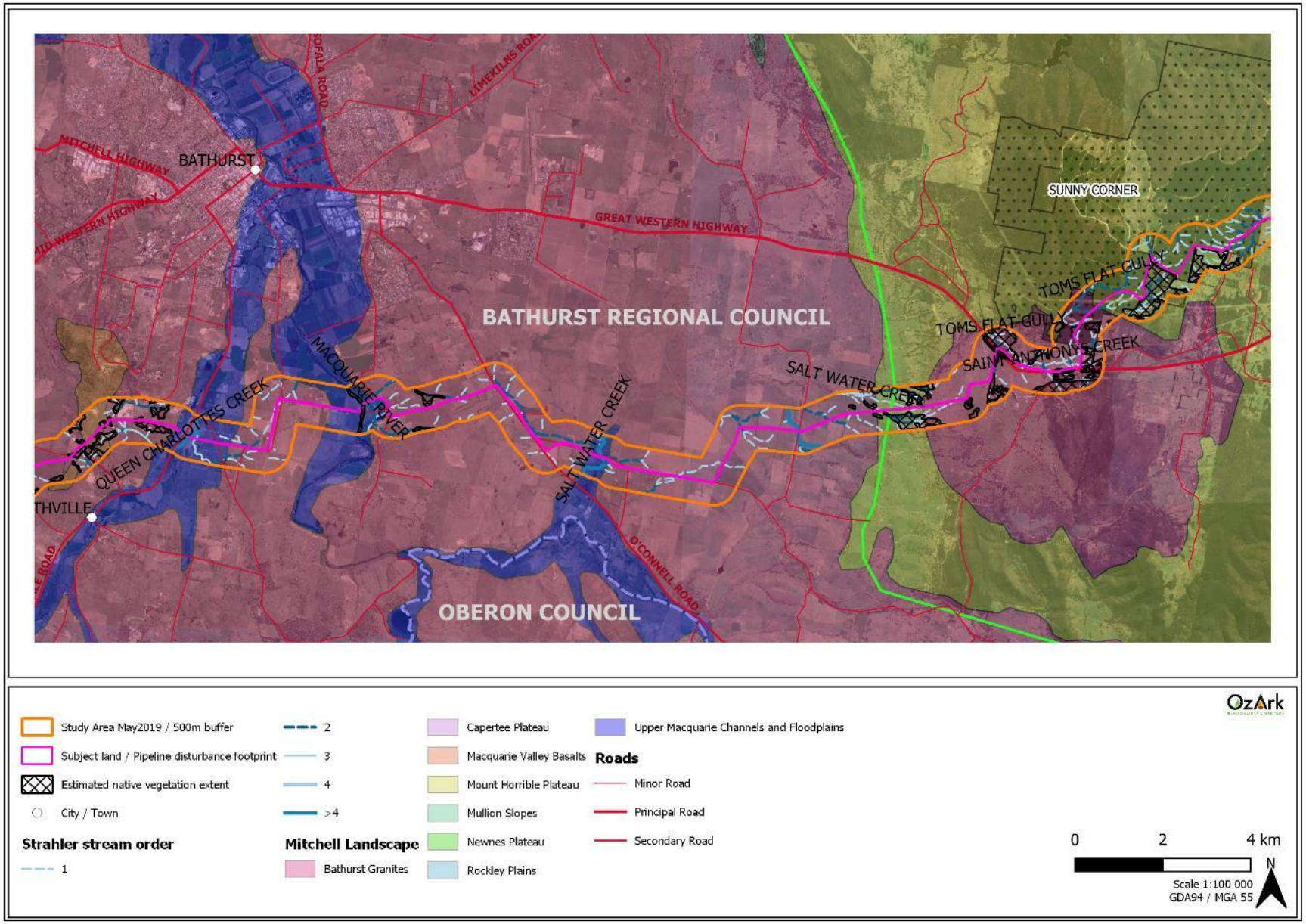


**Figure 3-3. Location maps of the pipeline development, map 3.**

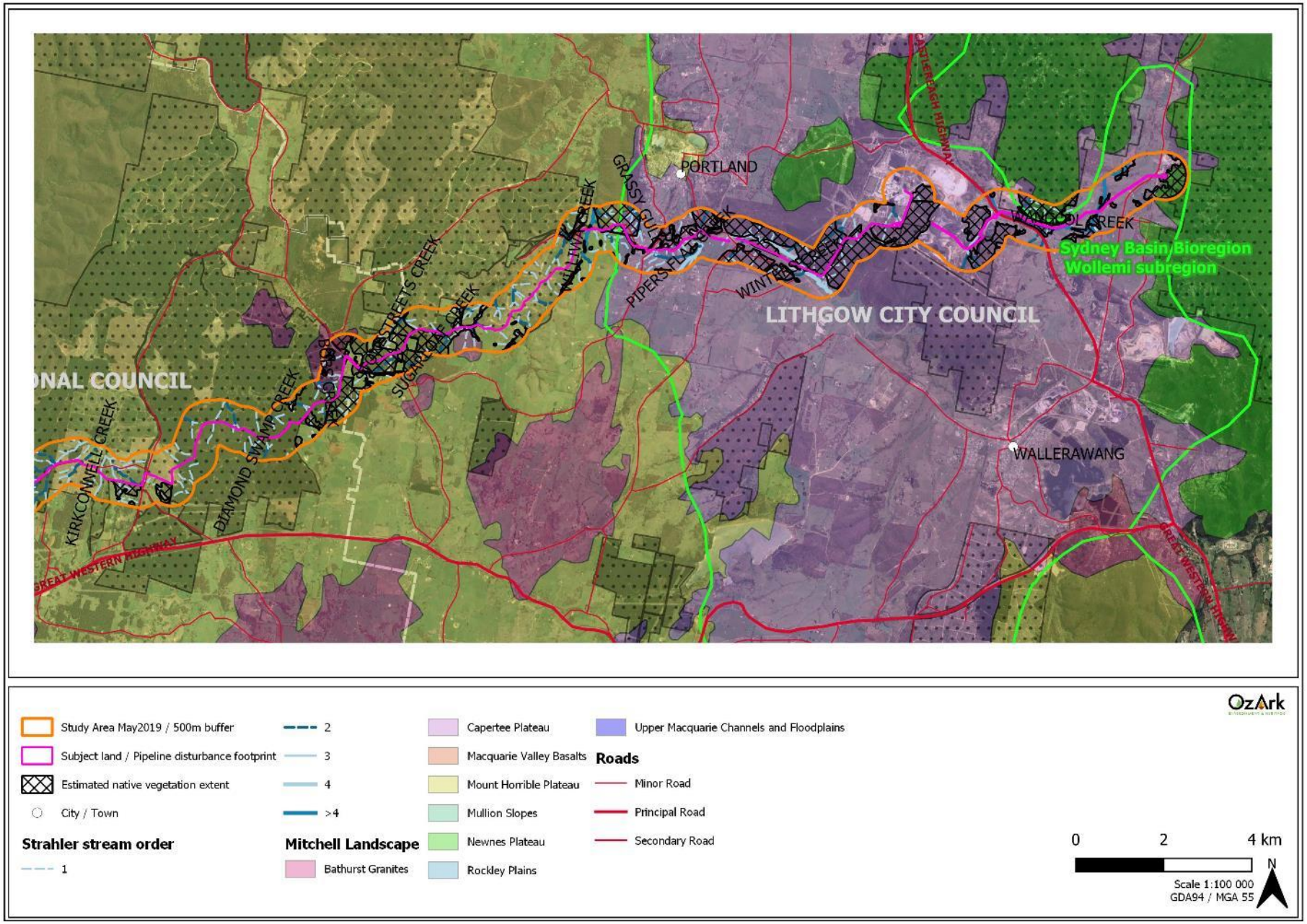


**Figure 3-4. Site maps of the pipeline development, map 1.**

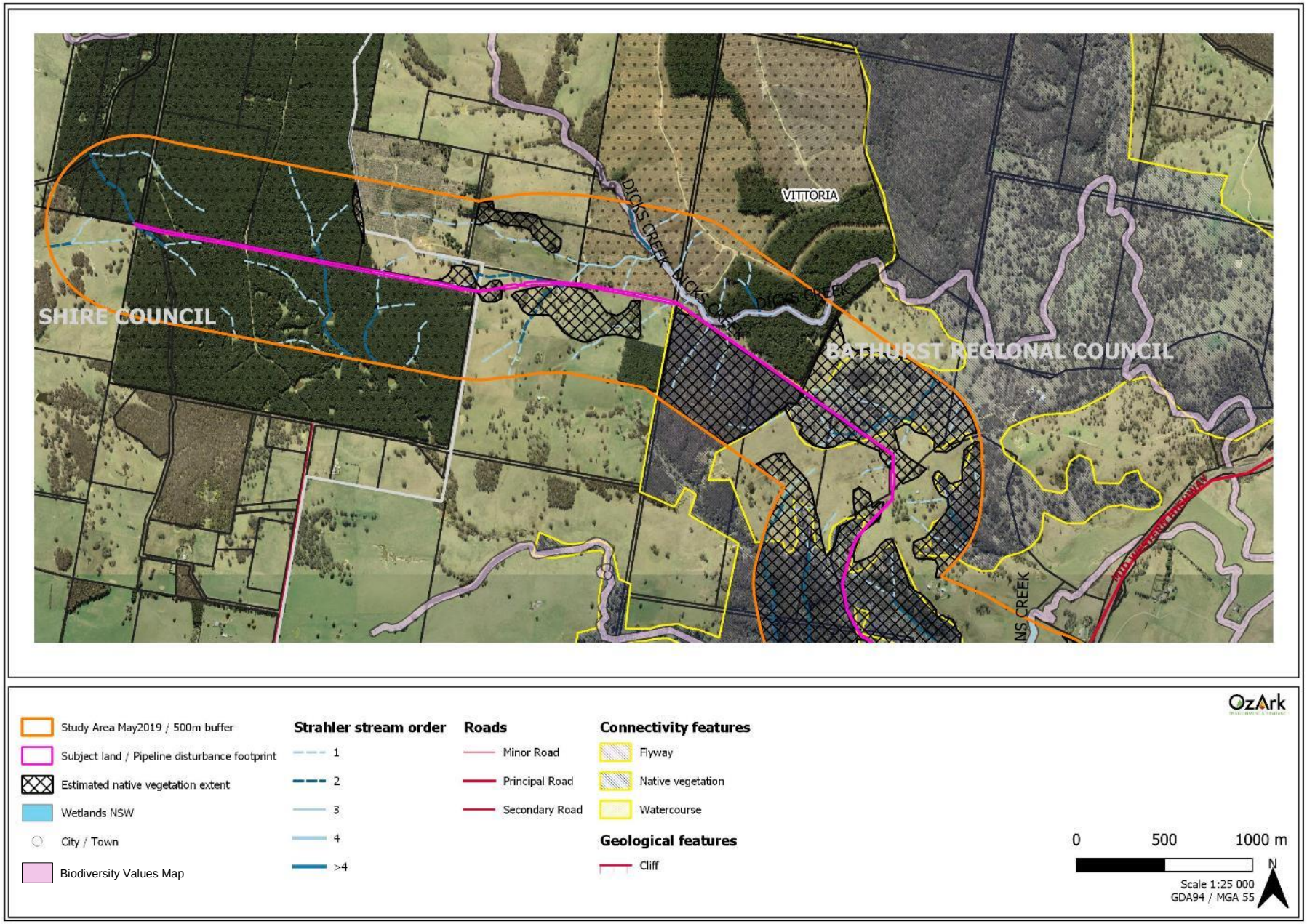


**Figure 3-5. Site maps of the pipeline development, map 2.**

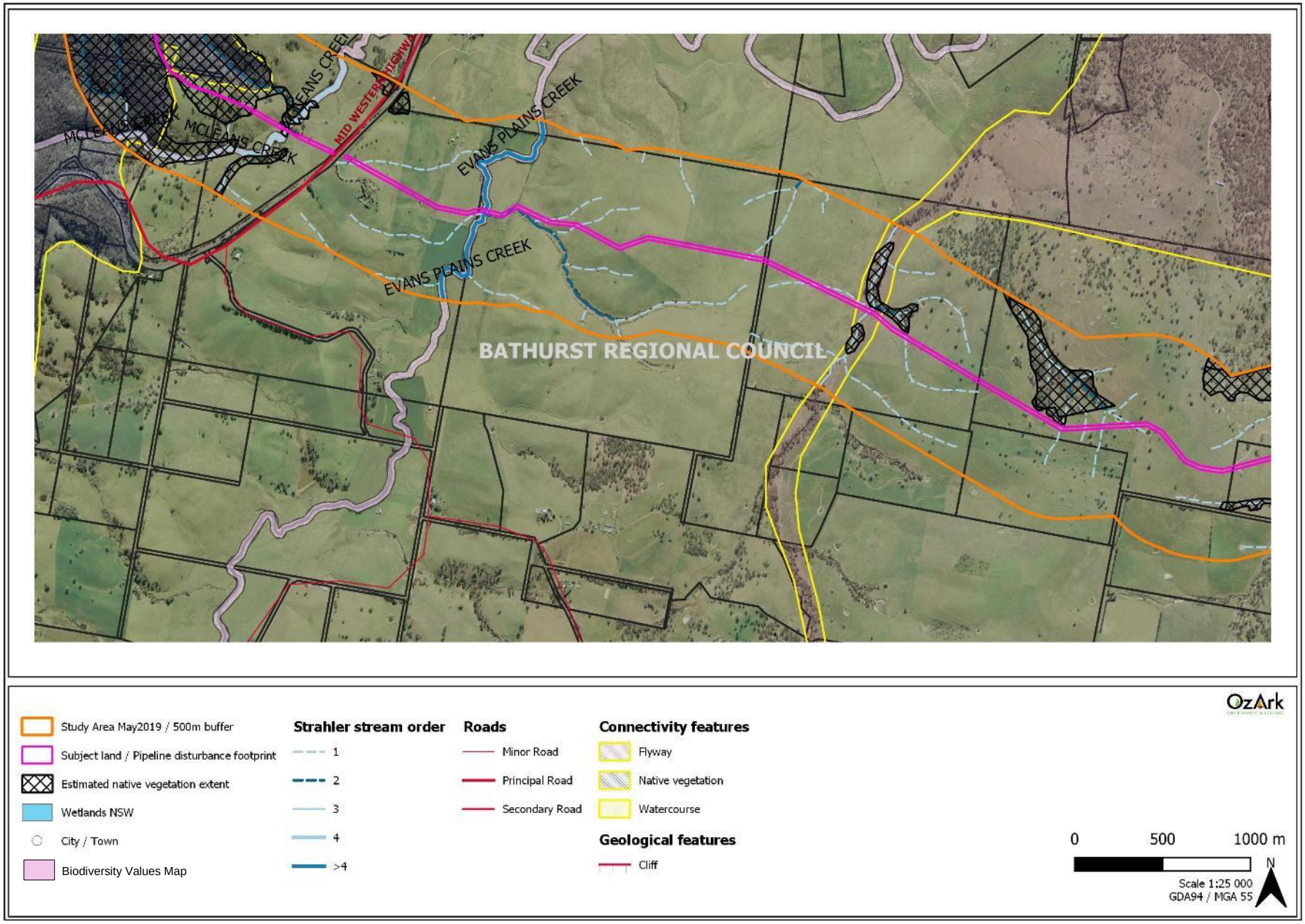


**Figure 3-6. Site maps of the pipeline development, map 3.**

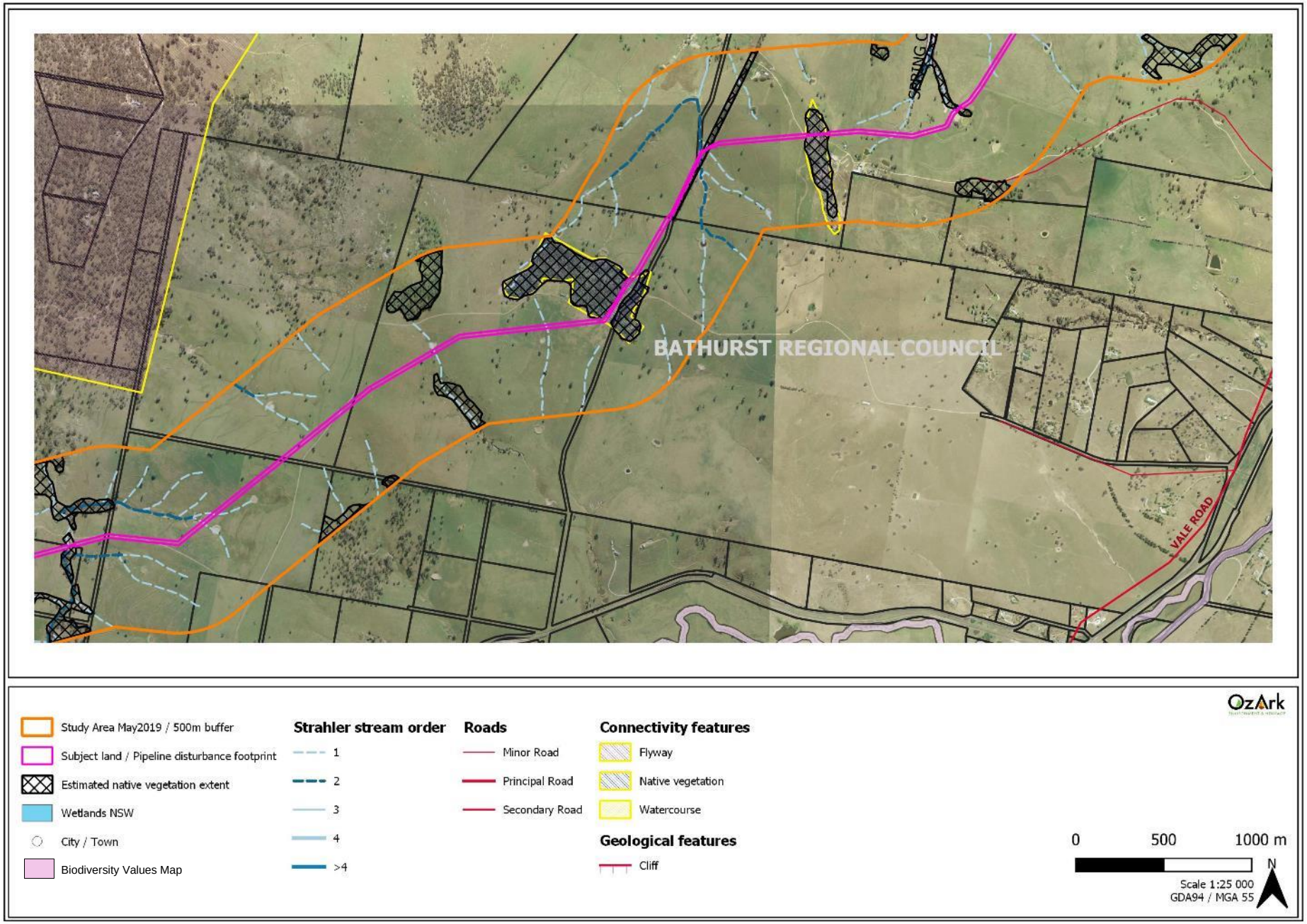


**Figure 3-7. Site maps of the pipeline development, map 4.**

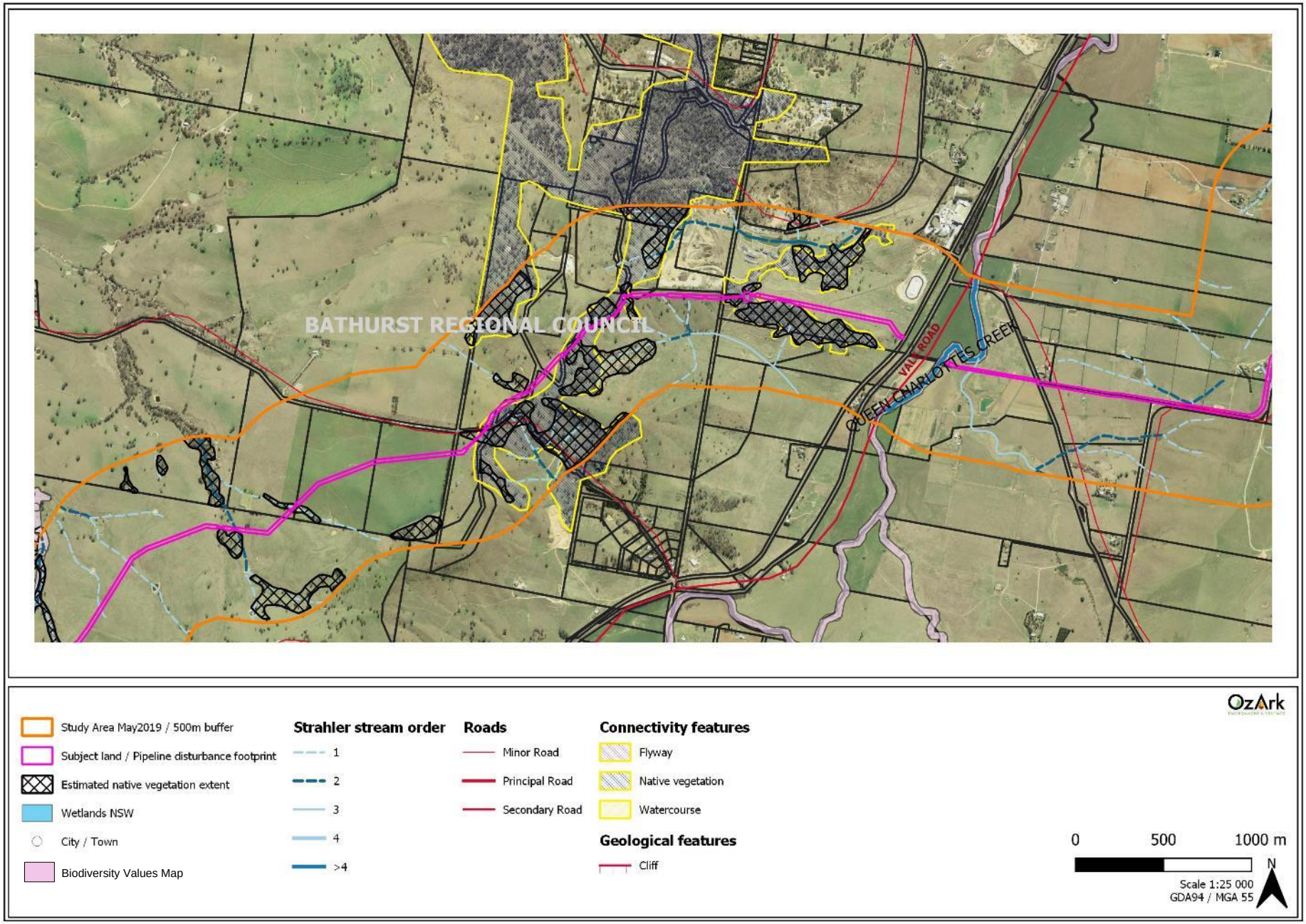


**Figure 3-8. Site maps of the pipeline development, map 5.**

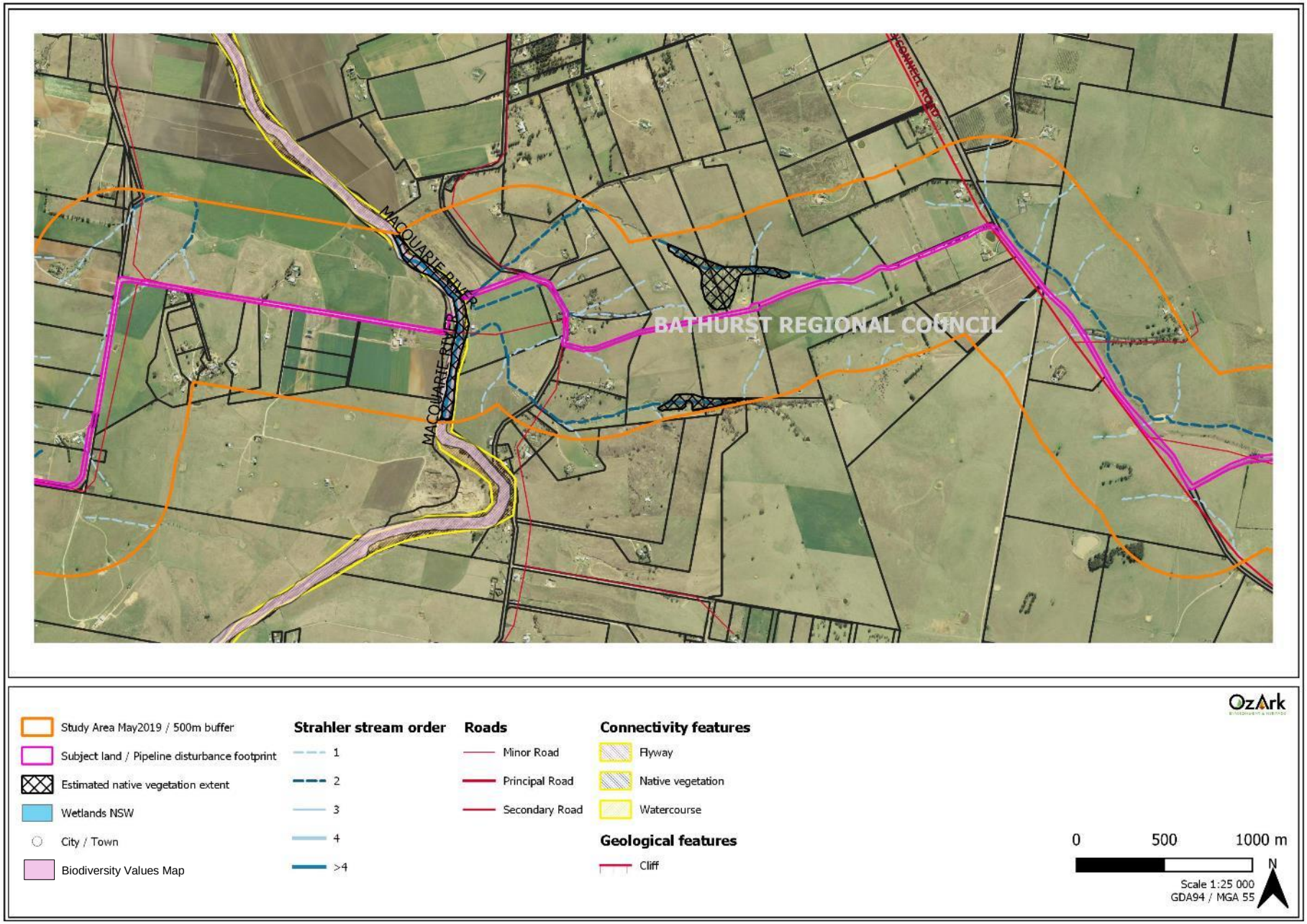


**Figure 3-9. Site maps of the pipeline development, map 6.**

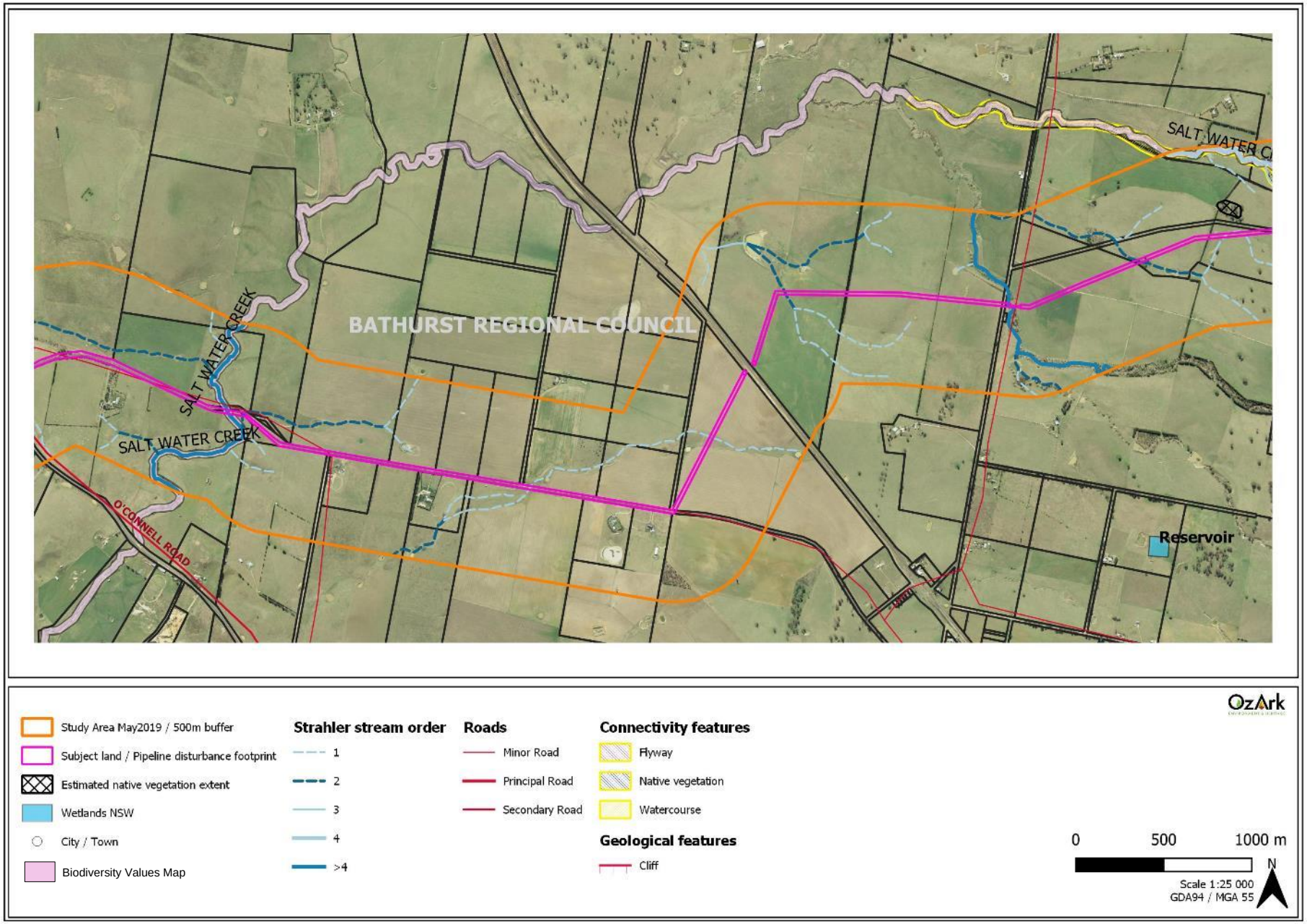


**Figure 3-10. Site maps of the pipeline development, map 7.**

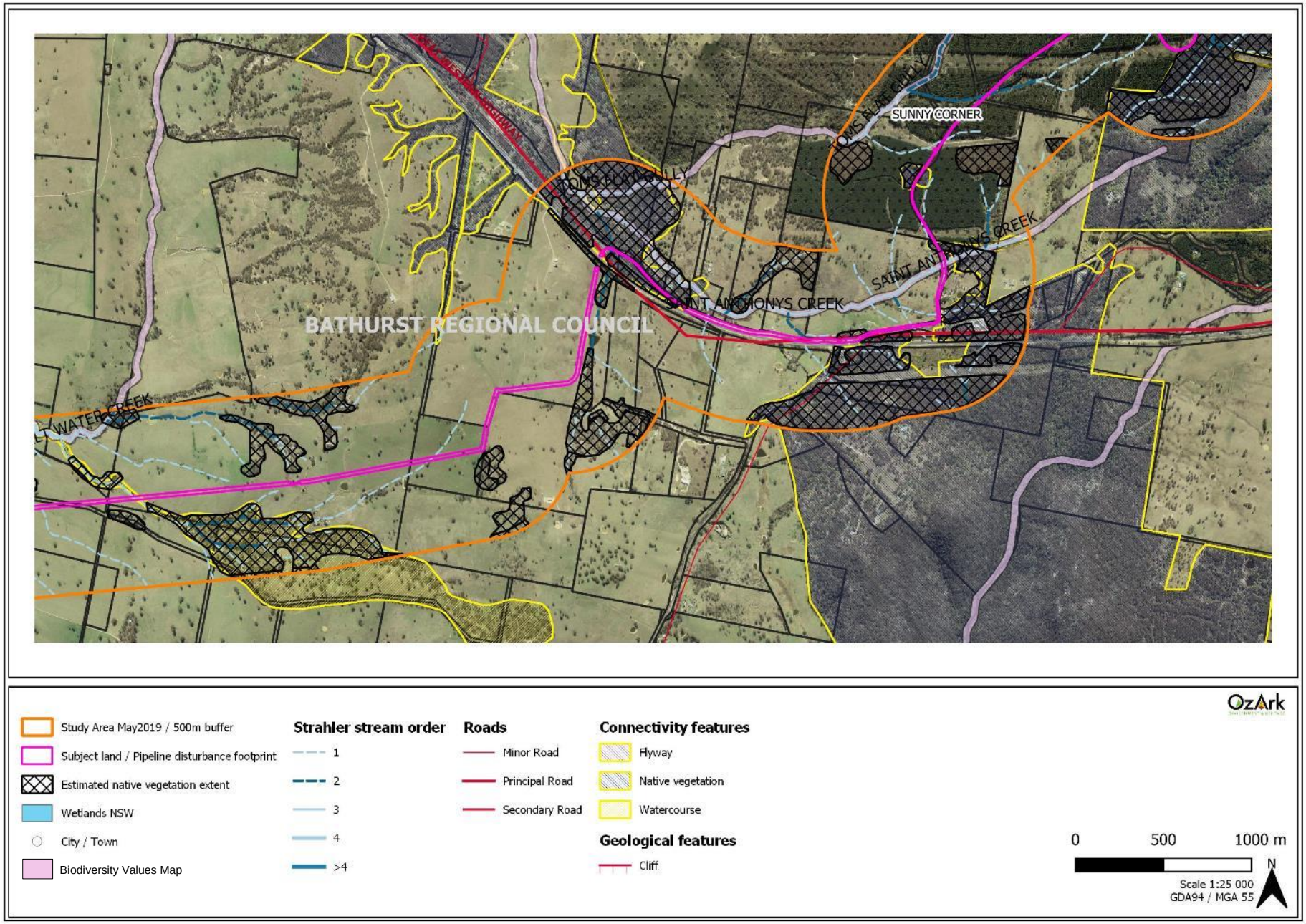


**Figure 3-11. Site maps of the pipeline development, map 8.**

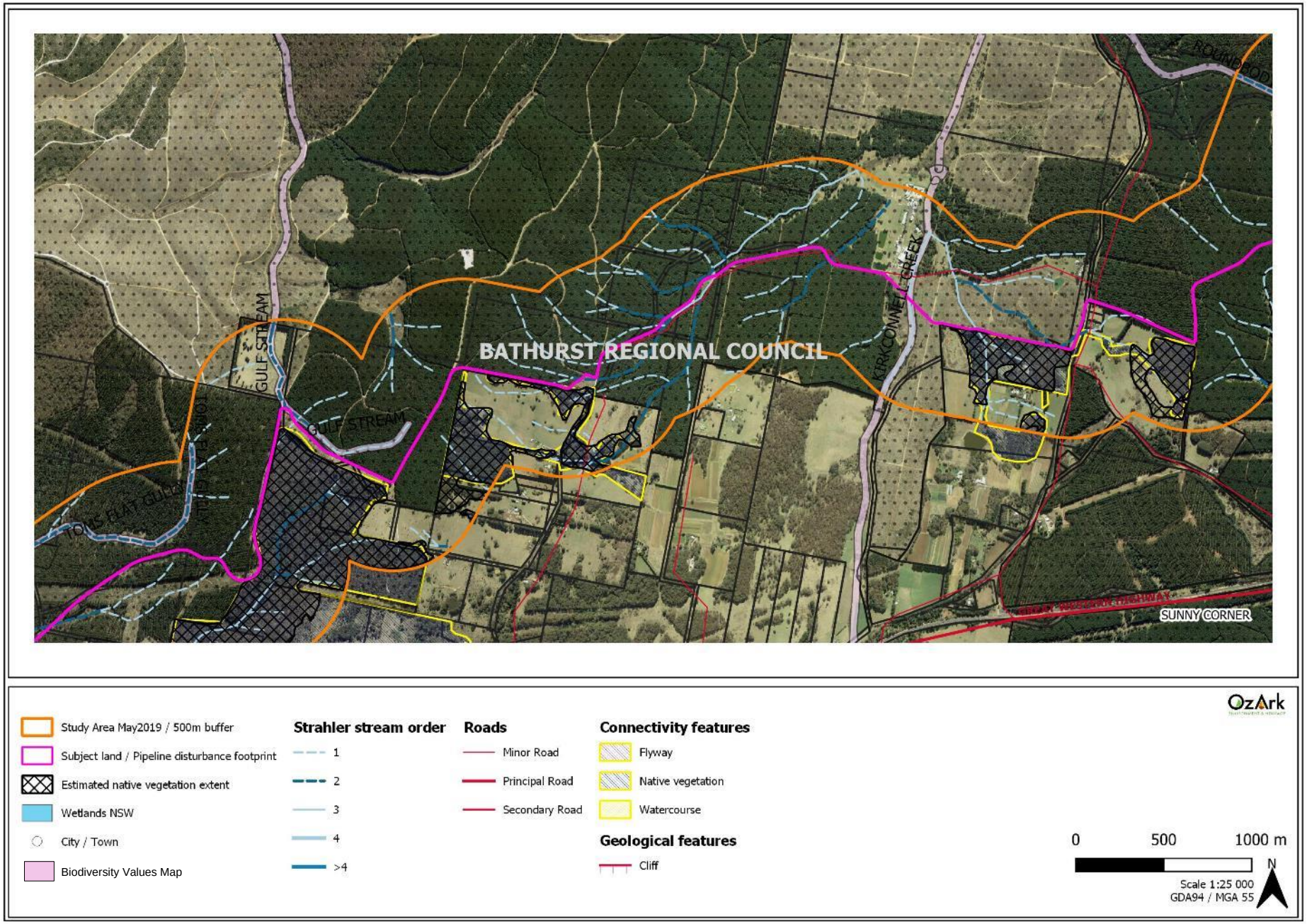


**Figure 3-12. Site maps of the pipeline development, map 9.**

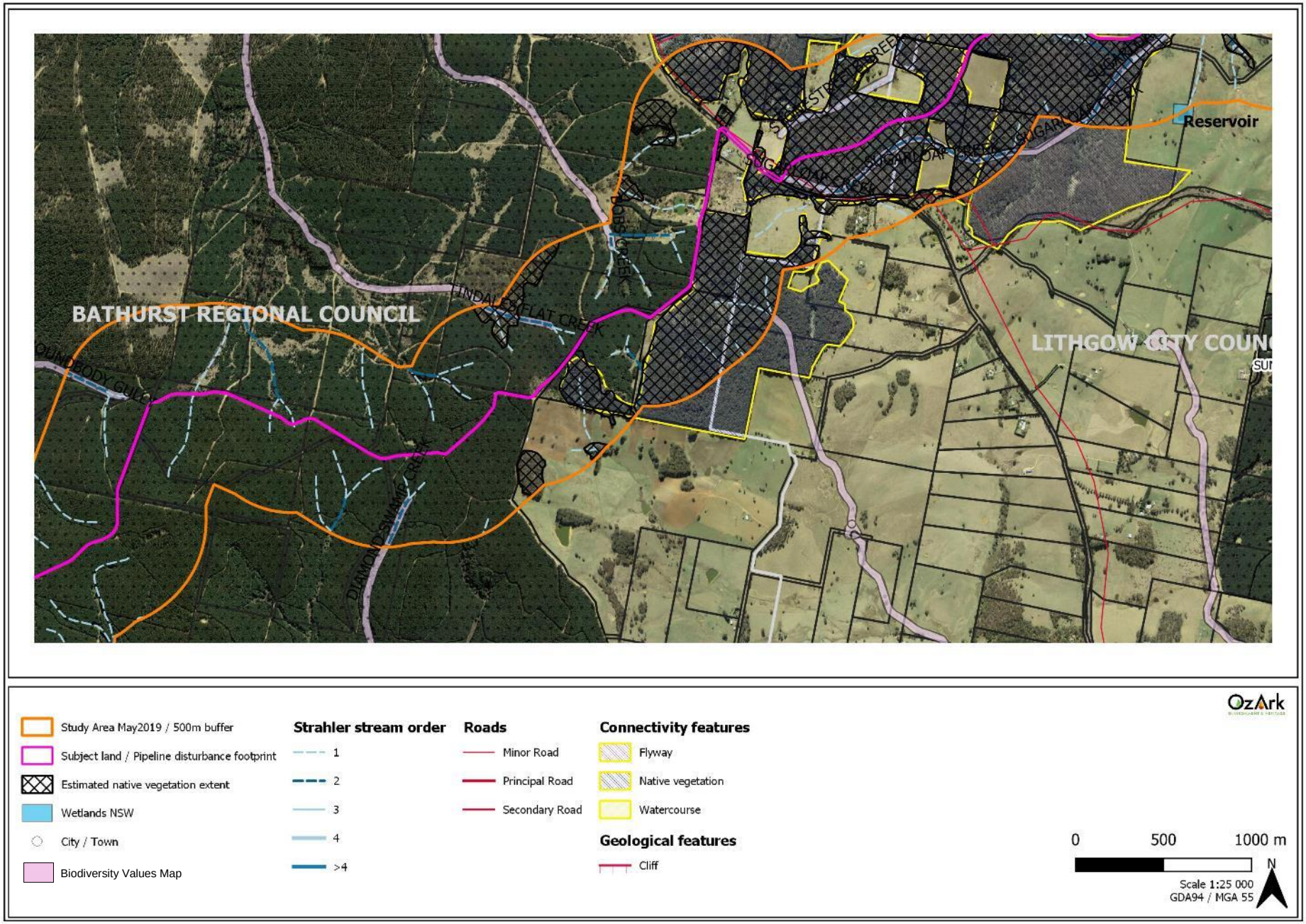


**Figure 3-13. Site maps of the pipeline development, map 10.**

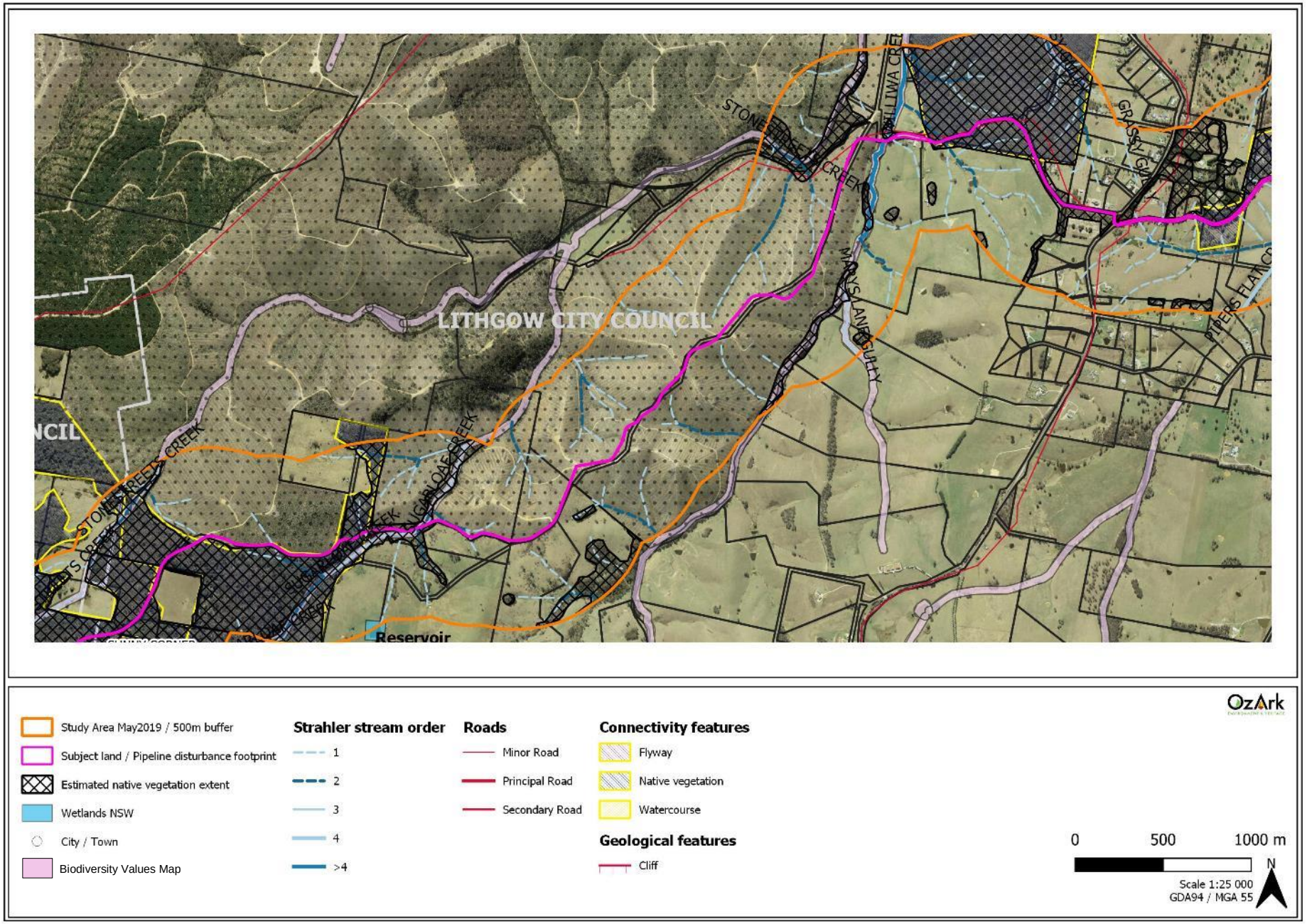


**Figure 3-14. Site maps of the pipeline development, map 11.**

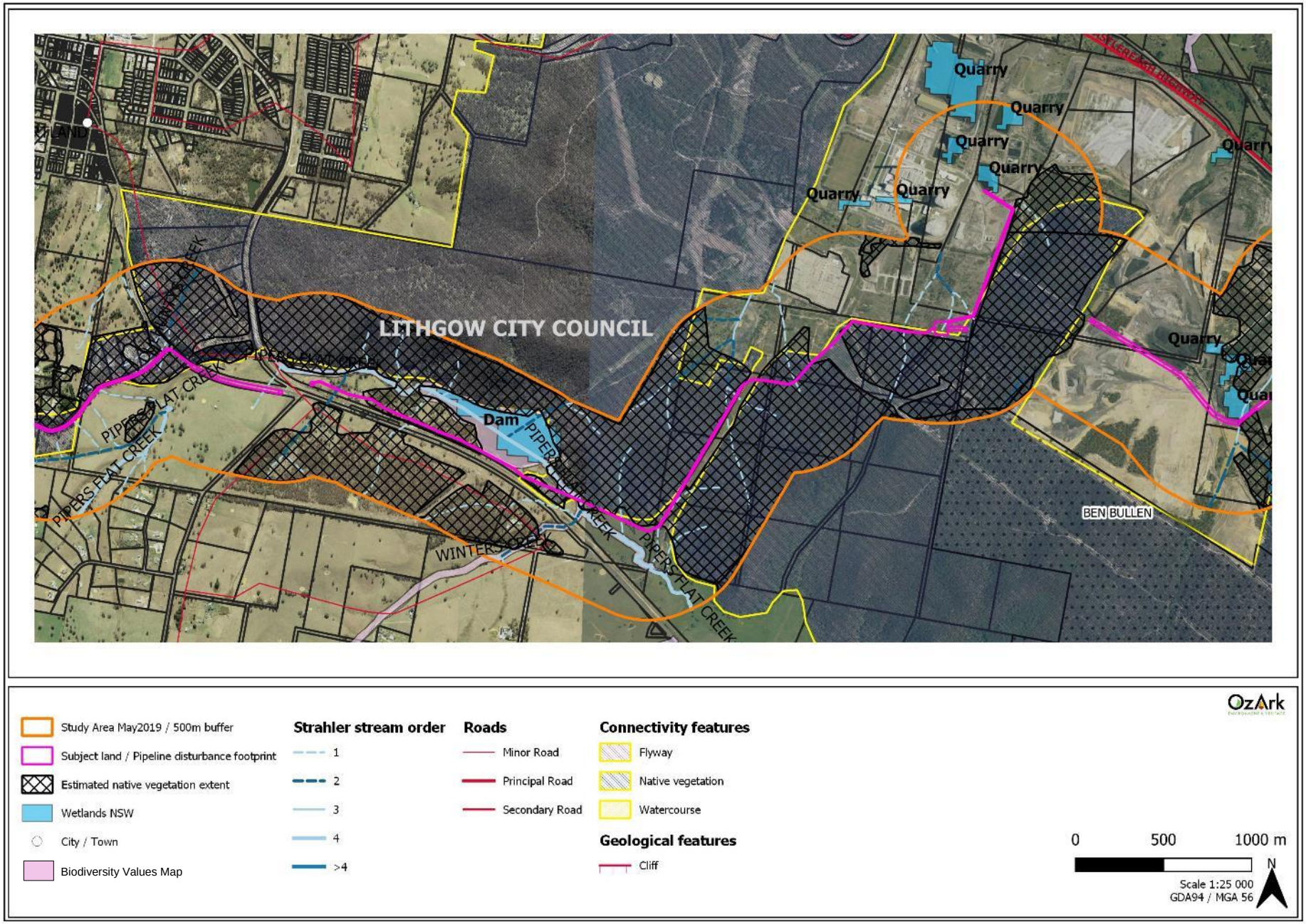
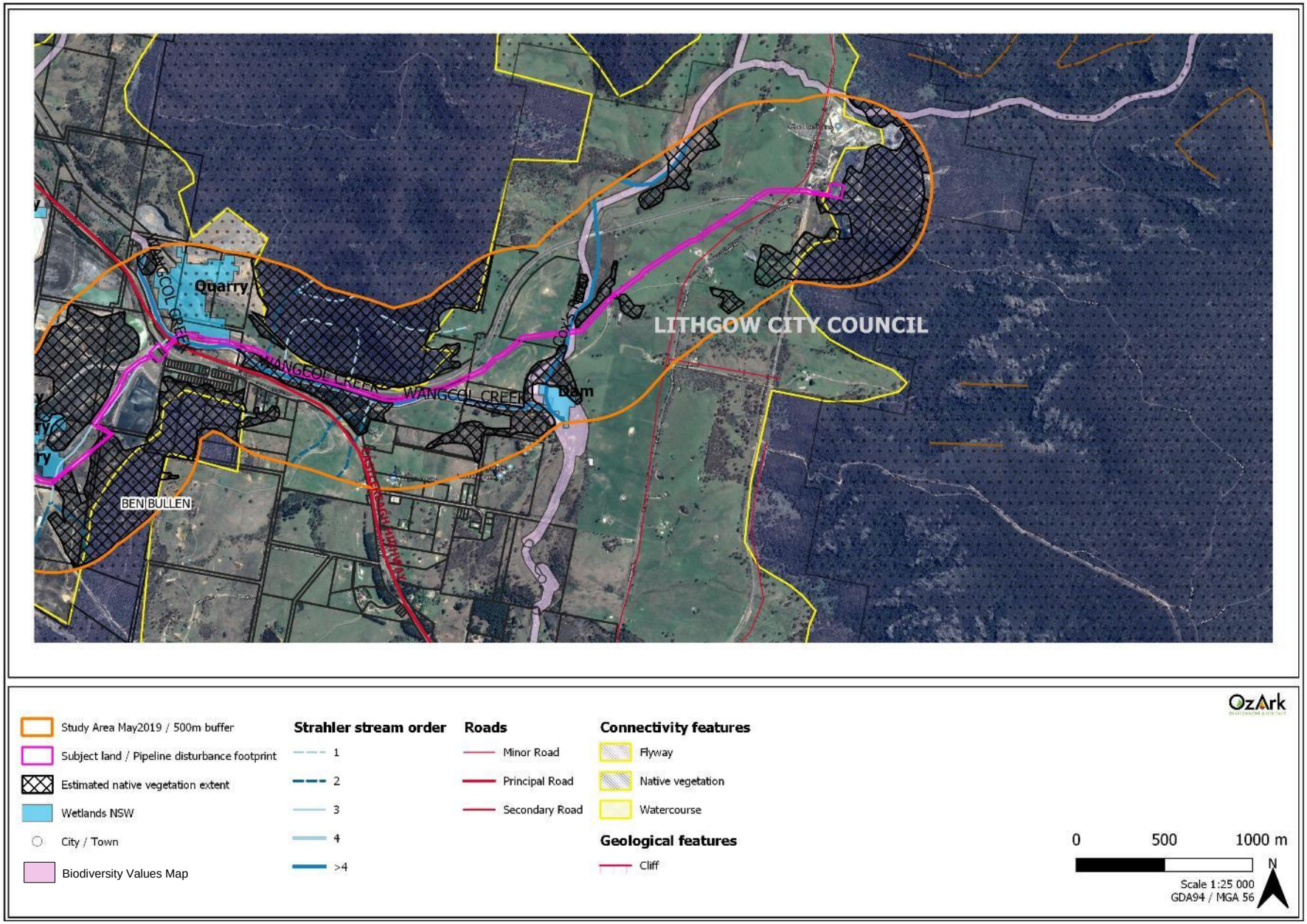


**Figure 3-15. Site maps of the pipeline development, map 12.**



## 3.2 NATIVE VEGETATION EXTENT

Existing native vegetation is mapped on the State Vegetation Type Map – Central Tablelands Region VIS 4778 (NSW Office of Environment and Heritage, 2017). This mapping shows large areas of the pipeline corridor and study area, particularly within the Bathurst Regional Council local government area, as non-native vegetation. This was confirmed following field survey, as is discussed in Section 4 of this BDAR.

This non-native vegetation comprises cleared agricultural land used for grazing and cropping and plantations of *Pinus radiata* within state forests.

Native vegetation consists of areas of paddock trees over exotic pasture and open woodlands in the western part of the study area, to forests in the higher altitudes in the eastern part of the study area.

The State Vegetation Type Map and aerial imagery was used to estimate the percentage of native vegetation cover for the study area and assign a cover class, according to the BAM. The vegetation cover of the study area (500 m buffer for linear development) is shown in Table 3-3 and on the site and location maps (Figures 3-1 to 3-15).

**Table 3-3. Estimated native vegetation cover of the study area.**

| Study Area (ha) | Estimated native vegetation cover (ha) | % native vegetation cover | Native vegetation cover class* |
|---|---|---|---|
| 9,013 | 1,662 | 18 | >10 – 30% |

***As defined by the BAM**

## 3.3 CONNECTIVITY FEATURES

Connectivity features of the study area include corridors of native vegetation, particularly in the eastern part of the pipeline corridor. Watercourses also provide some connectivity, although riparian vegetation on the larger rivers is often dominated by non-native pasture and trees such as Crack Willow.

Where suitable riparian habitat exists, it is likely to provide dispersal pathways or flyways for threatened raptor species, such as Little Eagle. Such habitat occurs along the Macquarie River and one other minor watercourse, as shown on the site maps.

Connectivity features, including potential flyways, have been mapped on the site maps, Figure 3-4 to 3-15.

## 3.4 WATERCOURSES AND KEY FISH HABITAT

The pipeline development includes the crossing of or running along the banks of 112 watercourses mapped by the NSW Water Management (General) Regulation 2018 hydro line spatial data (NSW Department of Industry, 2019). Of these, 86 watercourses crossed are 1st or 2nd Strahler order streams, many unnamed, at the crossing locations, while 26 are 3rd order or above. This includes five major, permanent rivers (from east to west):

- Piper's Flat Creek;
- Salt Water Creek;
- Macquarie River;
- Queen Charlottes Creek, and
- Evan's Plains Creek.

All watercourse crossings that were known at the time of the field survey were visited in order to collect data on the habitat values provided, including whether the stream at the crossing point has permanent water, aquatic vegetation and in-stream snags and rocks. Watercourse crossings are mapped in Figures 3-16 to 3-21. Detailed maps of Key Fish Habitat (KFH) are provided at a 1:5000 scale in Appendix 1. The locations of all watercourse crossings and their Strahler Order is provided in Appendix 1.

If the project was not state significant development, a permit under s201 of the *Fisheries Management Act* (FM Act) would be required from DPI Fisheries to undertake activities that disturb the banks or bed of KFH and above 2nd Strahler order watercourses. This includes the trenching of watercourse crossings for the purpose of laying the pipeline. Likewise if the project was not state significant development, a permit under s219 of the FM Act would also be required if trenching activities require the obstruction of fish passage. The proponent will be required to adhere to any provisions for impact minimisation and/or mitigation as detailed in the permit. Impact to native riparian vegetation will be accounted for by entry into the Biodiversity Offset Scheme.

Under the *Water Management Act 2000* (WM Act), trenching associated with laying the pipeline across the river bed and within 40 m of the upper banks (defined as waterfront land in the WM Act) is a controlled activity. As the project is State significant development, separate approval is not required under the WM Act to undertake the trenching works by section 4.41 of the EP&A Act.

### 3.4.1 Key Fish Habitat Classification

Twenty-six watercourses crossed by the pipeline development are mapped as KFH by DPI Fisheries predictive mapping. These sites were visited during the field survey, photographed and

data collected as described above in order to classify the sensitivity and type of fish habitat present, according to DPI Fisheries guidelines (Fairfull, 2013). This classification system is defined in Tables 3-4 and 3-5.

Results are shown in Table 3-6 and indicate that 21 of these watercourse crossings meet the criteria for KFH, including five highly sensitive fish habitats.

As well as habitat for fish, the five major streams listed above may also be habitat for other aquatic fauna, such as turtles and platypus.

**Table 3-4. Key Fish Habitat sensitivity classification scheme, taken from Fairfull, 2013.**

**Table 1 – Key fish habitat and associated sensitivity classification scheme**
***(for assessing potential impacts of certain activities and developments on key fish habitat types)***

**TYPE 1 - Highly sensitive key fish habitat:**

- *Posidonia australis* (strapweed)
- *Zostera, Heterozostera, Halophila and Ruppia* species of seagrass beds >5m$^2$ in area
- Coastal saltmarsh >5m$^2$ in area
- Coral communities
- Coastal lakes and lagoons that have a natural opening and closing regime (i.e. are not permanently open or artificially opened or are subject to one off unauthorised openings)
- Marine park, an aquatic reserve or intertidal protected area
- SEPP 14 coastal wetlands, wetlands recognised under international agreements (e.g. Ramsar, JAMBA, CAMBA, ROKAMBA wetlands), wetlands listed in the Directory of Important Wetlands of Australia[2]
- Freshwater habitats that contain in-stream gravel beds, rocks greater than 500 mm in two dimensions, snags greater than 300 mm in diameter or 3 metres in length, or native aquatic plants
- Any known or expected protected or threatened species habitat or area of declared 'critical habitat' under the FM Act
- Mound springs

**TYPE 2 – Moderately sensitive key fish habitat:**

- *Zostera, Heterozostera, Halophila* and *Ruppia* species of seagrass beds <5m$^2$ in area
- Mangroves
- Coastal saltmarsh <5m$^2$ in area
- Marine macroalgae such as *Ecklonia* and *Sargassum* species
- Estuarine and marine rocky reefs
- Coastal lakes and lagoons that are permanently open or subject to artificial opening via agreed management arrangements (e.g. managed in line with an entrance management plan)
- Aquatic habitat within 100 m of a marine park, an aquatic reserve or intertidal protected area
- Stable intertidal sand/mud flats, coastal and estuarine sandy beaches with large populations of in-fauna
- Freshwater habitats and brackish wetlands, lakes and lagoons other than those defined in TYPE 1
- Weir pools and dams up to full supply level where the weir or dam is across a natural waterway

**TYPE 3 – Minimally sensitive key fish habitat may include:**

- Unstable or unvegetated sand or mud substrate, coastal and estuarine sandy beaches with minimal or no in-fauna
- Coastal and freshwater habitats not included in TYPES 1 or 2
- Ephemeral aquatic habitat not supporting native aquatic or wetland vegetation

Notes: For the purposes of these policy and guidelines the following are **not considered key fish habitat**[5]:

- First and second order streams on gaining streams (based on the Strahler method of stream ordering)
- Farm dams on first and second order streams or unmapped gullies
- Agricultural and urban drains
- Urban or other artificial ponds (e.g. evaporation basins, aquaculture ponds)
- Sections of stream that have been concrete-lined or piped (not including a waterway crossing)
- Canal estates

**Table 3-5. Key Fish Habitat classification of waterways for fish passage, taken from Fairfull, 2013.**

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

**Table 3-6. Key fish habitat assessment for streams intersected by the proposed activity.**

| Waypoint | Watercourse | Strahler Order | Riparian Buffer (m) | Photograph | KFH Sensitivity Type | KFH waterway class (fish passage) | Crossing method | Assessment |
|---|---|---|---|---|---|---|---|---|
| WC11 | McLeans Creek | 4 | 40 |  | Minimally sensitive | Unlikely KFH | Trench | Non-permanent<br>In-stream snags<br>No native riparian vegetation (except paddock tree)<br>No aquatic vegetation |
| WC13 | Evans Plains Creek | >4 | 50 |  | Moderately sensitive | Moderate KFH | Trench | Semi-permanent to permanent<br>Native aquatic vegetation in-stream<br>No in-stream rocks, gravel beds or snags<br>Mud/sand bottom |
| WC19 | Un-named | >4 | 50 |  | Minimally sensitive | Unlikely KFH | Trench | Non-permanent<br>No native riparian vegetation<br>No aquatic vegetation<br>No in-stream snags, rocks or gravel beds |
| WC23 | Queen Charlottes Creek | >4 | 50 |  | Moderately sensitive | Moderate KFH | Under bore | Semi-permanent to permanent<br>Native aquatic vegetation in-stream<br>No in-stream rocks, gravel beds or snags.<br>Mud bottom |
| WC24 | Un-named | 3 | 30 |  | Minimally sensitive | Unlikely KFH | Trench | Ephemeral tributary of Queen Charlotte's Creek<br>No defined channel or wetland area<br>Previously cropped paddock<br>Not KFH |

| Waypoint | Watercourse | Strahler Order | Riparian Buffer (m) | Photograph | KFH Sensitivity Type | KFH waterway class (fish passage) | Crossing method | Assessment |
|---|---|---|---|---|---|---|---|---|
| WC25 | Macquarie River | >4 | 50 |  | Highly sensitive | Major KFH | Under bore | Known habitat of threatened fish species<br>In-stream snags<br>Mud bottom<br>Native aquatic vegetation in-stream<br>Permanent flowing waterway |
| WC26 | Salt Water Creek | >4 | 50 |  | Highly sensitive | Moderate KFH | Trench | Habitat of threatened fish species<br>Aquatic vegetation<br>Semi-permanent - permanent pools<br>In-stream snags<br>No in-stream rocks or gravel beds |
| WC27 | Un-named | 2 | 20 |  | Minimally sensitive | Unlikely KFH | Trench | Ephemeral tributary or overflow of Salt Water Creek<br>No defined channel or wetland area<br>Previously cropped paddock<br>Not KFH |
| WC28 | Un-named | >4 | 50 |  | Minimally sensitive | Unlikely KFH | Trench | Non-permanent<br>No aquatic vegetation<br>Mud/sand substrate<br>No in-stream rocks of gravel beds |
| WC29 | Un-named | 2 | 20 | Not visited (crossing not defined at time of survey) | Minimally sensitive | Unlikely KFH | Trench | Site of artificial farm dam from aerial imagery (see provided maps) |

| Waypoint | Watercourse | Strahler Order | Riparian Buffer (m)- | Photograph | KFH Sensitivity Type | KFH waterway class (fish passage) | Crossing method | Assessment |
|---|---|---|---|---|---|---|---|---|
| WC30 | Un-named | 3 | 30 |  | Minimally sensitive | Unlikely KFH | Trench | Dry, un-named gully<br>Intermittent flow following rain events. No permanent or semi-permanent pools<br>No aquatic flora present |
| WC31 | Un-named | 2 | 20 |  | Minimally sensitive | Minimal KFH | Trench | Semi-permanent pools and intermittent flows after rain events<br>Mud bottom<br>No in-stream rocks or gravel beds<br>No native aquatic vegetation |
| WC32 | Saint Anthony's Creek | 3 | 30 |  | Minimally sensitive | Minimal KFH | Trench, within existing road causeway | Intermittent flow and pools following rain events<br>No aquatic vegetation |
| WC34 | Un-named | 3 | 30 |  | Minimally sensitive | Minimal KFH | Trench | Ephemeral wetland pools<br>Native wetland aquatic vegetation<br>No rocks or gravel beds<br>No snags |
| WC35 | Kirkconnell Creek | 3 | 30 | No photograph | Highly sensitive | Moderate KFH | Trench | Habitat for threatened fish species |
| WC36 | Un-named | 3 | 30 | No photograph | Minimally sensitive | Minimal KFH | Trench | |
| WC37 | Sugarloaf Creek | 3 | 30 | See below | Minimally sensitive | Minimal KFH | Trench | Intermittent flow and pools following rain events<br>No aquatic vegetation |

| Waypoint | Watercourse | Strahler Order | Riparian Buffer (m) | Photograph | KFH Sensitivity Type | KFH waterway class (fish passage) | Crossing method | Assessment |
|---|---|---|---|---|---|---|---|---|
| WC38 | Sugarloaf Creek | 3 | 30 |  | Minimally sensitive | Minimal KFH | Trench, within existing road causeway | Intermittent flow and pools following rain events<br>No aquatic vegetation<br>No instream rocks or gravel beds |
| WC39 | Williwa Creek | >4 | 50 |  | Moderately sensitive | Moderate KFH | Trench | Intermittent flow following rain events<br>Semi-permanent to permanent pools<br>No in-stream rocks, snags or gravel beds<br>Aquatic vegetation |
| WC40 | Piper's Flat Creek | 4 | 40 |  | Minimally sensitive | Minimal KFH | Trench | Intermittent flow following rain events<br>No in-stream rocks, snags or gravel beds<br>Aquatic vegetation |
| WC97 | Un-named | 3 | 30 | No photograph | N/A | N/A | N/A | Former stream now part of active coal mine pit and highly modified. Not considered Key Fish Habitat. |
| WC98 | Un-named | 3 | 30 | No photograph | N/A | N/A | N/A | Former stream now part of active coal mine pit and highly modified. Not considered Key Fish Habitat. |
| WC99 | Piper's Flat Creek | 4 | 40 |  | Highly sensitive | Moderate KFH | Trench | In-stream snags greater than 300mm<br>Aquatic vegetation<br>No in-stream gravel beds or rocks<br>Semi - permanent pools<br>Intermittent flow after rain events only |
| WC100 | Un-named | 3 | 30 | No photograph | N/A | N/A | Trench | Not regarded as KFH |

| Waypoint | Watercourse | Strahler Order | Riparian Buffer (m)- | Photograph | KFH Sensitivity Type | KFH waterway class (fish passage) | Crossing method | Assessment |
|---|---|---|---|---|---|---|---|---|
| WC101 | Wangcol Creek | >4 | 50 |  | Highly sensitive | Moderate KFH | Trench | Aquatic vegetation<br>No in-stream gravel beds<br>Large in-stream rocks (associated with existing crossing construction)<br>Semi-permanent pools<br>Intermittent flow after rain events only |
| WC102 | Cox's River | >4 | 50 |  | Moderately sensitive | Moderate KFH | Trench | Aquatic vegetation<br>No in-stream gravel beds<br>Semi-permanent pools<br>Intermittent flow after rain events only |

**Figure 3-16. Watercourses, crossing, Key Fish Habitat and wetlands of the study area – Map 1.**

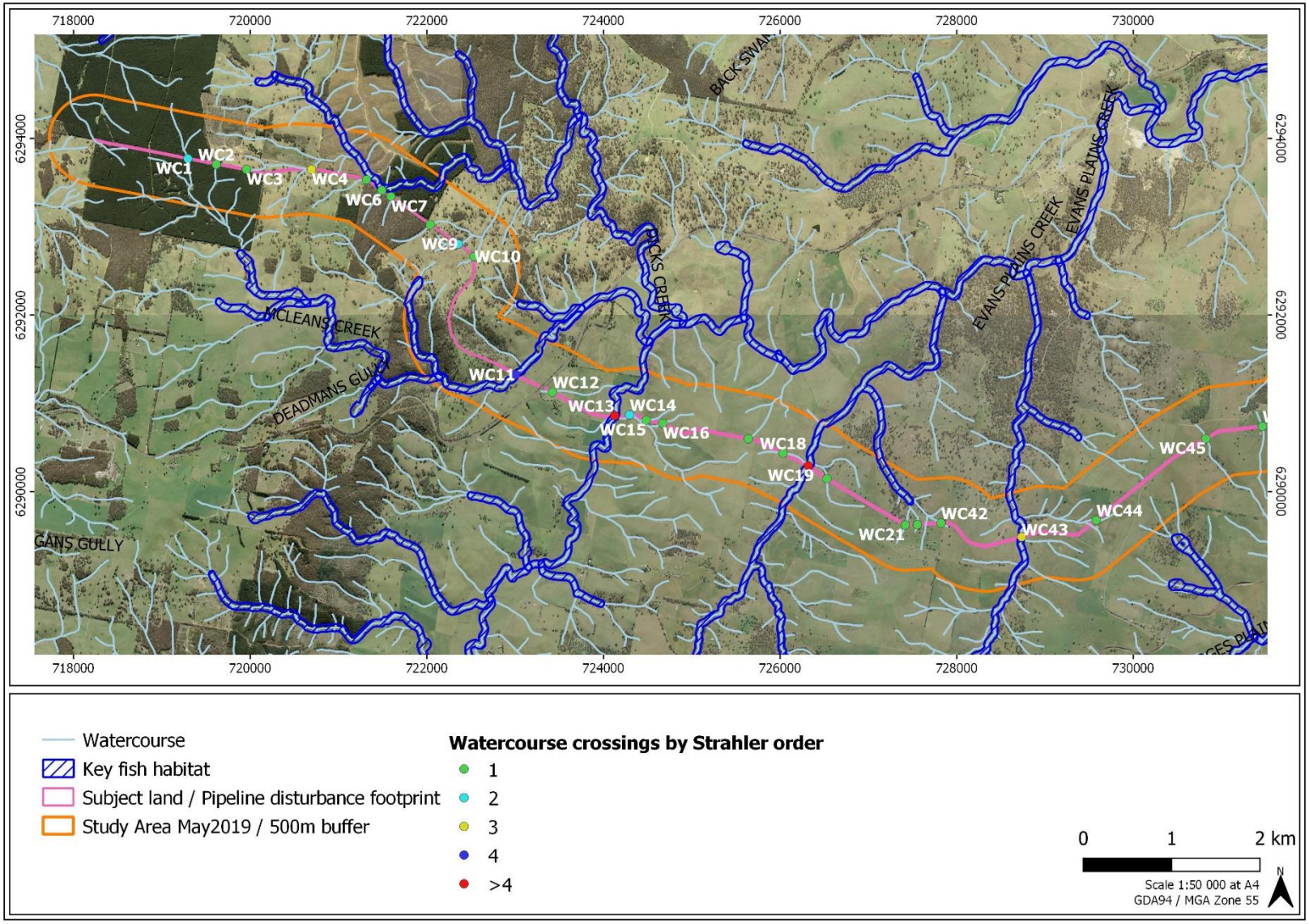


**Figure 3-17. Watercourses, crossing, Key Fish Habitat and wetlands of the study area – Map 2.**

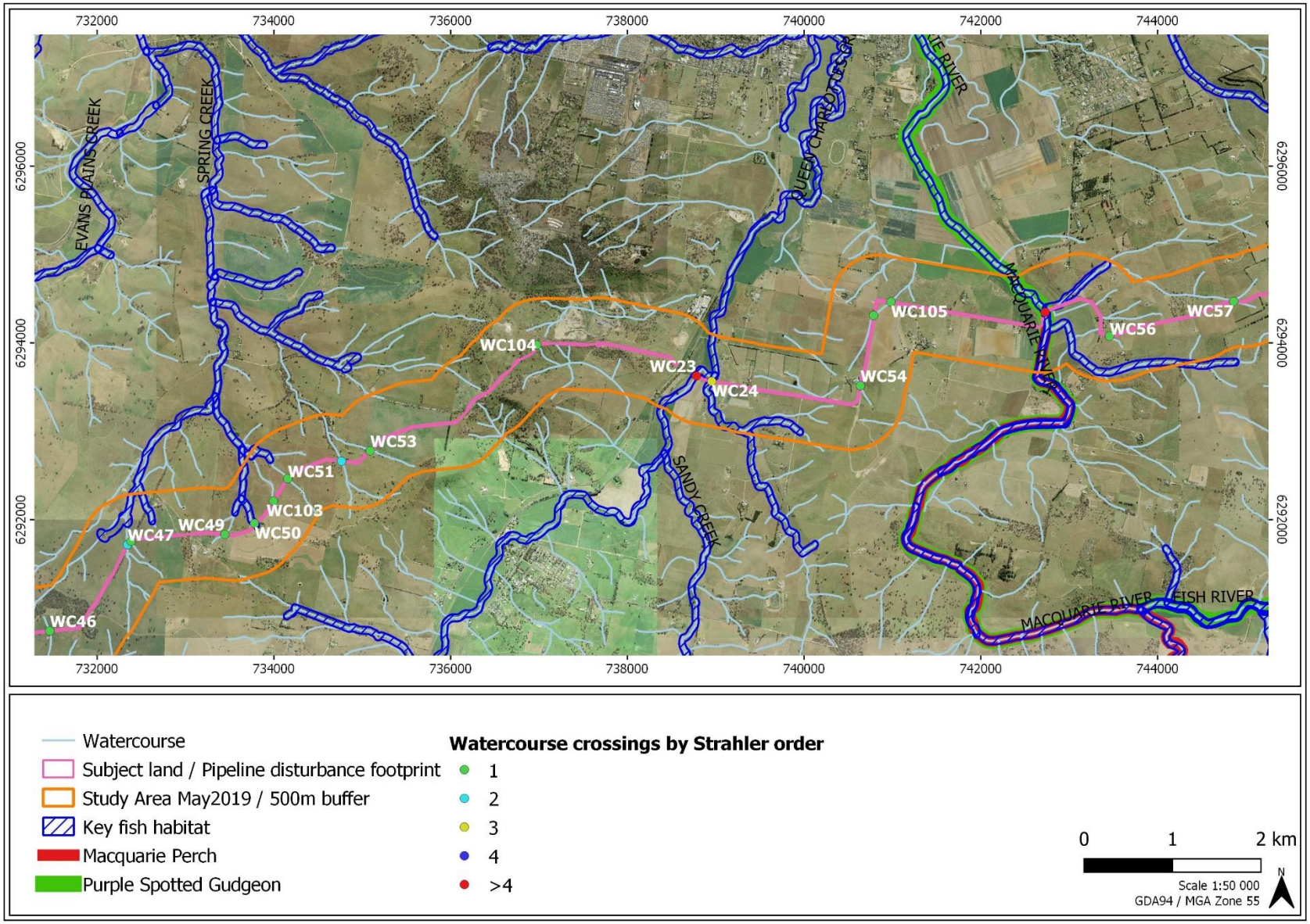


**Figure 3-18. Watercourses, crossing, Key Fish Habitat and wetlands of the study area – Map 3.**

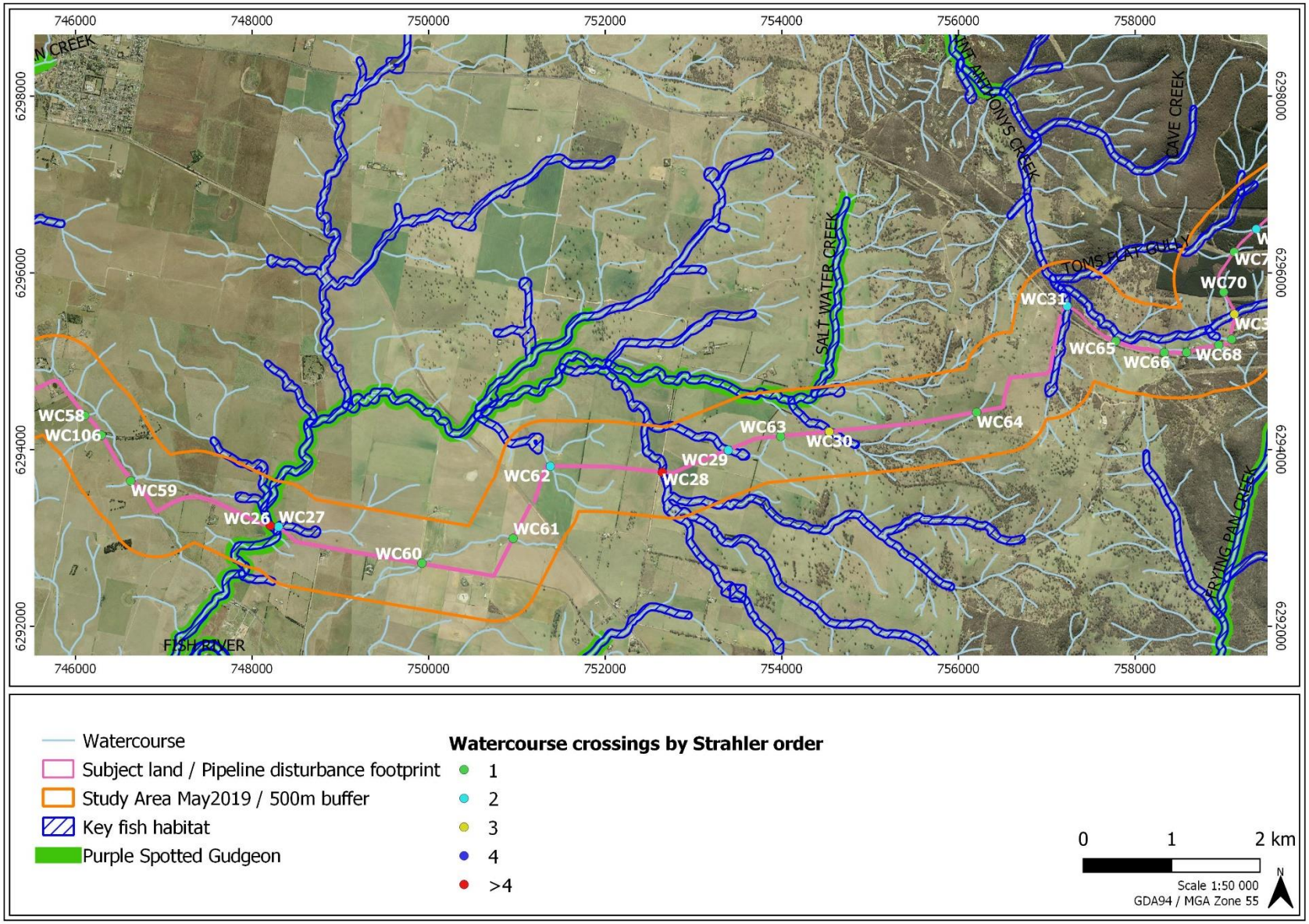


**Figure 3-19. Watercourses, crossing, Key Fish Habitat and wetlands of the study area – Map 4.**

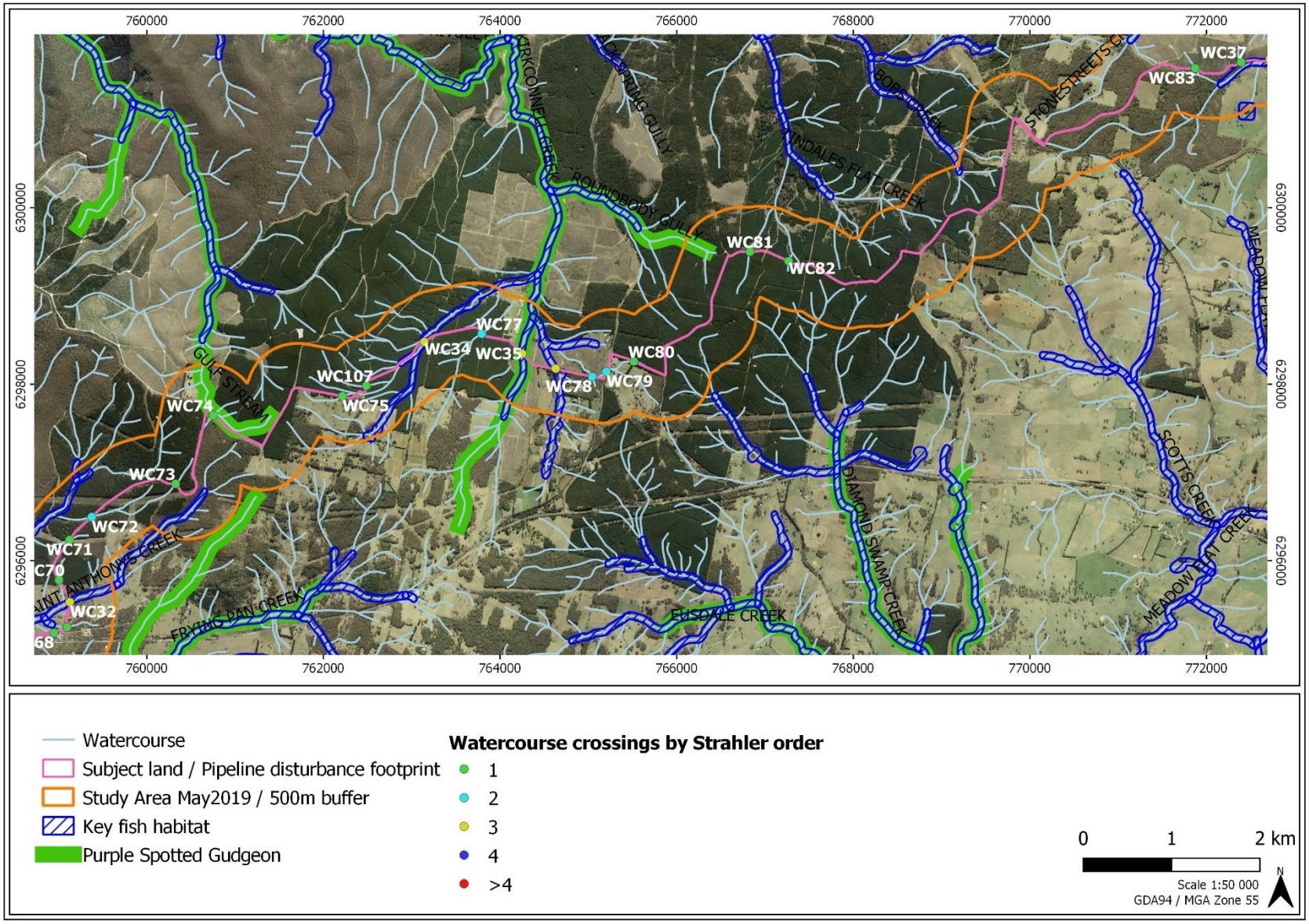


**Figure 3-20. Watercourses, crossing, Key Fish Habitat and wetlands of the study area – Map 5.**

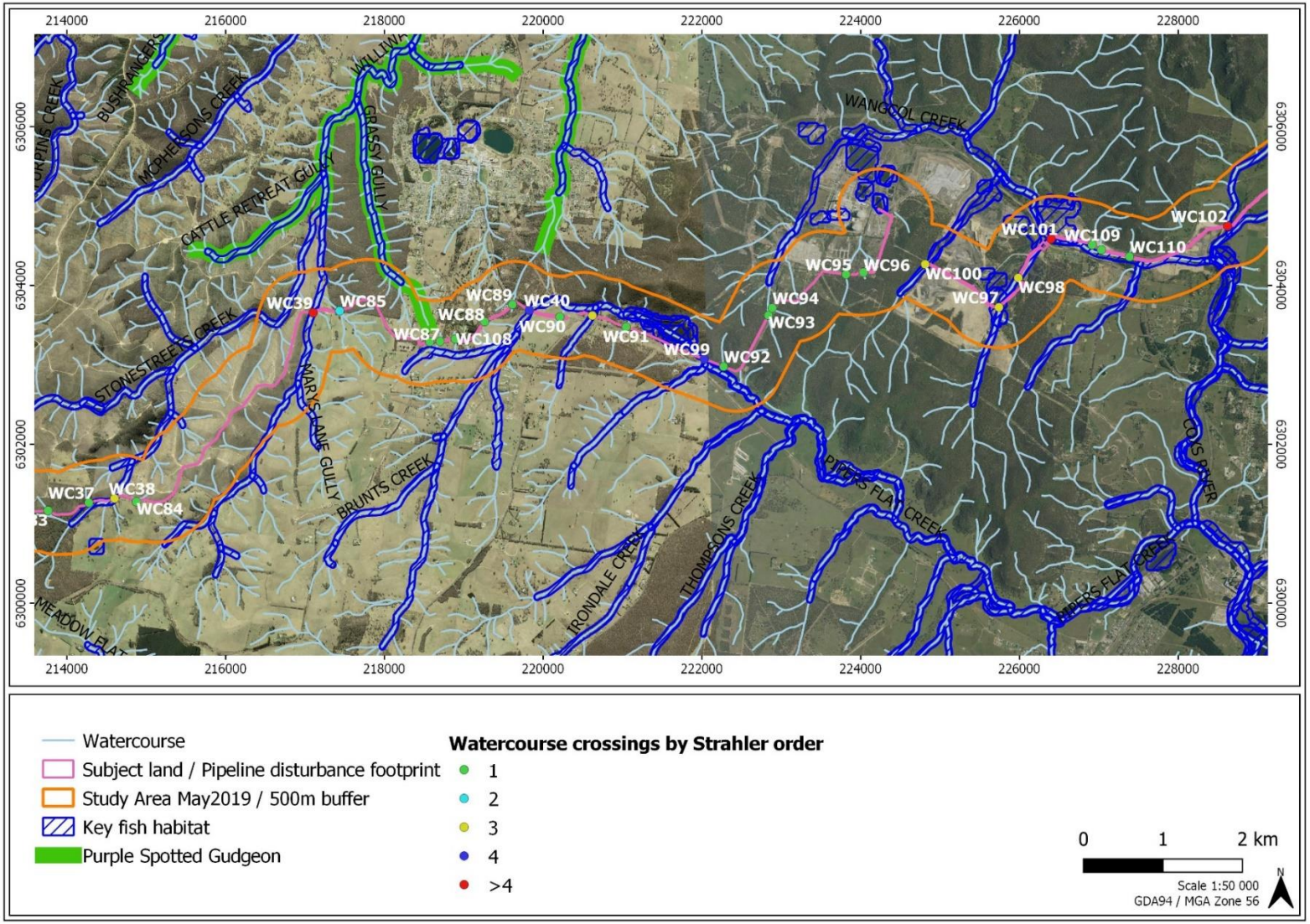
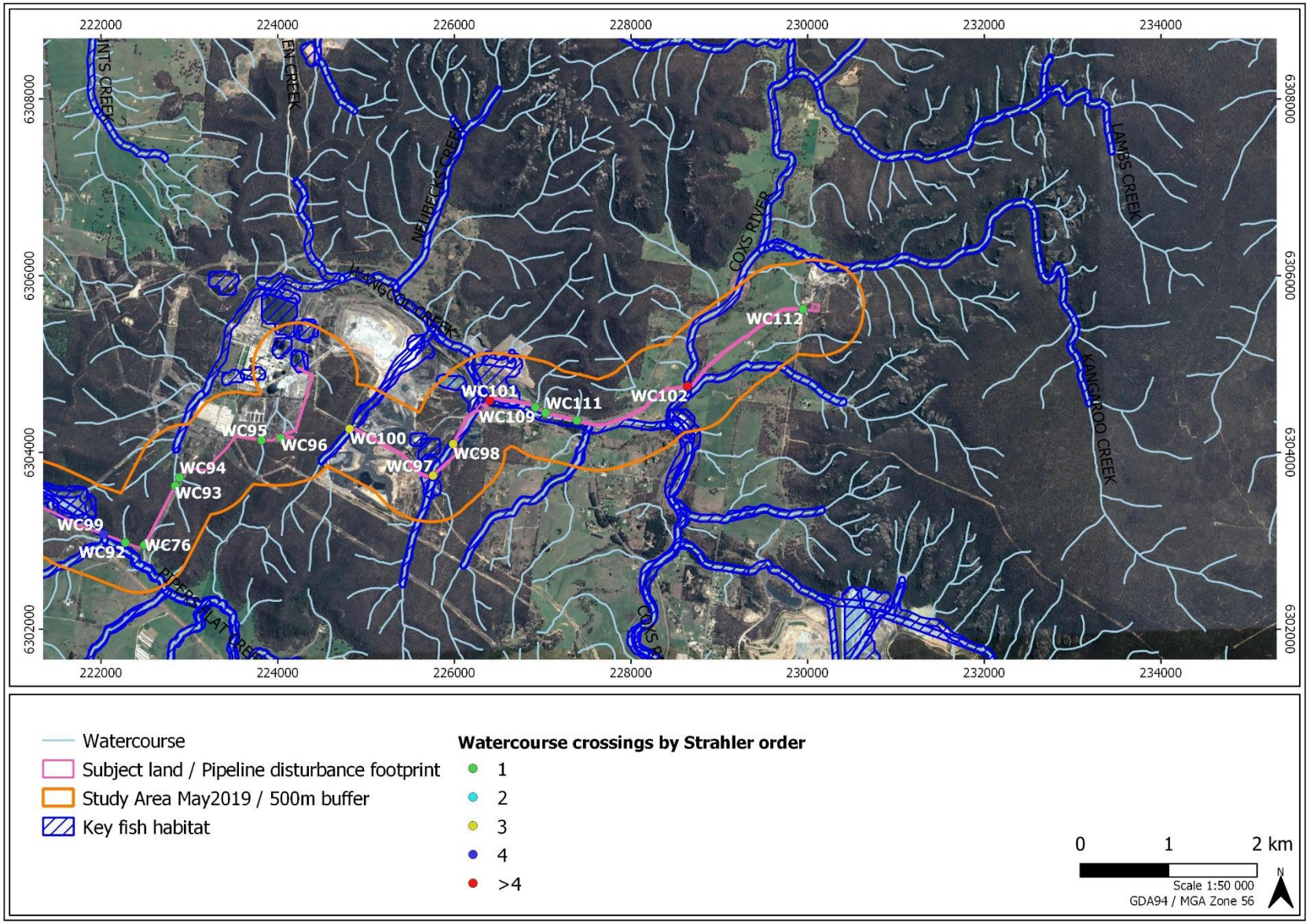


**Figure 3-21. Watercourses, crossing, Key Fish Habitat and wetlands of the study area – Map 6.**



### 3.4.2 Aquatic Endangered Ecological Communities

There are no aquatic endangered ecological communities within the study area. Although the lower Macquarie River forms part of the Darling River endangered ecological community, the community extends only as far up river as Burrendong Dam.

Burrendong Dam is approximately 90 km north-north-west of the study area.

## 3.5 WETLANDS

The NSW Wetlands spatial data (NSW Office of Environment and Heritage, 2013) indicates that wetlands in the study area are limited to artificially created dams and reservoirs and those created within abandoned quarry and mine pits at the eastern section of the pipeline corridor. This includes reservoirs and dams on Coxs River and Pipers Flat Creek. None occur within the pipeline corridor and are not likely to be directly impacted by the pipeline development. Unexpected indirect impact will be avoided and minimised by implementing environmental safeguards discussed in Sections 6.1 and 6.2.

The Directory of Important Wetlands of Australia indicates that there are no listed Important Wetlands in the study area.

Wetlands of the study area are mapped on the site maps, Figure 3-4 to 3-15.

## 3.6 KARST, CAVE AND ROCK HABITAT

There are no cave or karst systems within the study area or pipeline corridor. The pipeline corridor follows a route that avoids areas of rock and outcrop with none present on the pipeline corridor.

East of the study area, there are extensive areas of sandstone cliffs and gorges of the Capertee Uplands IBRA subregion. However these do not occur in the pipeline corridor, as shown on the site maps (Figure 3-4 to 3-15).

## 3.7 GROUNDWATER DEPENDANT ECOSYSTEMS (GDE)

The Bureau of Metrology (BoM) GDE Atlas (Bureau of Meterology, 2019) indicates that several watercourses crossed by the pipeline development have a high potential for the occurrence of a GDE. However, many of these watercourses are ephemeral, without any evidence of groundwater flow when visited during field work.

Any GDE on these watercourses is likely limited to terrestrial vegetation within the riparian corridor that opportunistically accesses groundwater under dry conditions.

The *Pipeline Water Assessment: McPhillamy's Gold Project* (EMM Consulting, 2019) indicates that a high priority GDE, named The Springs, occurs within 180 m of the pipeline corridor west of

Perthville. This high priority GDE will not be directly impacted by the pipeline development. Any GDE occurring within the pipeline development is likely limited to terrestrial vegetation within the riparian corridor that opportunistically accesses groundwater under dry conditions. The pipeline excavation is shallow, does not involve any water take activities and is not likely to cause any reduction in groundwater availability to any GDE.

# 4 NATIVE VEGETATION

## 4.1 SURVEY METHODOLOGY

Existing vegetation mapping of the study area (*State Vegetation Type Map: Central Tablelands Region V1.0*) was used to predict the Plant Community Types (PCT) present on the pipeline corridor. These predictions were used to inform the field survey and assist in the location of formalised vegetation plots. These plots were used to verify the presence of the mapped PCT, or, if different from existing mapping, enable the identification of the PCT present.

The entire pipeline corridor was traversed either by foot, where native vegetation was found to be present, or vehicle. Observations made while traversing the pipeline corridor were used to establish the boundaries of PCTs, using dominant upper layer species as an indicator of changes in community.

The pipeline corridor was then assessed in accordance with the BAM, as outlined below.

- Nested plots (a 20 m x 20 m floristic plot within a larger 50 m x 20 m habitat plot, respectively) were used to collect data on floristic composition, structure and habitat function. Five 1 m x 1 m plots within the 50 m x 20 m plot were used to measure litter cover.
- Plots were located randomly within each PCT and vegetation zone within the development site. The number of plots surveyed per vegetation zone was determined by the area categories described in the BAM.
- Attention was paid to the presence of any of the threatened plant species deemed likely to be present based on the desktop assessment.
- Where possible, plant species were identified in the field. Those that could not be identified were collected as voucher specimens and identified at a later date.
- Other data important for understanding the context of the site was also recorded, e.g. disturbance factors, habitat features and landform.
- The locations of plots were recorded using GPS within GDA 94 Zone 55 projected coordinate system.
- All data was recorded on hardcopy paper field data sheets developed specifically for the BAM.
- Vegetation communities were identified in accordance with the *NSW VIS Plant Community Type Classification* (NSW Office of Environment and Heritage, 2018b). The PCTs present at the site were determined on the basis of dominant species in each stratum, vegetation structure, and landscape position and soil type.
- If any of the vegetation communities had potential to be part of a Threatened Ecological Community (TEC), the published identification guidelines were consulted to determine if the vegetation community on site qualified as being part of the TEC.

Photographs were taken at each BAM plot, looking along the plot midline – one in landscape view, the second in portrait view. GPS coordinates and compass bearing of each plot were recorded.

The location of the BAM plots within the pipeline corridor was determined in accordance with the BAM, which requires the plots to be located randomly within vegetation zones. The vegetation zones reflect the different PCTs and vegetation condition of the PCTs present on the site. The location of each plot, mapped locations, site photographs and completed field data sheets are provided in Appendix 2.

Field surveys were undertaken in August, September, October and December of 2018 and January and May 2019.

## 4.2 PLANT COMMUNITY TYPES

Plant Community Types (PCT) were identified by reviewing existing mapping (NSW Office of Environment and Heritage, 2017), using plot data collected in the field (Appendix 2) in the online Vegetation Information System (VIS) community identification tool (NSW Office of Environment and Heritage, 2018b) and using dominant upper, mid and ground layer species recorded in relation to VIS descriptions of PCT.

Two-hundred and fifty-three plant species were recorded during the field survey of the pipeline corridor. Presence of characteristic upper, mid and ground layer species were important in determining PCT. Boundaries of PCTs within the pipeline corridor were determined by change in dominance of these species. This was detected by walking and slowly driving the length of the pipeline corridor where native vegetation occurs.

Twelve PCTs were determined as occurring within the pipeline corridor. These PCTs and how they were determined as being on the pipeline corridor are described in Table 4-1.

A total of 8.51 ha of native vegetation occurs within the pipeline corridor. This compares to a total of 1,662 ha of native vegetation estimated to occur in the study area. Maps showing the location of PCTs within the pipeline corridor are included in the vegetation maps in Appendix 3.

**Table 4-1. Plant Community Types present on the pipeline corridor.**

| PCT ID | PCT Name | Vegetation Formation | Associated TEC | Justification for Identification | Current NSW Extent (ha) | % Cleared | BAM plots |
|---|---|---|---|---|---|---|---|
| 85 | River Oak forest and woodland wetland of the NSW South Western Slopes and South Eastern Highlands Bioregion. | Forested Wetlands | Not a TEC | Mapped as PCT 85 by existing mapping.<br>River Oak present.<br>*Poa labillaardieri* dominant ground layer species. | 8000 | 80 | MAC03 |
| | **Description**<br>Tall or very tall open forest or woodland of River Oak (*Casuarina cunninghamiana* subsp. *cunninghamiana*) often with other tree species such as Ribbon Gum *(Eucalyptus viminalis*), Blakely's Red Gum (*Eucalyptus blakelyi*) or Yellow Box (*Eucalyptus melliodora*). Shrub layer generally sparse including species such as River Bottlebrush (*Callistemon sieberi*), Silver Wattle (*Acacia dealbata*), *Melicytus dentatus*, Bracken (*Pteridium esculentum*), *Lomandra longifolia* and Stinging Nettle (*Urtica incisa*). Ground cover sparse to dense containing native grasses such as *Microlaena stipoides, Poa labillardieri, Austrodanthonia racemosa* and couch grass (*Cynodon dactylon*), along with forbs such as *Geranium solanderi* var. *solanderi*, Bidgee-Widgee (*Acaena novae - zelandiae*) and Kidney Weed (*Dichondra repens*). Sedges such as *Carex* spp. and *Juncus* spp.are common. Weeds are common. Blackberry (*Rubus discolor*), *Phalaris aquatica* and Willow (*Salix* spp.) are major weeds. Occurs on gravels, sands and loams on various substrates along major watercourses in the NSW South-western Slopes Bioregion and western edge of the South East Highlands Bioregion excluding the Murray River valley where it is absent. Grades into River Red Gum communities (including ID79) at lower elevations to the west and grades into various box eucalypt woodlands upslope from the rivers. A threatened community due to clearing and weed infestation. | | | | | | |
| 287 | Long-leaved Box - Red Box - Red Stringybark mixed open forest on hills and hillslopes in the NSW South Western Slopes Bioregion. | Dry Sclerophyll Forests (Shrubby sub-formation) | Not a TEC | Mapped as PCT 287 by existing mapping.<br>VIS Identification tool confirms match (MAC70, MAC71, MAC76).<br>Dominant upper layer of *Eucalyptus goniocalyx* and *E. macroryncha* at MAC74 | 20 000 | 67 | MAC70<br>MAC76<br>MAC74<br>MAC71 |
| | **Description**<br>Mid-high to tall open forest or woodland to 25 m high dominated by Long-leaved Box (*Eucalyptus goniocalyx*), Red Box (*Eucalyptus polyanthemos*) and Red Stringybark (*Eucalyptus macroryncha*). Other tree species include Yellow Box (*Eucalyptus melliodora*) and White Box (*Eucalyptus albens*). A lower tree layer of Black Cypress Pine (*Callitris endlicheri*) is present at some locations. The shrub layer is sparse and includes *Brachyloma daphnoides* subsp. *daphnoides*, *Phyllanthus hirtellus*, *Persoonia sericea*, *Lissanthe strigosa*, *Indigofera australis*, *Acacia* | | | | | | |

| PCT ID | PCT Name | Vegetation Formation | Associated TEC | Justification for Identification | Current NSW Extent (ha) | % Cleared | BAM plots |
|---|---|---|---|---|---|---|---|
| | *genistifolia*, Acacia *buxifolia*, *Leptospermum continentale*, *Dillwynia sericea*, *Melichrus urceolaris*, *Pultenaea* spp., *Cassinia* spp. and *Hibbertia obtusifolia*. The ground layer is mid-dense and includes grasses such as *Themeda australis*, *Aristida ramosa*, *Poa sieberiana*, *Joycea pallida* and various species of *Austrodanthonia*. Forbs include *Senecio* spp. *Gonocarpus tetragynus*, *Cymbonotus preissianus*, *Dichopogon strictus*, *Galium gaudichaudii*, *Hypericum gramineum*, *Drosera peltata* and *Hydrocotyle laxiflora*. The rock ferns *Cheilanthes austrotenuifolia* of *Cheilanthes sieberi* are common along with the mat-rushes *Lomandra multiflora* subsp. *multiflora* and *Lomandra filiformis* subsp. *coriacea*. Occurs clayey soils derived from a range of substrates including granite, metamorphic rocks, fine-grained sedimentary and volcanic rocks on hillslopes in hill landorm patterns mainly in the NSW South-western Slopes Bioregion extending onto the South Eastern Highlands Bioregion. While a vulnerable community, it is less threatened than grassy box woodlands on flats and is sampled in a number of reserves as of 2007. | | | | | | |
| 654 | Apple Box - Yellow Box dry grassy woodland of the South Eastern Highlands Bioregion. | Grassy Woodlands | White Box Yellow Box Blakely's Red Gum Woodland | Mapped as PCT 654 by existing mapping.<br>*Eucalyptus melliodora* and *E. bridgesiana* dominant upper layer species.<br>Exists either as mature trees or regenerating upper layer over non-native pasture. Difficult to identify. | No estimate | 95 | MAC01<br>MAC13<br>MAC51203<br>MAC73 |
| | **Description**<br>Other Diagnostics Features: None; Landscape Position: Gently undulating slopes | | | | | | |
| 679 | Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion | Grassy Woodlands | Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South | Mapped by existing mapping as PCT 731 and 1093.<br>Identified as PCT 679 by the absence of dominant upper layer species associated with above PCTs and presence of *Eucalyptus pauciflora* and *Eucalyptus stellulata*.<br>Tussock grass and forb ground layer species typical of PCT 679 also present | No estimate | 35 | MAC30011907<br>MAC31011901<br>MAC31011903 |

| PCT ID | PCT Name | Vegetation Formation | Associated TEC | Justification for Identification | Current NSW Extent (ha) | % Cleared | BAM plots |
|---|---|---|---|---|---|---|---|
| | | | Western Slopes Bioregions | (*Poa sieberiana* and *Aceana novae-zealandiae*).<br><br>Located in appropriate landscape position, i.e. frost hollow drainage line. | | | |
| | **Description**<br>Low open woodland often with a wet heath and/or tussock grass understorey. Landscape Position: Occurs in frost hollow drainage lines in montane and tableland areas. | | | | | | |
| 727 | Broad-leaved Peppermint - Brittle Gum - Red Stringybark dry open forest on the South Eastern Highlands Bioregion | Dry Sclerophyll Forests (Shrubby sub-formation) | Not a TEC | MAC09 mapped as non-native, however regenerating native upper and ground layer present.<br><br>Adjacent intact vegetation mapped as PCT 727 by existing mapping.<br><br>MAC08 part of intact vegetation.<br><br>Presence of *Eucalyptus mannifera, E. dives, Acacia falciformis, Lomandra filiformis, Joycea pallida, Gonocarpus tetragynus* and *Poa sieberiana* used to determine PCT. | No estimate | 50 | MAC08<br><br>MAC09 |
| | Other Diagnostics Features: None. Landscape Position: Undulating exposed and sheltered footslopes. | | | | | | |
| 731 | Broad-leaved Peppermint - Red Stringybark grassy open forest on undulating hills, South Eastern Highlands Bioregion | Grassy Woodlands | Not a TEC | MAC29011903 and MAC29011901 are rehabilitated mine land. Regenerating native trees, shrubs and grasses. Assumed PCT 731 due to existing mapping of adjacent intact vegetation.<br><br>MAC30011905 is cleared powerline easement with regenerating native | No estimate | 80 | MAC29011903<br><br>MAC30011905<br><br>MAC30011906<br><br>MAC29011901<br><br>MAC29011902 |

| PCT ID | PCT Name | Vegetation Formation | Associated TEC | Justification for Identification | Current NSW Extent (ha) | % Cleared | BAM plots |
|---|---|---|---|---|---|---|---|
| | | | | shrubs, grasses and forbs. Single regenerating upper layer species is *Eucalyptus mannifera*. Adjacent intact vegetation mapped by existing mapping as PCT 731.<br><br>Other sites, upper layer dominated by *Eucalyptus dives* and *E. mannifera*, confirming existing mapping. | | | |
| | **Description**<br>Open forest with a sparse shrub layer and grassy groundcover. Landscape Position: Occurs on undulating hills between 550 and 1100m from the western Blue Mountains to near Braidwood. | | | | | | |
| 732 | Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion. | Grassy Woodlands | Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregions. | Mapped as PCT 732 by existing mapping.<br><br>Identified by using VIS Community Identification tool.<br><br>Species in upper and mid layers typical of PCT (*Eucalyptus dives, Acacia dealbata*) | No estimate | 65 | MAC250909<br><br>MAC30011901 |
| | **Description**<br>Open forest with a sparse shrub layer and grassy groundcover.; Landscape Position: Occurs on undulating granite tablelands of the upper Cox's and Abercrombie River valleys between 600 and 1100m. | | | | | | |

| PCT ID | PCT Name | Vegetation Formation | Associated TEC | Justification for Identification | Current NSW Extent (ha) | % Cleared | BAM plots |
|---|---|---|---|---|---|---|---|
| 765 | Carex - Juncus sedgeland/wet grassland of the South Eastern Highlands Bioregion | Freshwater Wetlands | Not a TEC | No native upper or mid layer but recognised by landscape position (drainage floor with boggy, water-logged soil) and the dominance of *Carex appressa*, *Schoenus apogon* and *Eleocharis acuta* in the ground layer. | No estimate | No estimate | MAC11 |
| | **Description**<br>None available. | | | | | | |
| 1093 | Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion. | Dry Sclerophyll Forest (Shrubby sub-formation) | Not a TEC | Determined by dominance of *Eucalyptus mannifera, E. macrorhyncha* and *E. goniocalyx* in upper, *Dianella revoluta*, *Lomandra filiformis, Gonocarpus tetragynus* and *Rhyridosperma pallida* in ground layer.<br>Confirmed by VIS Community Identification Tool.<br>Mapped as PCT 1093 by existing mapping. | No estimate | 61 | MAC04<br>MAC05<br>MAC07<br>MAC71201<br>MAC250910<br>MAC30011902<br>MAC30011903<br>MAC30011904<br>MAC31011904<br>MAC31011905 |
| | **Description**<br>Low open forest or woodland with an open understorey of sclerophyll shrubs, and sparse ground layer of grasses and forbs.; LandscapePosition: Occurs on ridges and slopes between 550 and 1150m on the Southern and Central Tablelands, between Wallerawang and Captains Flat. | | | | | | |

| PCT ID | PCT Name | Vegetation Formation | Associated TEC | Justification for Identification | Current NSW Extent (ha) | % Cleared | BAM plots |
|---|---|---|---|---|---|---|---|
| 1191 | Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion | Grassy Woodlands | Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregions | Mapped as PCT 1191 by existing mapping.<br>Large mature trees of a single species (*Eucalyptus viminalis*) over exotic pasture and blackberry.<br>Sole upper layer species occurs in 1191 | No estimate | 95 | MAC250907 |
| | **Description**<br>Open forest, woodland (or occasionally as grassland patches) with a sparse shrub layer and a dense grassy groundcover.; Landscape Position: Occurs on frost-hollow flats and footslopes in undulating tableland areas between 600 and 1100m. | | | | | | |
| 1197 | Snow Gum - Mountain Gum tussock grass-herb forest of the South Eastern Highlands Bioregion | Wet Sclerophyll Forests (Grassy sub-formation) | Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregions. | Plot data confirmed by VIS Community Identification tool. | No estimate | 90 | MAC12<br>MAC240901<br>MAC240902<br>MAC250901<br>MAC250902<br>MAC250906<br>MAC250904<br>MAC250903 |

| PCT ID | PCT Name | Vegetation Formation | Associated TEC | Justification for Identification | Current NSW Extent (ha) | % Cleared | BAM plots |
|---|---|---|---|---|---|---|---|
| | | | Tableland Basalt Forest of the Sydney Basin and South Eastern Highlands Bioregions. | | | | |
| | **Description**<br><br>Occurs on ridges and frost hollows on clay loams derived from a wide variety of substrates; Landscape Position: On undulating plateaux between Oberon and Crookwell. | | | | | | |
| 1330 | Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion | Grassy Woodlands | White Box Yellow Box Blakely's Red Gum Woodland | Mostly occurs as sparse mature trees over exotic ground layer with no mid layer. However PCT 1330 is mapped by existing mapping.<br><br>*Eucalyptus melliodora* and *E. blakelyi* are the dominant upper layer species at all plots. | No estimate | 94 | MAC41506<br>MAC51201<br>MAC61202<br>MAC67<br>MAC77<br>MAC65 |
| | **Description**<br><br>Woodland with a sparse shrub layer and dense grassy groundcover; LandscapePosition: Occurs on loamy soils on undulating terrain between 500 and 900m on the tablelands. | | | | | | |

## 4.3 VEGETATION CONDITION, PATCH SIZE AND ZONES

To be assessed under the BAM, native vegetation on the pipeline corridor has been further stratified into broad condition states and patch size. Native vegetation has then been assigned a zone, based on its condition state and the patch to which it belongs.

Broad condition states have been determined by the lack or presence of key structural elements of the respective PCT and the vegetation integrity score, calculated in the online BAM calculator using plot data. This method also compares data collected with the benchmarks for each PCT. The presence or absence of structural elements was assessed both by reviewing plot data and general observations made while carrying out field work. Results are shown in Table 4-2.

Vegetation patches are connected areas of native woody and non-woody vegetation that may extend beyond the pipeline corridor. Individual patches are defined under the BAM as areas of native vegetation separated by less than 100 m for woody vegetation or 30 m for non-woody vegetation. They may contain multiple PCT and vegetation condition states. Patches are assigned a size class based on their extent.

In the case of some PCT, vegetation with the same condition state occurs in multiple discontinuous patches of varying extent. To account for differing patch size class these have been designated as different zones, allowing differing patch size class to be accounted for in the calculation of Biodiversity Credits.

Vegetation patches corresponding to areas of native vegetation are shown in Table 4-2. In this table, Patch Number correlates to the vegetation patches mapped in Appendix 3.

Vegetation condition, patches and zones are mapped in the vegetation maps in Appendix 3.

**Table 4-2. Stratification of native vegetation on the pipeline corridor.**

| PCT | Condition state | Condition description | Vegetation Integrity | Extent (ha) | Patch Number | Patch size (ha) | Patch Size Class | Vegetation Zone |
|---|---|---|---|---|---|---|---|---|
| 85 | Poor | Sparse mature trees. Mid layer absent. Ground layer composed of native and non-native grasses and forbs. | 21.5 | 0.09 | 7 | 8.6 | 5-24 ha | 85_Poor |
| 287 | Good | Vegetation shows all structural elements of PCT | 57.2 | 0.74 | 13 | 1402 | >100 ha | 287_Good |
| 654 | Moderate | Native upper and ground layer, but no mid layer present. | 53.3 | 0.32 | 8 | 38.6 | 25-100 ha | 654_Moderate |
| | Poor | Mature and regenerating upper layer over a ground layer of non-native pasture. No mid layer present | 19 | 0.09 | 13 | 1402.5 | >100 ha | 654_Poor |
| | Poor | Mature and regenerating upper layer over a ground layer of non-native pasture. No mid layer present | | 0.24 | 8 | 38.6 | 25-100 ha | 654_Poor_01 |
| 679 | Good | All structural elements of PCT present, however very weedy (Blackberry and non-native grasses). | 58.4 | 0.17 | 1 | 22, 528 | >100 ha | 679_Good |
| | Poor | Native upper layer largely absent, but regenerating. Non-native grasses and forbs dominate ground layer, but some native species present. Mid layer absent. | 26.1 | 0.19 | 1 | 22, 528 | >100 ha | 679_Poor |
| 727 | Poor | No mature upper layer present, although regenerating. Mid layer absent. Native grassy ground layer vegetation present. | 41.5 | 0.01 | 4 | 1052 | >100 ha | 727_Poor |
| 731 | Good | Open forest community with a sparse mid layer present. Ground layer grassy. | 70.4 | 0.6 | 1<br>4 | 22, 528<br>1052 | >100 ha | 731_Good |
| | Poor | Powerline easement and rehabilitated mine land. Regenerating native upper, mid and ground layer present, but high cover of non-native ground layer. | 39.2 | 1.86 | 1 | 22, 528 | >100 ha | 731_Poor |

| PCT | Condition state | Condition description | Vegetation Integrity | Extent (ha) | Patch Number | Patch size (ha) | Patch Size Class | Vegetation Zone |
|---|---|---|---|---|---|---|---|---|
| 732 | Good | Open forest. Intact upper layer, with sparse mid layer present. Grassy ground layer. Few weeds. | 56 | 0.01 | 4 | 1052 | >100 ha | 732_Good |
| | Poor | Rehabilitated mine land. Regenerating native upper, mid and ground layer present, but high cover of non-native ground layer. | 31.8 | 1.08 | 1 | 22, 528 | >100 ha | 732_Poor |
| 765 | Moderate | No native upper or mid layer. Native ground layer representative of PCT present. Weedy (Blackberry) | 44.8 | 0.01 | 15 | 0.25 | <5 ha | 765_Moderate |
| 1093 | Good | Structurally intact open forest with shrubby mid layer. Sparse grassy ground layer. | 72.6 | 1.14 | 1<br>4 | 22, 528<br>1052 | >100 ha | 1093_Good |
| | Moderate | Upper and ground layer present. However no mid layer. | 46.4 | 0.51 | 1 | 22, 528 | >100 ha | 1093_Moderate |
| | Poor | No upper layer present. Sparse shrub layer over native grasses and forbs. | 35.2 | 0.54 | 5<br>4<br>1 | 7757<br>1052<br>22, 528 | >100 ha | 1093_Poor |
| 1191 | Poor | Mature upper layer over exotic pasture. No native mid layer present. Weedy (Blackberry). | 20.4 | 0.03 | 2 | 0.46 | <5 ha | 1191_Poor |
| 1197 | Good | Grassy forest with intact upper layer and native ground layer. Sparse native mid layer present. | 71.8 | 0.22 | 3 | 237.3 | >100 ha | 1197_Good |
| | Poor | Sparse native mid and ground layer present. No native upper layer. Sites are within state forest timber plantation with an upper layer of *Pinus radiata.* | 13.4 | 0.1 | 3 | 237.3 | >100 ha | 1197_Poor |
| 1330 | Moderate | | 39.9 | 0.14 | 14<br>11 | 4.89<br>4.7 | <5 ha | 1330_Moderate |
| | Poor | | 17.3 | 0.1 | 12 | 3.8 | <5 ha | 1330_Poor |

| PCT | Condition state | Condition description | Vegetation Integrity | Extent (ha) | Patch Number | Patch size (ha) | Patch Size Class | Vegetation Zone |
|---|---|---|---|---|---|---|---|---|
| | | Paddock trees over non-native pasture. No mid layer present. | | | 9 | 0.62 | | |
| | | | | 0.25 | 13 | 1402 | >100 ha | 1330_Poor01 |
| | | | | 0.03 | 10 | 26 | 25-100 ha | 1330_Poor02 |
| | | | | 0.04 | 6 | 14 | 5-24 ha | 1330_Poor03 |
| Non-native | Non-native | Areas of crops, improved pasture and pine plantations. Few native species present. Cover dominated by common non-native pasture grasses and forbs. Total upper layer of *Pinus radiata* in plantations. | Not assessed | 83.2 | N/A | N/A | N/A | Non-native |
| No vegetation | No vegetation | Roads, tracks, active mining areas and other cleared land that does not support vegetation | Not assessed | | N/A | N/A | N/A | N/A |

## 4.4 THREATENED ECOLOGICAL COMMUNITIES

Four threatened ecological communities (TEC) are associated with the PCTs recorded as present within the pipeline corridor, as shown in Table 4-1:

- White Box Yellow Box Blakely's Red Gum Woodland (BC Act endangered ecological community)
- White Box – Yellow Box –Blakely's Red Gum Grassy Woodland and Derived Grassland (EPBC Act critically endangered ecological community).
- Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South Eastern Highlands, Sydney Basin, South East Corner and NSW South Western Slopes Bioregions (BC Act endangered ecological community)
- Tableland Basalt Forest of the Sydney Basin and South Eastern Highlands Bioregions (BC Act endangered ecological community).

Office of Environment and Heritage threatened species profiles and relevant identification guides were used to determine if the vegetation within the pipeline corridor should be classified as the TEC. The results of this process are documented in Table 4-3.

This indicates that one BC Act listed Endangered Ecological Community (EEC) and one EPBC Act listed Critically Endangered Ecosystem (CEEC) occur:

- White Box Yellow Box Blakely's Red Gum Woodland EEC
- White Box – Yellow Box –Blakely's Red Gum Grassy Woodland and Derived Grassland CEEC

They occur in areas of PCT 654 and PCT 1330, as indicated in Table 4-3. Their extent is mapped on the Plant Community Type Maps in Appendix 3.

**Table 4-3. Determination of Threatened Ecological Communities on the pipeline corridor.**

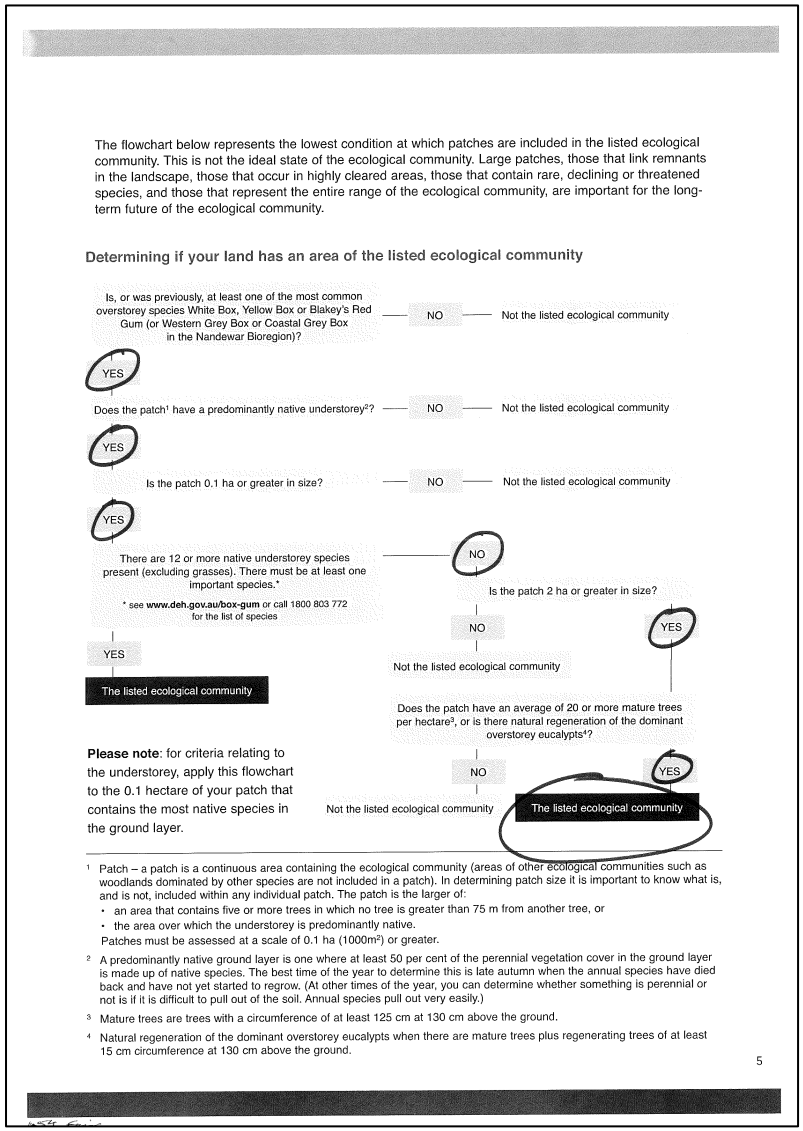
| TEC | BC Act* | EPBC Act+ | Associated PCT | Distribution relevant to pipeline corridor | Identification Guidelines | | TEC present | PCT and condition state |
|---|---|---|---|---|---|---|---|---|
| White Box Yellow Box Blakely's Red Gum Woodland | EEC | | 654<br>1330 | Bathurst, Hill End and Orange IBRA subregions (NSW Office of Environment and Heritage, 2019d). | Is the site on the tablelands or western slopes of NSW?<br>Does the site contain, or would the site have recently been likely to contain, White Box, Yellow Box or Blakely's Red Gum?<br>Is the ground layer mainly grassy?<br>If the site has been degraded, is there potential for assisted natural regeneration of the tree layer or the understorey (e.g. by removing grazing, weeds etc.)<br>(NSW Department of Environment and Climate Change, 2019e) | Yes<br>Yes<br>Yes<br>Yes | Yes | 654 Moderate<br>654 Poor<br>1330 Moderate<br>1330 Poor |
| White Box Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native Grassland | | CEEC | 654<br>1330 | South eastern Australia from southern Queensland to western Victoria. | See Figure 4-1 and 4-2. | | Yes | 654 Moderate |
| Tablelands Snow Gum, Black Sallee, Candlebark and Ribbon Gum Grassy Woodland in the South | EEC | | 679<br>732<br>1191<br>1197 | Orange IBRA subregion is the only subregion where this EEC occurs that overlaps the pipeline corridor.<br>(NSW Office of Environment and Heritage, 2019b) | Although the pipeline corridor is within the Orange IBRA, areas of the associated PCT on the pipeline corridor are not.<br>Presence or prior occurrence of Snow Gum, Candlebark, Ribbon Gum and/or Black Sallee. | No<br>No (732), Yes (679, 1191, 1197) | No. All associated PCT within the pipeline corridor | N/A |

| TEC | BC Act* | EPBC Act+ | Associated PCT | Distribution relevant to pipeline corridor | Identification Guidelines | | TEC present | PCT and condition state |
|---|---|---|---|---|---|---|---|---|
| Eastern Highlands, Sydney Basin, South East Corner and NSW Western Slopes Bioregions. | | | | | Understorey of intact sites characterised by native grasses and high diversity of herbs.<br>Disturbed remnants that would respond to assisted natural regeneration are considered part of the community.<br>(NSW Office of Environment and Heritage, 2019b) | Yes, at good condition sites.<br>Yes | are outside the Orange IBRA. | |
| Tableland Basalt Forest of the Sydney Basin and South Eastern Highlands Bioregions | EEC | | 1197 | Bathurst, Hill End and Orange IBRA subregions.<br>Distribution spans altitudes from 600 m to 900 m.<br>Occurs on loam or clay soils.<br>(NSW Office of Environment and Heritage, 2019c) | Is the site 600 -900 m above sea level?<br>Is the site on relatively fertile loam or clay soils derived mainly from basalt but also from other substrates?<br>Is the vegetation a grassy open forest or woodland, or a native grassland (where trees and shrubs have been removed)<br>Does the tree layer, if present, contain any of Ribbon Gum, Narrow-leaved Peppermint, Mountain Gum or Snow Gum? | No. Areas of PCT 1197 in the pipeline corridor are >1000m<br>Yes<br>Yes | No. Occurs outside the altitudinal range of the EEC. | N/A |

**BC Act: EEC = Endangered Ecological Community**

**EPBC Act: CEEC = Critically Endangered Ecological Community**

**Figure 4-1. Decision making flowchart (Australian Department of Environment and Heritage, 2006) to determine whether PCT 654 (Moderate condition state) (left) and PCT 654 (poor condition state) (right) are the White Box Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC.**



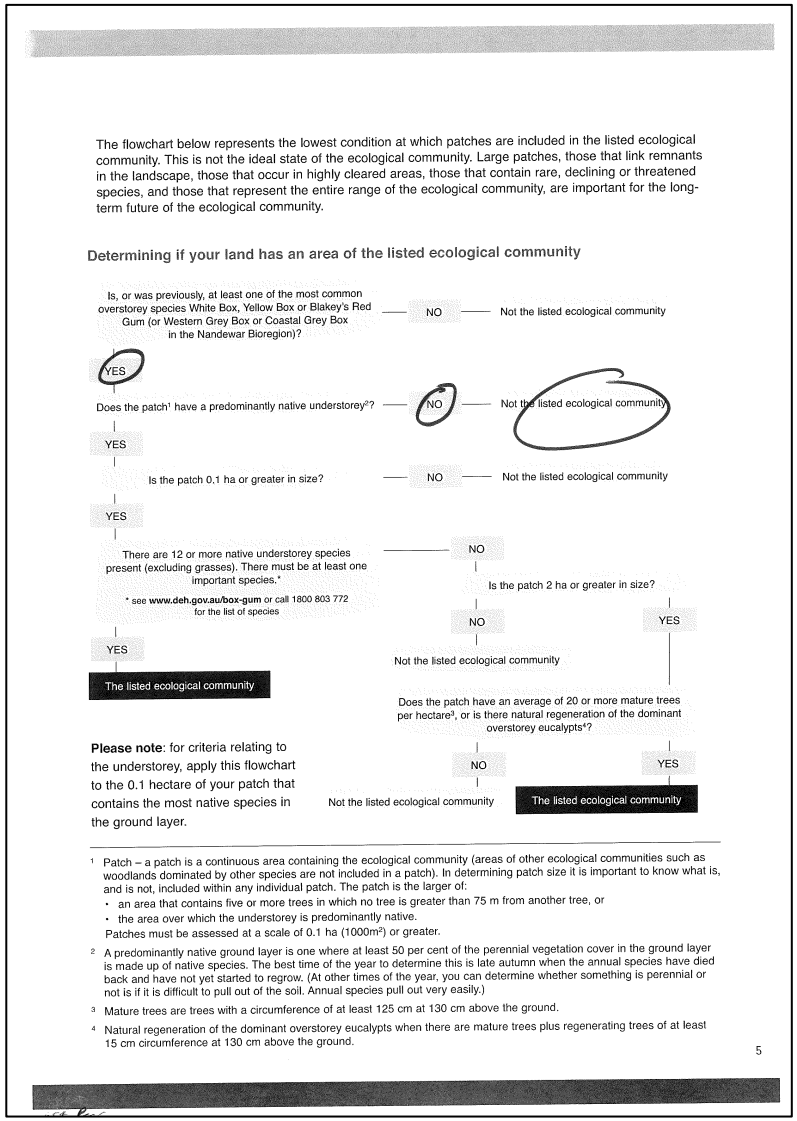
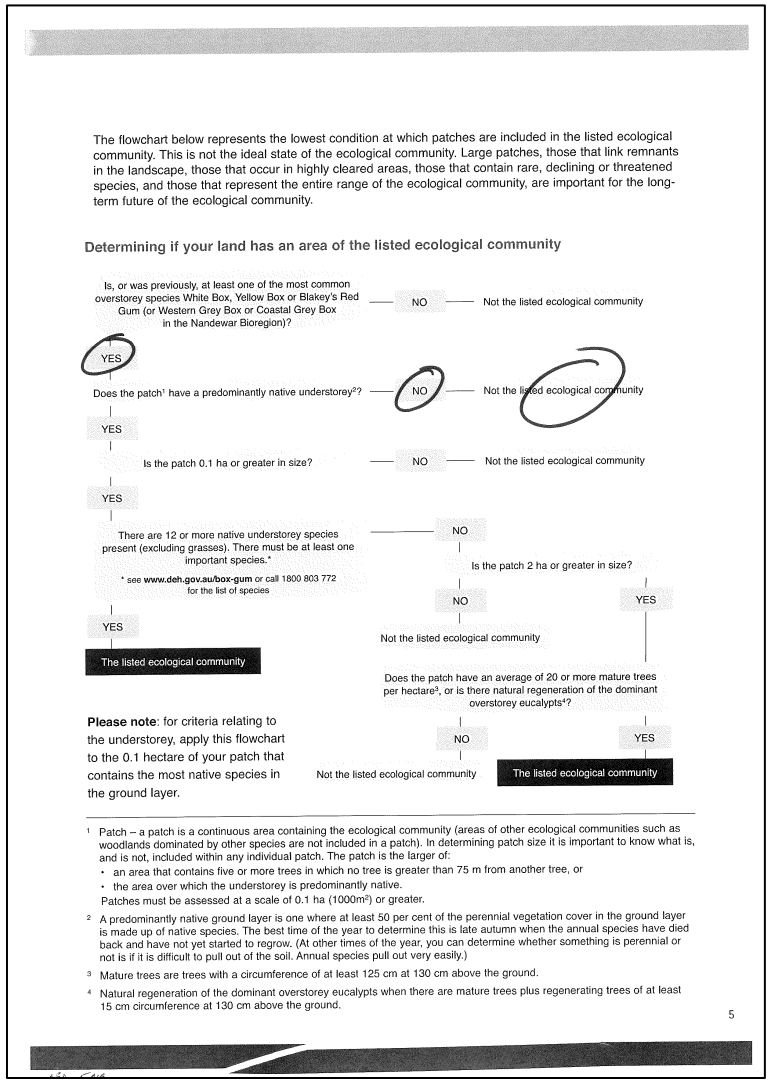



**Figure 4-2. Decision making flowchart (Australian Department of Environment and Heritage, 2006) to determine whether PCT 1330 (Moderate condition state) (left) and PCT 1330 (Poor condition state) (right) are the White Box Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC.**



The flowchart below represents the lowest condition at which patches are included in the listed ecological community. This is not the ideal state of the ecological community. Large patches, those that link remnants in the landscape, those that occur in highly cleared areas, those that contain rare, declining or threatened species, and those that represent the entire range of the ecological community, are important for the long-term future of the ecological community.

Determining if your land has an area of the listed ecological community



**Please note**: for criteria relating to the understorey, apply this flowchart to the 0.1 hectare of your patch that contains the most native species in the ground layer.

[1] Patch – a patch is a continuous area containing the ecological community (areas of other ecological communities such as woodlands dominated by other species are not included in a patch). In determining patch size it is important to know what is, and is not, included within any individual patch. The patch is the larger of:
- an area that contains five or more trees in which no tree is greater than 75 m from another tree, or
- the area over which the understorey is predominantly native.

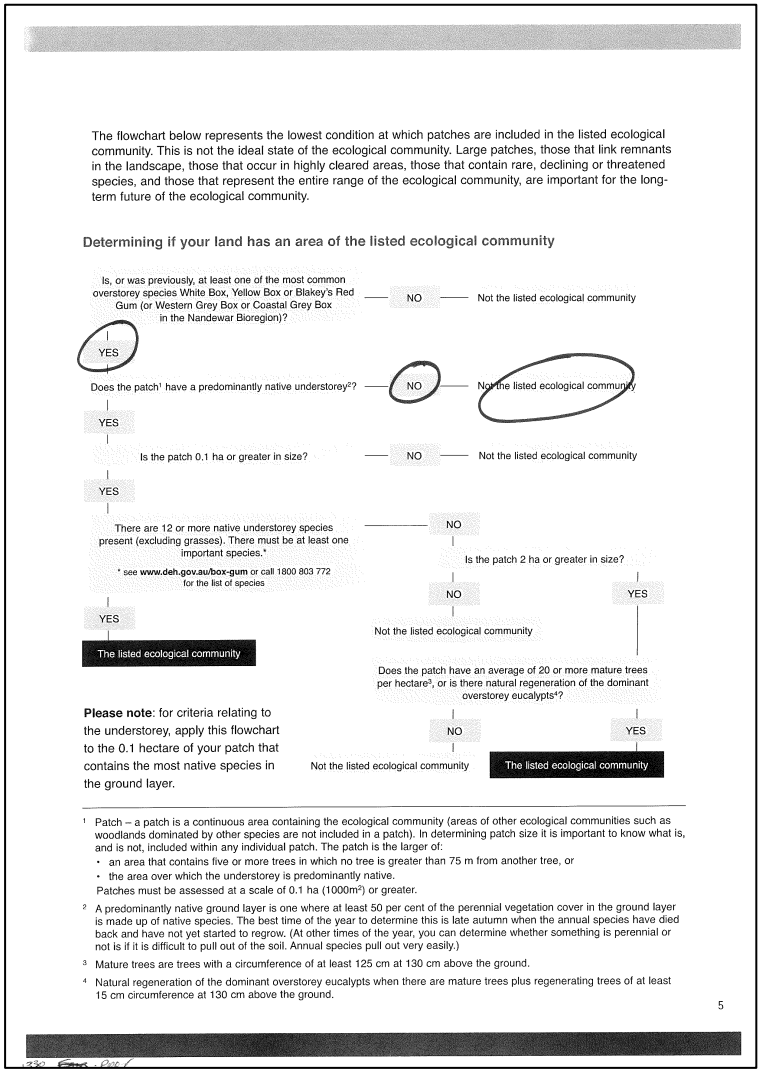
Patches must be assessed at a scale of 0.1 ha (1000m$^2$) or greater.

[2] A predominantly native ground layer is one where at least 50 per cent of the perennial vegetation cover in the ground layer is made up of native species. The best time of the year to determine this is late autumn when the annual species have died back and have not yet started to regrow. (At other times of the year, you can determine whether something is perennial or not is if it is difficult to pull out of the soil. Annual species pull out very easily.)

[3] Mature trees are trees with a circumference of at least 125 cm at 130 cm above the ground.

[4] Natural regeneration of the dominant overstorey eucalypts when there are mature trees plus regenerating trees of at least 15 cm circumference at 130 cm above the ground.

5



The flowchart below represents the lowest condition at which patches are included in the listed ecological community. This is not the ideal state of the ecological community. Large patches, those that link remnants in the landscape, those that occur in highly cleared areas, those that contain rare, declining or threatened species, and those that represent the entire range of the ecological community, are important for the long-term future of the ecological community.

Determining if your land has an area of the listed ecological community



**Please note**: for criteria relating to the understorey, apply this flowchart to the 0.1 hectare of your patch that contains the most native species in the ground layer.

[1] Patch – a patch is a continuous area containing the ecological community (areas of other ecological communities such as woodlands dominated by other species are not included in a patch). In determining patch size it is important to know what is, and is not, included within any individual patch. The patch is the larger of:
- an area that contains five or more trees in which no tree is greater than 75 m from another tree, or
- the area over which the understorey is predominantly native.

Patches must be assessed at a scale of 0.1 ha (1000m$^2$) or greater.

[2] A predominantly native ground layer is one where at least 50 per cent of the perennial vegetation cover in the ground layer is made up of native species. The best time of the year to determine this is late autumn when the annual species have died back and have not yet started to regrow. (At other times of the year, you can determine whether something is perennial or not is if it is difficult to pull out of the soil. Annual species pull out very easily.)

[3] Mature trees are trees with a circumference of at least 125 cm at 130 cm above the ground.

[4] Natural regeneration of the dominant overstorey eucalypts when there are mature trees plus regenerating trees of at least 15 cm circumference at 130 cm above the ground.

5

## 4.5 WEEDS

The study area is primarily an agricultural landscape, with large areas of non-native grazing pasture and cropping. The eastern end of the study area also contains state forest timber plantations of *Pinus radiata.* As a result, 83 species of non-native plant were recorded in the study area, particularly grasses and forbs that are common in improved pastures and disturbed, cleared road verges, such as Phalaris (*Phalaris* sp.), *Bromus* sp., Patterson's Curse (*Echium plantaganieum*) and White Clover (*Trifolium repens*). In total, 83.2 ha of non-native vegetation occurs within the pipeline corridor, as shown on vegetation maps in Appendix 3.

The BAM lists non-native plants that are considered high threat weeds. The presence and cover of these species are used to determine the vegetation condition of plant community types. Fourteen high threat weeds were recorded on the pipeline corridor during the field survey. They are listed in Table 4-4. Four species listed under the *Biosecurity Act 2015* as priority weeds for the Central Tablelands Local Land Services Region were also recorded. These are also listed in Table 4-4.

Measures for avoiding and minimising impact to biodiversity caused by the introduction and spread of weeds are listed in Section 6.3.

**Table 4-4. BAM high threat weeds and priority weeds that were recorded during the field survey.**

| Common Name | Species Name | BAM High Threat Weed | Priority Weed |
|---|---|---|---|
| *Hypericum perforatum* | St John's Wort | Yes | Yes |
| *Eragrostis curvula* | African Lovegrass | Yes | No |
| *Brassica tournefortii* | Mediterranean Turnip | Yes | No |
| *Acetosella vulgaris* | Sheep Sorrel | Yes | No |
| *Bromus diandrus* | Great Brome | Yes | No |
| *Cotoneaster glaucophyllus* | Cotoneaster | Yes | No |
| *Lycium ferocissimum* | African Boxthorn | Yes | Yes |
| *Pinus radiata* | Radiata Pine | Yes | No |
| *Rosa rubignosa* | Sweet Briar | Yes | No |
| *Salix fragilis* | Crack Willow | Yes | No |
| *Rubus fruticosus* | Blackberry | Yes | Yes |
| *Heliotropium amplexicaule* | Blue Heliotrope | Yes | No |
| *Cytisus scorparius* | Scotch Broom | Yes | Yes |
| *Paspalum dilatatum* | Paspalum | Yes | No |

# 5 THREATENED SPECIES

## 5.1 THREATENED FISH

Indicative distribution mapping of threatened fish provided by the NSW Department of Primary Industries indicates that several steams crossed by the pipeline corridor are potential habitat for two threatened fish species:

- Purple-spotted Gudgeon (*Mogurnda adspersa*), and
- Macquarie Perch (*Macquaria australasica*).

Macquarie Perch is known to occur only in the Macquarie River upstream of Bathurst, while Purple-spotted Gudgeon is more widely distributed within more permanent watercourses of the study area. Potential impact on threatened fish species is discussed in Section 6.3.

## 5.2 ECOSYSTEM CREDIT SPECIES

Information sources listed in Section 2.1 were searched to compile a list of ecosystem species predicted to occur on the pipeline corridor. Ecosystem species can reliably be predicted as occurring based on habitat surrogates. Under the BAM, there is no requirement to survey for these species. Offsetting requirements for impact to ecosystem species is considered by the BAM within the ecosystem credit calculations.

Based on the location of the pipeline corridor and the PCT and habitat attributes occurring, 33 ecosystem credit species are predicted to occur, as shown in Table 5-1.

### 5.2.1 Ecosystem Credit Species Surveys

As these species can be reliably predicted to occur based on habitat available, no targeted surveys were undertaken for any species listed in Table 5-1, with the exception of a number of dual-credit species (i.e. both ecosystem and species credit), as discussed in Section 5.3.1. However, opportunistic sightings of fauna were recorded throughout the duration of the survey period (i.e. August, September, October and December 2018 and January and May 2019).

Five species listed in Table 5-1 were recorded:

- Gang-Gang Cockatoo;
- Flame Robin;
- Dusky Woodswallow;
- Spotted Harrier; and
- Little Eagle.

### 5.2.2 Ecosystem Credit Species Likely to Occur

Ecosystem species likely to occur on the pipeline corridor, and therefore used for the purpose of biodiversity credit calculations, are listed in Table 5-1. The table includes a habitat assessment for each and the vegetation zone in which they are likely to occur.

**Table 5-1. Ecosystem credit species likely to occur on the pipeline corridor.**

| Species | NSW listing status | National listing status. | Sensitivity to Loss | Habitat Notes* | Pipeline Corridor PCT | Assessment |
|---|---|---|---|---|---|---|
| ***Anthochaera phrygia*** Regent Honeyeater (Foraging) | Critically Endangered | Critically Endangered | High | The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Birds are also found in drier coastal woodlands and forests in some years. Range is between north-eastern Victoria and south-eastern Queensland. There are only three known key breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. In the last 10 years Regent Honeyeaters have been recorded in urban areas around Albury where woodlands tree species such as Mugga Ironbark and Yellow Box were planted 20 years ago. The Regent Honeyeater is a generalist forager, although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar. | 85<br>287<br>654<br>731<br>732<br>1093<br>1191<br>1330 | As the species requires mature, flowering Eucalyptus and diverse upper layer vegetation for foraging resources, the species is not likely to occur in vegetation zones lacking this feature: 85 Poor, 649 Poor, 1093 Poor, Poor01, Poor02, Poor03. |
| ***Callocephalon fimbriatum*** Gang-gang Cockatoo (Foraging) | Vulnerable | Not Listed | Moderate | The Gang-gang Cockatoo is distributed from southern Victoria through south- and central-eastern New South Wales. In New South Wales, the Gang-gang Cockatoo is distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes. It occurs regularly in the Australian Capital Territory. It is rare at the extremities of its range, with isolated records known from as far north as Coffs Harbour and as far west as Mudgee. In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas. | 85<br>287<br>654<br>679<br>727<br>731<br>732<br>1093<br>1191<br>1197<br>1330 | Likely to occur in all vegetation zones at times. |
| ***Calyptorhynchus lathami*** Glossy Black-Cockatoo (Foraging) | Vulnerable | Not Listed | High | The Glossy Black-Cockatoo is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. An isolated population exists on Kangaroo Island, South Australia. Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of she oak occur. Black She oak (*Allocasuarina littoralis*) and Forest She oak (*A. torulosa*) are important foods. Inland populations feed on a wide range of she-oaks, including Drooping She oak, *Allocasuaraina diminuta*, and *A. gymnathera*. Belah is also utilised and may be a critical food source for some populations. In the Riverina, birds are associated with hills and rocky rises supporting Drooping Sheoak, but also recorded in open woodlands dominated by Belah (*Casuarina cristata*). Feeds almost exclusively on the seeds of several species of she-oak (*Casuarina* and *Allocasuarina* species), shredding the cones with the massive bill. Dependent on | 731<br>732<br>1093<br>1330 | A specialist feeder on *Casuarina* and *Allocasuarina* seeds, the species is not likely to forage in vegetation zones lacking this resources: 649 Poor, 731 Very Poor, Very Poor01, Very Poor02, 1093 Poor, Poor01, Poor02, Poor03, 1191 Poor, 1330 Poor, Poor01, Poor02, Poor03, Poor04, Poor05. |

| Species | NSW listing status | National listing status. | Sensitivity to Loss | Habitat Notes* | Pipeline Corridor PCT | Assessment |
|---|---|---|---|---|---|---|
| | | | | large hollow-bearing eucalypts for nest sites. A single egg is laid between March and May. | | |
| ***Chthonicola sagittata*** Speckled Warbler | Vulnerable | Not Listed | High | The Speckled Warbler has a patchy distribution throughout south-eastern Queensland, the eastern half of NSW and into Victoria, as far west as the Grampians. The species is most frequently reported from the hills and tablelands of the Great Dividing Range, and rarely from the coast. The Speckled Warbler lives in a wide range of Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area. | 85<br>287<br>654<br>727<br>731<br>732<br>1093<br>1191<br>1330 | Likely to occur in all associated vegetation zones at times. |
| ***Circus assimilis*** Spotted Harrier | Vulnerable | Not Listed | Moderate | The Spotted Harrier occurs throughout the Australian mainland, except in densely forested or wooded habitats of the coast, escarpment and ranges, and rarely in Tasmania. Individuals disperse widely in NSW and comprise a single population. Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. | 85<br>1191 | Present. Recorded during the survey. |
| ***Climacteris picumnus victoriae*** Brown Treecreeper (eastern subspecies) | Vulnerable | Not Listed | High | The Brown Treecreeper is endemic to eastern Australia and occurs in eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range. It is less commonly found on coastal plains and ranges. The western boundary of the range of the species runs approximately through Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell. The eastern subspecies lives in eucalypt woodlands through central NSW and in coastal areas with drier open woodlands. Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey; also found in mallee and River Red Gum (Eucalyptus camaldulensis) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging. | 85<br>287<br>654<br>727<br>731<br>1093<br>1191<br>1197<br>1330 | Forages in the upper layer of Eucalypt woodland and grassy forest. Unlikely to occur in vegetation zones with no upper layer: 649 Poor, 727 Poor, Poor01, 731 Very Poor, Very Poor01, Very Poor02, 1093 Poor, Poor01, Poor02, Poor03, 1197 Poor. |

| Species | NSW listing status | National listing status. | Sensitivity to Loss | Habitat Notes* | Pipeline Corridor PCT | Assessment |
|---|---|---|---|---|---|---|
| ***Daphoenositta chrysoptera*** Varied Sittella | Vulnerable | Not Listed | Moderate | The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west. Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. | 85<br>287<br>654<br>679<br>727<br>731<br>732<br>1093<br>1191<br>1197<br>1330 | Forages in the upper layer of Eucalypt woodland and grassy forest. Unlikely to occur in vegetation zones with no upper layer: 649 Poor, 679 Very Poor, 727 Poor, Poor01, 731 Very Poor, Very Poor01, Very Poor02, 1093 Poor, Poor01, Poor02, Poor03, 1197 Poor. |
| ***Dasyurus maculatus*** Spotted-tailed Quoll | Vulnerable | Endangered | High | Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. Mostly nocturnal, although will hunt during the day; spends most of the time on the ground, although also an excellent climber and will hunt possums and gliders in tree hollows and prey on roosting birds. Use communal 'latrine sites', often on flat rocks among boulder fields, rocky cliff-faces or along rocky stream beds or banks. Such sites may be visited by multiple individuals and can be recognised by the accumulation of the sometimes characteristic 'twisty-shaped' faeces deposited by animals. A generalist predator with a preference for medium-sized (500g-5kg) mammals. Consumes a variety of prey, including gliders, possums, small wallabies, rats, birds, bandicoots, rabbits, reptiles and insects. Also eats carrion and takes domestic fowl. Females occupy home ranges up to about 750 hectares and males up to 3500 hectares. Are known to traverse their home ranges along densely vegetated creek lines. Average litter size is five; both sexes mature at about one year of age. Life expectancy in the wild is about 3-4 years. | 85<br>287<br>654<br>679<br>727<br>731<br>732<br>1093<br>1191<br>1197<br>1330 | Likely in all associated vegetation zones due to proximity to habitat with suitable den sites etc. |
| ***Falsistrellus tasmaniensis*** Eastern False Pipistrelle | Vulnerable | Not Listed | High | The Eastern False Pipistrelle is found on the south-east coast and ranges of Australia, from southern Queensland to Victoria and Tasmania. Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings. | 287<br>654<br>679<br>731<br>732<br>1093<br>1197<br>1330 | Likely to occur in all associated vegetation zones at times. |

| Species | NSW listing status | National listing status. | Sensitivity to Loss | Habitat Notes* | Pipeline Corridor PCT | Assessment |
|---|---|---|---|---|---|---|
| ***Glossopsitta pusilla*** Little Lorikeet | Vulnerable | Not Listed | High | The Little Lorikeet is distributed widely across the coastal and Great Divide regions of eastern Australia from Cape York to South Australia. NSW provides a large portion of the species' core habitat, with lorikeets found westward as far as Dubbo and Albury. Forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country, e.g. paddocks, roadside remnants and urban trees also help sustain viable populations of the species. | 85<br>287<br>654<br>731<br>732<br>1093<br>1191<br>1330 | Not likely to occur in vegetation zones without a mature Eucalyptus canopy: 85 Poor, 649 Poor, 731 Very Poor, Very Poor01, Very Poor02, 1093 Poor, Poor01, Poor02, Poor03. |
| ***Grantiella picta*** Painted Honeyeater | Vulnerable | Vulnerable | Moderate | The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. During the winter it is more likely to be found in the north of its distribution. Inhabits Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus Amyema. | 85<br>287<br>654<br>727<br>731<br>732<br>1093<br>1330 | Not likely to occur in vegetation zones not supporting mistletoes and mature Eucalyptus canopy: 85 Poor, 649 Poor, 727 Poor, Poor 01, 731 Very Poor, Very Poor 01, Very Poor 02, 1093 Poor, Poor01, Poor02, Poor03 |
| ***Haliaeetus leucogaster*** White-bellied Sea-Eagle (Foraging) | Vulnerable | Not Listed | High | The White-bellied Sea-Eagle is distributed along the coastline (including offshore islands) of mainland Australia and Tasmania. It also extends inland along some of the larger waterways, especially in eastern Australia. The habitats occupied by the sea-eagle are characterised by the presence of large areas of open water (larger rivers, swamps, lakes, and the sea and sewage ponds). Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, forest (including rainforest) and even urban areas. Breeding territories are located close to water, and mainly in tall open forest or woodland, although nests are sometimes located in other habitats such as dense forest (including rainforest), closed scrub or in remnant trees on cleared land. | 85<br>287<br>679<br>1191<br>1330 | Likely to occur in all associated vegetation zones at times. |
| ***Hieraaetus morphnoides*** Little Eagle (Foraging) | Vulnerable | Not Listed | Moderate | The Little Eagle is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. It occurs as a single population throughout NSW. Occupies open eucalypt forest, woodland or open woodland. She oak or Acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. | 85<br>287<br>654<br>679<br>727<br>731<br>732 | Present. Recorded during the survey. |

| Species | NSW listing status | National listing status. | Sensitivity to Loss | Habitat Notes* | Pipeline Corridor PCT | Assessment |
|---|---|---|---|---|---|---|
| | | | | | 1093<br>1191<br>1197<br>1330 | |
| ***Hoplocephalus bungaroides***<br>Broad-headed Snake<br>(Foraging) | Endangered | Vulnerable | High | The Broad-headed Snake is largely confined to Triassic and Permian sandstones, including the Hawkesbury, Narrabeen and Shoalhaven groups, within the coast and ranges in an area within approximately 250 km of Sydney. Nocturnal. Shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring. Moves from the sandstone rocks to shelters in crevices or hollows in large trees within 500m of escarpments in summer. Feeds mostly on geckos and small skinks; will also eat frogs and small mammals occasionally. | 732 | Likely to occur in all associated vegetation zones at times. |
| ***Lathamus discolor***<br>Swift Parrot<br>(Foraging) | Endangered | Critically Endangered | Moderate | The Swift Parrot breeds in Tasmania during spring and summer, migrating in the autumn and winter months to south-eastern Australia from Victoria and the eastern parts of South Australia to south-east Queensland. In NSW mostly occurs on the coast and south west slopes. Migrates to the Australian south-east mainland between March and October. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted *Gum Corymbia maculata*, Red Bloodwood *C. gummifera*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*. Commonly used lerp infested trees include Inland Grey Box *E. microcarpa*, Grey Box *E. moluccana* and Blackbutt *E. pilularis*. | 287<br>654<br>732<br>1330 | Not likely in vegetation zones without a mature Eucalyptus canopy: 649 Poor, 732 Poor. |
| ***Lophoictinia isura***<br>Square-tailed Kite<br>(Foraging) | Vulnerable | Not Listed | Moderate | The Square-tailed Kite ranges along coastal and subcoastal areas from south-western to northern Australia, Queensland, NSW and Victoria. In NSW, scattered records of the species throughout the state indicate that the species is a regular resident in the north, north-east and along the major west-flowing river systems. Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. In arid north-western NSW, has been observed in stony country with a ground cover of chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland. | 85<br>287<br>654<br>731<br>1093 | Likely to occur in all associated vegetation zones at times. |

| Species | NSW listing status | National listing status. | Sensitivity to Loss | Habitat Notes* | Pipeline Corridor PCT | Assessment |
|---|---|---|---|---|---|---|
| ***Melanodryas cucullata cucullata*** Hooded Robin (south-eastern form) | Vulnerable | Not Listed | Moderate | The Hooded Robin is widespread, found across Australia, except for the driest deserts and the wetter coastal areas - northern and eastern coastal Queensland and Tasmania. However, it is common in few places, and rarely found on the coast. Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. Often perches on low dead stumps and fallen timber or on low-hanging branches, using a perch-and-pounce method of hunting insect prey. | 85<br>287<br>654<br>731<br>1093<br>1191<br>1197<br>1330 | Likely to occur in all associated vegetation zones at times. |
| ***Melithreptus gularis gularis*** Black-chinned Honeyeater (eastern subspecies) | Vulnerable | Not Listed | Moderate | The eastern subspecies extends south from central Queensland, through NSW, Victoria into south eastern South Australia, though it is very rare in the last state. In NSW it is widespread, with records from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. It is rarely recorded east of the Great Dividing Range, although regularly observed from the Richmond and Clarence River areas. It has also been recorded at a few scattered sites in the Hunter, Central Coast and Illawarra regions, though it is very rare in the latter. 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*). Also inhabits open forests of smooth-barked gums, stringybarks, ironbarks, river sheoaks (nesting habitat) and tea-trees | 85<br>287<br>654<br>731<br>1330 | Not likely in vegetation zones without a mature Eucalyptus canopy: 85 Poor, 731 Very Poor, Very Poor01, Very Poor02, |
| ***Miniopterus schreibersii oceanensis*** Eastern Bentwing-bat (Foraging) | Vulnerable | Not Listed | | Eastern Bentwing-bats occur along the east and north-west coasts of Australia. Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. Maternity caves have very specific temperature and humidity regimes. | 85<br>654<br>679<br>727<br>731<br>732<br>1093<br>1191<br>1197<br>1330 | Likely to occur in all associated vegetation zones at times. |

| Species | NSW listing status | National listing status. | Sensitivity to Loss | Habitat Notes* | Pipeline Corridor PCT | Assessment |
|---|---|---|---|---|---|---|
| ***Ninox connivens*** Barking Owl (Foraging) | Vulnerable | Not Listed | High | The Barking Owl is found throughout continental Australia except for the central arid regions and now occurs in a wide but sparse distribution in NSW. Core populations exist on the western slopes and plains (especially the Pilliga) and in some northeast coastal and escarpment forests. Sometimes extend their home range into urban areas, hunting birds in garden trees and insects attracted to streetlights. Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey on these fertile soils. Roost in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as Acacia and Casuarina species. | 287<br>654<br>727<br>731<br>732<br>1093<br>1330 | Likely to occur in all associated vegetation zones at times. |
| ***Ninox strenua*** Powerful Owl (Foraging) | Vulnerable | Not Listed | High | The Powerful Owl is endemic to eastern and south-eastern Australia, mainly on the eastern side of the Great Dividing Range, from south-eastern Queensland to Victoria. The Powerful Owl is found in open forests and woodlands, as well as along sheltered gullies in wet forests with dense understoreys, especially along watercourses. Will sometimes be found in open areas near forests such as farmland, parks and suburban areas, as well as in remnant bushland patches. Needs old growth trees to nest. | 287<br>654<br>727<br>731<br>732<br>1093<br>1191<br>1197<br>1330 | Likely to occur in all associated vegetation zones at times. |
| ***Petaurus australis*** Yellow-bellied Glider | Vulnerable | Not Listed | High | The Yellow-bellied Glider is found along the eastern coast to the western slopes of the Great Dividing Range, from southern Queensland to Victoria. Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. | 654<br>731<br>732<br>1093<br>1197<br>1330 | Not likely in vegetation zones without hollow bearing trees (hollows >25cm diameter): 731 Very Poor01, 731 Very Poor02, 732 Poor, |
| ***Petroica boodang*** Scarlet Robin | Vulnerable | Not Listed | Moderate | The Scarlet Robin is found from south east Queensland to south east South Australia and also in Tasmania and south west Western Australia. In NSW, it occurs from the coast to the inland slopes. After breeding, some Scarlet Robins disperse to the lower valleys and plains of the tablelands and slopes. Some birds may appear as far west as the eastern edges of the inland plains in autumn and winter. The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or | 85<br>287<br>654<br>679<br>727<br>731<br>732<br>1093 | Likely to occur in all associated vegetation zones at times. |

| Species | NSW listing status | National listing status. | Sensitivity to Loss | Habitat Notes* | Pipeline Corridor PCT | Assessment |
|---|---|---|---|---|---|---|
| | | | | wet forest communities, or in wetlands and tea-tree swamps. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. The Scarlet Robin breeds on ridges, hills and foothills of the western slopes, the Great Dividing Range and eastern coastal regions; this species is occasionally found up to 1000 metres in altitude. The Scarlet Robin is primarily a resident in forests and woodlands, but some adults and young birds disperse to more open habitats after breeding. In autumn and winter many Scarlet Robins live in open grassy woodlands, and grasslands or grazed paddocks with scattered trees. | 1191<br>1197<br>1330 | |
| ***Petroica phoenicea***<br>Flame Robin | Vulnerable | Not Listed | Moderate | The Flame Robin is endemic to south eastern Australia, and ranges from near the Queensland border to south east South Australia and also in Tasmania. In NSW, it breeds in upland areas and in winter, many birds move to the inland slopes and plains. Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. The ground layer of the breeding habitat is dominated by native grasses and the shrub layer may be either sparse or dense. Occasionally occurs in temperate rainforest, and also in herb fields, heathlands, shrublands and sedgelands at high altitudes. In winter, birds migrate to drier more open habitats in the lowlands (i.e. valleys below the ranges, and to the western slopes and plains). Often occurs in recently burnt areas; however, habitat becomes unsuitable as vegetation closes up following regeneration. In winter lives in dry forests, open woodlands and in pastures and native grasslands, with or without scattered trees. In winter, occasionally seen in heathland or other shrublands in coastal areas. | 85<br>287<br>654<br>679<br>727<br>731<br>732<br>1093<br>1191<br>1197<br>1330 | Present. Recorded during the survey. |
| ***Phascolarctos cinereus***<br>Koala<br>(Foraging) | Vulnerable | Vulnerable | High | The Koala has a fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. Inhabit eucalypt woodlands and forests. | 85<br>287<br>654<br>727<br>731<br>732<br>1093<br>1191<br>1197<br>1330 | Not likely in vegetation zones without mature Eucalyptus trees: 85 Poor, 649 Poor, 727 Poor, Poor01, 731 Very Poor, Very Poor01, Very Poor 02, 732 Poor, 1093 Poor, Poor01, Poor02, Poor03, 1197 Poor |

| Species | NSW listing status | National listing status. | Sensitivity to Loss | Habitat Notes* | Pipeline Corridor PCT | Assessment |
|---|---|---|---|---|---|---|
| ***Polytelis swainsonii*** Superb Parrot (Foraging) | Vulnerable | Vulnerable | Moderate | The Superb Parrot is found throughout eastern inland NSW. On the South-western Slopes their core breeding area is roughly bounded by Cowra and Yass in the east, and Grenfell, Cootamundra and Coolac in the west. Birds breeding in this region are mainly absent during winter, when they migrate north to the region of the upper Namoi and Gwydir Rivers. The other main breeding sites are in the Riverina along the corridors of the Murray, Edward and Murrumbidgee Rivers where birds are present all year round. Inhabit Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. In the Riverina the birds nest in the hollows of large trees (dead or alive) mainly in tall riparian River Red Gum Forest or Woodland. On the South West Slopes nest trees can be in open Box-Gum Woodland or isolated paddock trees. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box. | 85<br>654<br>1330 | Likely to occur in all associated vegetation zones at times. |
| ***Pomatostomus temporalis temporalis*** Grey-crowned Babbler (eastern subspecies) | Vulnerable | Not Listed | Moderate | The eastern subspecies (temporalis occurs from Cape York south through Queensland, NSW and Victoria and formerly to the south east of South Australia. This subspecies also occurs in the Trans-Fly Region in southern New Guinea. 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. | 85<br>287 | Likely to occur in all associated vegetation zones at times. |
| ***Pteropus poliocephalus*** Grey-headed Flying-fox (Foraging) | Vulnerable | Vulnerable | High | Grey-headed Flying-foxes are generally found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. In times of natural resource shortages, they may be found in unusual locations. Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. | 287<br>654<br>731<br>732<br>1093<br>1330 | Likely to occur in all associated vegetation zones at times. |
| ***Saccolaimus flaviventris*** Yellow-bellied Sheathtail-bat | Vulnerable | Not Listed | High | The Yellow-bellied Sheathtail-bat is a wide-ranging species found across northern and eastern Australia. In the most southerly part of its range - most of Victoria, south-western NSW and adjacent South Australia - it is a rare visitor in late summer and autumn. There are scattered records of this species across the New England Tablelands and North West Slopes. Roosts singly or in groups of up to | 287<br>654<br>731<br>732<br>1093 | Likely to occur in all associated vegetation zones at times. |

| Species | NSW listing status | National listing status. | Sensitivity to Loss | Habitat Notes* | Pipeline Corridor PCT | Assessment |
|---|---|---|---|---|---|---|
| | | | | six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. | 1197<br>1330 | |
| ***Scoteanax rueppellii*** Greater Broad-nosed Bat | Vulnerable | Not Listed | High | The Greater Broad-nosed Bat is found mainly in the gullies and river systems that drain the Great Dividing Range, from north-eastern Victoria to the Atherton Tableland. It extends to the coast over much of its range. In NSW it is widespread on the New England Tablelands, however does not occur at altitudes above 500 m. 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. | 731<br>732<br>1093<br>1197<br>1330 | Likely to occur in all associated vegetation zones at times. |
| ***Stagonopleura guttata*** Diamond Firetail | Vulnerable | Not Listed | Moderate | 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. Not commonly found in coastal districts, though there are records from near Sydney, the Hunter Valley and the Bega Valley. This species has a scattered distribution over the rest of NSW, though is very rare west of the Darling River. Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum *Eucalyptus pauciflora* Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland. | 85<br>287<br>654<br>727<br>731<br>732<br>1093<br>1191<br>1197<br>1330 | Likely to occur in all associated vegetation zones at times. |
| ***Tyto novaehollandiae*** Masked Owl (Foraging) | Vulnerable | Not Listed | High | The Masked Owl extends from the coast where it is most abundant to the western plains. Overall records for this species fall within approximately 90% of NSW, excluding the most arid north-western corner. There is no seasonal variation in its distribution. Lives in dry eucalypt forests and woodlands from sea level to 1100 m. A forest owl, but often hunts along the edges of forests, including roadsides. Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting. | 287<br>654<br>727<br>731<br>732<br>1093<br>1191<br>1197<br>1330 | Likely to occur in all associated vegetation zones at times. |

| Species | NSW listing status | National listing status. | Sensitivity to Loss | Habitat Notes* | Pipeline Corridor PCT | Assessment |
|---|---|---|---|---|---|---|
| ***Varanus rosenbergi*** Rosenberg's Goanna | Vulnerable | Not Listed | High | Rosenberg's Goanna occurs on the Sydney Sandstone in Wollemi National Park to the north-west of Sydney, in the Goulburn and ACT regions and near Cooma in the south. Found in heath, open forest and woodland. Associated with termites, the mounds of which this species nests in and requires a large habitat range. | 654<br>727<br>731<br>732<br>1093<br>1330 | Likely to occur in all associated vegetation zones at times. |

## 5.3 SPECIES CREDIT SPECIES

Forty-three candidate species credit species were predicted as occurring on the pipeline corridor based on the location and PCTs present (Table 5-4). According to the BAM, if suitable habitat for these species occurs on the pipeline corridor, they must be the subject of targeted survey according to recommended guidelines, or else assumed as present.

After consideration of habitat constraints, 22 species could be immediately discounted due to unsuitable habitat and/or distribution, while 20 species credit species had potential to occur and required targeted survey and/or habitat assessment in accordance with the BAM (Table 5-4). Those species that were the subject of targeted surveys are discussed further in Section 5.3.1.

### 5.3.1 Species Credit Species Surveys

**Flora**

Targeted surveys were carried out for threatened plant species where suitable habitat occurred following methods outlined in *NSW Guide to Surveying Threatened Plants* (NSW Office of Environment and Heritage, 2016), as described in Table 5-2. No species credit plant species were recorded on the pipeline corridor.

At the time of the survey, climatic conditions were dry, with significantly less rainfall having occurred in the months leading up to the survey. As a result, the diversity of grasses and forbs was low throughout the pipeline corridor. This limited the ability to detect ground layer plants, particularly annual species. Therefore these species have been assumed present within areas of suitable habitat. Two species were assumed present in this way – Silky Swainson-pea and Austral Toadflax.

**Table 5-2. Survey methods used for predicted threatened plant species.**

| Species | Associated PCT | Survey Method |
|---|---|---|
| ***Acacia flocktoniae***<br>Flockton Wattle | 1330 | Field traverse within pipeline corridor located in associated PCT. Where survey area was dissected by a road, both sides of road were traversed. |
| ***Eucalyptus aggregata***<br>Black Gum | 1191<br>1197 | Field traverse within pipeline corridor located in associated PCT. Where survey area was dissected by a road, both sides of road were traversed. |
| ***Eucalyptus pulverulenta***<br>Silver-leafed Gum | 1093<br>731<br>732 | Field traverse within pipeline corridor located in associated PCT. Where survey area was dissected by a road, both sides of road were traversed. |
| ***Eucalyptus robertsonii subsp. hemisphaerica***<br>Robertson's Peppermint | 727<br>1197 | Field traverse within pipeline corridor located in associated PCT. Where survey area was dissected by a road, both sides of road were traversed. |
| ***Euphrasia scabra***<br>Rough Eyebright | 679<br>1191 | Field traverse within pipeline corridor located in associated PCT. Where survey area was dissected by a road, both sides of road were traversed. |
| ***Grevillea divaricata***<br>Grevillea divaricata | 649<br>1093 | Field traverse within pipeline corridor located in associated PCT. Where survey area was dissected by a road, both sides of road were traversed. |

| Species | Associated PCT | Survey Method |
|---|---|---|
| ***Lepidium hyssopifolium***<br>Aromatic Peppercress | 679<br>654<br>732<br>1191<br>1197<br>1330 | Field traverse within pipeline corridor located in associated PCT. Where survey area was dissected by a road, both sides of road were traversed. |
| ***Persoonia marginata***<br>Clandulla Geebung | 649<br>1093<br>287 | Field traverse within pipeline corridor located in associated PCT. Where survey area was dissected by a road, both sides of road were traversed. |
| ***Swainsona sericea***<br>Silky Swainson-pea | 654<br>1330<br>1191 | Field traverse within pipeline corridor located in associated PCT. Where survey area was dissected by a road, both sides of road were traversed. |
| ***Thesium australe***<br>Austral Toadflax | 679<br>732<br>1191<br>1197<br>1330 | Field traverse within pipeline corridor located in associated PCT. Where survey area was dissected by a road, both sides of road were traversed. |
| ***Veronica blakelyi***<br>Veronica blakelyi | 649<br>731<br>732<br>1197 | Field traverse within pipeline corridor located in associated PCT. Where survey area was dissected by a road, both sides of road were traversed. |
| ***Eucalyptus cannonii***<br>Capertee Stringybark | 649<br>1093 | Field traverse within pipeline corridor located in associated PCT. Where survey area was dissected by a road, both sides of road were traversed. |

## Fauna

Due to the logistical constraints on the field survey due to its 90km length, few targeted surveys for threatened fauna were undertaken. Rather, species have been assumed as present where suitable habitat exists on the pipeline corridor.

Targeted surveys and methods used were carried out for those species listed below.

**Superb Parrot (breeding):** Hollow-bearing trees on the pipeline corridor located within PCTs 85, 654 and 1330 were observed and monitored for Superb Parrot activity for a 0.5 hour period. Note that there were no hollow-bearing trees in PCT 85 and hollow-bearing trees were limited to large mature paddock trees in PCT 1330. No Superb Parrots were recorded, either using hollows or foraging on the pipeline corridor.

**Purple Copper Butterfly**: All areas of native vegetation, including PCTs 1330 and 1093, above 850 m elevation were searched for the presence of Blackthorn (*Bursaria spinosa*) using the field transverse method. Sites of known records around the Yetholme and Sunny Corner regions were also searched for the presence of habitat as there was potential for the proposal to be re-routed through this area.

Areas where Blackthorn were recorded were mapped and a 40 m buffer drawn around each location to indicate suitable habitat for the species, as suitable butterfly habitat is not found further than this distance from Blackthorn plants.

Four areas of potential habitat for this species were recorded within the pipeline corridor, as mapped in the species polygon maps for this species (Appendix 4).

**Grey-headed Flying Fox (breeding):** Treed areas (both native and introduced) and other suitable habitat within the pipeline corridor was searched using a field transverse method (both on foot and from slow moving vehicle) for the presence of Grey-headed Flying Fox breeding camps. No camps were present within the pipeline corridor.

**Raptors (breeding):** Searches were carried out in suitable treed areas (native and introduced) within the pipeline corridor for raptors and raptor nests that might indicate the presence of breeding White-bellied Sea-Eagle, Little Eagle, Spotted Harrier and Square-tailed Kite. A field transverse method was used (both on foot and from slow moving vehicle).

The Little Eagle and Spotted Harrier were both recorded foraging on the pipeline corridor, however no nests of these or any other raptor were recorded on the pipeline corridor.

**Barking Owl (Breeding), Powerful Owl (Breeding), Masked Owl (Breeding), Glossy Black-Cockatoo (Breeding) and Gang Gang Cockatoo (Breeding):** Areas of suitable habitat within the pipeline corridor (being those areas mapped as native vegetation) were searched by pedestrian transect and slow-moving vehicle for the presence of suitably sized tree hollows. The location of hollow-bearing trees were recorded using GPS.

Seventeen trees with large hollows of a suitable size for the above species were located within 100 m of the pipeline development footprint, with none located within the footprint. Impact to native vegetation within this 100 m buffer will occur at seven of these trees, with impact limited to existing roads at the remaining locations.

The BAM requires a 100 m buffer be placed around suitable nesting trees for the Masked Owl, Barking Owl and Powerful Owl where impact to suitable habitat is expected. This will occur at four locations, as shown in Table 5-3. All hollow-bearing trees are mapped in Appendix 6.

**Table 5-3. Suitable nesting trees for threatened owl species.**

| Hollow size | MGA Zone | Easting | Northing | Comment | Candidate Species |
|---|---|---|---|---|---|
| >20 cm | 55 | 721297 | 6293524 | Pipeline corridor occurs on adjacent road. No impact to vegetation within 100 m buffer. | None |
| >20 cm | 55 | 732355 | 6291702 | Majority of pipeline corridor within the 100 m buffer occurs in non-native pasture. Some impact to PCT 1330 within 100 m buffer. | Masked Owl<br>Barking Owl<br>Powerful Owl |
| >20 cm | 55 | 733038 | 6291854 | Majority of pipeline corridor within the 100 m buffer occurs in non-native pasture. Some impact to PCT 1330 within 100 m buffer. | Masked Owl<br>Barking Owl<br>Powerful Owl |

| Hollow size | MGA Zone | Easting | Northing | Comment | Candidate Species |
|---|---|---|---|---|---|
| >20 cm | 55 | 760587 | 6296892 | Pipeline corridor occurs on adjacent road. No impact to vegetation within 100 m buffer. | None |
| >20 cm | 55 | 760594 | 6297259 | Pipeline corridor occurs on adjacent road. No impact to vegetation within 100 m buffer. | None |
| >20 cm | 55 | 760677 | 6297645 | Pipeline corridor occurs on adjacent road. No impact to vegetation within 100 m buffer. | None |
| >20 cm | 55 | 769687 | 6300243 | Pipeline corridor occurs on adjacent road. No impact to vegetation within 100 m buffer. | None |
| >20 cm | 55 | 770404 | 6300841 | Pipeline corridor occurs on adjacent road. No impact to vegetation within 100 m buffer. | None |
| >20 cm | 55 | 771749 | 6301560 | Pipeline corridor occurs on adjacent road. No impact to vegetation within 100 m buffer. | None |
| >20 cm | 55 | 771922 | 6301533 | Pipeline corridor occurs on adjacent road. No impact to vegetation within 100 m buffer. | None |
| >20 cm | 55 | 775903 | 6304005 | Pipeline corridor occurs on adjacent road. No impact to vegetation within 100 m buffer. | None |
| >20 cm | 55 | 775975 | 6303975 | Pipeline corridor occurs on adjacent road. No impact to vegetation within 100 m buffer. | None |
| >20 cm | 56 | 222047 | 6303058 | Impact to PCT 679 within 100 m buffer. | PCT not associated with candidate species |
| >20 cm | 56 | 222309 | 6302984 | Impact to PCT 679 within 100 m buffer. | PCT not associated with candidate species |
| >20 cm | 56 | 222356 | 6302979 | Impact to PCT 679 within 100 m buffer. | PCT not associated with candidate species |
| >20 cm | 56 | 223304 | 6303827 | Impact to PCT 732 an PCT 1093 within 100 m buffer. | Masked Owl<br><br>Barking Owl<br><br>Powerful Owl |

| Hollow size | MGA Zone | Easting | Northing | Comment | Candidate Species |
|---|---|---|---|---|---|
| >20 cm | 56 | 223368 | 6303908 | Impact to PCT 732 an PCT 1093 within 100 m buffer. | Masked Owl<br><br>Barking Owl<br><br>Powerful Owl |

**Koala:** Targeted searches for Koala were carried out within suitable habitat using the Spot Assessment Technique. Although areas of sparse upper layer vegetation and paddock trees were searched thoroughly, forested areas were surveyed at random points only. Only trees on the pipeline corridor were searched, not adjoining vegetation.

Although no evidence of the presence of Koala was recorded on the pipeline corridor, large areas of suitable habitat occur in adjacent areas. It is likely that any Koala within the vicinity would at least occasionally forage in those parts of the pipeline corridor that contain mature *Eucalyptus* trees.

However, the absence of Koala during the field survey conducted during the breeding season (August to February) and the disturbed nature of the pipeline corridor given its proximity to roadside edges and cleared agricultural land, would indicate the pipeline corridor is not core Koala habitat.

**Bush Stone-curlew:** Pedestrian transects were carried out through PCT 1330 within the pipeline corridor, searching for this species and threatened plants. Although numerous other bird species were recorded (Appendix 2), the Bush Stone-Curlew was not present.

### 5.3.2 Candidate species assessment

Species that were not the subject of targeted surveys were assumed as present where suitable habitat occurred in the pipeline corridor. A total of 10 candidate species were assumed to be present.

Species polygons have been created to assess each species either recorded or assumed as present. This represents the extent of suitable habitat for each species within the pipeline corridor, in accordance with individual species requirements in the threatened species profile database. For species recorded during survey, numbers of individuals have been used where appropriate. For those assumed as present, the areas of associated PCT (as outlined in the NSW Office of Environment and Heritage Threatened Species Profiles) have been used as the species polygon, as required under the BAM.

Table 5-4 indicates the area of each species polygon. They are mapped in the species polygon maps in Appendix 4.

**Table 5-4. Species credit species likely to occur on the pipeline corridor. Habitat descriptions have been taken from NSW Office of Environment and Heritage Threatened Species Profiles.**

| Species | NSW listing status | Biodiversity Risk Weighting | National listing status. | Habitat Description | Pipeline corridor PCT | Assessment | Species Polygon Area | Species credits required |
|---|---|---|---|---|---|---|---|---|
| ***Acacia flocktoniae*** Flockton Wattle | Vulnerable | 1.5 | Vulnerable | The Flockton Wattle is found only in the Southern Blue Mountains (at Mt Victoria, Megalong Valley and Yerranderie) and grows in dry sclerophyll forest on sandstone. | 1330 | Absent (targeted survey) | 0 | 0 |
| ***Anthochaera phrygia*** Regent Honeyeater (Breeding) | Critically Endangered | 3.0 | Critically Endangered | See Table 5-1 | 85<br>287<br>649<br>654<br>731<br>732<br>1093<br>1191<br>1330 | Absent. The pipeline corridor does not overlap important area mapping for this species. | 0 | 0 |
| ***Aprasia parapulchella*** Pink-tailed Legless Lizard | Vulnerable | 2.0 | Vulnerable | There is a concentration of populations in the Canberra/Queanbeyan Region. Other populations have been recorded near Cooma, Yass, Bathurst, Albury and West Wyalong. This species is also found in the Australian Capital Territory. Inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by Kangaroo Grass (Themeda australis). Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks. Commonly found beneath small, partially- | N/A | Absent. No habitat.<br><br>The pipeline corridor does not contain any rocky areas and is not within 50 m of any rocky areas.<br><br>The pipeline route has been chosen to avoid these areas due to ease of construction and to avoid impact to habitat. | 0 | 0 |

| Species | NSW listing status | Biodiversity Risk Weighting | National listing status. | Habitat Description | Pipeline corridor PCT | Assessment | Species Polygon Area | Species credits required |
|---|---|---|---|---|---|---|---|---|
| | | | | embedded rocks and appear to spend considerable time in burrows below these rocks; the burrows have been constructed by and are often still inhabited by small black ants and termites. | | | | |
| ***Burhinus grallarius*** Bush Stone-curlew | Endangered | 2.0 | Not Listed | The Bush Stone-curlew is found throughout Australia except for the central southern coast and inland, the far south-east corner, and Tasmania. Only in northern Australia is it still common however and in the south-east it is either rare or extinct throughout its former range. Inhabits open forests and woodlands with a sparse grassy ground layer and fallen timber. | 1330 | Absent.<br><br>Not recorded during targeted survey. | 0 | 0 |
| ***Callocephalon fimbriatum*** Gang-gang Cockatoo (Breeding) | Vulnerable | 2.0 | Not Listed | See Table 5-1. | 85<br>287<br>649<br>654<br>679<br>727<br>731<br>732<br>1093<br>1191<br>1197<br>1330 | Absent.<br><br>There are no trees with large hollows within the pipeline corridor. | 0 | 0 |
| ***Calyptorhynchus lathami*** Glossy Black-Cockatoo (Breeding) | Vulnerable | 2.0 | Not Listed | See Table 5-1 | 1093<br>1191<br>649<br>1330<br>731 | Absent.<br><br>There are no trees with large hollows within the pipeline corridor. | 0 | 0 |

| Species | NSW listing status | Biodiversity Risk Weighting | National listing status. | Habitat Description | Pipeline corridor PCT | Assessment | Species Polygon Area | Species credits required |
|---|---|---|---|---|---|---|---|---|
| | | | | | 732 | | | |
| ***Cercartetus nanus*** Eastern Pygmy-possum | Vulnerable | 2.00 | Not Listed | The species has a strong affinity for communities in the interface region between shale-derived and sandstone-derived soils, with forested habitats that have good native cover and woody debris. | 287<br>649<br>727<br>731<br>732<br>1093<br>1191<br>1197<br>1330 | Assumed present. | 7.1<br><br>All areas of associated PCT within the pipeline corridor have been mapped as the species polygon. | 125 |
| ***Chalinolobus dwyeri*** Large-eared Pied Bat | Vulnerable | 3.0 | Vulnerable | Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (Petrochelidon ariel), frequenting low to mid-elevation dry open forest and woodland close to these features. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in sandstone caves and overhangs. They remain loyal to the same cave over many years. Found in well-timbered areas containing gullies. The relatively short, broad wing combined with the low weight per unit area of wing indicates manoeuvrable flight. This species probably forages for small, flying insects below the forest canopy. Likely to hibernate through the coolest months. It is uncertain whether mating occurs early in winter or in spring. | N/A | Absent. No habitat.<br><br>The subject site does not contain cliffs or rocky areas containing caves and overhangs.<br><br>The pipeline route has been chosen so as to avoid impact to these habitats and for ease of construction. | 0 | 0 |

| Species | NSW listing status | Biodiversity Risk Weighting | National listing status. | Habitat Description | Pipeline corridor PCT | Assessment | Species Polygon Area | Species credits required |
|---|---|---|---|---|---|---|---|---|
| ***Delma impar*** Striped Legless Lizard | Vulnerable | 1.5 | Vulnerable | The Striped Legless Lizard occurs in the Southern Tablelands, the South West Slopes and possibly on the Riverina. Populations are known in the Goulburn, Yass, Queanbeyan, Cooma and Tumut areas. Found mainly in Natural Temperate Grassland but has also been captured in grasslands that have a high exotic component. Habitat is where grassland is dominated by perennial, tussock-forming grasses such as Kangaroo Grass, spear-grasses. and Poa tussocks Poa spp., and occasionally wallaby grasses. Sometimes present in modified grasslands with a significant content of exotic grasses. Usually found where soils are predominantly basalt with a high clay content and a propensity for cracking. Favoured habitat typically contains little bare ground, with plant litter to a depth of approximately 3 cm. | 1330 | Absent. No habitat.<br><br>Areas of PCT 1330 within the study area consist of paddock trees and shelter belts over exotic pasture grasses and forbs. Native perennial tussock grasses are absent and there are no cracking clay soils occurring.<br><br>Areas are subjected to heavy grazing pressure and there is no deep litter layer present.<br><br>The pipeline corridor is remote from any known population. | 0 | 0 |
| ***Eucalyptus aggregata*** Black Gum | Vulnerable | 2.0 | Vulnerable | In NSW Black Gum occurs in the South Eastern Highlands Bioregion and on the western fringe of the Sydney Basin Bioregion. Black Gum has a moderately narrow distribution, occurring mainly in the wetter, cooler and higher parts of the tablelands, for example in the Blayney, Crookwell, Goulburn, Braidwood and Bungendore districts. Grows in the lowest | 1191<br>1197 | Absent (targeted survey) | 0 | 0 |

| Species | NSW listing status | Biodiversity Risk Weighting | National listing status. | Habitat Description | Pipeline corridor PCT | Assessment | Species Polygon Area | Species credits required |
|---|---|---|---|---|---|---|---|---|
| | | | | parts of the landscape, on alluvial soils, on cold, poorly-drained flats and hollows adjacent to creeks and small rivers. Also occurs as isolated paddock trees in modified native or exotic pastures and particularly in TSRs. | | | | |
| ***Eucalyptus pulverulenta*** Silver-leafed Gum | Vulnerable | 2.0 | Vulnerable | The Silver-leafed Gum is found in two quite separate areas, the Lithgow to Bathurst area and the Monaro (Bredbo to Bombala). Grows in shallow soils as an understorey plant in open forest, typically dominated by Brittle Gum, Red Stringybark, Broad-leafed Peppermint, Silvertop Ash and Apple Box. | 731<br>732<br>1093 | Absent (targeted survey) | 0 | 0 |
| ***Eucalyptus robertsonii subsp. hemisphaerica*** Robertson's Peppermint | Vulnerable | 2.0 | Vulnerable | Robertson's Peppermint is known only from the central tablelands of NSW, at small disjunct localities from north of Orange to Burraga. Locally frequent in grassy or dry sclerophyll woodland or forest, on lighter soils and often on granite. Usually found in closed grassy woodlands in locally sheltered sites. Habitats include quartzite ridges, upper slopes and a slight rise of shallow clay over volcanics. | 727<br>1197 | Absent (targeted survey). | 0 | 0 |
| ***Eucalyptus cannonii*** | Vulnerable | 1.5 | Not Listed | Capertee Stringybark has a broad altitudinal range, from around 450m to 1,050m. Within | 731<br>1093 | Recorded during the field survey, but not within the pipeline corridor. | 0 | 0 |

| Species | NSW listing status | Biodiversity Risk Weighting | National listing status. | Habitat Description | Pipeline corridor PCT | Assessment | Species Polygon Area | Species credits required |
|---|---|---|---|---|---|---|---|---|
| Capertee Stringybark | | | | this range, the species appears to tolerate most situations except the valley floors. | | | | |
| ***Euphrasia scabra*** Rough Eyebright | Endangered | 3.0 | Not Listed | There are three extant populations of the Rough Eyebright in NSW: Bondi State Forest, South East Forests National Park and near Nunnock Swamp. Occurs in or at the margins of swampy grassland or in sphagnum bogs, often in wet, peaty soil. An annual species, with most flowering collections of the species have been made between January and April. | 679<br>1191 | Absent. No habitat.<br><br>Areas of PCTs 679 and 1191 on the pipeline corridor do not contain swampy grassland or bogs.<br><br>The sedgeland/wet grassland of PCT 765 was searched for this species (although not an associated PCT). It was not detected. | 0 | 0 |
| ***Grevillea divaricata*** | Endangered | 3.0 | Not Listed | Specimen notes describe the plant as occurring frequently in dry open forest lands and as possibly growing on rocky river margins.<br>Flowers recorded in April, but the species probably also flowers in the spring months.<br>Plants possibly regenerate from lignotuber and sucker, either naturally or in response to fire. May also be capable of recruitment via rhizomes.<br>The fire response of the species is unknown, however type material appears to have been rhizomatous or lignotuberous | 1093 | Absent (targeted survey). | 0 | 0 |

| Species | NSW listing status | Biodiversity Risk Weighting | National listing status. | Habitat Description | Pipeline corridor PCT | Assessment | Species Polygon Area | Species credits required |
|---|---|---|---|---|---|---|---|---|
| | | | | and capable of semi-basal suckering.<br>Flowers are probably bird-pollinated. | | | | |
| ***Haliaeetus leucogaster*** White-bellied Sea-Eagle (Breeding) | Vulnerable | 2.0 | Not Listed | See Table 5-1. | | Absent (targeted survey). | 0 | 0 |
| ***Hieraaetus morphnoides*** Little Eagle (Breeding) | Vulnerable | 1.5 | Not Listed | See Table 5-1. | | Absent (targeted survey). | 0 | 0 |
| ***Hoplocephalus bungaroides*** Broad-headed Snake (Breeding) | Endangered | 3.0 | Vulnerable | See Table 5-1.for breeding<br><br>Requires rocky areas | 732 | Absent.<br><br>No habitat. | 0 | 0 |
| ***Lathamus discolor*** Swift Parrot (Breeding) | Endangered | 3.0 | Critically Endangered | See Table 5-1. | N/A | Absent. Outside distribution.<br><br>The species breeds only in Tasmania. | 0 | 0 |
| ***Lepidium hyssopifolium*** Aromatic Peppercress | Endangered | 3.0 | Endangered | In NSW, the Aromatic Peppercress has a small population near Bathurst, one population at Bungendore, and one near Crookwell. The species occurs in a variety of habitats including woodland with a grassy | 654<br>679<br>732<br>1191<br>1197<br>1330 | Absent (targeted survey) | 0 | 0 |

| Species | NSW listing status | Biodiversity Risk Weighting | National listing status. | Habitat Description | Pipeline corridor PCT | Assessment | Species Polygon Area | Species credits required |
|---|---|---|---|---|---|---|---|---|
| | | | | understorey and grassland. Appears to respond to disturbance, having appeared after soil disturbance at one site. | | | | |
| ***Litoria aurea*** Green and Golden Bell Frog | Endangered | 2.0 | Vulnerable | The Green and Golden Bell Frog main populations in NSW are located around the metropolitan areas of Sydney, Shoalhaven and mid north coast (one an island population). There is only one known population on the NSW Southern Tablelands. Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (Typha spp.) or spikerushes (Eleocharis spp.). Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (Gambusia holbrooki), have a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas. | 654<br>1197<br>765 | Absent.<br><br>No suitable habitat. Wetland/watercourses areas within the pipeline corridor generally lack sheltering sites and emergent vegetation due to disturbance associated with agricultural activities.<br><br>Potentially suitable habitat on the Macquarie River and Queen Charlotte's Creek will be avoided by underboring. | 0 | 0 |
| ***Litoria booroolongensis*** Booroolong Frog | Endangered | 2.0 | Endangered | Live along permanent streams with some fringing vegetation cover such as ferns, sedges or grasses.<br>Adults occur on or near cobble banks and other rock structures within stream margins.<br>Shelter under rocks or amongst vegetation near the ground on the stream edge. | 85<br>654<br>731<br>1330<br>1197 | Absent. No habitat.<br><br>Watercourses crossed by the pipeline corridor are mostly non-permanent, being dry at the time of the survey.<br><br>Those that are permanent lack cobble banks and streamside rocks. | 0 | 0 |

| Species | NSW listing status | Biodiversity Risk Weighting | National listing status. | Habitat Description | Pipeline corridor PCT | Assessment | Species Polygon Area | Species credits required |
|---|---|---|---|---|---|---|---|---|
| | | | | Sometimes bask in the sun on exposed rocks near flowing water during summer.<br>Breeding occurs in spring and early summer and tadpoles metamorphose in late summer to early autumn.<br>Eggs are laid in submerged rock crevices and tadpoles grow in slow-flowing connected or isolated pools. | | | | |
| ***Litoria castanea*** Yellow-spotted Tree Frog | Critically Endangered | 3.0 | Endangered | Yellow-spotted Tree frog has only one known population near Yass.<br>Require large permanent ponds or slow flowing 'chain-of-ponds' streams with abundant emergent vegetation such as bulrushes and aquatic vegetation.<br>Adults are active during spring and summer and bask on sunny days.<br>Move and forage at night on grassy banks or float on the water's surface.<br>Males call at night from the open water and breeding generally occurs during or following rain.<br>Eggs are laid amongst aquatic vegetation.<br>Shelter during autumn and winter under fallen timber, rocks, other debris or thick vegetation. | 85 | Absent. Remote from the only known population. | 0 | 0 |

| Species | NSW listing status | Biodiversity Risk Weighting | National listing status. | Habitat Description | Pipeline corridor PCT | Assessment | Species Polygon Area | Species credits required |
|---|---|---|---|---|---|---|---|---|
| ***Litoria raniformis*** Southern Bell Frog | Endangered | 2.0 | Vulnerable | The Southern Bell Frog is known to exist only in isolated populations in the Coleambally Irrigation Area, the Lowbidgee floodplain and around Lake Victoria. Usually found in or around permanent or ephemeral Black Box/Lignum/Nitre Goosefoot swamps, Lignum/Typha swamps and River Red Gum swamps or billabongs along floodplains and river valleys. They are also found in irrigated rice crops, particularly where there is no available natural habitat. | 654 | Absent.<br><br>The pipeline corridor is outside the NSW distribution of the species (i.e. Coleambally Irrigation Area, Lowbridge floodplain and Lake Victoria). | 0 | 0 |
| ***Lophoictinia isura*** Square-tailed Kite (Breeding) | Vulnerable | 1.5 | Not Listed | See Table 5-1. | 85<br>287<br>654<br>731<br>1093 | Absent (targeted survey). | 0 | 0 |
| ***Miniopterus schreibersii oceanensis*** Eastern Bentwing-bat (Breeding) | Vulnerable | 3.0 | Not Listed | See Table 5-1. | 85<br>654<br>679<br>727<br>731<br>732<br>1093<br>1191<br>1197<br>1330 | Absent. No habitat present.<br><br>Require caves for breeding. None occur on the pipeline corridor. | 0 | 0 |
| ***Mixophyes balbus*** Stuttering Frog | Endangered | 3.0 | Vulnerable | Stuttering Frogs occur along the east coast of Australia from southern Queensland to north-eastern Victoria. Considered to | 85<br>732 | Absent. | 0 | 0 |

| Species | NSW listing status | Biodiversity Risk Weighting | National listing status. | Habitat Description | Pipeline corridor PCT | Assessment | Species Polygon Area | Species credits required |
|---|---|---|---|---|---|---|---|---|
| | | | | have disappeared from Victoria and to have undergone considerable range contraction in NSW, particularly in south-east NSW. It is the only Mixophyes species that occurs in south-east NSW and in recent surveys it has only been recorded at three locations south of Sydney. The Dorrigo region, in north-east NSW, appears to be a stronghold for this species. Found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range. Outside the breeding season adults live in deep leaf litter and thick understorey vegetation on the forest floor. | | The species is no longer present in South Eastern NSW. | | |
| ***Myotis macropus*** Southern Myotis | Vulnerable | 2.0 | Not Listed | The Southern Myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers. Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, stormwater channels, buildings, under bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface. | 85<br>1330<br>1191 | Assumed present | 0.23<br><br>All areas of associated PCT with appropriate habitat features (i.e. hollow bearing trees and/or other roost sites) within 200 m of waterways and pools >3 m wide have been mapped as the species polygon. | 1 |

| Species | NSW listing status | Biodiversity Risk Weighting | National listing status. | Habitat Description | Pipeline corridor PCT | Assessment | Species Polygon Area | Species credits required |
|---|---|---|---|---|---|---|---|---|
| ***Ninox connivens*** Barking Owl (Breeding) | Vulnerable | 2.0 | Not Listed | See Table 5-1. | 287<br>654<br>727<br>731<br>732<br>1093<br>1330 | Assumed present.<br><br>A 100 m buffer has been placed around potential nest trees (Section 5.3.1).<br><br>Species polygon has been calculated as areas within each 100 m buffer where native vegetation associated with the species will be impacted. | 0.27 | 4 |
| ***Ninox strenua*** Powerful Owl (Breeding) | Vulnerable | 2.0 | Not Listed | See Table 5-1. | 287<br>654<br>727<br>731<br>732<br>1093<br>1191<br>1197<br>1330 | Assumed present.<br><br>A 100 m buffer has been placed around potential nest trees (Section 5.3.1).<br><br>Species polygon has been calculated as areas within each 100 m buffer where native vegetation associated with the species will be impacted. | 0.27 | 4 |
| ***Paralucia spinifera*** Purple Copper Butterfly, Bathurst Copper Butterfly | Endangered | 2.0 | Vulnerable | Occurs above 850 m elevation, at sites with a south-west to north-west aspect, usually where direct sunlight reaches the habitat, and with extremes of cold such as regular winter snowfalls or heavy frosts.<br>Geology, soils and dominant vegetation canopy species vary between habitat locations. However vegetation structure is consistent, commonly open woodland or open forest with a | 731<br>732<br>1093<br>1191<br>1197<br>1330 | Assumed present.<br><br>Areas of associated PCT above 850 m elevation were searched for Blackthorn. Areas within 40 m of Blackthorn have been considered potential habitat for the species. | 0.3<br><br>Areas of the pipeline footprint that fall within these 40 m buffers have been used as the species polygon. | 6 |

| Species | NSW listing status | Biodiversity Risk Weighting | National listing status. | Habitat Description | Pipeline corridor PCT | Assessment | Species Polygon Area | Species credits required |
|---|---|---|---|---|---|---|---|---|
| | | | | sparse understorey that is dominated by the shrub, Blackthorn *Bursaria spinosa* subsp. *lasiophylla*.<br>Its lifecycle relies on a mutualistic relationship with the ant, *Anonychomyra itinerans*, and on the presence of *B. spinosa* subsp. *lasiophylla* which is used as the larval food plant.<br>The butterflies emerge between August (later at higher altitude sites) and November, with a two-week peak of activity in September. After mating, the females lay eggs on or in the immediate vicinity of *B. spinosa* subsp. *lasiophylla*. After hatching, the larva is attended by the ant *A. itinerans*, which is thought to provide predator protection to the larva and benefit by receiving nutritional secretions from the larva. Initially remaining on the *B. spinosa* subsp. *lasiophylla* night and day, the larva becomes nocturnal in the latter part of its six - eight week larval period. Pupation occurs between December and August in the underground nest of *A. itinerans* at the base of the host plant.<br>The relationship with *A. itinerans* and *B. spinosa* subsp. *lasiophylla* is not well understood, but it is thought to be highly significant. Even though the ant is sometimes difficult to detect, *A. itinerans* has been recorded at almost all locations. Similarly *B. spinosa* | | | | |

| Species | NSW listing status | Biodiversity Risk Weighting | National listing status. | Habitat Description | Pipeline corridor PCT | Assessment | Species Polygon Area | Species credits required |
|---|---|---|---|---|---|---|---|---|
| | | | | subsp. *lasiophylla* is present at all locations.<br>Adult males fly rapidly at about one metre from the ground and rest with wings parted in places exposed to full sun. Females fly less rapidly and tend to remain nearer to the host plant. The butterflies generally remain in the vicinity of *B. spinosa* subsp. *lasiophylla*, and are rarely observed more than 10 m distant from the plant. | | | | |
| ***Persoonia marginata***<br>Clandulla Geebung | Vulnerable | 2.0 | Vulnerable | The Clandulla Geebung occurs between Kandos and Clarence in the western Blue Mountains. Populations are largely disjunct and include Clandulla, Ben Bullen and Sunny Corner State Forests; isolated populations have also been recorded from Turon and Gardens of Stone National Parks. Grows in dry sclerophyll forest and woodland communities on sandstone. | 1093<br>287 | Absent (targeted survey) | 0 | 0 |
| ***Petaurus norfolcensis***<br>Squirrel Glider | Vulnerable | 2.0 | Not Listed | Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas.<br>Prefers mixed species stands with a shrub or Acacia midstorey. | 85<br>287<br>654<br>731<br>1093<br>1197<br>1330 | Assumed present. | 4.42<br><br>Vegetation zones lacking hollow-bearing trees are not considered suitable habitat: 85 Poor, 731 Poor, 1093 Poor, 1197 Poor.<br>All remaining associated PCT have | 78 |

| Species | NSW listing status | Biodiversity Risk Weighting | National listing status. | Habitat Description | Pipeline corridor PCT | Assessment | Species Polygon Area | Species credits required |
|---|---|---|---|---|---|---|---|---|
| | | | | Live in family groups of a single adult male one or more adult females and offspring.<br>Require abundant tree hollows for refuge and nest sites.<br>Diet varies seasonally and consists of *Acacia* gum, eucalypt sap, nectar, honeydew and manna, with invertebrates and pollen providing protein. | | | been mapped as species polygon | |
| ***Petrogale penicillata*** Brush-tailed Rock-wallaby | Endangered | 3.0 | Vulnerable | The range of the Brush-tailed Rock-wallaby extends from south-east Queensland to the Grampians in western Victoria, roughly following the line of the Great Dividing Range. However the distribution of the species across its original range has declined significantly in the west and south and has become more fragmented. In NSW they occur from the Queensland border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. Occupy rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. Browse on vegetation in and adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees. | 654<br>731<br>732<br>1093<br>1197<br>1330 | Absent. No suitable habitat.<br><br>The subject area is not within 1 km of rocky escarpments, gorges, steep slopes, boulder piles, rock outcrops or cliff lines. | 0 | 0 |
| ***Phascogale tapoatafa*** | Vulnerable | 2.0 | Not Listed | Prefer dry sclerophyll open forest with sparse groundcover | 654<br>727 | Assumed present, except as described below. | 2.9 | 59 |

| Species | NSW listing status | Biodiversity Risk Weighting | National listing status. | Habitat Description | Pipeline corridor PCT | Assessment | Species Polygon Area | Species credits required |
|---|---|---|---|---|---|---|---|---|
| Brush-tailed Phascogale | | | | of herbs, grasses, shrubs or leaf litter.<br>Also inhabit heath, swamps, rainforest and wet sclerophyll forest.<br>Agile climber foraging preferentially in rough barked trees of 25 cm DBH or greater.<br>Feeds mostly on arthropods but will also eat other invertebrates, nectar and sometimes small vertebrates.<br>Females have exclusive territories of approximately 20 - 40 ha, while males have overlapping territories often greater than 100 ha.<br>Nest and shelter in tree hollows with entrances 2.5 - 4 cm wide and use many different hollows over a short time span.<br>Mating occurs May - July; males die soon after the mating season whereas females can live for up to three years but generally only produce one litter. | 731<br>1093 | Vegetation zones lacking hollow-bearing trees are not considered suitable habitat: 727 Poor, 1093 Poor, 731 Poor, 1093 Poor. | Vegetation zones lacking hollow-bearing trees are not considered suitable habitat: 727 Poor, 1093 Poor, 731 Poor, 1093 Poor.<br><br>All other associated PCT have been mapped as species polygon. | |
| ***Phascolarctos cinereus***<br>Koala<br>(Breeding) | Vulnerable | 2.0 | Vulnerable | See Table 5-1. | 85<br>287<br>654<br>727<br>731<br>732<br>1093<br>1191<br>1197<br>1330 | Absent.<br><br>Koalas were not recorded during targeted survey.<br><br>Given the absence of Koala and the disturbed nature of the pipeline corridor (e.g. edges of existing road corridors, easements etc.), the | 0 | 0 |

| Species | NSW listing status | Biodiversity Risk Weighting | National listing status. | Habitat Description | Pipeline corridor PCT | Assessment | Species Polygon Area | Species credits required |
|---|---|---|---|---|---|---|---|---|
| | | | | | | pipeline corridor is not considered important habitat.<br><br>Impacts will be avoided by not clearing mature trees. | | |
| ***Polytelis swainsonii*** Superb Parrot (Breeding) | Vulnerable | 2.0 | Vulnerable | See Table 5-1. | 85<br>654<br>1330 | Absent (targeted survey). | 0 | 0 |
| ***Pteropus poliocephalus*** Grey-headed Flying-fox (Breeding) | Vulnerable | 2.0 | Vulnerable | See Table 5-1. | 287<br>654<br>731<br>732<br>1093<br>1330 | Absent (targeted survey) | 0 | 0 |
| ***Swainsona sericea*** Silky Swainson-pea | Vulnerable | 2.0 | Not Listed | Found in Natural Temperate Grassland and Snow Gum *Eucalyptus pauciflora* Woodland on the Monaro. Found in Box-Gum Woodland in the Southern Tablelands and South West Slopes. Sometimes found in association with cypress-pines Callitris spp. Habitat on plains unknown. | 654<br>1330<br>1191 | Assumed present.<br><br>Although targeted survey was carried out and the plant was not recorded, climatic conditions at the time meant that detection was unlikely.<br><br>Assumed present in areas of moderate condition vegetation. Associated PCT in poor condition are not likely to contain populations of the species due to heavy grazing pressure and an exotic ground layer. | 0.46 | 1 |

| Species | NSW listing status | Biodiversity Risk Weighting | National listing status. | Habitat Description | Pipeline corridor PCT | Assessment | Species Polygon Area | Species credits required |
|---|---|---|---|---|---|---|---|---|
| ***Thesium australe*** Austral Toadflax | Vulnerable | 1.5 | Vulnerable | Austral Toad-flax is found in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. It is also found in Tasmania and Queensland and in eastern Asia. Although originally described from material collected in the SW Sydney area, populations have not been seen in a long time. It may persist in some areas in the broader region. Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. | 1197<br>1330 | Assumed present.<br><br>Although not recorded during targeted searches, climatic conditions at the time of the survey meant that detection of this plant was unlikely. | 0.3<br><br>As the species was not recorded, all areas of associated PCT have been mapped as species polygon. | 4 |
| ***Tyto novaehollandiae*** Masked Owl | Vulnerable | 2.0 | Not Listed | See Table 5-1 | 287<br>654<br>727<br>731<br>732<br>1093<br>1191<br>1197<br>1330 | Assumed present.<br><br>A 100 m buffer has been placed around potential nest trees (Section 5.3.1).<br><br>Species polygon has been calculated as areas within each 100 m buffer where native vegetation associated with the species will be impacted. | 0.27 | 4 |
| ***Veronica blakelyi*** Veronica blakelyi | Vulnerable | 2.0 | Not Listed | Occurs in eucalypt forest, often in moist and sheltered areas. Associated canopy species include *Eucalyptus dives, E. dalrympleana, E. rossii* and *E. pauciflora.*<br>At known locations, populations are generally restricted in distribution and abundance. | 732<br>731<br>1197 | Absent (targeted survey). | 0 | 0 |

| Species | NSW listing status | Biodiversity Risk Weighting | National listing status. | Habitat Description | Pipeline corridor PCT | Assessment | Species Polygon Area | Species credits required |
|---|---|---|---|---|---|---|---|---|
| | | | | Flowers in late Spring through to early Summer.<br>The species appears to re-sprout after fire, although an optimal fire regime (frequency, intensity, etc) is unknown. | | | | |
| ***Zieria obcordata***<br>Zieria obcordata | Endangered | 3.0 | Endangered | Grows in eucalypt woodland or shrubland dominated by species of *Acacia* on rocky hillsides. Also occurs in *Eucalyptus* and *Callitris* dominated woodland with an open, low shrub understorey, on moderately steep, mainly west to north-facing slopes in sandy loam amongst granite boulders. The altitude range of sites is 500 to 830 metres.<br>Associated vegetation includes *Eucalyptus blakelyi, Brachychiton populneus* and *Acacia implexa* woodland with pockets of low shrub understorey. Also in *E. goniocalyx, E. blakelyi, E. macrorhyncha, A. doratoxylon, A. vestita* and *Callitris glaucophylla* woodland with a shrubby understorey.<br>Understorey species include *Pandorea pandorana, Isotoma axillaris, Westringia eremicola, Leucopogon attenuatus, Dillwynia sericea, Olearia ramulosa, Stypandra glauca, Stellaria pungens, Acacia vestita, Melichrus urceolatus, Cryptandra amara,* | | Absent. No habitat.<br>No rocky areas or land containing granite boulders on rock outcrops occur in the pipeline corridor. | 0 | 0 |

| Species | NSW listing status | Biodiversity Risk Weighting | National listing status. | Habitat Description | Pipeline corridor PCT | Assessment | Species Polygon Area | Species credits required |
|---|---|---|---|---|---|---|---|---|
| | | | | *Lepidosperma, Styphelia, Kunzea, Haloragis* and *Cheilanthes* species.<br>Main flowering period is in spring (September-October), but plants tend to have flowers present throughout the year.<br>In wild populations, plants tend to grow in crevices between granite boulders. The species has proved to be very difficult to cultivate. Best growth has been achieved with plants in a very sandy well-drained soil. Wild plants have strongly aromatic leaves.<br>*Zieria obcordata* is extremely sensitive to grazing and browsing disturbances by domestic stock and native herbivores. Heavily browsed plants and vigorous regrowth (following severe browsing by wallabies) have been recorded at sites. | | | | |

# 6 IMPACT ASSESSMENT

## 6.1 AVOIDANCE, MINIMISATION AND MITIGATION

The pipeline development applies the principles of avoiding, minimising and mitigating impact. This has included the choice of route for the pipeline corridor, the use of construction techniques such as under boring, implementation of environmental safeguards to manage unavoidable impacts and offsetting impacts where required.

The pipeline development avoids impact by the following measures:

- The pipeline corridor traverses large extents of cleared agricultural land and timber plantations without any native vegetation present. Where possible, the pipeline will be trenched into existing roads and tracks, minimising impact to native vegetation and threatened species habitat.
- Impact to threatened fish distribution and key fish habitat in the Macquarie River and Queen Charlottes Creek will be avoided by under boring;
- The pipeline route has been chosen to avoid recorded populations of host plants (*Bursaria spinosa*) of the Purple Copper Butterfly. Impact to essential breeding habitat for the species has thus been avoided;
- The pipeline alignment has been refined to avoid mature, hollow-bearing trees and impact to hollow-nesting threatened species. The locations of hollow-bearing trees recorded during the field survey are mapped in Appendix 6.
- Impact to foraging habitat of canopy species such as Little Lorikeet, Swift Parrot and Regent Honeyeater is being avoided as there is no requirement to remove mature trees.
- Refinement of the pipeline development footprint to a maximum width of 6 m within areas of native vegetation to minimise impact.
- Except where pumping stations are to be constructed, clearing of vegetation is largely confined to the mid and ground layer only. Canopy will be retained, where possible
- Where their placement within native vegetation cannot be avoided, pumping stations have been located in previously disturbed areas of poor condition vegetation.
- An area of intact native vegetation adjacent the Mount Piper power station will be underbored to avoid the requirement for clearing.

In addition to the above, environmental safeguards will be implemented to further mitigate the impact of the pipeline development. These are listed in Table 6-1.

**Table 6-1. Environmental safeguards**

| Impact | Environmental Safeguard | Timing |
|---|---|---|
| Clearing and prevention of over-clearing | 1. Where possible, the pipeline will be constructed on or adjacent to existing roads and forestry tracks, significantly reducing the extent of vegetation required to be cleared.<br>2. One area of intact native vegetation at the Mount Piper Power Station will be underbored to avoid impact.<br>3. All personnel are to be inducted to be aware that disturbance of any stand of native vegetation outside the development footprint, or otherwise unauthorised disturbance, could have legislative consequences if done without approval. Evidence of all personnel receiving an induction would be kept on file (signed induction sheets).<br>4. Before start of work, clearly identify the extent of permitted vegetation clearing and areas to be retained as native vegetation.<br>5. A pre-clearing process and unexpected threatened species finds procedure is recommended. This would see trees identified with high habitat values to be removed only under supervision of an experienced ecologist or animal handler (e.g. WIRES personnel). Any fauna found during the disturbance are to be allowed (or assisted) to relocate into adjoining habitat.<br>6. Vegetation will be removed in such a way to avoid unnecessary damage to surrounding vegetation.<br>7. Where possible, vegetation to be removed will be mulched on-site and re-used to stabilise disturbed areas.<br>8. Natural regeneration of any bare soil or cleared areas will be encouraged through retention of native vegetation material on site and brush-matting.<br>9. Where native vegetation occurs, existing access roads and the pipeline corridor itself will be used to access the construction site where possible.<br>10. Any paddock trees proposed for removal will be first inspected and clearly marked by a qualified ecologist to assess habitat value. Ecologist will advise of any additional management actions to be taken based on assessment. | Pre-construction<br>Construction |
| Soil management | 11. Develop and implement and erosion and sediment control plan to manage erosion risks in accordance with Council requirements and/or Landcom's Managing Urban Stormwater, Soils & Construction Guidelines 'The Blue Book' (Landcom, 2004).<br>12. Monitor erosion for a 12-month period following construction. Implement corrective action if required.<br>13. Easement to be reinstated to natural ground level and allowed to naturally regenerate. | Pre-construction<br>Post construction |
| Damage to native vegetation outside of impact zone | 14. Stockpile and compound sites are to be located within the assessed development footprint and preferentially according to the following criteria:<br>o At least 40 m away from the nearest waterway.<br>o In areas of low ecological conservation significance (i.e. previously disturbed land).<br>o On relatively level ground.<br>15. Stockpiling of materials and equipment, and parking of vehicles, is to be avoided within the dripline (extent of foliage cover) of any tree. | Construction |
| Introduction and spread of significant weeds and pathogens | 16. Inspection and control of environmental weeds in accordance with a site vegetation management plan and subject to requirements of Council.<br>17. Construction machinery and vehicles will be clean, and soil- and weed-free, before entry to the work site.<br>18. Any new fill brought onto the pipeline corridor will be certified, weed-free fill only to be used for on-site earthwork.<br>19. Any herbicide use is to be in accordance with the requirements on the label. Any person carrying out herbicide application would be appropriately trained and competent in its use.<br>20. Monitor weeds at pump stations annually during operational stage. Implement control when necessary. | Construction<br>Post Construction<br>Operation |

| Impact | Environmental Safeguard | Timing |
|---|---|---|
| Disturbance to fallen timber, dead wood and bush rock | 21. Woody debris, dead wood and bush rock encountered on site is to be relocated to the edge of the disturbance area to enhance habitat and regeneration.<br>22. Where practical, it will be re-spread on easement at completion. | Pre-construction<br>Construction |
| Threatened species | 23. Immediately prior to construction, a qualified ecologist will be engaged to undertake targeted survey for Aromatic Peppercress, Capertee Stringybark, Silky Swainson-pea and Austral Toadflax.<br>24. The location of any of the above plants recorded will be clearly marked, and the pipeline constructed so as to avoid individuals/populations where practical. Where unavoidable, impact will be offset in accordance with the BAM.<br>25. Hollow-bearing trees will be clearly marked pre-construction and retained.<br>26. No new tracks to be cleared without further assessment, as threatened flora species may occur in any unassessed impact area.<br>27. If the impact footprint changes from the current extent assessed in the study, re-assessment of the potential impact of the activity would be needed to ensure impacts to threatened species are not inadvertently caused, given that suitable habitat for threatened species occurs elsewhere on the property.<br>28. Construction work to occur only during daylight hours to avoid indirect impacts on threatened fauna such as vehicle strikes.<br>29. Enforce 20 km/h speed limits off road to reduce the risk of vehicle strikes. Sign posted speed limits will be enforced on public access roads.<br>30. Monitor natural regeneration annually for 24 months following construction. Implement corrective action if required.<br>31. Where the pipeline easement traverses White Box Yellow Box Blakely's Red Gum Woodland EEC, revegetation of the easement will be assisted post-construction by the spreading of native grass seed, using a mix of species listed in the BioNet Vegetation Classification descriptions for the relevant PCTs. | Construction<br>Post-construction |

## 6.2 IMPACTS ON KEY FISH HABITAT AND AQUATIC BIODIVERSITY

### 6.2.1 Avoiding, Minimising and mitigating Impact

Two major watercourses will be under bored to avoid impact: Queen Charlottes Creek and the Macquarie River. All other watercourses will be crossed using open trenching.

Impacts of these crossings will be minimised by the following:

- Selecting construction methods that have a smaller construction footprint and result in less disturbance of the stream bed and banks and any associated vegetation;
- Maintaining the existing hydraulic, hydrological, geomorphic and ecological function of the watercourses;
- Using appropriate protection measures to minimise scour and impacts on water quality;
- Minimising the duration of in-stream activities;
- Limiting construction of crossings to times of low flow;
- Rehabilitating disturbed areas of stream bed and banks;
- Implementing a management plan to remove or lockdown equipment in the event that high flows are forecast during instream activities.

Crossings should be constructed in accordance with NSW DPI Policies and Guidelines on Fish-Friendly Waterway Crossings and Policy and Guidelines: Aquatic Habitat Management and Fish Conservation.

Potential impacts associated with watercourse crossing construction and environmental safeguards proposed for mitigating these impacts are listed in Table 6-2.

**Table 6-2. Environmental safeguards for mitigation of impacts to aquatic habitat and biodiversity.**

| Impact | Environmental Safeguard | Timing |
|---|---|---|
| Loss and degradation of riparian and aquatic habitat | Select locations and construction methods for pipeline crossings that minimise disturbance of the riparian zone. Existing cleared or disturbed areas adjacent to easements such as roads, existing crossing points will be used.<br>Locate under bore entry and exit points outside designated riparian corridors and existing vegetation.<br>Revegetate disturbed areas with local native species immediately after construction works are completed and monitor rehabilitated areas to ensure that revegetation is successful.<br>Use flow diversion methods for trenching construction<br>Avoid the removal of large woody debris situated instream.<br>Select an appropriate boring depth below the watercourse for under bored crossings to prevent bed collapse.<br>When trenching, impacts on flows will be reduced by staging the trench across the channel or minimising the time that flows are stopped or intercepted.<br>Once the pipeline is laid, scouring and erosion will be prevented by restoring the channel shape and bed level to its preconstruction condition by backfilling the trench with appropriate material. | Pre-construction<br>Construction<br>Post-construction |
| Contamination from accidental spillages of fuel and oil | Minimise direct access to the river by construction vehicles and machinery.<br>Inspect construction vehicles and machinery for leakage of fuel and oils.<br>Establish a bunded area for storage of fuel and oils and refuelling of machinery. Vehicles will not be refuelled on site.<br>Report spillages to the appropriate officer and immediately deploy spill containment kits to restrict their spread to or within the river. | Construction |
| Increased sediment load and turbidity<br>Addition of organic matter<br>Addition of nutrients | Include the following in the sediment and erosion control plan:<br>• Restriction of vegetation clearing and construction works to no rainfall periods to reduce the risk of sediment runoff.<br>• Deployment of erosion control matting in the riparian zone and silt curtains along the river bank to prevent | Pre-construction<br>Construction<br>Post-construction |

| Impact | Environmental Safeguard | Timing |
|---|---|---|
| | sediment entering the river channel and provision of protection against scouring and erosion of the river bed.<br>• Inspect these control measures regularly during the course of construction to ensure they are functioning properly.<br>• Installation of a coffer dam made of appropriate materials to isolate the construction site and minimise downstream impacts.<br>• Monitor turbidity, pH and oxygen levels of the water within and downstream of the construction area and, if a decline in water quality is detected, stop or scale back further works and revise control measures.<br>• Stabilisation and rehabilitation of disturbed/eroded areas of the river bed and bank, riparian zone and instream aquatic habitat<br>• Minimise the time open cut trenches remain open.<br>• Stockpile the material removed from the trench outside the riparian zone to prevent runoff into the watercourse during rainfall events. | |
| Disruption of movement of fish | Limit construction to periods of low water flow and not during critical fish migration and spawning seasons (i.e. Spring and Summer). | |
| Injury or mortality of aquatic biota contained within coffer dams | Translocate fish, turtles and platypi from the coffer dam to flowing water within the river. Screen the pump to minimise entrainment of fish when the water is pumped out. | |

### 6.2.2 Significance of Impact to Threatened Fish Species

Two threatened fish species are predicted to occur within the study area based on NSW DPI Fisheries predictive mapping, Macquarie Perch and Purple-spotted Gudgeon.

Within the study area, Macquarie Perch is only known from the Macquarie River. This crossing will be under bored, meaning there is no potential impact on this species as a result of the pipeline development. Accordingly, no further assessment has been conducted for this species.

In accordance with the FM Act, the 7-part test of significance has been undertaken for the Purple-spotted Gudgeon. This finds there will be no significant impact to Purple-spotted Gudgeon as a result of the proposal (Table 6-3).

**Table 6-3. 7-part test of significance for Purple-spotted Gudgeon.**

| Criteria | Assessment |
|---|---|
| 1) In the case of a threatened species, the proposed development or activity is not 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 | Appropriate environmental safeguards (Table 6-2) can be implemented to ensure that there is no adverse impact on the |

| Criteria | Assessment |
|---|---|
| | life cycle of the species to place a local population at risk of extinction.<br><br>Specifically, the following will be implemented:<br><br>• Select locations and construction methods for pipeline crossings that minimise disturbance of the riparian zone;<br>• Avoid the removal of large woody debris situated instream<br>• Stabilisation and rehabilitation of disturbed/eroded areas of the river bed and bank, riparian zone and instream aquatic habitat;<br>• Limit construction to periods of low water flow and not during critical fish migration and spawning seasons (over summer for this species). |
| 2) In the case of an endangered population, the proposed development or activity is not 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 a species is likely to be placed at risk of extinction. | Not applicable |
| 3) In the case of an endangered ecological community or critically endangered ecological community, the proposed development or activity:<br>i. is not 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<br>ii. is not likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction, | Not applicable |
| 4) In relation to the habitat of a threatened species, population or ecological community:<br>i. the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and<br>ii. that an area of habitat is not likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and<br>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 | i. Two watercourses mapped by DPI Fisheries indicative mapping for the species are potentially impacted by the pipeline development, Saltwater Creek and Kirkconnell Creek. The total estimated impact will not exceed 0.05 ha in extent.<br>ii. During construction, fish passage requirements will be provided in accordance with DPI Fisheries Policy and guidelines for fish habitat conservation and management. Any impact is temporary in nature, occurring during construction only.<br>iii. Habitat impacted is limited to a corridor of maximum width of 6 m at Kirconnel Creek and 20 m at Saltwater Creek. Crossing points are not located within permanent pools that might provide dry climate refuges or important breeding habitat. |
| 5) That the proposed development or activity is not likely to have an adverse effect on critical habitat (either directly or indirectly) | The pipeline development does not occur within any areas on the Critical Habitat Register (now the Register of Declared Areas of Outstanding Biodiversity Value). |
| 6) That the proposed development or activity is not consistent with the objectives or actions of a recovery plan or threat abatement plan. | Preventing sedimentation and poor water quality by conserving and restoring riparian vegetation and using effective erosion and sediment control measures is a key recovery action for this species that may be impacted by the pipeline development. |

| Criteria | Assessment |
|---|---|
| | These impacts are listed in Table 6-2 as:<br>• Loss and degradation of riparian and aquatic habitat;<br>• Contamination from accidental spillages of fuel and oil;<br>• Increased sediment load and turbidity, addition of organic matter and nutrients.<br>Implementation of environmental safeguards listed in Table 6-2 will avoid and/or minimise these impacts. |
| 7) That the proposed development constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process. | The following Key Threatening Processes listed under the FM Act are potentially exacerbated by the pipeline development:<br>• Installation and operation of instream structures and other mechanisms that alter natural flow status;<br>• Removal of large woody debris from NSW rivers and streams;<br>• Degradation of native riparian vegetation along New South Wales water courses<br>Implementation of environmental safeguards listed in Table 6-2 will minimise these impacts. |

## 6.3 IMPACTS ON NATIVE VEGETATION

The pipeline development footprint has been refined to minimise the impact to native vegetation. Where practical, the pipeline alignment has been refined to avoid areas of good condition native vegetation and the corridor narrowed to a maximum of 6 m wide. This also avoids threatened species habitat such as hollow-bearing trees and host plants for the Purple Copper Butterfly.

Where native vegetation communities cannot be avoided, the pipeline development will predominantly impact ground and mid layer vegetation with minimal removal of mature upper layer native trees – except where pumping stations are constructed at four locations. Some isolated paddock trees in non-native vegetation may need to be cleared.

Pumping stations have been taken into account within the BAM by the creation of two vegetation management zones: the pipeline corridor, where only ground and mid layer vegetation will be removed, and pumping stations, where all vegetation will be impacted. These management zones are shown in Figures 6-1 to 6-4.

The BAM quantifies impact to native vegetation by calculating a future vegetation integrity score (VI), based on the level of impact. Change in the VI score for each vegetation zone impacted by the pipeline development is shown in Table 6-4.

One vegetation zone proposed to be impacted does not require offset:

- 1197 Poor has a VI score of 13.4 (Table 4-2), which is below the offset threshold of 15 required by the BAM.

Areas of non-native vegetation do not require assessment, as impact to these areas will not significantly impact any entities discussed in Section 5.

**Table 6-4. Change in vegetation integrity and a result of impact from the pipeline development.**

| PCT | Condition state | Vegetation Zone | Management Zone | Future VI | Change in VI | Total Change in VI |
|---|---|---|---|---|---|---|
| 85 | Poor | 85_Poor | Pipeline | 2.2 | -19.3 | -19.3 |
| 287 | Good | 287_Good | Pipeline | 25.2 | -32 | -32 |
| 654 | Moderate | 654_Moderate | Pipeline | 12.7 | -40.5 | -42.5 |
| | | | Pumping St. | 0 | -53.3 | |
| | Poor | 654_Poor | Pipeline | 7 | -12 | -12 |
| | Poor | 654_Poor_01 | Pipeline | 7 | -12 | -15.5 |
| | | | Pumping St. | 0 | -19 | |
| 679 | Good | 679_Good | Pipeline | 23 | -35.4 | -35.4 |
| | Poor | 679_Poor | Pipeline | 3.5 | -22.6 | -22.6 |
| 727 | Poor | 727_Poor | Pipeline | 1.6 | -40 | -40 |
| 731 | Good | 731_Good | Pipeline | 24.1 | -46.3 | -46.3 |
| | Poor | 731_Poor | Pipeline | 4.6 | -34.6 | -36 |
| | | | Pumping St. | 0 | -39.2 | |
| 732 | Good | 732_Good | Pipeline | 22.6 | -33.4 | -33.4 |
| | Poor | 732_Poor | Pipeline | 9.5 | -22.1 | -27.2 |
| | | | Pumping St. | 0 | -31.8 | |
| 765 | Moderate | 765_Poor | Pipeline | 0 | -44.8 | -44.8 |
| 1093 | Good | 1093_Good | Pipeline | 23.6 | -48.9 | -48.9 |
| | Moderate | 1093_Moderate | Pipeline | 19.4 | -27 | -27 |
| | Poor | 1093_Poor | Pipeline | 0.3 | -34.9 | -34.9 |
| 1191 | Poor | 1191_Poor | Pipeline | 12.3 | -8.1 | -8.1 |
| 1197 | Good | 1197_Good | Pipeline | 24.1 | -47.7 | -47.7 |
| | Poor | 1197_Poor | Pipeline | 2.8 | -10.6 | -10.6 |
| 1330 | Moderate | 1330_Moderate | Pipeline | 23.8 | -16.1 | -16.1 |
| | Poor | 1330_Poor | Pipeline | 11.1 | -6.3 | -6.3 |
| | | 1330_Poor01 | Pipeline | 11.1 | -6.3 | -6.3 |
| | | 1330_Poor02 | Pipeline | 11.1 | -6.3 | -6.3 |
| | | 1330_Poor03 | Pipeline | 11.1 | -6.3 | -6.3 |

**Figure 6-1. Pumping station management zone, map 1.**

**Figure 6-2. Pumping station management zone, map 2.**

**Figure 6-3. Pumping station management zones, map 3.**

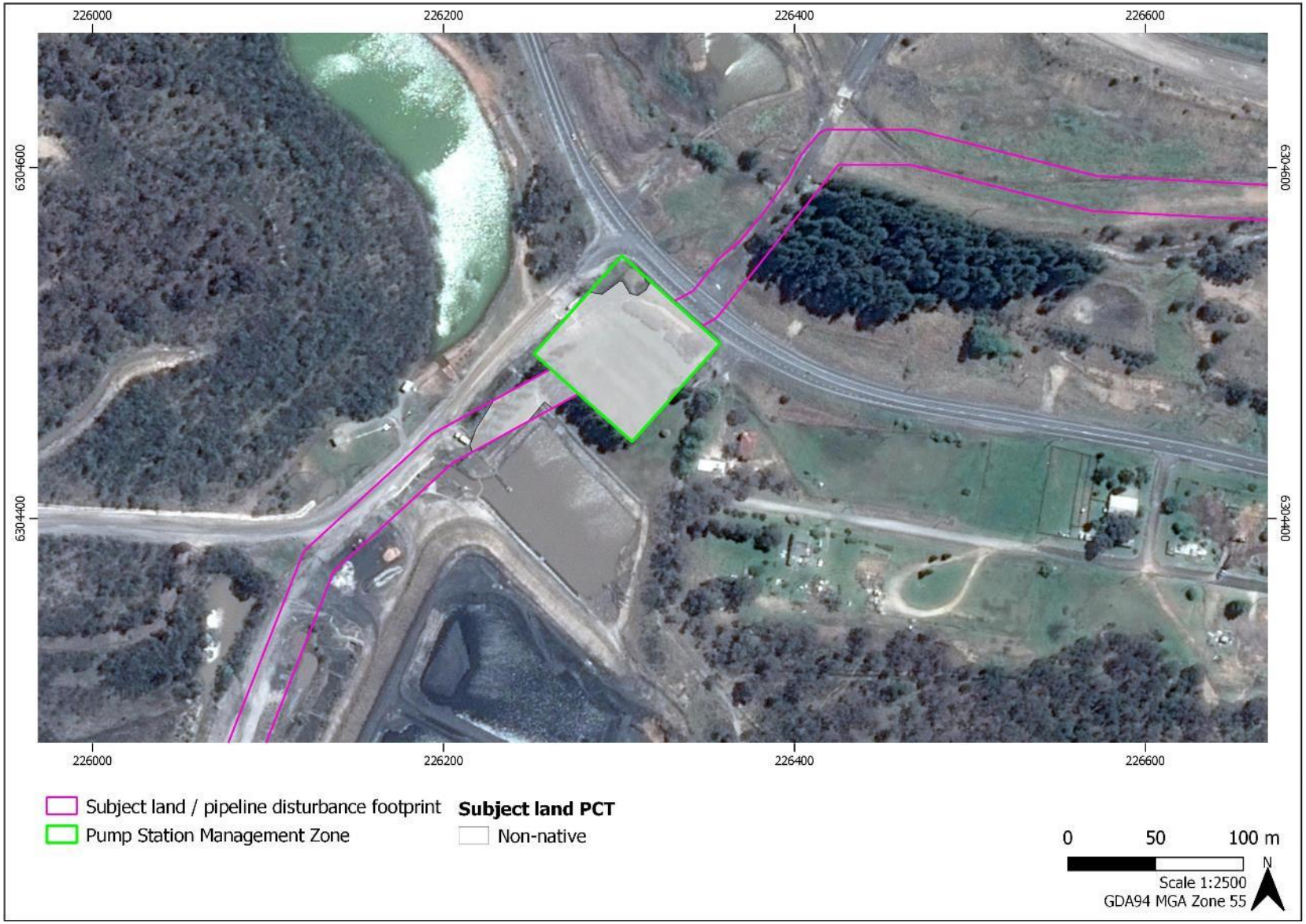
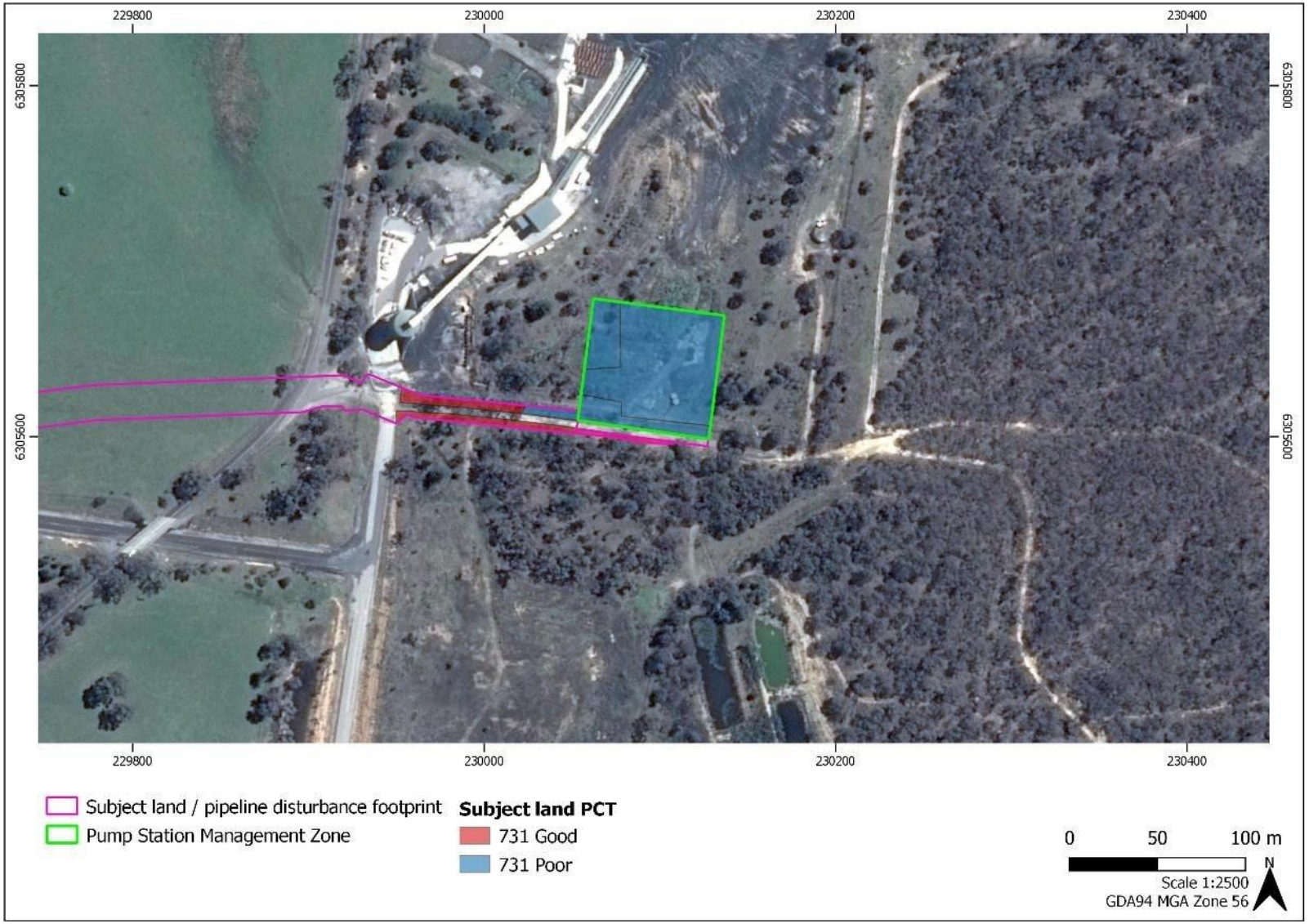


**Figure 6-4. Pumping station management zones, map 4.**



## 6.4 SERIOUS AND IRREVERSIBLE IMPACTS (SAII)

The *Guidance to assist a decision-maker to determine a serious and irreversible impact* (the Guide) (NSW Office of Environment and Heritage, 2017) has been used to determine which threatened species require further assessment for SAII. One Endangered Ecological Community (EEC) is listed as a candidate entity for SAII in the Guide, and therefore requires further assessment under the BAM:

- White Box Yellow Box Blakely's Red Gum Woodland EEC.

Assessment of the potential for SAII to each entity listed above has been undertaken in Table 6-5. The assessment concludes that there are no SAII associated with the pipeline development.

**Table 6-5. Assessment of impacts to White Box Yellow Box Blakely's Red Gum EEC.**

| **BC Act White Box Yellow Box Blakely's Red Gum Woodland EEC** | |
|---|---|
| **SAII Assessment Criteria** | **Assessment** |
| Actions and measures taken to avoid impact. | Pumping station facility No.4 to be constructed on an area of existing disturbance, already clear of mature trees and covered by the remains of a previous concrete slab. Vegetation here is in largely poor condition state (Figure 6-1).<br><br>The corridor skirts the edges of EEC patches and takes a path between large trees to avoid the requirement of removing mature, hollow-bearing trees.<br><br>Loss of the ability of the EEC to regenerate naturally will be avoided by retaining the upper layer and allowing the easement to regenerate, rather than maintaining a cleared easement post construction.<br><br>No laydown areas are located in areas of this EEC. |
| The area and condition of the ecological community to be impacted by the development | 1.17 ha of the EEC occurs within the pipeline corridor. Vegetation integrity of the vegetation zones concerned ranges from 19 (native upper layer over non-native pasture, no mid layer) to 53.3 (native upper and ground layer, no mid layer).<br><br>There will be an expected decrease in vegetation integrity during construction, although only the site of the pumping station facility (0.175 ha) will be permanently cleared.<br><br>The size of this pumping facility has been reduced from 75x75 m to 50x35 m to minimise impact. |
| A description of the extent to which the impact exceeds the threshold for the entity that is specified in the *Guidance for determining an SAII*. | No threshold determined. |
| The extent and overall condition of the EEC within the study area. | The extent of the EEC within the study area has been estimated based on field observations and existing vegetation mapping. It is estimated that there is 66.88 ha of the EEC in the study area. |

| BC Act White Box Yellow Box Blakely's Red Gum Woodland EEC | |
|---|---|
| **SAII Assessment Criteria** | **Assessment** |
| | As the land use is similar across the study area, it has been assumed that overall condition of that vegetation is similar to that which exists on the pipeline corridor. i.e. larger areas of native upper layer vegetation over non-native pasture and smaller areas with a largely native ground layer. Mid layer is sparse throughout potential areas of the EEC. |
| An estimate of the reduction in extent of the EEC in the study area as a result of the proposal. | As described above, the extent of EEC will be reduced by 0.175 ha, 0.3%, of the estimated extent within the study area.<br><br>The remaining 1 ha within the pipeline corridor will only be impacted during construction. |
| The development's impact on:<br>1. Abiotic factors<br>2. Characteristic and functionally important species<br>3. The quality and integrity of an occurrence of the community through threats and indirect impacts. | 1. Impact to abiotic factors such as soil will be managed according to the measures outlined in Section 6.1. There will be no impact to ground water or surface water resources.<br>2. Upper layer vegetation will not be impacted by the pipeline development. Impact to threatened species that might occur will be avoided/minimised by implementing measures discussed in Section 6.1. Ground disturbance will be temporary, with the easement reinstated to natural ground level following construction and left to naturally regenerate.<br>3. Indirect impacts and threats to the quality and integrity of the community will be avoided and minimised by implementing measures discussed in Section 6.1. Only the site of pumping station 4 (0.175 ha) will be permanently impacted and the narrow pipeline corridor (6 m) prevents fragmentation that might lead to loss of integrity of the local occurrence. |
| Direct or indirect fragmentation and isolation of an important area | There will be no additional fragmentation or isolation of an important area. Areas of this EEC already exist as isolated patches in an agricultural landscape and, with the exception of one pump station, the pipeline development will cause temporary ground disturbance only within areas mapped as this EEC, with no loss of mature trees cover. |
| Measures proposed to contribute to the recovery of the EEC in the IBRA subregion | The proponent will offset their impact by entering the Biodiversity Offset Scheme.<br><br>Where the pipeline easement traverses areas of the EEC, the regeneration of the easement will be assisted by the seeding of native grasses using a mix of species listed in the BioNet Vegetation Classification descriptions for the relevant PCTs |
| Determination | No SAII |

## 6.5 PRESCRIBED IMPACTS

The Biodiversity Conservation Regulation 2017 lists nine impacts as prescribed impacts that must be avoided, minimised and mitigated. These prescribed impacts and their relevance to the Proposal are described in Table 6-6.

**Table 6-6. Prescribed impacts of the pipeline development.**

| Prescribed Impacts | Site Assessment | Mitigation Measure |
|---|---|---|
| Impacts on the habitat of threatened species or ecological communities associated with karst, caves, crevices, cliffs and other features of geological significance. | None associated with the Proposal. | None required. |
| Impacts of development on the habitat of threatened species or ecological communities associated with rocks. | None associated with the Proposal. | None required |
| Impacts of development on the habitat of threatened species or ecological communities associated with human made structures. | No human made structures will be disturbed by the pipeline development. | None required. |
| Impacts of development on the habitat of threatened species or ecological communities associated with non-native vegetation. | Non-native vegetation on the development site may provide habitat for ecosystem credit species. | Where possible, the pipeline will be constructed on or adjacent to existing roads and forestry tracks, significantly reducing the extent of vegetation required to be cleared.<br>Before start of work, clearly identify the extent of permitted vegetation clearing and areas to be retained as native vegetation.<br>A pre-clearing process and unexpected threatened species finds procedure is recommended. This would see trees identified with high habitat values to be removed only under supervision of an experienced ecologist or animal handler (e.g. WIRES personnel). Any fauna found during the disturbance are to be allowed (or assisted) to relocate into adjoining habitat.<br>Vegetation will be removed in such a way to avoid unnecessary damage to surrounding vegetation.<br>Only existing access roads and the pipeline corridor itself will be used to access the construction site. |
| Impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range. | Some loss of connectivity may occur as a result of the pipeline development, although due to the narrow width of the corridor, this is likely to be minimal. | Where possible, the pipeline will be constructed on or adjacent to existing roads and forestry tracks, significantly reducing the extent of vegetation required to be cleared.<br>Natural regeneration of any bare soil or cleared areas will be encouraged through retention of native vegetation material on site and brush-matting. |

| Prescribed Impacts | Site Assessment | Mitigation Measure |
|---|---|---|
| | | Easement to be reinstated to natural ground level and ground cover allowed to naturally regenerate. |
| Impacts of the development on movement of threatened species that maintains their life cycle. | None associated with the Proposal. | None required. |
| Impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities. | Runoff carrying sediment from the pipeline development at watercourse crossings. | Major watercourse crossings (Macquarie River, Queen Charlottes Creek) will be under bored<br>Environmental safeguards for the mitigation of impacts will be implemented (Table 6-2). |
| Impacts of wind turbine strikes on protected animals. | None associated with the Proposal. | None required**.** |
| Impact of vehicle strikes on threatened species of animals or on animals that are part of a TEC. | There will be increased vehicle traffic in the pipeline corridor during the construction phase. | Vehicles will adhere to sign posted speed limits on all public roads.<br>Vehicles will be restricted to a speed limit of 20 km/h when travelling off road.<br>In areas of native vegetation, vehicles will use existing access roads and the pipeline corridor only to access construction areas.<br>Construction to occur only during daylight hours. |

# 7 OTHER RELEVANT LEGISLATION

## 7.1 ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT

An EPBC Protected Matters report (Appendix 5) indicated the matters protected under the EPBC Act listed in Table 7-1 potentially occur within the study area.

Significant impact must be referred to the Minister. Sections 7.1.1, 7.1.2 and 7.1.3 assess the significance of impact to the one ecological community and ten species listed in Table 7-1, finding there will be no significant impact to any EPBC Act listed threatened species.

**Table 7-1. Matters of environmental significance listed under the EPBC Act potentially occurring in the study area.**

| Matters of Environmental Significance | Number of Matters Potentially Occurring | Comments |
|---|---|---|
| Wetlands of International Importance | 5 | None of these wetlands occur within the study area (Section 3.5). |

| Matters of Environmental Significance | Number of Matters Potentially Occurring | Comments |
|---|---|---|
| Listed Threatened Ecological Communities | 3 | White Box Yellow Box Blakely's Red Gum Grassy Woodland CEEC occurs within the study area (Section 4.4) |
| Listed Threatened Species | 49 | Section 5.1 indicates that one fish listed as threatened under the EPBC Act might occur, while Sections 5.2.2 and 5.3.2 indicate that 9 EPBC Act listed threatened species may occur, based on desktop study and field survey:<br>Regent Honeyeater, Swift Parrot, Spotted-tailed Quoll, Painted Honeyeater, Koala, Superb Parrot, Grey-headed Flying Fox, Purple Copper Butterfly and Austral Toadflax |
| Listed Migratory Species | 12 | Due to the temporary nature of the impact, migratory species are unlikely to be significantly impacted. |
| **Other Matters Protected by the EPBC Act** | | |
| Commonwealth Land | 11 | The pipeline corridor does not cross any areas of commonwealth land. |
| Listed Marine Species | 19 | There is no marine environment within the study area. |

### 7.1.1 Critically Endangered and Endangered Species

Two Critically Endangered (CE) and one Endangered (E) species have the potential to be impacted by the pipeline development, Regent Honeyeater (CE), Swift Parrot (CE) and Spotted-tailed Quoll (E).

Under the EPBC Act, an action is likely to have a significant impact on a Critically Endangered species if there is a real chance that it will:

1. Lead to a long-term decrease in the size of a population
2. Reduce the area of occupancy of the species
3. Fragment an existing population into two or more populations
4. Adversely affect habitat critical to the survival of a species
5. Disrupt the breeding cycle of a population
6. Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
7. Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat
8. Introduce disease that may cause the species to decline, or
9. Interfere with the recovery of the species.

Each species listed above has been assessed against these guidelines, as shown in Table 7-2 to Table 7-4.

**Table 7-2. Assessment of significance of impact for Regent Honeyeater.**

| **Species** | **EPBC Status** |
|---|---|
| **Regent Honeyeater**<br>(*Anthochaera Phrygia*) | CE |
| **Significant Impact Guideline** | **Assessment** |
| Lead to a long-term decrease in the size of a population | The pipeline development does not require the removal of mature trees that provide resources critical to maintaining the size of the population (i.e. abundance of flowering *Eucalyptus*). The pipeline development does not occur within any area mapped as being important habitat for the species by OEH. Disturbance is temporary only for the duration of construction activities, with no impact throughout the operational phase of the project.<br><br>The pipeline development is not therefore likely to lead to a long-term decrease in the size of the Regent Honeyeater population. |
| Reduce the area of occupancy of the species | The pipeline development impacts only a narrow corridor of native vegetation throughout its length and does not occur within any area mapped as being important habitat for the species by OEH. Habitat utilised by the species (i.e. mature flowering *Eucalyptus* trees) will not be impacted, with temporary disturbance only during the construction phase of the project. As a result, the pipeline development does not involve any activity that would reduce the area of occupancy of the species. |
| Fragment an existing population into two or more populations | Where native vegetation is impacted, the pipeline corridor width has been reduced to 6 m or follows existing road corridors. Canopy cover will also not be impacted. This does not restrict the movement of any Regent Honeyeater so that the population would be fragmented into two or more populations. |
| Adversely affect habitat critical to the survival of a species | Critical habitat is defined in the *National Recovery Plan for the Regent Honeyeater* (Commonwealth of Australia, 2016) as:<br>• Any breeding or foraging habitat in areas where the species is likely to occur (as defined by the National Recovery Plan), and<br>• Any newly discovered breeding or foraging locations.<br><br>Much of the pipeline corridor is not suitable foraging or breeding habitat, consisting of poor condition vegetation without a canopy of key tree species (e.g. Yellow Box, Ironbark species). Where moderate to good condition vegetation occurs and foraging resources are available, the pipeline corridor has been narrowed to 6 m wide, with no requirement for the canopy to be cleared.<br><br>The pipeline corridor avoids any areas mapped as a breeding area.<br><br>There will therefore be no adverse affect on critical habitat of the species. |
| Disrupt the breeding cycle of a population | The pipeline corridor does not occur in any area mapped in the National Recovery Plan as key breeding area or other breeding area (Commonwealth of Australia, 2016). The pipeline development is therefore not likely to disrupt the breeding cycle of the species. |
| Modify, destroy, remove, isolate or decrease the availability or quality of habitat | Where native vegetation is impacted, the pipeline corridor width has been reduced to 6 m or follows existing road corridors and canopy cover will not be impacted. No area of habitat will therefore be isolated to the extent that the species will decline. Habitat will be modified by the removal of ground layer and mid layer vegetation during construction, however this disturbance |

| Species | EPBC Status |
|---|---|
| **Regent Honeyeater**<br>(*Anthochaera Phrygia*) | CE |
| **Significant Impact Guideline** | **Assessment** |
| to the extent that the species is likely to decline | will be temporary only, with the easement allowed to regenerate following the construction phase. Considering this and the amount of adjacent vegetation that will not be disturbed, no decline in the species is likely. |
| Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat | Invasive species that may be harmful to Regent Honeyeater (e.g. feral cat, Bell Miner, Noisy Miner) are already established throughout the pipeline corridor. The pipeline development does not involve any actions that would be likely to introduce any invasive species. |
| Introduce disease that may cause the species to decline, or | The pipeline development does not include any actions that would be likely to introduce diseases or pathogens into the environment. Environmental safeguards for the management of biosecurity risks will be implemented. |
| Interfere with the recovery of the species. | The pipeline development does not occur within a mapped Important Bird Areas for the species or known breeding area (Commonwealth of Australia, 2016). It is therefore not likely to interfere with the species recovery. |
| **Conclusion** | No significant impact |

**Table 7-3. Assessment of significance of impact for Swift Parrot.**

| Species | EPBC Status |
|---|---|
| **Swift Parrot**<br>(*Lathamus discolour*) | CE |
| **Significant Impact Guideline** | **Assessment** |
| Lead to a long-term decrease in the size of a population | The Swift Parrot breeds in Tasmania and migrates to the mainland to forage during the non-breeding season. The pipeline development does not require the removal of mature trees that provide foraging resources critical to maintaining the size of the population (i.e. abundance of flowering *Eucalyptus*). Disturbance is temporary only for the duration of construction activities, with no impact throughout the operational phase of the project.<br>The pipeline development is not therefore likely to lead to a long-term decrease in the size of the Swift Parrot population. |
| Reduce the area of occupancy of the species | Habitat utilised by the species (i.e. mature flowering *Eucalyptus* trees) will not be impacted in areas of good to moderate condition vegetation, with temporary disturbance only during the construction phase of the project. As a result, the pipeline development does not involve any activity that would reduce the area of occupancy of the species. |
| Fragment an existing population into two or more populations | Where native vegetation is impacted, the pipeline corridor width has been reduced to 6 m or follows existing road corridors. Canopy cover will also not be impacted. This does not restrict the movement of any Swift Parrot so that the population would be fragmented into two or more populations. |

| Species | EPBC Status |
|---|---|
| **Swift Parrot**<br><br>(*Lathamus discolour*) | CE |
| **Significant Impact Guideline** | **Assessment** |
| Adversely affect habitat critical to the survival of a species | The pipeline corridor does not occur in any area mapped by OEH as important for Swift Parrot.<br><br>The *National Recovery Plan for the Swift Parrot Lathamus discolour* (Saunders & Tzaros, 2011) lists the following as important habitat for the Swift Parrot:<br><br>• Nesting habitat,<br>• Habitat used by large populations,<br>• Habitat used repeatedly between seasons (site fidelity), or<br>• Habitat used for prolonged periods of time.<br><br>In addition, the Recovery Plan lists the former Hawkesbury – Nepean, Hunter – Central Rivers, Lachlan, Murray, Murrumbidgee, Northern Rivers, Southern Rivers and Sydney Metro Catchment Management Authorities (CMA) as priority areas for Swift Parrot conservation in NSW.<br><br>The pipeline corridor is not nesting habitat (the species breeds only in Tasmania) and is not used by large populations, repeatedly or for prolonged periods of time (there are no recent or historical records of Swift Parrot within 10 km of the corridor). The pipeline corridor occurs within the former Central West CMA, not listed in the Recovery Plan as a priority for Swift Parrot conservation.<br><br>There is therefore no adverse affect on critical habitat as a result of the pipeline development. |
| Disrupt the breeding cycle of a population | Swift Parrots breed in Tasmania. The proposal will not disrupt a population's breeding cycle. |
| Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline | Where native vegetation is impacted, the pipeline corridor width has been reduced to 6 m or follows existing road corridors and canopy cover will not be impacted. No area of habitat will therefore be isolated to the extent that the species will decline. Habitat will be modified by the removal of ground layer and mid layer vegetation during construction, however this disturbance will be temporary only, with the easement allowed to regenerate following the construction phase. Considering this and the amount of adjacent vegetation that will not be disturbed, no decline in the species is likely. |
| Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat | Invasive species that may be harmful to Swift Parrot (e.g. feral cat, Bell Miner, Noisy Miner) are already established throughout the pipeline corridor. The pipeline development does not involve any actions that would be likely to introduce any invasive species. |
| Introduce disease that may cause the species to decline, or | The pipeline development does not include any actions that would be likely to introduce diseases or pathogens into the environment. Environmental safeguards for the management of biosecurity risks will be implemented. |
| Interfere with the recovery of the species. | As the pipeline corridor does not occur in breeding habitat or any other habitat critical for the conservation of the species, it is not likely to interfere with recovery. |
| **Conclusion** | No significant impact |

**Table 7-4. Assessment of significance of impact for Spotted-tailed Quoll.**

| Species | EPBC Status |
|---|---|
| **Spotted-tailed Quoll**<br><br>(*Dasyurus maculatus*) | E |
| **Significant Impact Guideline** | **Assessment** |
| Lead to a long-term decrease in the size of a population | Important habitat elements necessary for the long-term maintenance of the population will not be impacted by the pipeline development. i.e. den sites such as hollow trees and rock outcrops will not be removed, and any hollow fallen timber will be removed from the pipeline corridor and placed in native vegetation adjacent the easement. The development is not likely to cause a long-term decrease in the size of the population. |
| Reduce the area of occupancy of the species | The pipeline development impacts only a narrow corridor of native vegetation throughout its length and does involve clearing larger patches of vegetation. Disturbance is temporary only during the construction phase of the project. As a result, the pipeline development does not involve any activity that would reduce the area of occupancy of the species. |
| Fragment an existing population into two or more populations | Where native vegetation is impacted, the pipeline corridor width has been reduced to 6 m or follows existing road corridors. Canopy cover will also not be impacted, allowing continued movement of arboreal species such as Spotted-tailed Quoll. This does not result in the fragmentation or isolation of any population. |
| Adversely affect habitat critical to the survival of a species | Habitat critical to survival of the species comprises large patches of forest with adequate denning sites (Victorian Department of Environment, Land, Water and Planning, 2016). This type of habitat does not occur within the pipeline corridor. Any den sites that are encountered (i.e. hollow bearing trees and/or fallen hollow logs) will be avoided or, in the case of fallen logs, relocated to areas of adjacent vegetation. Critical habitat will therefore not be affected. |
| Disrupt the breeding cycle of a population | Critical breeding habitat (outlined above) will not be adversely affected by the pipeline development. Habitat will not be isolated or fragmented to an extent that prevents breeding movement/dispersal of the species. There will thus be no disruption to the species breeding cycle. |
| Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline | Where native vegetation is impacted, the pipeline corridor width has been reduced to 6 m or follows existing road corridors and canopy cover will not be impacted. No area of habitat will therefore be isolated to the extent that the species will decline. Habitat will be modified by the removal of ground layer and mid layer vegetation during construction, however this disturbance will be temporary only, with the easement allowed to regenerate following the construction phase. No extensive patches of forest will be removed, as the development is a linear development. Considering this and the amount of adjacent vegetation that will not be disturbed, no decline in the species is likely. |
| Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat | Invasive species that may be harmful to Spotted-tailed Quoll (e.g. feral cat, feral dog, Red Fox) are already established throughout the pipeline corridor. The pipeline development does not involve any actions that would be likely to introduce any invasive species. |
| Introduce disease that may cause the species to decline, or | The pipeline development does not include any actions that would be likely to introduce diseases or pathogens into the environment. Environmental safeguards for the management of biosecurity risks will be implemented. |

| Species | EPBC Status |
|---|---|
| **Spotted-tailed Quoll**<br><br>(*Dasyurus maculatus*) | E |
| **Significant Impact Guideline** | **Assessment** |
| Interfere with the recovery of the species. | The pipeline development does not adversely affect breeding, habitat critical for species survival or impact any of the 11 recovery objectives listed in the *National Recovery Plan for the Spotted-tailed Quoll* (Victorian Department of Environment, Land, Water and Planning, 2016). It therefore does not interfere with the recovery of the species. |
| **Conclusion** | No significant impact |

### 7.1.2 Vulnerable Species

Six Vulnerable (V) species have the potential to be impacted by the pipeline development, Painted Honeyeater, Koala, Superb Parrot, Grey-headed Flying Fox, Purple Copper Butterfly and Austral Toadflax.

Under the EPBC Act, an action is likely to have a significant impact on a Vulnerable species if there is a real chance or possibility that it will:

1. Lead to a long-term decrease in the size of an important population of a species
2. Reduce the area of occupancy of an important population
3. Fragment an existing important population into two or more populations
4. Adversely affect habitat critical to the survival of a species
5. Disrupt the breeding cycle of an important population
6. Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
7. Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
8. Introduce disease that may cause the species to decline, or
9. Interfere substantially with the recovery of the species.

Each species listed above has been assessed against these guidelines, as shown in Table 7-6 to Table 7-11.

**Table 7-5. Assessment of significance of impact for Painted Honeyeater.**

| Species | EPBC Status |
|---|---|
| **Painted Honeyeater**<br><br>(*Grantiella picta*) | V |
| **Significant Impact Guideline** | **Assessment** |
| Lead to a long-term decrease in the size of an important population of a species | Any occurrence of this species within the pipeline corridor is likely to be of vagrant individuals and is not part of any recognised important population as it is unlikely to be a key source population either for breeding or dispersal. |

| Species | EPBC Status |
|---|---|
| **Painted Honeyeater**<br><br>(*Grantiella picta*) | V |
| Reduce the area of occupancy of an important population | By retaining mature trees that contain primary foraging (mistletoes) and breeding (canopy) habitat, the pipeline development ensures that the area of occupancy of the species is not likely to be reduced. |
| Fragment an existing important population into two or more populations | As there is no important population of the species within the pipeline corridor, there will be no fragmentation of an important population. |
| Adversely affect habitat critical to the survival of a species | See 2. above |
| Disrupt the breeding cycle of an important population | Potential breeding habitat of canopy Eucalyptus species is not impacted by the pipeline development. |
| Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline | By only temporarily impacted ground layer and mid layer vegetation, the pipeline development will not substantially modify or remove critical habitat elements required by this species (i.e. canopy trees and mistletoe) so that the species is likely to decline. |
| Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat | Invasive species that may be harmful to the Painted Honeyeater (e.g. Bell Miner, Noisy Miner) are already established throughout the pipeline corridor. The pipeline development does not involve any actions that would be likely to introduce any additional invasive species. |
| Introduce disease that may cause the species to decline, or | The pipeline development does not include any actions that would be likely to introduce diseases or pathogens into the environment. Environmental safeguards for the management of biosecurity risks will be implemented. |
| Interfere substantially with the recovery of the species. | By maintaining important habitat elements required by the species, the pipeline development does not interfere with the recovery of the species. |
| **Conclusion** | No significant impact |

**Table 7-6. Assessment of significance of impact for Koala.**

| Species | EPBC Status |
|---|---|
| **Koala**<br><br>(*Phascolarctos cinereus*) | V |
| **Significant Impact Guideline** | **Assessment** |
| Lead to a long-term decrease in the size of an important population of a species | No mature or emergent canopy trees, comprising Koala feed tree species, will be removed by the pipeline development. Although no important populations are defined under the EPBC Act, no other activity is proposed that would directly lead to mortality or impact to Koala that would cause a decrease, short or long term, in the size of any population. |
| Reduce the area of occupancy of an important population | The nature of the habitat being removed (i.e. ground and mid layer vegetation only from existing edge habitats such as road corridors) is not likely to reduce the area of occupancy of Koala. |

| Species | EPBC Status |
|---|---|
| **Koala**<br><br>(*Phascolarctos cinereus*) | V |
| **Significant Impact Guideline** | **Assessment** |
| Fragment an existing important population into two or more populations | Where native vegetation is impacted, the pipeline corridor width has been reduced to 6 m or follows existing road corridors. Canopy cover will also not be impacted, allowing continued movement of arboreal species such as Koala between closely spaced trees.<br><br>The pipeline will be trenched and buried, with ground surface reinstated to its natural level and form. This and will not act as a barrier to Koalas dispersing between widely spaced trees or habitat patches.<br><br>This does not result in the fragmentation or isolation of any important population or population. |
| Adversely affect habitat critical to the survival of a species | Each PCT within the pipeline corridor has been assessed against the *EPBC Act referral guidelines for the vulnerable Koala* (Australian Government Department of Environment, 2014), using the inland geographical context (as the area receives <800mm annual rainfall). The full assessment is provided in Appendix 7 and indicates that the following PCT may be considered critical habitat (habitat score of 5 or greater):<br><br>PCT 287, PCT 654, PCT 679, PCT 731, PCT 732, PCT 1093, PCT 1091, PCT 1197 and PCT 1330.<br><br>However, the pipeline development will clear only 3.7 ha of habitat of a score of 8 or greater, no long term fragmentation will result, the density and number of Koalas is very low (very few records within 2 km of impact and not detected during on-ground survey) and clearing will not include mature Koala feed trees in moderate to good condition vegetation.<br><br>Thus there is not likely to be any adverse effect on critical habitat. |
| Disrupt the breeding cycle of an important population | No Koalas were detected during the survey, despite targeted surveys during the October to May breeding season. The pipeline corridor is not likely to constitute important breeding habitat. |
| Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline | Where native vegetation is impacted, the pipeline corridor width has been reduced to 6 m or follows existing road corridors and canopy cover will not be impacted. No area of habitat will therefore be isolated to the extent that the species will decline. Habitat will be modified by the removal of ground layer and mid layer vegetation during construction, however this disturbance will be temporary only, with the easement allowed to regenerate following the construction phase. No extensive patches of forest will be removed, as the development is a linear development.<br><br>The pipeline will be buried and is not likely to severe connectivity.<br><br>Considering this and the amount of adjacent vegetation that will not be disturbed, no decline in the species is likely. |
| Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat | Invasive species, particularly introduced predators that might be harmful to Koala are already established in the pipeline corridor. The pipeline development does not involve any activities that might increase harm associated with invasive species. |
| Introduce disease that may cause the species to decline, or | The pipeline development does not include any actions that would be likely to introduce diseases or pathogens into the environment. Environmental safeguards for the management of biosecurity risks will be implemented. |

| Species | EPBC Status |
|---|---|
| **Koala**<br><br>(*Phascolarctos cinereus*) | V |
| **Significant Impact Guideline** | **Assessment** |
| Interfere substantially with the recovery of the species. | Given the above, the pipeline development is not likely to severely interfere with recovery of the species. |
| **Conclusion** | No significant impact |

**Table 7-7. Assessment of significance of impact for Superb Parrot.**

| Species | EPBC Status |
|---|---|
| **Superb Parrot**<br><br>(*Polytelis swainsonii*) | V |
| **Significant Impact Guideline** | **Assessment** |
| Lead to a long-term decrease in the size of an important population of a species | Superb Parrots exist as a single population across their distribution (Australian Government Department of Environment and Energy, 2019). The temporary nature of the disturbance/impact and the retention of mature hollow bearing trees will prevent the pipeline development from presenting any risk of reducing the size of this population. |
| Reduce the area of occupancy of an important population | The extent and nature of habitat impacted will not reduce the area of occupancy of the species. Note that Superb Parrots were not detected during surveys of the pipeline corridor. |
| Fragment an existing important population into two or more populations | The narrow width of the pipeline corridor will not form a barrier to movements and dispersal of the species so as to fragment the population. In addition, large trees that form habitat corridors for the species would be retained. |
| Adversely affect habitat critical to the survival of a species | Critical habitat for Superb Parrot includes the following (Baker-Gabb, 2011):<br><br>**Breeding:** on the inland slopes and tablelands, box-gum woodlands comprised of *Eucalyptus* species including *E. blakelyi, E. camaldulensis, E. bridgesiana, E. albens, E. melliodira* and *E. microcarpa.* Nests are often located in large *E. blakelyi*, with the same nest hollows used in successive years.<br><br>**Foraging:** during the non-breeding season, birds disperse to foraging areas. Habitat use during this period is not well known, but likely includes River Red Gum Forest, box and box-pine woodlands on the plains of central west and north-central NSW.<br><br>Based on the definition above, the pipeline corridor may contain some areas breeding habitat where suitable hollow trees occur, but is unlikely to be critical foraging habitat in the non-breeding season.<br><br>Hollow bearing trees have been mapped during field work and none were observed to contain nesting Superb Parrot, despite being observed during the breeding season. Although some isolated paddock trees may be cleared, hollow-bearing trees will be retained by the pipeline development so as not to adversely affect Superb Parrot habitat. |
| Disrupt the breeding cycle of an important population | No hollow bearing trees will be removed by the pipeline development. Therefore no disruption to the breeding cycle of the species is likely. |
| Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline | The pipeline development will result in the temporary modification of habitat through the removal of ground layer vegetation within the narrow (6 m) corridor. Large trees, including hollow bearing trees, critical for survival will not be impacted. The corridor is within exiting cleared agricultural landscape and existing road corridors and easement. It will thus not fragment or isolate areas of habitat. |
| Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat | Invasive species, particularly introduced predators or nest competitors such as Indian Mynah, are already established in the pipeline corridor. The pipeline development does not involve any activities that might increase harm associated with invasive species. |

| | |
|---|---|
| Introduce disease that may cause the species to decline, or | The pipeline development does not include any actions that would be likely to introduce diseases or pathogens into the environment. Environmental safeguards for the management of biosecurity risks will be implemented. |
| Interfere substantially with the recovery of the species. | Retention of nesting habitat ensures that the pipeline development will not interfere with any recovery of the species. |
| **Conclusion** | No significant impact |

**Table 7-8. Assessment of significance of impact for Grey-headed Flying Fox.**

| **Species** | **EPBC Status** |
|---|---|
| **Grey-headed Flying-fox**<br>(*Pteropus poliocephalus*) | V |
| **Significant Impact Guideline** | **Assessment** |
| Lead to a long-term decrease in the size of an important population of a species | No flying-fox camps were recorded during a survey of the pipeline corridor. A search of the *National Flying-fox monitoring viewer* (Australian Government Department of Environment, 2019) indicates that there are no nationally important or other Grey-headed Flying-fox camps located within the pipeline corridor.<br>Therefore there will be no impact to Grey-headed Flying Fox camps and no decrease in the size of an important population as a result of the pipeline development. |
| Reduce the area of occupancy of an important population | Given there are no camps impacted by the pipeline development, there will be no decrease in the area of occupancy of any important population. |
| Fragment an existing important population into two or more populations | As above. |
| Adversely affect habitat critical to the survival of a species | The pipeline corridor contains foraging habitat for the species, i.e a canopy of flowering and fruiting trees such as *Eucalyptus*. Mature canopy trees will not be impacted by the proposal as they are not required to be cleared. |
| Disrupt the breeding cycle of an important population | There are no breeding camps located within the pipeline corridor (see 1. Above). |
| Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline | See 4. above. Habitat will not be modified in a way that would impact the species to the point of causing a decline. |
| Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat | Invasive species are already present within the pipeline corridor. Introduction of new weeds (e.g. exotic vines) that may affect foraging resources will be manged by implementing various environmental safeguards and weed control. |
| Introduce disease that may cause the species to decline, or | The pipeline development does not include any actions that would be likely to introduce diseases or pathogens into the environment. Environmental safeguards for the management of biosecurity risks will be implemented. |

| Species | EPBC Status |
|---|---|
| **Grey-headed Flying-fox**<br>(*Pteropus poliocephalus*) | V |
| **Significant Impact Guideline** | **Assessment** |
| Interfere substantially with the recovery of the species. | As no camps are impacted, the pipeline development will not interfere with the recovery of the species. |
| **Conclusion** | No significant impact |

**Table 7-9. Assessment of significance of impact for Purple Copper Butterfly.**

| Species | EPBC Status |
|---|---|
| **Purple Copper Butterfly**<br>(*Paralucia spinifera*) | V |
| **Significant Impact Guideline** | **Assessment** |
| Lead to a long-term decrease in the size of an important population of a species | As no breeding habitat (see 5 below) will be impacted by the pipeline development, there is not likely to be any long term decrease in the size of populations of the species at Yetholme of the Mount Piper Power Station. |
| Reduce the area of occupancy of an important population | Where the pipeline corridor passes within proximity of known populations at Yetholme and the Mount Piper Power Station, the alignment follows existing cleared powerline easements and road corridors, avoiding the requirement for extensive vegetation removal and risk of decreasing the area of occupancy for the species. |
| Fragment an existing important population into two or more populations | Where the pipeline corridor passes within proximity of known populations at Yetholme and the Mount Piper Power Station, the alignment follows existing cleared powerline easements and road corridors, avoiding further habitat fragmentation. Fragmentation of these populations into two or more populations will therefore be avoided. |
| Adversely affect habitat critical to the survival of a species | The pipeline alignment has been selected to avoid known populations of Blackthorn (*Bursaria spinosa subsp. lasiophylla*) and none of this larval plant will be removed. Where the plant exists close to the pipeline corridor, the alignment has been placed along cleared easements and road corridors. Removal of any other associated vegetation is temporary only, with vegetation on easement allowed to naturally regenerate after completion of construction.<br>There will thus be no adverse impact on habitat critical for survival. |
| Disrupt the breeding cycle of an important population | No Blackthorn, the larval host plant of the species, will be removed or impacted. This avoids any disruption to the butterfly's breeding cycle. |
| Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline | See 4 and 5 above.<br>The nature of impact and avoidance measures taken (i.e. alignment follows existing roads and easements through butterfly habitat) means that habitat will not be modified or fragmented to the extent that the species would decline. |
| Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat | Weeds that might threaten habitat quality, such as Blackberry, Broome and Radiata Pine, are already established within the pipeline corridor near locations of known butterfly records. Environmental safeguards to control the further spread and introduction of weeds as a result of the pipeline development will be implemented. |

| Species | EPBC Status |
|---|---|
| **Purple Copper Butterfly**<br><br>(*Paralucia spinifera*) | V |
| **Significant Impact Guideline** | **Assessment** |
| Introduce disease that may cause the species to decline, or | The pipeline development does not include any actions that would be likely to introduce diseases or pathogens into the environment. Environmental safeguards for the management of biosecurity risks will be implemented. |
| Interfere substantially with the recovery of the species. | Given the above and the avoidance and minimisation actions taken, the pipeline development is not likely to interfere with the recovery of the species. |
| **Conclusion** | No significant impact |

**Table 7-10. Assessment of significance of impact for Austral Toadflax.**

| Species | EPBC Status |
|---|---|
| **Austral Toadflax**<br><br>(*Thesium australe*) | V |
| **Significant Impact Guideline** | **Assessment** |
| Lead to a long-term decrease in the size of an important population of a species | There are no important populations identified for this species and there are no records of the species within the Pipeline Corridor. The pipeline development is unlikely to impact on the species so that a long-term decrease in the population size occurs. |
| Reduce the area of occupancy of an important population | As above. It is not expected that the pipeline development will reduce the area of occupancy of the species, since there are no historical records of the species in the pipeline corridor and it was not recorded during the survey. |
| Fragment an existing important population into two or more populations | The pipeline will be trenched and buried. Following completion of construction, the trench will be back-filled, and the ground surface reinstated to its natural level. This will prevent fragmentation of habitat, allowing to dispersal of the plant between any populations. |
| Adversely affect habitat critical to the survival of a species | Kangaroo Grass (*Themeda australis*) is known to be critical to the species, as it is a root parasite. While Kangaroo Grass was recorded during vegetation surveys, it occurs in isolated situations and is never the dominant component of the ground layer vegetation. Given this and the lack of records, the pipeline corridor is not likely to impact habitat critical to the species survival. |
| Disrupt the breeding cycle of an important population | The plant is known to cope well with infrequent disturbance, germinating well from seed and rootstock remaining in the soil (Australian Government Department of Environment and Energy, 2019). Impact associated with the pipeline development would not be likely to disrupt the breeding cycle, especially given the temporary nature of the disturbance. |
| Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline | The temporary nature of the impact and the plant's ability to recover from disturbance means that habitat will not be modified, removed or isolated to the extent that a decline would result. |
| Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat | Introduced grasses and weeds are already widely distributed throughout the pipeline corridor. Environmental safeguards to control the further spread and introduction of weeds as a result of the pipeline development will be implemented. |
| Introduce disease that may cause the species to decline, or | The pipeline development does not include any actions that would be likely to introduce diseases or pathogens into the environment. Environmental safeguards for the management of biosecurity risks will be implemented. |
| Interfere substantially with the recovery of the species. | Given the above and the avoidance and minimisation actions taken, the pipeline development is not likely to interfere with the recovery of the species |
| **Conclusion** | No significant impact |

### 7.1.3 Critically Endangered Ecological Communities

An action is likely to have a significant impact on a critically endangered or endangered ecological community (CEEC) if there is a real chance or possibility that it will:

1. Reduce the extent of an ecological community
2. Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines
3. Adversely affect habitat critical to the survival of an ecological community
4. modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns
5. Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting
6. Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:
   a. assisting invasive species, that are harmful to the listed ecological community, to become established, or
   b. causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or
7. Interfere with the recovery of an ecological community.

Table 7-12 assess significance of impact for the single CEEC located within the pipeline corridor.

**Table 7-11**

| **Species** | **EPBC Status** |
|---|---|
| White Box – Yellow Box – Blakely's Red Gum Grassy woodland CEEC | CEEC |
| **Significant Impact Guideline** | **Assessment** |
| Reduce the extent of an ecological community | Nationally, the extent of this community an estimated 416,325 ha across NSW, Victoria, Queensland and the ACT. An estimated 250,729 ha occurs in NSW (Beeton, 2019).<br><br>There is an estimated 33.3 ha of the CEEC in the study area, of which 0.28 ha falls within the pipeline corridor, at the site of pumping station 4, representing 0.8% of the CEEC in the study area.<br><br>Impact to 0.8% of the CEEC's extent in the study area is not likely to reduce its extent to the point where the local occurrence of the community is placed at risk of extinction. In the context of the estimated NSW and national extent of the community, impact to 0.28 ha is negligible.<br><br>As far as is practicable, the pipeline alignment has been selected to avoid areas of EPBC Act listed CEEC. |

| Species | EPBC Status |
|---|---|
| White Box – Yellow Box – Blakely's Red Gum Grassy woodland CEEC | CEEC |
| **Significant Impact Guideline** | **Assessment** |
| Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines | The community occurs in a fragmented landscape as a result of past clearing activities. The 0.28 ha impacted occurs at the edge of a vegetation patch currently disturbed and fragmented by bike trails and a vehicle track. The pipeline development will not increase fragmentation or isolation of the community. |
| Adversely affect habitat critical to the survival of an ecological community | The site of the pumping station contains some juvenile trees and native ground layer species. The surrounding area immediately adjacent to the pipeline corridor contains mature trees, native grasses and forbs, which will continue to act as a source of seed to enable recruitment of flora species to occur, and the continued survival of the community. |
| Modify or destroy abiotic (non-living) factors (such as water, nutrients or soil) necessary for an ecological community's survival, including groundwater levels, or substantial alteration of surface water drainage patterns | Availability and flow of groundwater will not be impacted by the pipeline development. Surface water flows will not be altered, as the easement will be reinstated to the natural ground level at completion of construction.<br><br>Impact avoidance and minimisation procedures will be implemented (Section 6.1) to retain soil on site and ensure erosion and soil loss does not occur. |
| Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora and fauna harvesting | The impact is temporary and will not alter the composition of the CEEC in the local area. |
| Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:<br><br>Assisting invasive species that are harmful to the listed ecological community to become established, or<br><br>Causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which will kill or inhibit the growth of species in the ecological community | Weeds that might impact the community are already established (e.g. African Boxthorn, Blackberry, exotic grasses). Environmental safeguards and weed management are being implemented to minimise the risk of spreading these weeds and the introduction of new weeds<br><br>The pipeline development does not include any activities that will cause regular use of fertilisers, chemicals or pollutants. Some herbicide may be used for periodic weed control activities only. All applications of herbicide will be of approved chemicals and following procedures for use indicated on the chemicals' labels.<br><br>Areas of the community being impacted are already in a poor – moderate condition state, with a high cover of introduced grasses and minimal shrub layer. The temporary nature of the impact and the environmental safeguards that will be implemented will enable the pipeline development to avoid causing further substantial reduction in the quality or integrity of the community. |

| Species | EPBC Status |
|---|---|
| White Box – Yellow Box – Blakely's Red Gum Grassy woodland CEEC | CEEC |
| **Significant Impact Guideline** | **Assessment** |
| Interfere with the recovery of an ecological community. | Mature trees that provide a valuable seed bank to enable the natural recovery of the community will not be removed by the pipeline development. The easement will not be maintained as a permanently clear easement and be allowed to naturally regenerate. |
| **Conclusion** | No significant impact |

## 7.2 SEPP 44 - KOALA HABITAT PROTECTION

Lithgow, Bathurst and Blayney local government areas (LGA) are listed under Schedule 1 of the *State Environmental Planning Policy No 44 – Koala Habitat Protection* (SEPP 44) as LGAs to which SEPP 44 applies.

As discussed in Section 5.3.1, targeted surveys using the spot assessment technique were carried out for Koala within the pipeline corridor. No foraging or breeding Koalas were detected. Only one tree species listed in Schedule 2 of the SEPP as a feed tree (*Eucalyptus viminalis*) was recorded. It comprised >15% of tree cover in only one PCT, *Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion.*

Results of the survey indicate that the pipeline corridor is not core Koala habitat, but that the area mapped as the above PCT comprises potential Koala habitat. The pipeline development does not require the removal of mature trees that might be important for foraging Koala.

Any impact to Koala habitat as a result of the pipeline development has been considered through the calculation of ecosystem credits under the BAM, which the proponent will be required to offset, as discussed in Section 9.

# 8 MINIMISING, MITIGATING AND REPORTING OF IMPACTS OVER TIME

Impacts to biodiversity are likely during the construction phase of the project only. There is not expected to be any additional impact to biodiversity during the operational phase (e.g. during maintenance activities). Although measures for avoiding, minimising and mitigating expected impacts have been proposed in Section 6, the pipeline will be monitored throughout construction and for a 12 month period following completion.

Once operational, there are unlikely to be any further impacts as a result of the pipeline development.

Measures for monitoring and reporting on impacts over time, including unexpected impacts, are provided in Table 8-1.

**Table 8-1. Measures for minimising and mitigating impacts over time.**

| Impact | Timing | Monitoring Activity | Adaptive Management | Reporting |
|---|---|---|---|---|
| Increased sediment load and turbidity of watercourses<br><br>Addition of organic matter to watercourses<br><br>Addition of nutrients to watercourses | Pre-construction | Monitor turbidity, pH and oxygen levels of the water within and downstream of the construction area and, if a decline in water quality is detected, stop or scale back further works and revise control measures. | Complete to provide baseline data | Responsible Officer.<br><br>Proponent to keep records. |
| | Construction | | If a decline in water quality is detected, stop or scale back further works and revise control methods | Responsible Officer.<br><br>May require notification of DPI. |
| | 6 months post-construction<br><br>12 months post-construction | | Complete to ensure water quality remains/returns to baseline levels. | Responsible officer.<br><br>Proponent to keep records. |
| Introduction and spread of weeds | Construction | Carryout washdown and vehicle/machinery inspections | Prevent contaminated vehicles from entering the construction site. | Responsible Officer.<br><br>Severe outbreaks of priority weeds may require reporting to Council and/or Local Land Services.<br><br>Proponent to keep records. |
| | 6 months post-construction<br><br>12 months post-construction | Inspect length of easement for new occurrences of priority weeds | Implement control measures if required | |
| | Operational phase | Monitor for weed outbreaks annually at pumping stations. | Implement control measures if required. | |
| Soil Management and erosion | Construction | Implement erosion and sediment control plan | If unexpected erosion/soil loss occurs, stop or scale back further works and revise control methods. | Responsible Officer.<br><br>Proponent to keep records. |
| | 24 months post-construction | Inspect length of easement for erosion<br><br>Inspect length of easement for regeneration of vegetation | Implement remediation and/or revegetation works if required. | |

| Impact | Timing | Monitoring Activity | Adaptive Management | Reporting |
|---|---|---|---|---|
| Impact to fauna | Construction | Keep records of any accidental death of fauna as a result of construction activities. | If unexpected impact to fauna is recorded, stop or scale back further works and revise environmental safeguards.<br><br>Contact suitably qualified and experienced person to advise if fauna injuries occur (e.g. WIRES) | Responsible Officer.<br><br>Proponent to keep records. |

# 9 BIODIVERSITY OFFSET STRATEGY

The proponent plans to offset the pipeline development by entry into the NSW Biodiversity Offset Scheme.

Impacts of the pipeline development on native vegetation, threatened species and threatened communities have been quantified under the BAM as biodiversity credits, including ecosystem credits for the clearing of native vegetation and ecosystem species habitat, and species credits for species credit species.

The proponent must offset the development by purchasing and retiring the correct number and types of biodiversity credits as described in the Biodiversity Credit Report. If correct credits are not available to trade, the proponent may seek to offset the pipeline development by paying into the Biodiversity Conservation Trust, or purchase land for the purpose of establishment of a stewardship site with suitable credits.

## 9.1 BIODIVERSITY CREDIT REPORT

Biodiversity credit classes requiring offset are summarised in Table 9-1 and

Table 9-2.

**Table 9-1. Ecosystem credit summary.**

| Zone | Vegetation zone name | Vegetation integrity loss / gain | Area (ha) | Constant | Species sensitivity to gain class (for BRW) | Biodiversity risk weighting | Potential SAII | Ecosystem credits |
|---|---|---|---|---|---|---|---|---|
| **Apple Box - Yellow Box dry grassy woodland of the South Eastern Highlands Bioregion** | | | | | | | | |
| 13 | 654_Moderate | 42.5 | 0.3 | 0.25 | High Sensitivity to Potential Gain | 2.00 | TRUE | 7 |
| 14 | 654_Poor | 12.0 | 0.1 | 0.25 | High Sensitivity to Potential Gain | 2.00 | TRUE | 1 |
| 15 | 654_Poor01 | 15.5 | 0.2 | 0.25 | High Sensitivity to Potential Gain | 2.00 | TRUE | 2 |
| | | | | | | | **Subtotal** | **10** |
| **Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion** | | | | | | | | |
| 16 | 679_Good | 35.4 | 0.2 | 0.25 | High Sensitivity to Potential Gain | 1.50 | | 2 |
| 17 | 679_Poor | 22.6 | 0.2 | 0.25 | High Sensitivity to Potential Gain | 1.50 | | 2 |
| | | | | | | | **Subtotal** | **4** |
| **Broad-leaved Peppermint - Brittle Gum - Red Stringybark dry open forest on the South Eastern Highlands Bioregion** | | | | | | | | |
| 18 | 727_Poor | 40.0 | 0.0 | 0.25 | High Sensitivity to Potential Gain | 1.75 | | 1 |
| | | | | | | | **Subtotal** | **1** |
| **Broad-leaved Peppermint - Red Stringybark grassy open forest on undulating hills, South Eastern Highlands Bioregion** | | | | | | | | |
| 19 | 731_Good | 46.3 | 0.6 | 0.25 | High Sensitivity to Potential Gain | 2.00 | | 14 |
| 20 | 731_Poor | 36.0 | 1.9 | 0.25 | High Sensitivity to Potential Gain | 2.00 | | 33 |
| | | | | | | | **Subtotal** | **47** |
| **Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion** | | | | | | | | |
| 21 | 732_Good | 33.4 | 0.0 | 0.25 | High Sensitivity to Potential Gain | 1.75 | | 1 |
| 22 | 732_Poor | 27.2 | 1.1 | 0.25 | High Sensitivity to Potential Gain | 1.75 | | 13 |
| | | | | | | | **Subtotal** | **14** |
| **Carex - Juncus sedgeland/wet grassland of the South Eastern Highlands Bioregion** | | | | | | | | |
| 23 | 765_Moderate | 44.8 | 0.0 | 0.25 | Moderate Sensitivity to Potential Gain | 1.25 | | 1 |
| | | | | | | | **Subtotal** | **1** |
| **Long-leaved Box - Red Box - Red Stringybark mixed open forest on hills and hillslopes in the NSW South Western Slopes Bioregion** | | | | | | | | |
| 12 | 287_Good | 32.0 | 0.7 | 0.25 | High Sensitivity to Potential Gain | 1.75 | | 10 |
| | | | | | | | **Subtotal** | **10** |
| **Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion** | | | | | | | | |
| 1 | 1093_Good | 48.9 | 1.1 | 0.25 | High Sensitivity to Potential Gain | 1.75 | | 24 |

| Zone | Vegetation zone name | Vegetation integrity loss / gain | Area (ha) | Constant | Species sensitivity to gain class (for BRW) | Biodiversity risk weighting | Potential SAII | Ecosystem credits |
|---|---|---|---|---|---|---|---|---|
| 2 | 1093_Moderate | 27.0 | 0.5 | 0.25 | High Sensitivity to Potential Gain | 1.75 | | 6 |
| 3 | 1093_Poor | 34.9 | 0.5 | 0.25 | High Sensitivity to Potential Gain | 1.75 | | 8 |
| | | | | | | | **Subtotal** | **38** |
| **River Oak forest and woodland wetland of the NSW South Western Slopes and South Eastern Highlands Bioregion** | | | | | | | | |
| 24 | 85_Poor | 19.3 | 0.1 | 0.25 | High Sensitivity to Potential Gain | 2.00 | | 1 |
| | | | | | | | **Subtotal** | **1** |
| **Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion** | | | | | | | | |
| 4 | 1191_Poor | 8.1 | 0.0 | 0.25 | High Sensitivity to Potential Gain | 2.50 | | 1 |
| | | | | | | | **Subtotal** | **1** |
| **Snow Gum - Mountain Gum tussock grass-herb forest of the South Eastern Highlands Bioregion** | | | | | | | | |
| 5 | 1197_Good | 47.7 | 0.2 | 0.25 | High Sensitivity to Potential Gain | 2.50 | | 7 |
| 6 | 1197_Poor | 10.6 | 0.1 | 0.25 | High Sensitivity to Potential Gain | 2.50 | | 0 |
| | | | | | | | **Subtotal** | **7** |
| **Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion** | | | | | | | | |
| 7 | 1330_Moderate | 16.1 | 0.1 | 0.25 | High Sensitivity to Potential Gain | 2.00 | TRUE | 1 |
| 8 | 1330_Poor | 6.3 | 0.1 | 0.25 | High Sensitivity to Potential Gain | 2.00 | TRUE | 1 |
| 9 | 1330_Poor01 | 6.3 | 0.3 | 0.25 | High Sensitivity to Potential Gain | 2.00 | TRUE | 1 |
| 10 | 1330_Poor02 | 6.3 | 0.0 | 0.25 | High Sensitivity to Potential Gain | 2.00 | TRUE | 1 |
| 11 | 1330_Poor03 | 6.3 | 0.0 | 0.25 | High Sensitivity to Potential Gain | 2.00 | TRUE | 1 |
| | | | | | | | **Subtotal** | **5** |
| | | | | | | | **Total** | **139** |

**Table 9-2. Species credit summary.**

| Vegetation zone name | Habitat condition (HC) | Area (ha) / individual (HL) | Constant | Biodiversity risk weighting | Potential SAII | Species credits |
|---|---|---|---|---|---|---|
| ***Cercartetus nanus / Eastern Pygmy-possum ( Fauna )*** | | | | | | |
| 1093_Good | 48.9 | 1.14 | 0.25 | 2 | False | 28 |
| 1093_Moderate | 27.0 | 0.51 | 0.25 | 2 | False | 7 |
| 1093_Poor | 34.9 | 0.54 | 0.25 | 2 | False | 9 |
| 1191_Poor | 8.1 | 0.03 | 0.25 | 2 | False | 0 |
| 1197_Good | 47.7 | 0.22 | 0.25 | 2 | False | 5 |
| 1197_Poor | 10.6 | 0.1 | 0.25 | 2 | False | 1 |
| 1330_Moderate | 16.1 | 0.14 | 0.25 | 2 | False | 1 |
| 1330_Poor | 6.3 | 0.1 | 0.25 | 2 | False | 0 |
| 1330_Poor01 | 6.3 | 0.25 | 0.25 | 2 | False | 1 |
| 1330_Poor02 | 6.3 | 0.03 | 0.25 | 2 | False | 0 |
| 1330_Poor03 | 6.3 | 0.04 | 0.25 | 2 | False | 0 |
| 287_Good | 32.0 | 0.74 | 0.25 | 2 | False | 12 |
| 727_Poor | 40.0 | 0.01 | 0.25 | 2 | False | 0 |
| 731_Good | 46.3 | 0.6 | 0.25 | 2 | False | 14 |
| 731_Poor | 34.6 | 1.86 | 0.25 | 2 | False | 32 |
| 732_Good | 33.4 | 0.01 | 0.25 | 2 | False | 0 |
| 732_Poor | 27.2 | 1.08 | 0.25 | 2 | False | 15 |
| | | | | | **Subtotal** | **125** |
| ***Myotis macropus / Southern Myotis ( Fauna )*** | | | | | | |
| 1330_Poor | 6.3 | 0.1 | 0.25 | 2 | False | 0 |
| 1330_Moderate | 16.1 | 0.07 | 0.25 | 2 | False | 1 |
| 1330_Poor02 | 6.3 | 0.03 | 0.25 | 2 | False | 0 |
| | | | | | **Subtotal** | **1** |
| ***Ninox connivens / Barking Owl ( Fauna )*** | | | | | | |
| 1093_Good | 48.9 | 0.12 | 0.25 | 2 | N/A | 3 |
| 1330_Moderate | 16.1 | 0.12 | 0.25 | 2 | N/A | 1 |
| 732_Poor | 27.2 | 0.03 | 0.25 | 2 | N/A | 0 |
| | | | | | **Subtotal** | **4** |
| ***Ninox strenua / Powerful Owl ( Fauna )*** | | | | | | |
| 1093_Good | 48.9 | 0.12 | 0.25 | 2 | N/A | 3 |
| 1330_Moderate | 16.1 | 0.12 | 0.25 | 2 | N/A | 1 |
| 732_Poor | 27.2 | 0.03 | 0.25 | 2 | N/A | 0 |
| | | | | | **Subtotal** | **4** |
| ***Paralucia spinifera / Purple Copper Butterfly, Bathurst Copper Butterfly ( Fauna )*** | | | | | | |
| 1093_Good | 48.9 | 0.09 | 0.25 | 2 | False | 2 |
| 1093_Poor | 34.9 | 0.04 | 0.25 | 2 | False | 1 |
| 731_Good | 46.3 | 0.05 | 0.25 | 2 | False | 1 |

| Vegetation zone name | Habitat condition (HC) | Area (ha) / individual (HL) | Constant | Biodiversity risk weighting | Potential SAII | Species credits |
|---|---|---|---|---|---|---|
| 731_Poor | 34.6 | 0.11 | 0.25 | 2 | False | 2 |
| | | | | | **Subtotal** | **6** |
| ***Petaurus norfolcensis / Squirrel Glider ( Fauna )*** | | | | | | |
| 1093_Good | 48.9 | 1.14 | 0.25 | 2 | False | 28 |
| 1093_Moderate | 27.0 | 0.51 | 0.25 | 2 | False | 7 |
| 1197_Good | 47.7 | 0.22 | 0.25 | 2 | False | 5 |
| 1330_Moderate | 16.1 | 0.14 | 0.25 | 2 | False | 1 |
| 1330_Poor | 6.3 | 0.1 | 0.25 | 2 | False | 0 |
| 1330_Poor01 | 6.3 | 0.25 | 0.25 | 2 | False | 1 |
| 1330_Poor02 | 6.3 | 0.03 | 0.25 | 2 | False | 0 |
| 1330_Poor03 | 6.3 | 0.04 | 0.25 | 2 | False | 0 |
| 287_Good | 32.0 | 0.74 | 0.25 | 2 | False | 12 |
| 654_Moderate | 42.5 | 0.32 | 0.25 | 2 | False | 7 |
| 654_Poor | 12.0 | 0.09 | 0.25 | 2 | False | 1 |
| 654_Poor01 | 15.5 | 0.24 | 0.25 | 2 | False | 2 |
| 731_Good | 46.3 | 0.6 | 0.25 | 2 | False | 14 |
| | | | | | **Subtotal** | **78** |
| ***Phascogale tapoatafa / Brush-tailed Phascogale ( Fauna )*** | | | | | | |
| 1093_Good | 48.9 | 1.14 | 0.25 | 2 | False | 28 |
| 1093_Moderate | 27.0 | 0.51 | 0.25 | 2 | False | 7 |
| 654_Moderate | 42.5 | 0.32 | 0.25 | 2 | False | 7 |
| 654_Poor | 12.0 | 0.09 | 0.25 | 2 | False | 1 |
| 654_Poor01 | 15.5 | 0.24 | 0.25 | 2 | False | 2 |
| 731_Good | 46.3 | 0.6 | 0.25 | 2 | False | 14 |
| | | | | | **Subtotal** | **59** |
| ***Swainsona sericea / Silky Swainson-pea ( Flora )*** | | | | | | |
| 654_Moderate | 42.5 | 0.32 | 0.25 | 2 | False | 7 |
| 1330_Moderate | 16.1 | 0.14 | 0.25 | 2 | False | 1 |
| | | | | | **Subtotal** | **8** |
| ***Thesium australe / Austral Toadflax ( Flora )*** | | | | | | |
| 1197_Good | 47.7 | 0.22 | 0.25 | 1.5 | False | 4 |
| 1197_Poor | 10.6 | 0.1 | 0.25 | 1.5 | False | 0 |
| | | | | | **Subtotal** | **4** |
| ***Tyto novaehollandiae / Masked Owl ( Fauna )*** | | | | | | |
| 1093_Good | 48.9 | 0.12 | 0.25 | 2 | N/A | 3 |
| 1330_Moderate | 16.1 | 0.12 | 0.25 | 2 | N/A | 1 |
| 732_Poor | 27.2 | 0.03 | 0.25 | 2 | N/A | 0 |
| | | | | | **Subtotal** | **4** |

# 10 CONCLUSION

The findings of the BDAR are as follows:

- A total of 12 Plant Community Types (PCT) were identified as occurring within the pipeline corridor, totalling 8.51 ha in extent. Vegetation condition ranges from poor to good, with several PCT occurring in three condition states.
- One BC Act threatened ecological community was determined as present: White Box Yellow Box Blakely's Red Gum Woodland EEC.
- One EPBC Act threatened ecological community was determined as present: White Box Yellow Box Blakely's Red Gum Grassy Woodland CEEC.
- Six threatened BC Act threatened species were recorded during the field survey, as listed below. For the purposes of assessment under the BAM, they are all ecosystem species.
    - Gang Gang Cockatoo
    - Dusky Woodswallow
    - Spotted Harrier
    - Little Eagle
    - Flame Robin
    - Capertee Stringybark
- Ten BAM species credit species were assumed present based on the absence of targeted survey in suitable habitat or low likelihood of detection based on climatic conditions at the time of the survey, comprising:
    - Eastern Pygmy Possum
    - Southern Myotis
    - Purple Copper Butterfly
    - Squirrel Glider
    - Brush-tailed Phascogale
    - Silky Swainson-pea
    - Austral Toadflax
    - Masked Owl
    - Barking Owl
    - Powerful Owl
- To offset the impact of the pipeline development on native vegetation and threatened species, the proponent is required to enter the Biodiversity Offset Scheme. A total of 139 ecosystem and 293 species credits are required.

- One threatened fish species – Purple-spotted Gudgeon – is potentially impacted by the proposal. The seven-part test of significance for this species indicates that there will be no significant impact as a result of the pipeline development.
- EPBC Act significant impact guidelines were applied to one EPBC listed CEEC and nine EPBC listed threatened species. The pipeline development will not have a significant impact on any of these entities.
- The pipeline corridor does not constitute core Koala habitat. Impact to Koala will be avoided by retaining mature canopy species within the pipeline corridor in areas of moderate to good condition native vegetation.

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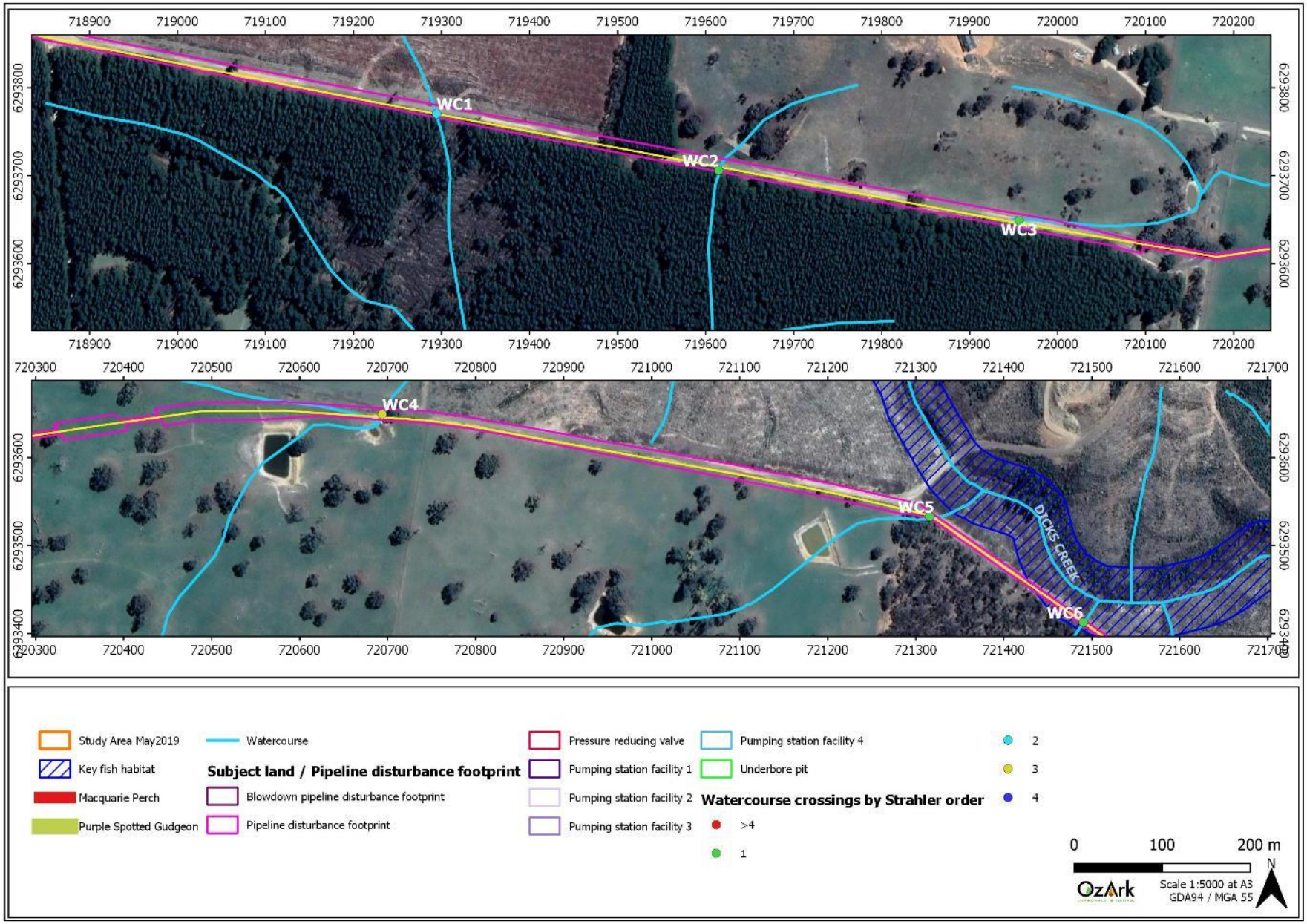
# APPENDIX 1. WATERCOURSE CROSSINGS

| Waypoint | Name | Zone | Easting | Northing | Strahler O | Impact |
|---|---|---|---|---|---|---|
| WC1 | Unnamed | 55H | 719311 | 6293766 | 2 | Route crosses watercourse |
| WC10 | Unnamed | 55H | 722535 | 6292652 | 1 | Route crosses watercourse |
| WC100 | Unnamed | 56 H | 224873 | 6304245 | 3 | Route crosses watercourse |
| WC101 | Wangcol Creek | 56 H | 226387 | 6304588 | >4 | Route crosses watercourse |
| WC102 | Coxs River | 56 H | 228622 | 6304741 | >4 | Route crosses watercourse |
| WC103 | Unnamed | 55H | 7339955 | 6292213 | 1 | Route crosses watercourse |
| WC104 | Unnamed | 55H | 736970 | 6293972 | 1 | Route crosses watercourse |
| WC105 | Unnamed | 55H | 740980 | 6294454 | 1 | Route crosses watercourse |
| WC106 | Unnamed | 55H | 746292 | 6294159 | 1 | Route crosses watercourse |
| WC107 | Unnamed | 55H | 762483 | 6297984 | 1 | Route crosses watercourse |
| WC108 | Unnamed | 55H | 777122 | 6303439 | 1 | Route crosses watercourse |
| WC109 | Unnamed | 56H | 226919 | 6304513 | 1 | Route crosses watercourse |
| WC11 | Mcleans Creek | 55H | 723004 | 6291324 | 4 | Route crosses watercourse |
| WC110 | Unnamed | 56H | 227386 | 6304361 | 1 | Route crosses watercourse |
| WC111 | Unnamed | 56H | 227023 | 6304454 | 1 | Route crosses watercourse |
| WC12 | Unnamed | 55H | 723422 | 6291127 | 1 | Route crosses watercourse |
| WC13 | Evans Plains Creek | 55H | 724128 | 6290860 | >4 | Route crosses watercourse |
| WC14 | Unnamed | 55H | 724296 | 6290870 | 2 | Route crosses watercourse |
| WC15 | Unnamed | 55H | 724501 | 6290800 | 1 | Route crosses watercourse |
| WC16 | Unnamed | 55H | 724673 | 6290773 | 1 | Route crosses watercourse |
| WC17 | Unnamed | 55H | 725641 | 6290598 | 1 | Route crosses watercourse |
| WC18 | Unnamed | 55H | 726034 | 6290435 | 1 | Route crosses watercourse |
| WC19 | Unnamed | 55H | 726321 | 6290293 | >4 | Route crosses watercourse |
| WC2 | Unnamed | 55H | 719615 | 6293706 | 1 | Route crosses watercourse |
| WC20 | Unnamed | 55H | 726532 | 6290145 | 1 | Route crosses watercourse |
| WC21 | Unnamed | 55H | 727425 | 6289618 | 1 | Route crosses watercourse |
| WC22 | Unnamed | 55H | 727544 | 6289626 | 1 | Route crosses watercourse |
| WC23 | Queen Charlottes Creek | 55H | 738782 | 6293627 | >4 | Route crosses watercourse |

| | | | | | | |
|---|---|---|---|---|---|---|
| WC24 | Unnamed | 55H | 738945 | 6293567 | 3 | Route crosses watercourse |
| WC25 | Macquarie River | 55H | 742729 | 6294346 | >4 | Route crosses watercourse |
| WC26 | Salt Water Creek | 55H | 748208 | 6293138 | >4 | Route crosses watercourse |
| WC27 | Unnamed | 55H | 748297 | 6293125 | 2 | Route crosses watercourse |
| WC28 | Unnamed | 55H | 752673 | 6293750 | >4 | Route crosses watercourse |
| WC29 | Unnamed | 55H | 753378 | 6294001 | 2 | Route crosses watercourse |
| WC3 | Unnamed | 55H | 720030 | 6293632 | 1 | Route adjacent to watercourse |
| WC30 | Unnamed | 55H | 754515 | 6294221 | 3 | Route crosses watercourse |
| WC31 | Unnamed | 55H | 757205 | 6295618 | 2 | Route crosses watercourse. Tributary of Saint Anthonys Creek |
| WC32 | Saint Anthonys Creek | 55H | 759121 | 6295505 | 3 | Route crosses watercourse |
| WC34 | Unnamed | 55H | 763093 | 6298434 | 3 | Route crosses watercourse |
| WC35 | Kirkconnell Creek | 55H | 764246 | 6298340 | 3 | Route crosses watercourse |
| WC36 | Unnamed | 55H | 764601 | 6298172 | 3 | Route crosses watercourse |
| WC37 | Unnamed | 55H | 772251 | 6301596 | 1 | Route crosses watercourse |
| WC38 | Sugarloaf Creek | 55H | 772782 | 6301708 | 3 | Route crosses watercourse |
| WC39 | Williwa Creek | 55H | 775357 | 6303877 | >4 | Route crosses watercourse |
| WC4 | Unnamed | 55H | 720690 | 6293638 | 3 | Route crosses point where two 2nd order streams become 3rd order |
| WC40 | Pipers Flat Creek | 55H | 778074 | 6303747 | 4 | Route crosses watercourse |
| WC41 | Unnamed | 55H | 778778 | 6303565 | 3 | Route crosses watercourse |
| WC42 | Unnamed | 55H | 727824 | 6289642 | 1 | Route crosses watercourse |
| WC43 | Unnamed | 55H | 728739 | 6289496 | 3 | Route crosses watercourse |
| WC44 | Unnamed | 55H | 729581 | 6289676 | 1 | Route crosses watercourse |
| WC45 | Unnamed | 55H | 730824 | 6290600 | 1 | Route crosses watercourse |
| WC46 | Unnamed | 55H | 731454 | 6290738 | 1 | Route crosses watercourse |
| WC47 | Unnamed | 55H | 732324 | 6291675 | 2 | Route crosses watercourse |
| WC48 | Unnamed | 55H | 732378 | 6291746 | 1 | Route crosses watercourse |
| WC49 | Unnamed | 55H | 733474 | 6291827 | 1 | Route crosses watercourse |
| WC5 | Unnamed | 55H | 721316 | 6293533 | 1 | Route crosses watercourse. Tributary of Dicks Creek |
| WC50 | Unnamed | 55H | 733793 | 6291962 | 1 | Route crosses watercourse |
| WC51 | Unnamed | 55H | 734157 | 6292463 | 1 | Route crosses watercourse |

| | | | | | | |
|---|---|---|---|---|---|---|
| WC52 | Unnamed | 55H | 734756 | 6292677 | 2 | Route crosses watercourse |
| WC53 | Unnamed | 55H | 735077 | 6292778 | 1 | Route crosses watercourse |
| WC54 | Unnamed | 55H | 740650 | 6293467 | 1 | Route crosses watercourse |
| WC55 | Unnamed | 55H | 740808 | 6294324 | 1 | Route crosses watercourse |
| WC56 | Unnamed | 55H | 743380 | 6294113 | 1 | Route crosses watercourse |
| WC57 | Unnamed | 55H | 744850 | 6294466 | 1 | Route crosses watercourse |
| WC58 | Unnamed | 55H | 746111 | 6294374 | 1 | Route crosses watercourse |
| WC59 | Unnamed | 55H | 746632 | 6293634 | 1 | Route crosses watercourse |
| WC6 | Unnamed | 55H | 721468 | 6293426 | 1 | Route crosses watercourse. Tributary of Dicks Creek |
| WC60 | Unnamed | 55H | 749924 | 6292713 | 1 | Route crosses watercourse |
| WC61 | Unnamed | 55H | 750942 | 6292964 | 1 | Route crosses watercourse |
| WC62 | Unnamed | 55H | 751324 | 6293815 | 2 | Route crosses watercourse |
| WC63 | Unnamed | 55H | 753976 | 6294163 | 1 | Route crosses watercourse |
| WC64 | Unnamed | 55H | 756197 | 6294430 | 1 | Route crosses watercourse |
| WC65 | Unnamed | 55H | 757773 | 6295224 | 1 | Route crosses watercourse |
| WC66 | Unnamed | 55H | 758332 | 6295097 | 1 | Route crosses watercourse |
| WC67 | Unnamed | 55H | 758597 | 6295083 | 1 | Route crosses watercourse |
| WC68 | Unnamed | 55H | 758910 | 6295174 | 1 | Route crosses watercourse |
| WC69 | Unnamed | 55H | 759083 | 6295250 | 1 | Route crosses watercourse |
| WC7 | Unnamed | 55H | 721587 | 6293345 | 1 | Route crosses watercourse. Tributary of Dicks Creek |
| WC70 | Unnamed | 55H | 759009 | 6295757 | 1 | Route crosses watercourse |
| WC71 | Unnamed | 55H | 759119 | 6296226 | 1 | Route crosses watercourse |
| WC72 | Unnamed | 55H | 759333 | 6296461 | 2 | Route crosses watercourse |
| WC73 | Unnamed | 55H | 760347 | 6296842 | 1 | Route crosses watercourse |
| WC74 | Unnamed | 55H | 760651 | 6297605 | 1 | Route crosses watercourse |
| WC75 | Unnamed | 55H | 762223 | 6297858 | 1 | Route crosses watercourse |
| WC76 | Unnamed | 55H | 762464 | 6297899 | 2 | Route crosses watercourse |
| WC77 | Unnamed | 55H | 763793 | 6298570 | 2 | Route crosses watercourse |
| WC78 | Unnamed | 55H | 765034 | 6298080 | 2 | Route crosses watercourse |
| WC79 | Unnamed | 55H | 765208 | 6298147 | 2 | Route crosses watercourse |

| | | | | | | |
|---|---|---|---|---|---|---|
| WC8 | Unnamed | 55H | 722039 | 6293024 | 1 | Route crosses watercourse |
| WC80 | Unnamed | 55H | 765490 | 6298266 | 1 | Route crosses watercourse |
| WC81 | Unnamed | 55H | 766809 | 6299499 | 1 | Route crosses watercourse |
| WC82 | Unnamed | 55H | 767271 | 6299393 | 1 | Route crosses watercourse |
| WC83 | Unnamed | 55H | 771861 | 6301581 | 1 | Route crosses watercourse |
| WC84 | Unnamed | 55H | 772991 | 6301612 | 1 | Route crosses watercourse |
| WC85 | Unnamed | 55H | 775687 | 6303877 | 2 | Route crosses watercourse |
| WC86 | Unnamed | 55H | 776803 | 6303422 | 1 | Route crosses watercourse |
| WC87 | Unnamed | 55H | 776924 | 6303420 | 1 | Route crosses watercourse |
| WC88 | Unnamed | 55H | 777509 | 6303638 | 1 | Route crosses watercourse |
| WC89 | Unnamed | 55H | 777846 | 6303809 | 1 | Route crosses watercourse |
| WC9 | Unnamed | 55H | 722338 | 6292805 | 2 | Route crosses watercourse |
| WC90 | Unnamed | 55H | 778415 | 6303634 | 1 | Route crosses watercourse |
| WC91 | Unnamed | 56H | 220979 | 6303472 | 1 | Route crosses watercourse |
| WC92 | Unnamed | 56H | 222281 | 6302985 | 1 | Route crosses watercourse |
| WC93 | Unnamed | 56H | 222842 | 6303520 | 1 | Route crosses watercourse |
| WC94 | Unnamed | 56H | 222917 | 6303672 | 1 | Route crosses watercourse |
| WC95 | Unnamed | 56H | 223815 | 6304157 | 1 | Route crosses watercourse |
| WC96 | Unnamed | 56H | 223992 | 6304181 | 1 | Route crosses watercourse |
| WC97 | Unnamed | 56H | 225743 | 6303724 | 3 | Through mine. |
| WC98 | Unnamed | 56H | 226119 | 6304355 | 3 | Through mine. |
| WC99 | Pipers Flat Creek | 56H | 222043 | 6303047 | 4 | Route crosses watercourse |
| WC112 | Unnamed | 56H | 229947 | 6305620 | 1 | Route crosses watercourse |
| WC76 | Unnamed | 56H | 222489 | 6302949 | 1 | Route crosses watercourse |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WC2
WC3
WC4
WC5
WC6
DICKS CREEK
Study Area May2019
Key fish habitat
Macquarie Perch
Purple Spotted Gudgeon
Watercourse
Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Watercourse crossings by Strahler order
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2
3
4
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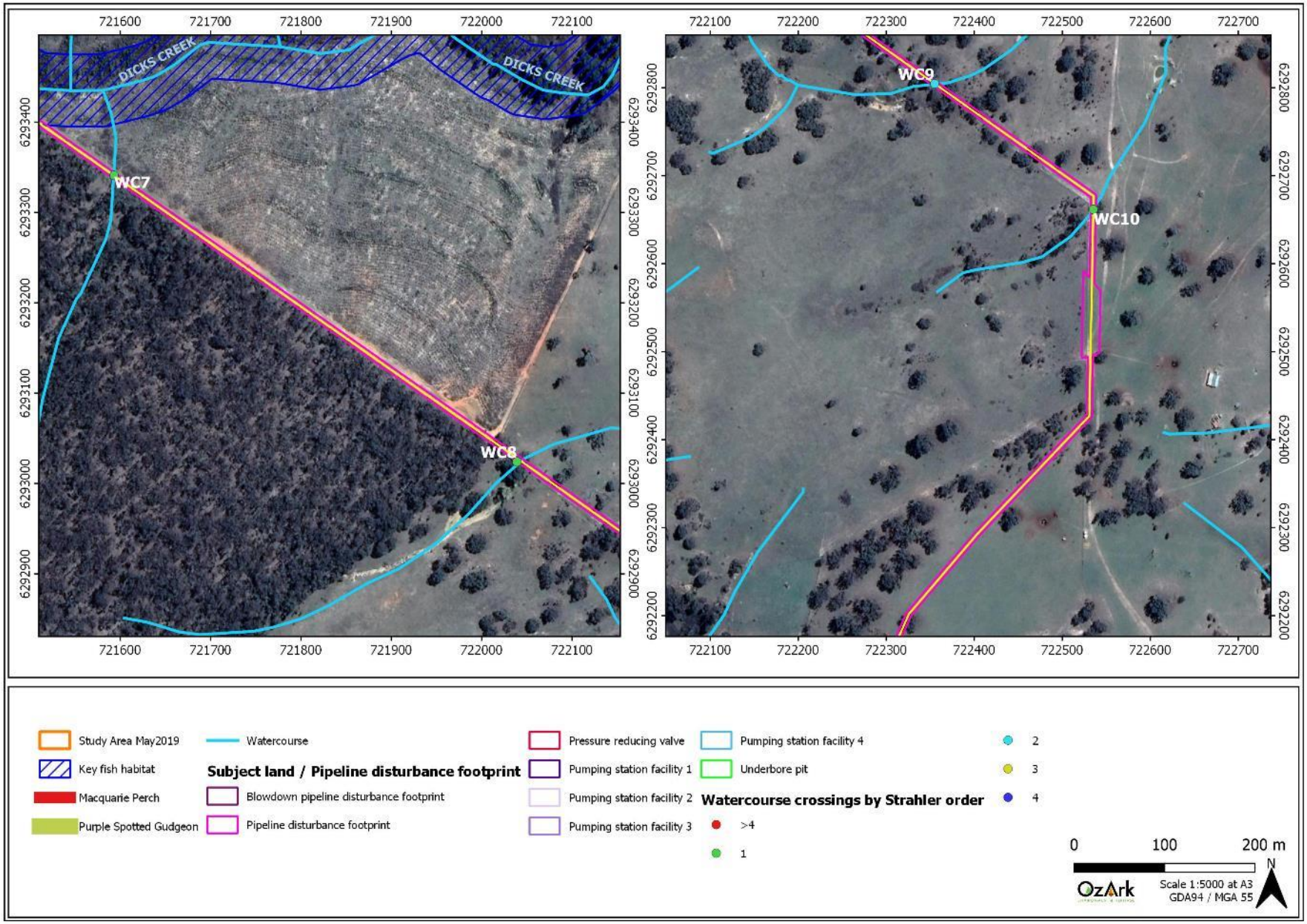
100
200 m
N
OzArk
Scale 1:5000 at A3
GDA94 / MGA 55


DICKS CREEK
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6292700
6292600
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6292400
6292300
6292200
Study Area May2019
Key fish habitat
Macquarie Perch
Purple Spotted Gudgeon
Watercourse
Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Watercourse crossings by Strahler order
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1
2
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200 m
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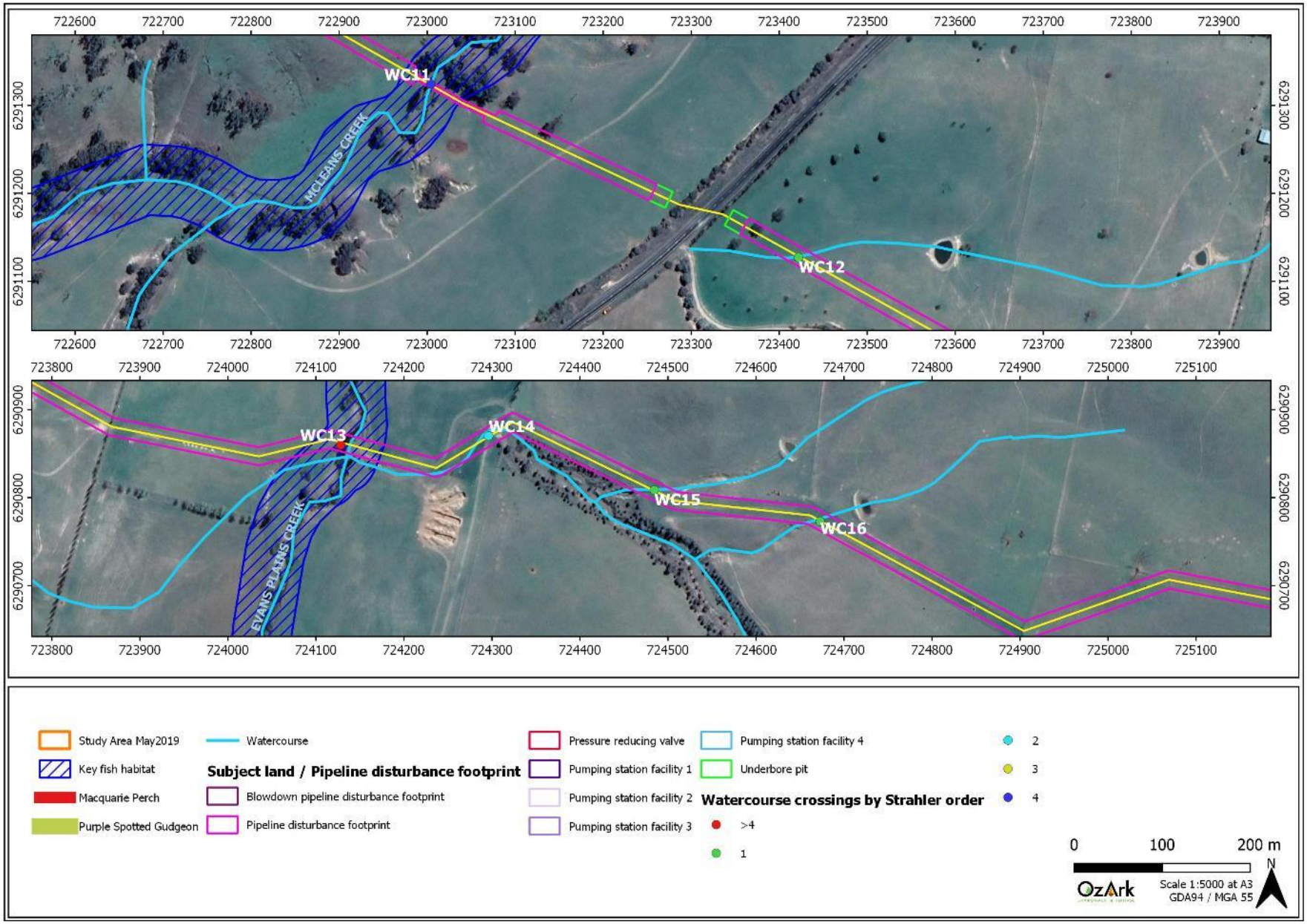
Scale 1:5000 at A3
GDA94 / MGA 55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WC12
WC13
WC14
WC15
WC16
MCLEANS CREEK
EVANS PLAINS CREEK
Study Area May2019
Key fish habitat
Macquarie Perch
Purple Spotted Gudgeon
Watercourse
Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Watercourse crossings by Strahler order
>4
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200 m
N
OzArk
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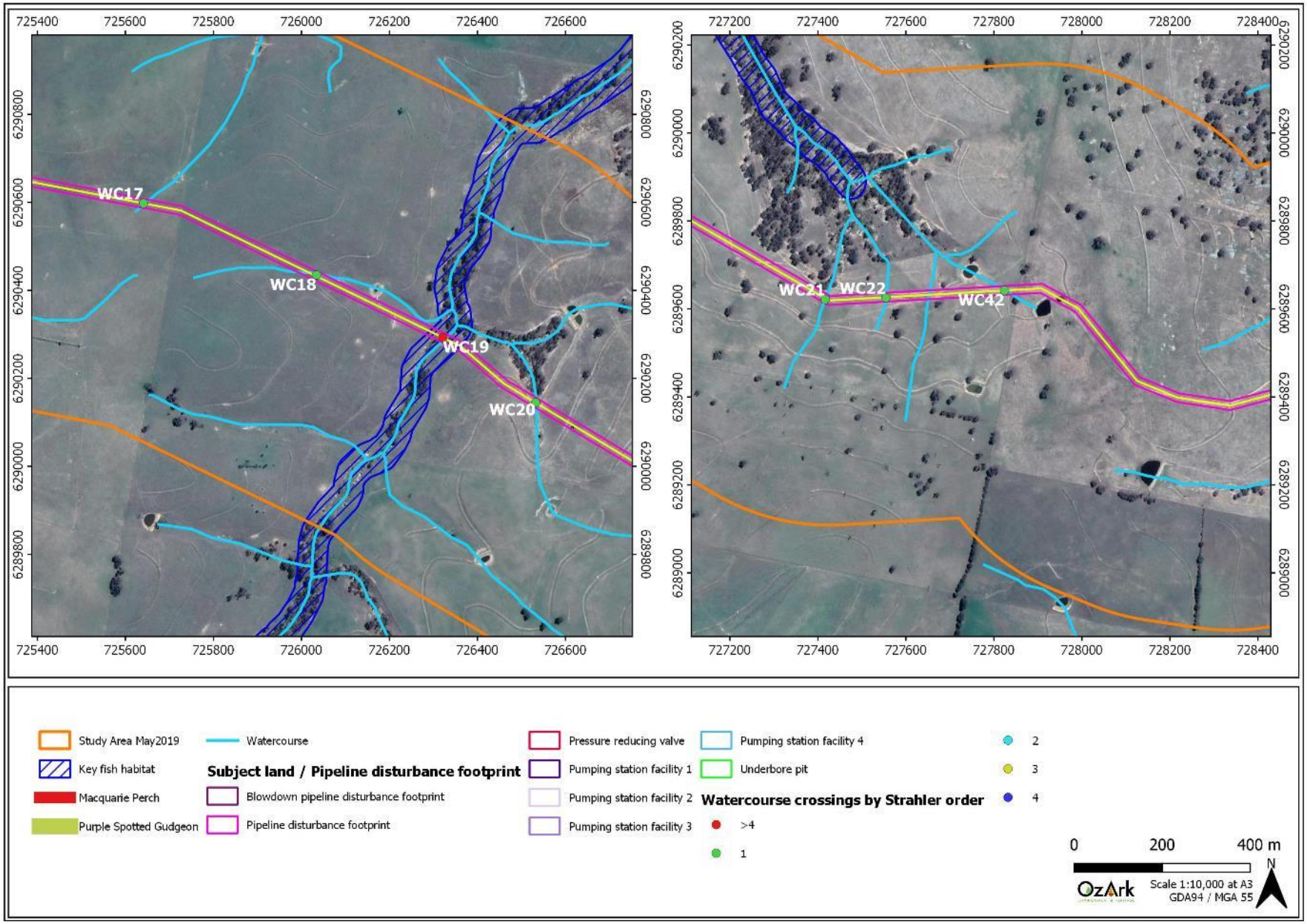
GDA94 / MGA 55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WC18
WC19
WC20
WC21
WC22
WC42
Study Area May2019
Key fish habitat
Macquarie Perch
Purple Spotted Gudgeon
Watercourse
Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Watercourse crossings by Strahler order
>4
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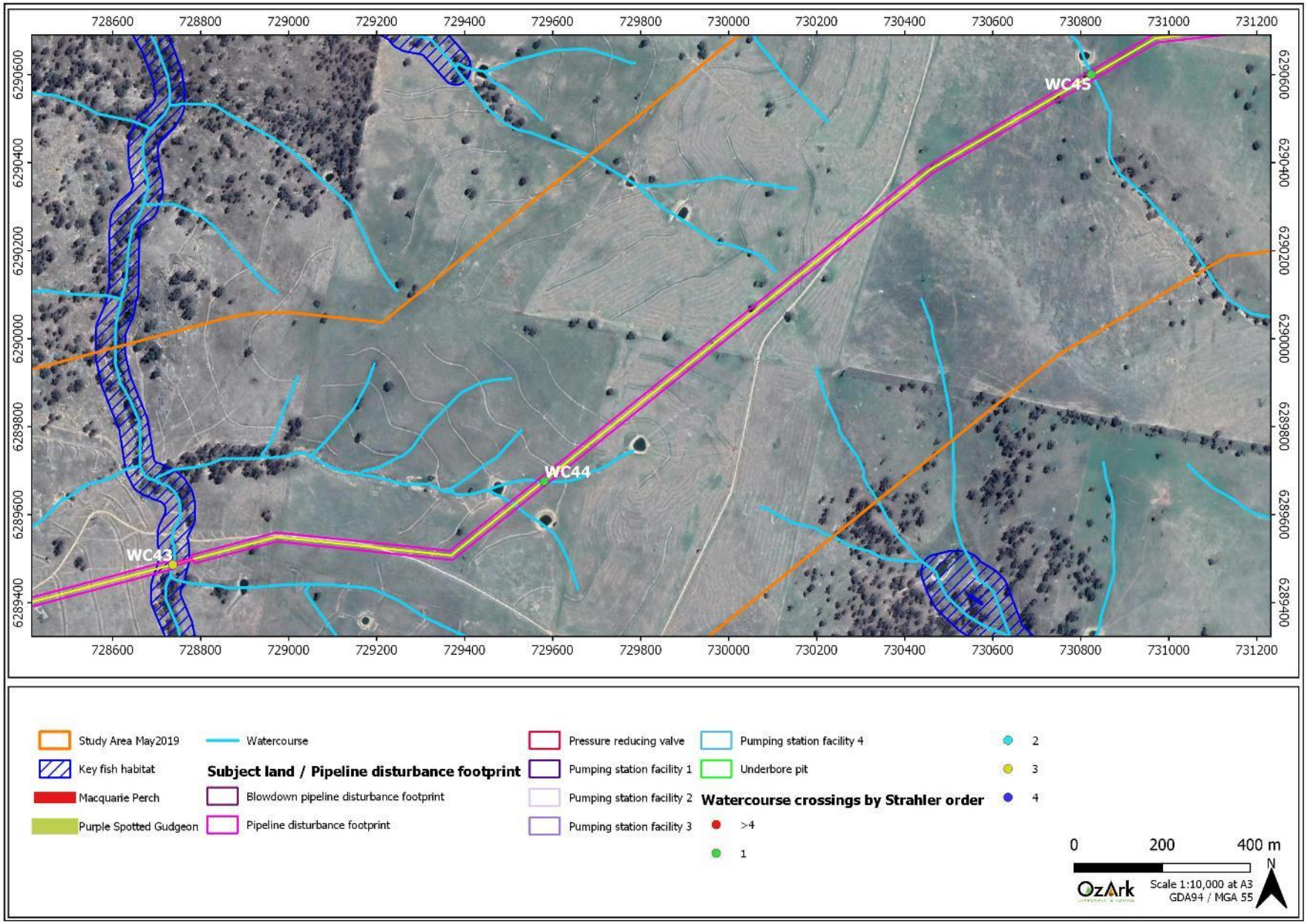
200
400 m
N
OzArk
Scale 1:10,000 at A3
GDA94 / MGA 55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WC43
WC44
WC45
Study Area May2019
Key fish habitat
Macquarie Perch
Purple Spotted Gudgeon
Watercourse
Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Watercourse crossings by Strahler order
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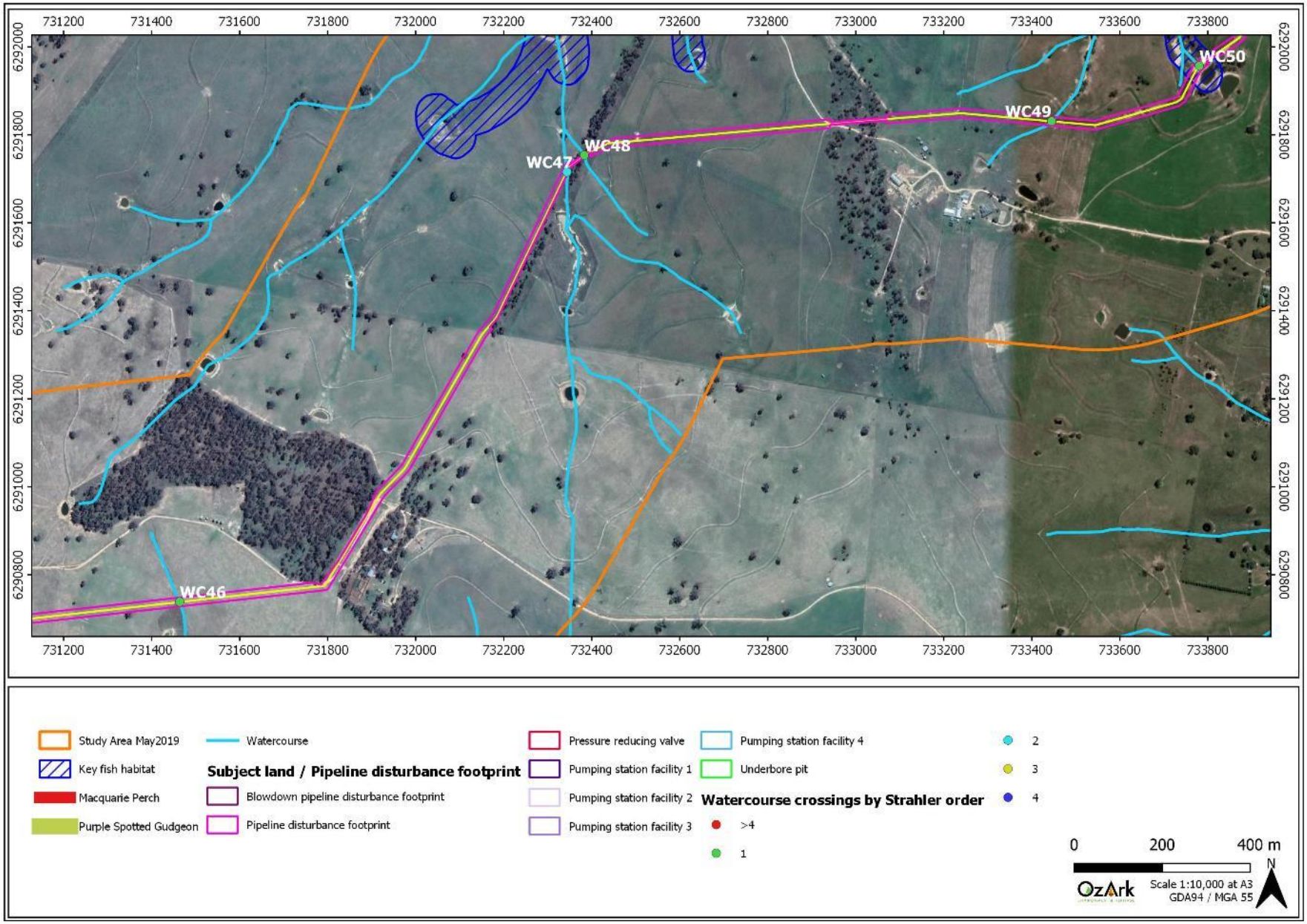
GDA94 / MGA 55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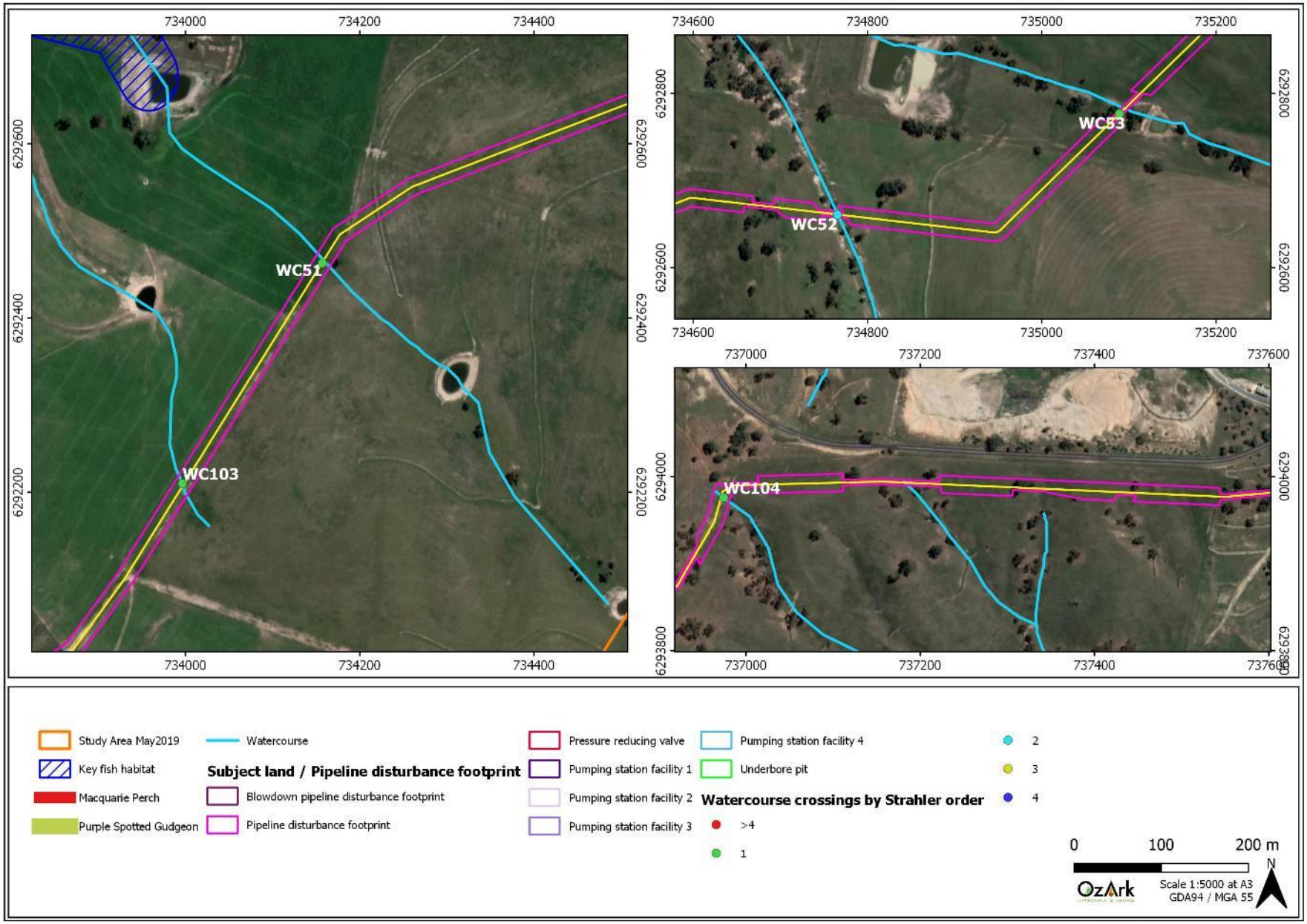
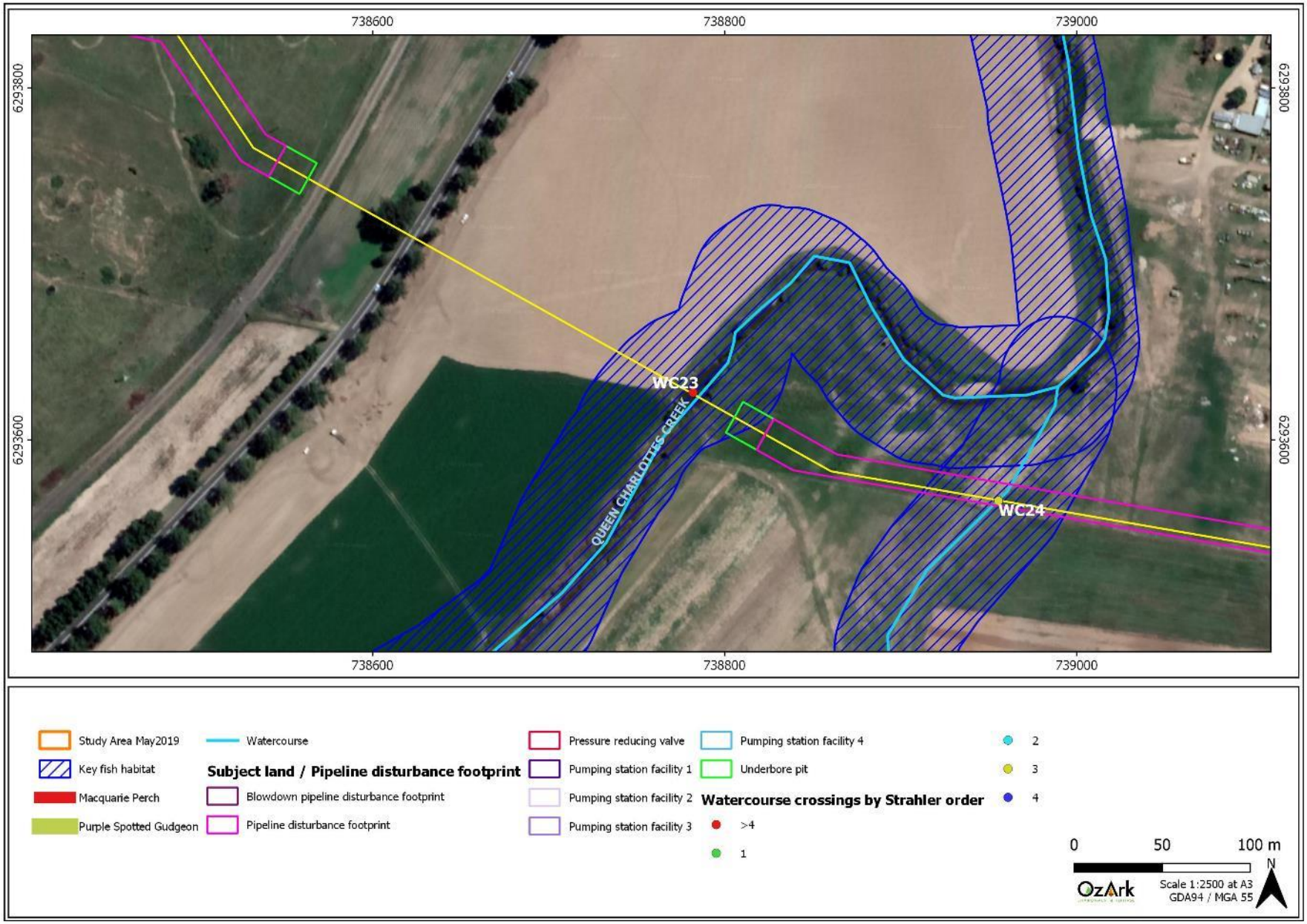
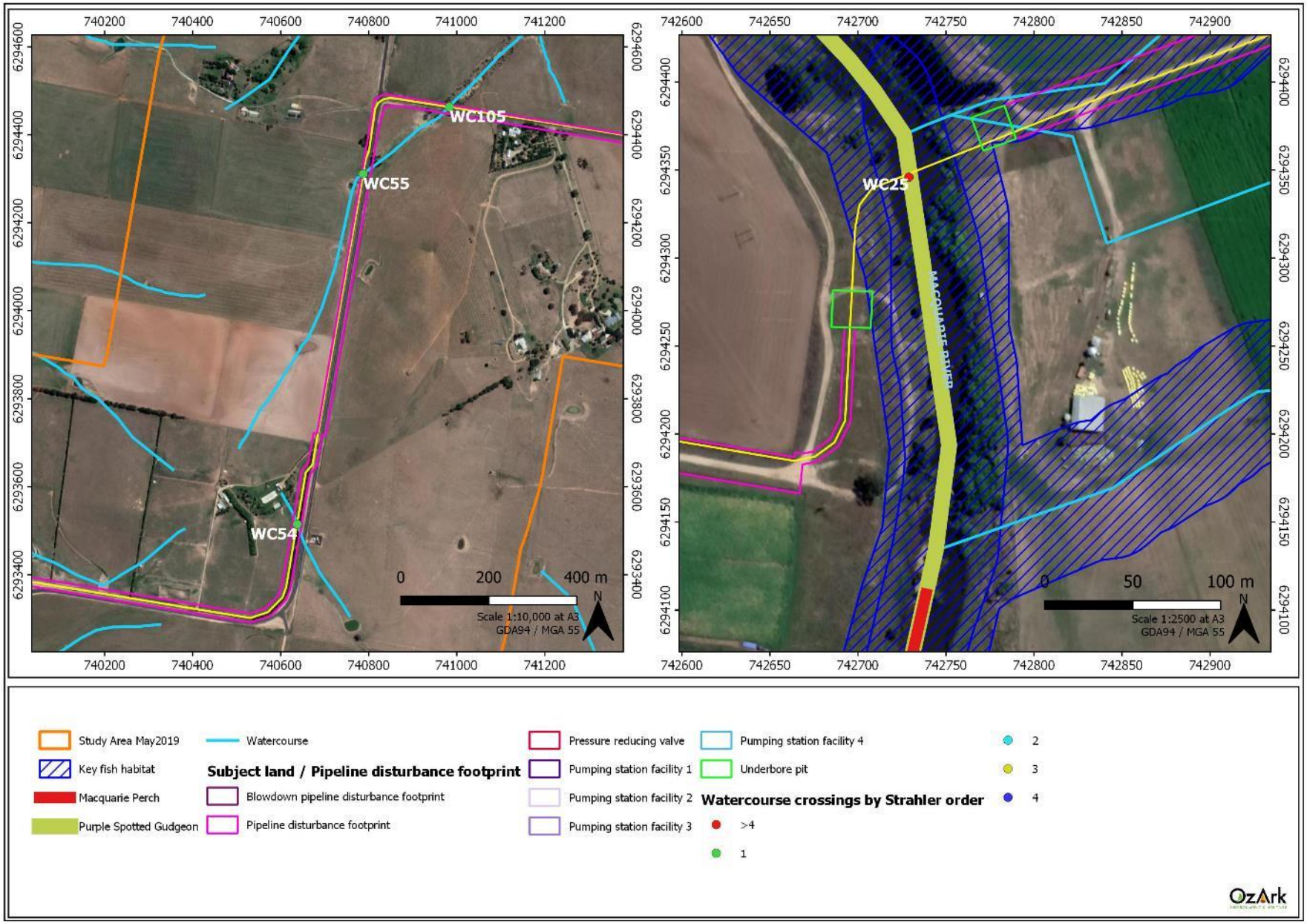
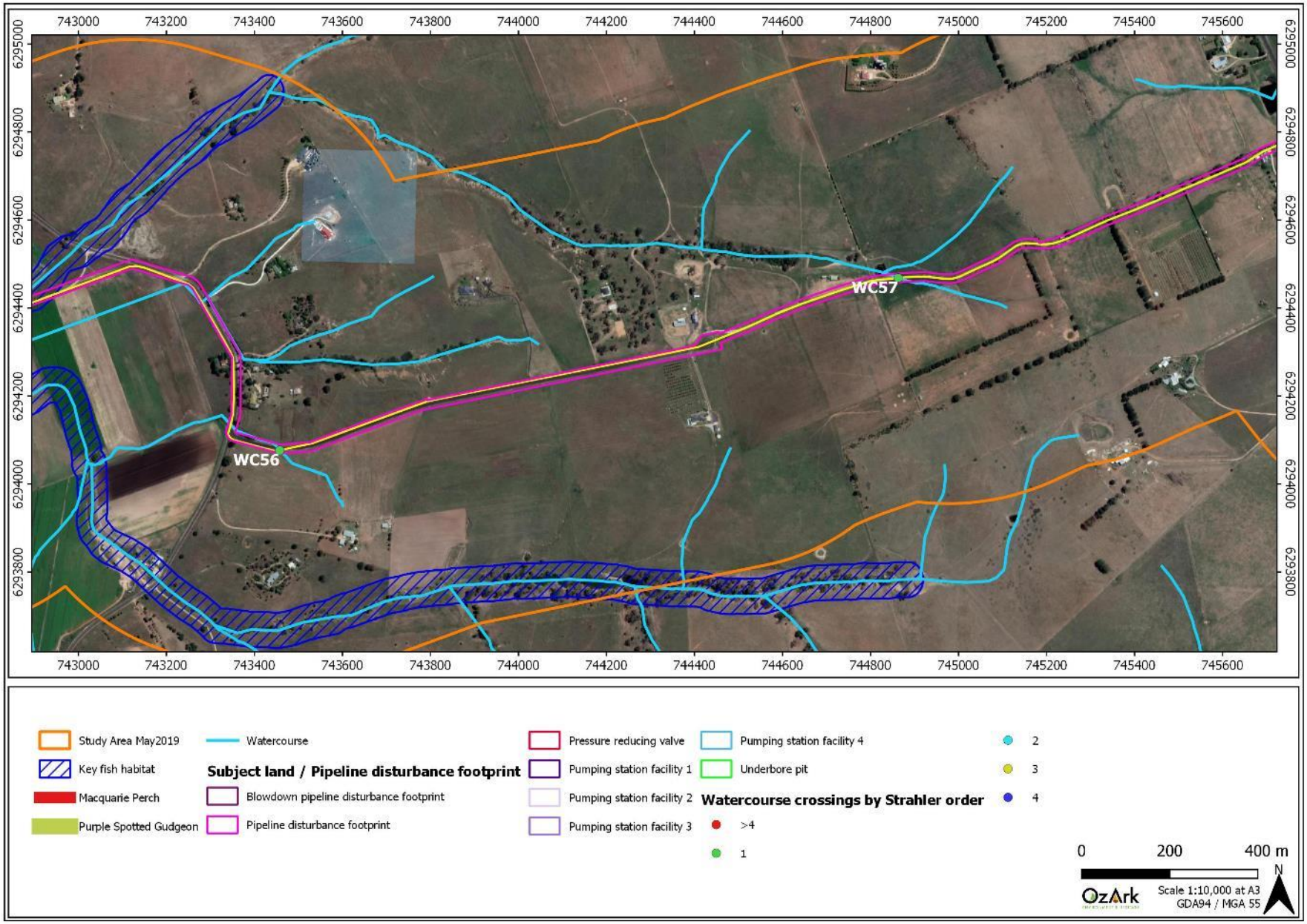
6291400
6291200
6291000
6290800
WC46
WC47
WC48
WC49
WC50
Study Area May2019
Key fish habitat
Macquarie Perch
Purple Spotted Gudgeon
Watercourse
Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Watercourse crossings by Strahler order
>4
1
2
3
4
0
200
400 m
N
OzArk
Scale 1:10,000 at A3
GDA94 / MGA 55


WC51
WC103
WC52
WC53
WC104
Study Area May2019
Key fish habitat
Macquarie Perch
Purple Spotted Gudgeon
Watercourse
Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Watercourse crossings by Strahler order
>4
1
2
3
4
0
100
200 m
N
OzArk
Scale 1:5000 at A3
GDA94 / MGA 55


738600
738800
739000
6293800
6293600
WC23
WC24
QUEEN CHARLOTTES CREEK
Study Area May2019
Key fish habitat
Macquarie Perch
Purple Spotted Gudgeon
Watercourse
Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Watercourse crossings by Strahler order
>4
1
2
3
4
0
50
100 m
N
OzArk
Scale 1:2500 at A3
GDA94 / MGA 55


WC105
WC55
WC54
0 200 400 m
Scale 1:10,000 at A3
GDA94 / MGA 55
WC25
MACQUARIE RIVER
0 50 100 m
Scale 1:2500 at A3
GDA94 / MGA 55
Study Area May2019
Key fish habitat
Macquarie Perch
Purple Spotted Gudgeon
Watercourse
Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Watercourse crossings by Strahler order
>4
1
2
3
4
OzArk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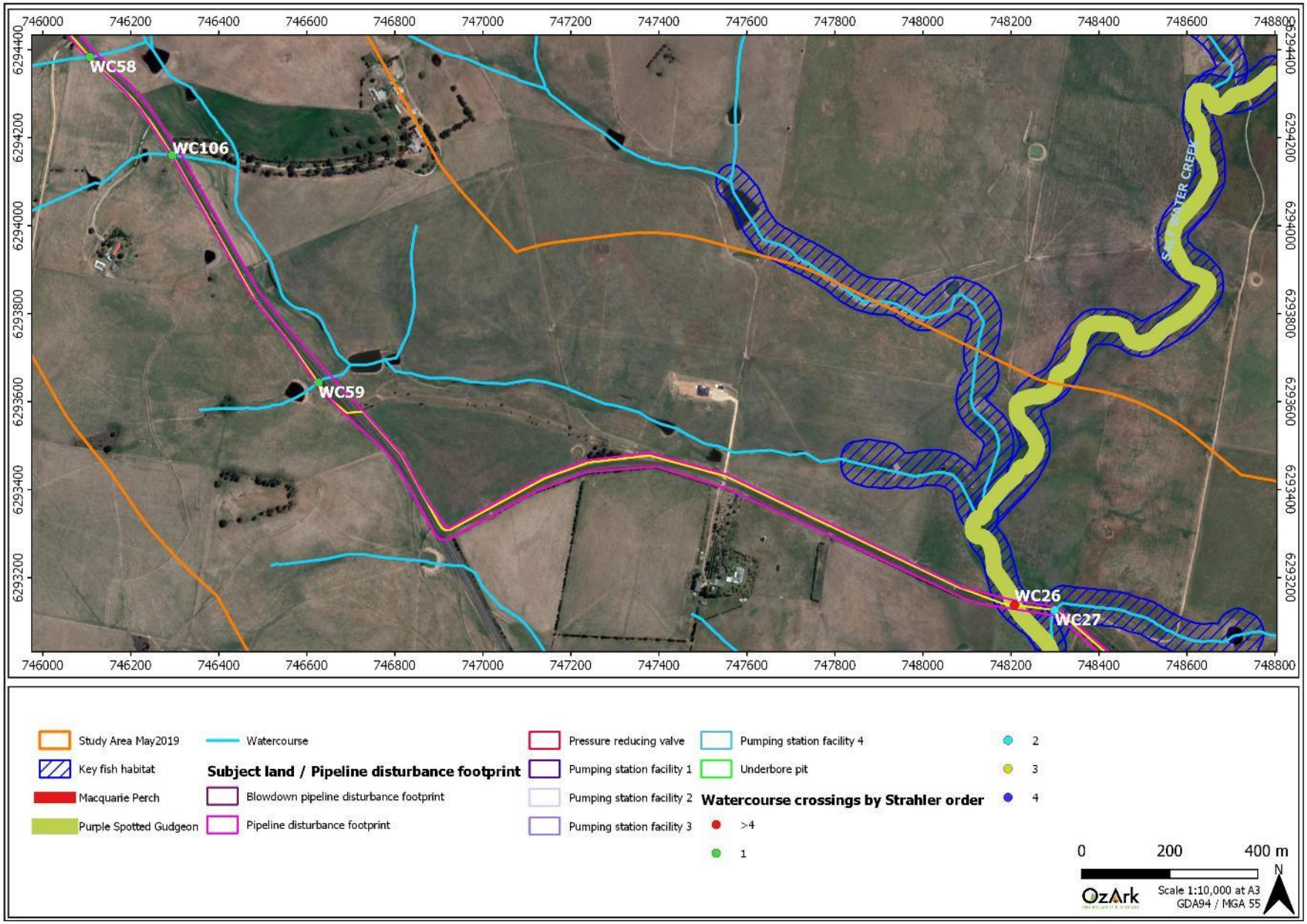
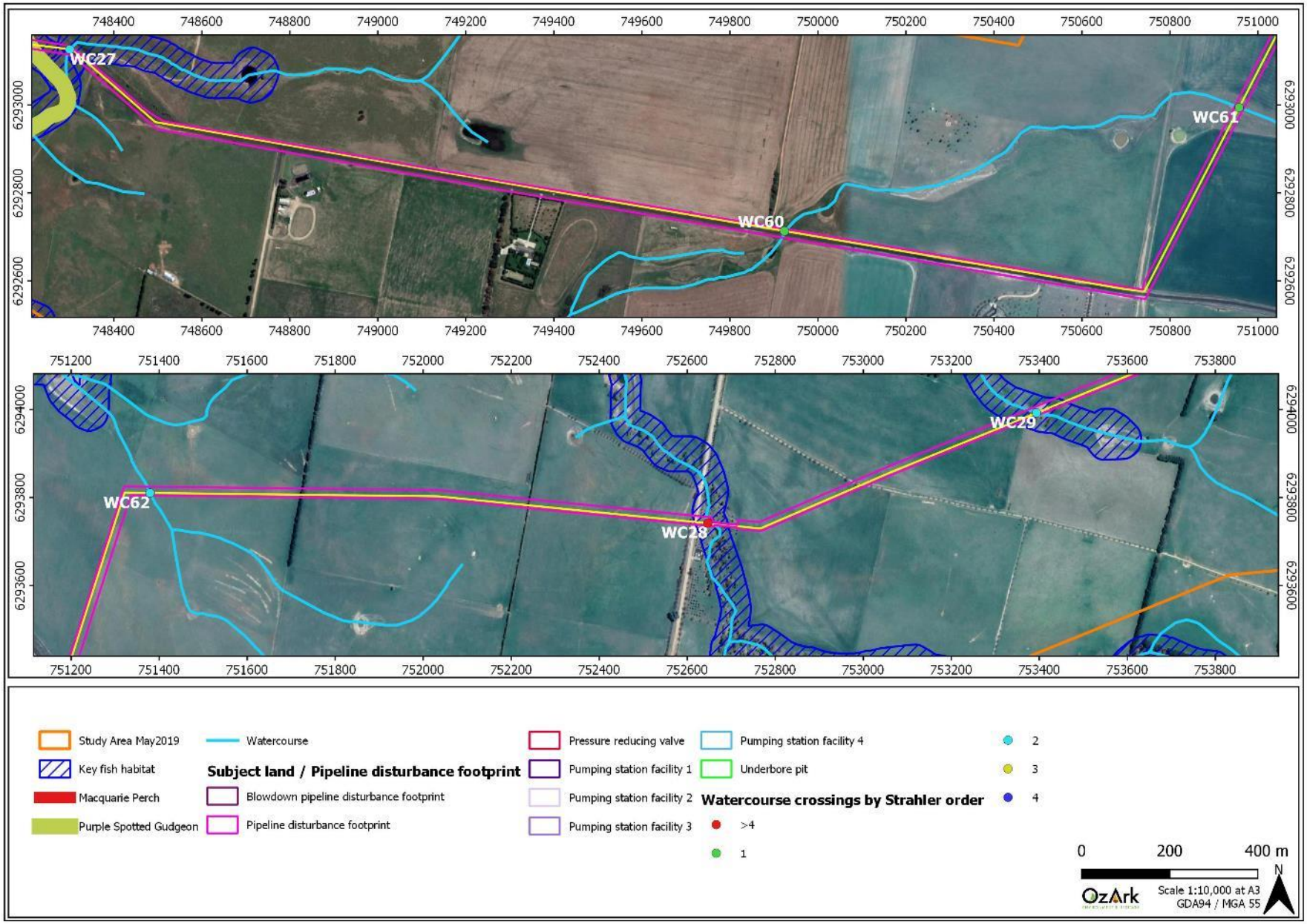
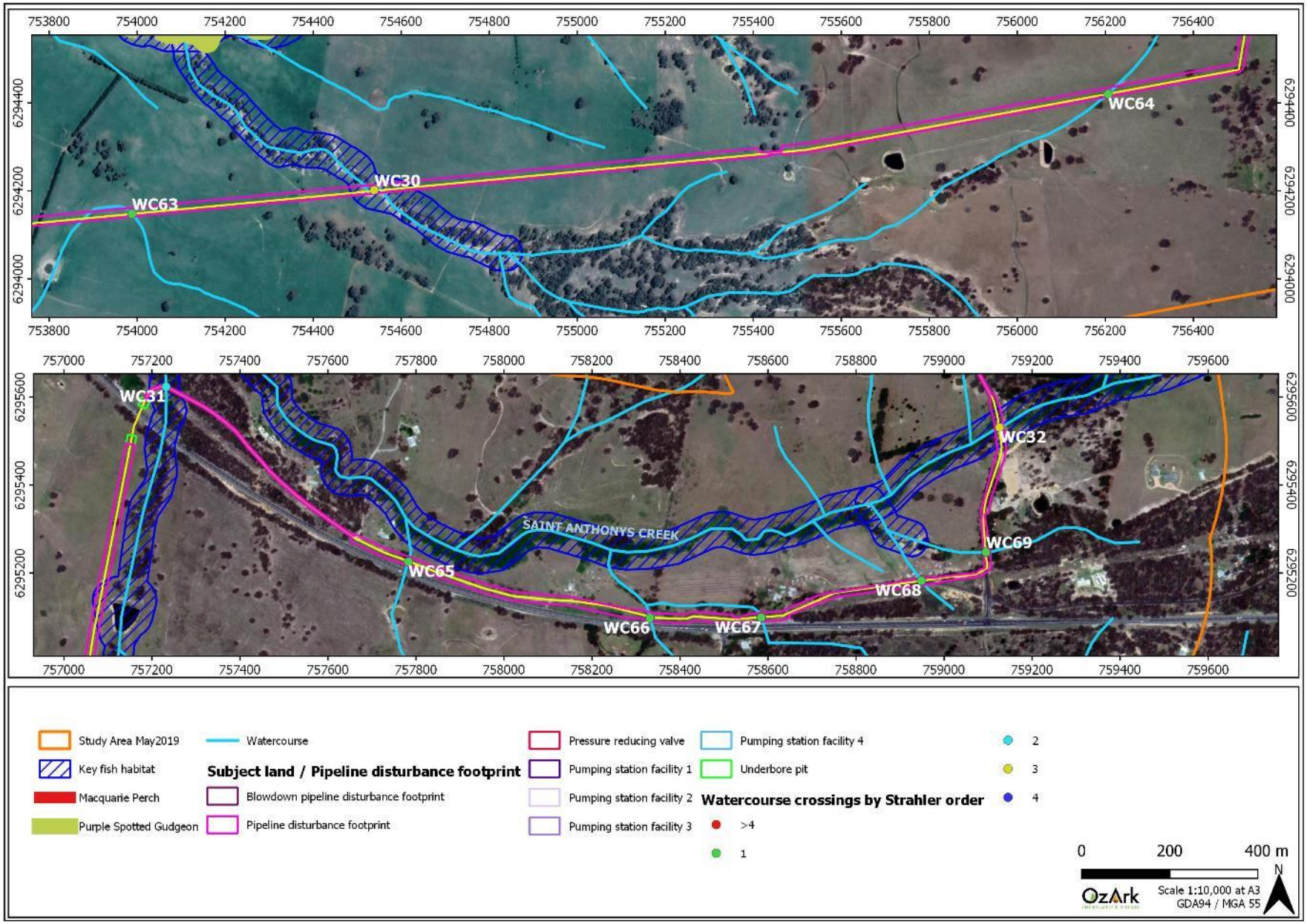
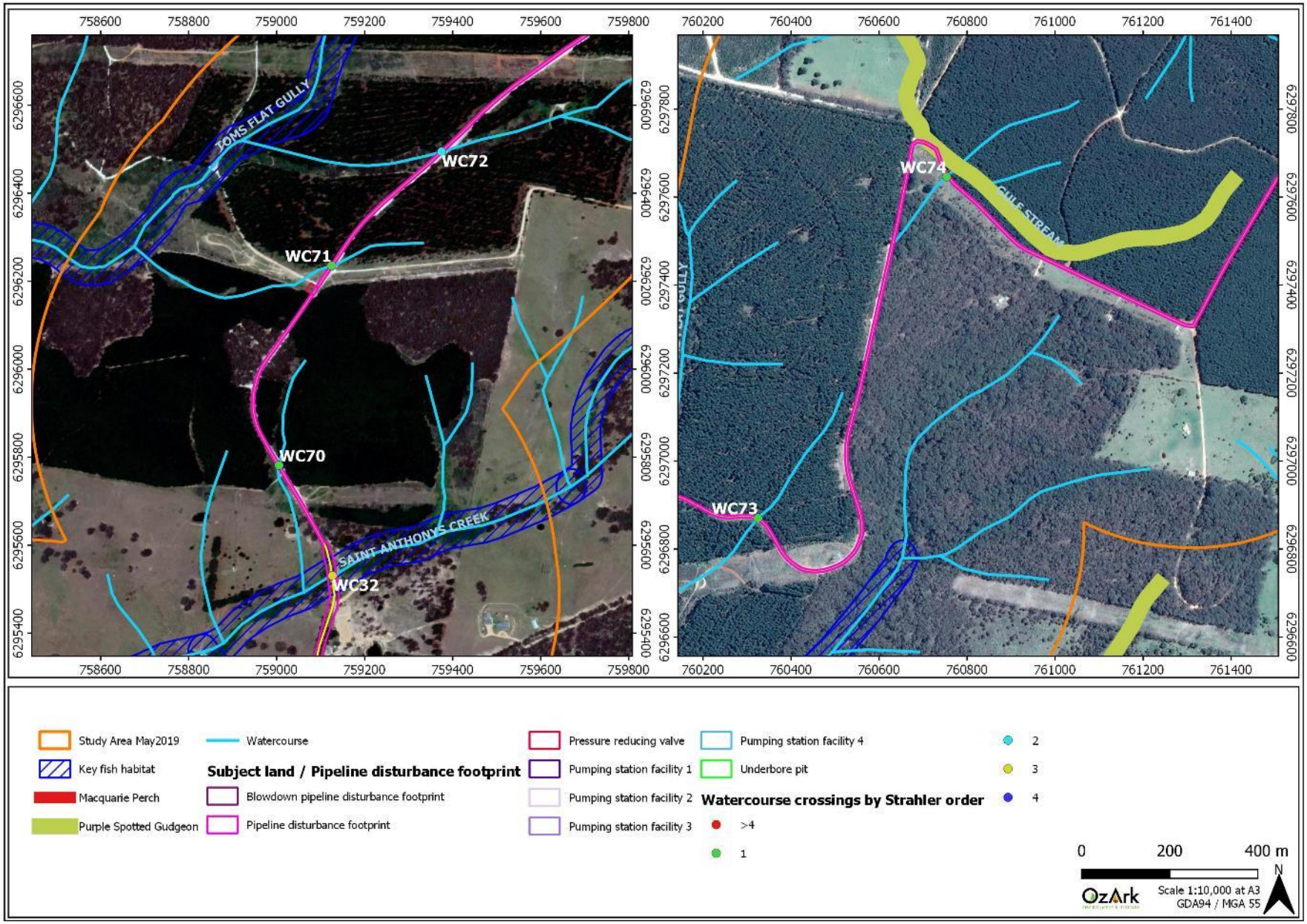
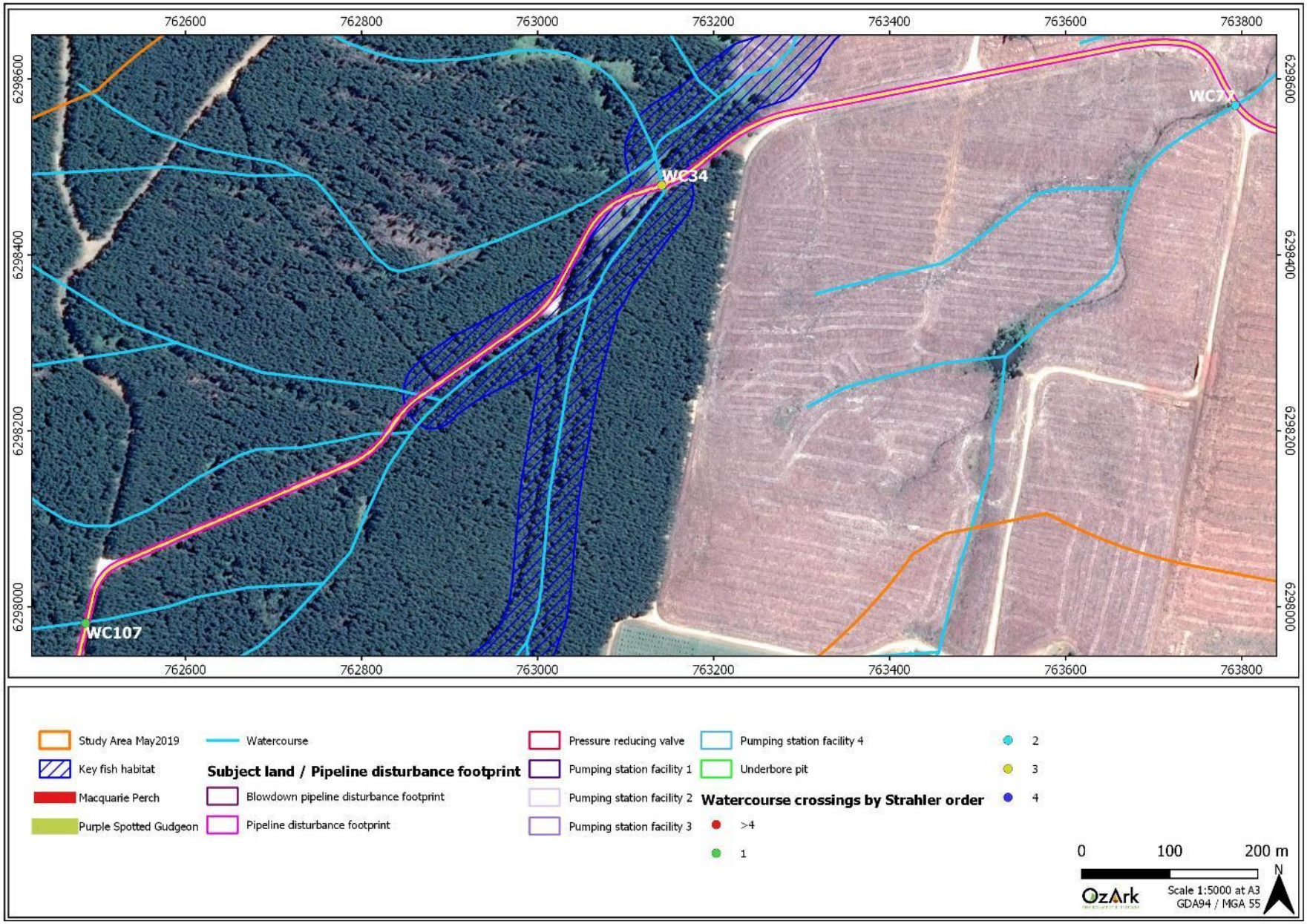
743200
743400
743600
743800
744000
744200
744400
744600
744800
745000
745200
745400
745600
6295000
6294800
6294600
6294400
6294200
6294000
6293800
WC56
WC57
Study Area May2019
Watercourse
Key fish habitat
Subject land / Pipeline disturbance footprint
Macquarie Perch
Blowdown pipeline disturbance footprint
Purple Spotted Gudgeon
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Watercourse crossings by Strahler order
>4
1
2
3
4
0
200
400 m
N
OzArk
Scale 1:10,000 at A3
GDA94 / MGA 55

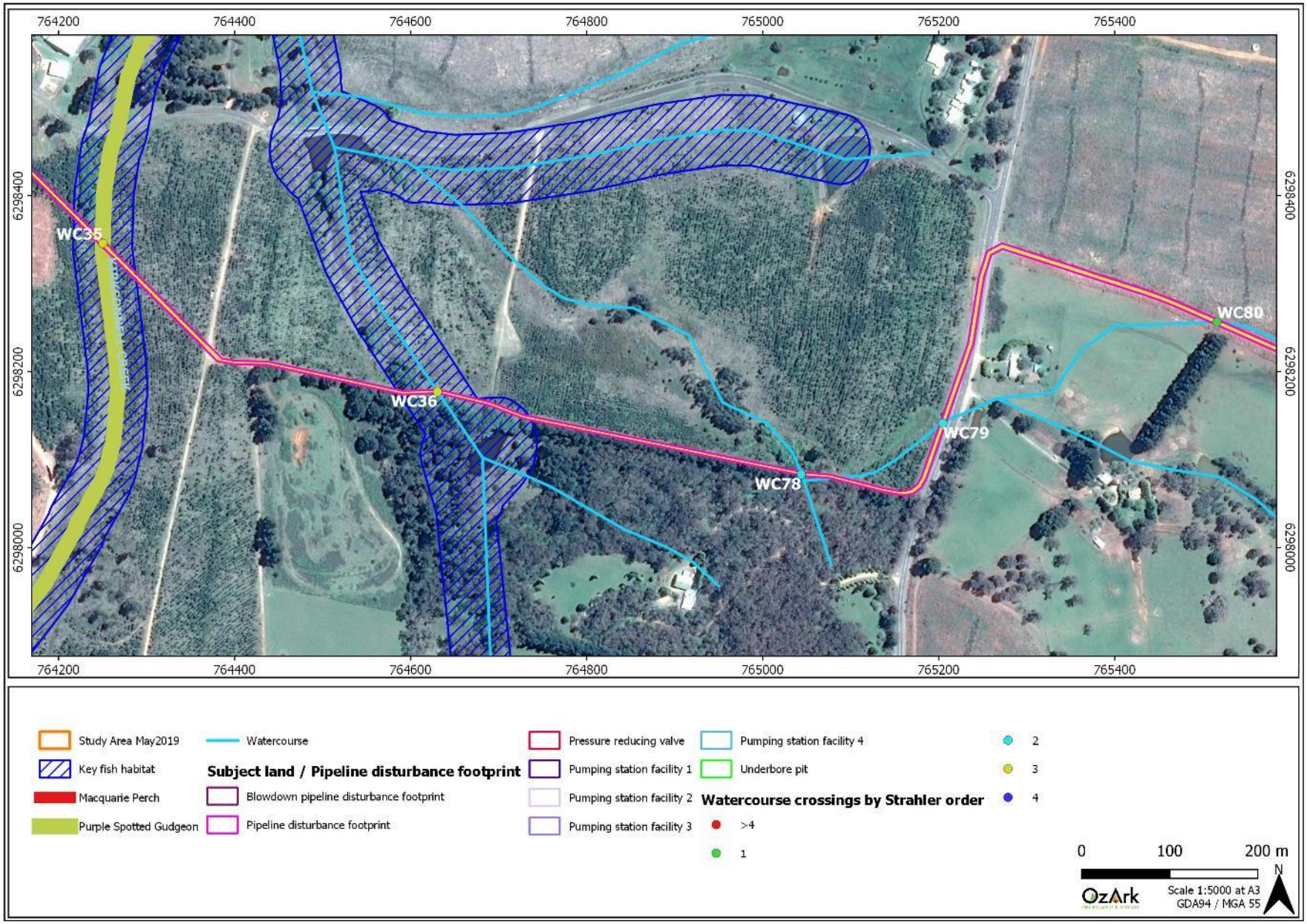

WC58
WC106
WC59
WC26
WC27
SALTWATER CREEK
Study Area May2019
Key fish habitat
Macquarie Perch
Purple Spotted Gudgeon
Watercourse
Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Watercourse crossings by Strahler order
>4
1
2
3
4
0
200
400 m
N
OzArk
Scale 1:10,000 at A3
GDA94 / MGA 55


WC27
WC60
WC61
WC62
WC28
WC29
Study Area May2019
Key fish habitat
Macquarie Perch
Purple Spotted Gudgeon
Watercourse
Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Watercourse crossings by Strahler order
>4
1
2
3
4
0
200
400 m
N
OzArk
Scale 1:10,000 at A3
GDA94 / MGA 55


WC63
WC30
WC64
WC31
WC32
WC69
WC68
WC67
WC66
WC65
SAINT ANTHONYS CREEK
Study Area May2019
Key fish habitat
Macquarie Perch
Purple Spotted Gudgeon
Watercourse
Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Watercourse crossings by Strahler order
>4
1
2
3
4
0
200
400 m
N
OzArk
Scale 1:10,000 at A3
GDA94 / MGA 55


TOMS FLAT GULLY
WC72
WC71
WC70
SAINT ANTHONYS CREEK
WC32
WC74
GULLY STREAM
WC73
Study Area May2019
Watercourse
Key fish habitat
Subject land / Pipeline disturbance footprint
Macquarie Perch
Blowdown pipeline disturbance footprint
Purple Spotted Gudgeon
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Watercourse crossings by Strahler order
>4
1
2
3
4
0
200
400 m
N
OzArk
Scale 1:10,000 at A3
GDA94 / MGA 55


762600
762800
763000
763200
763400
763600
763800
6298600
6298400
6298200
6298000
WC34
WC77
WC107
Study Area May2019
Key fish habitat
Macquarie Perch
Purple Spotted Gudgeon
Watercourse
Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Watercourse crossings by Strahler order
>4
1
2
3
4
0
100
200 m
N
OzArk
Scale 1:5000 at A3
GDA94 / MGA 55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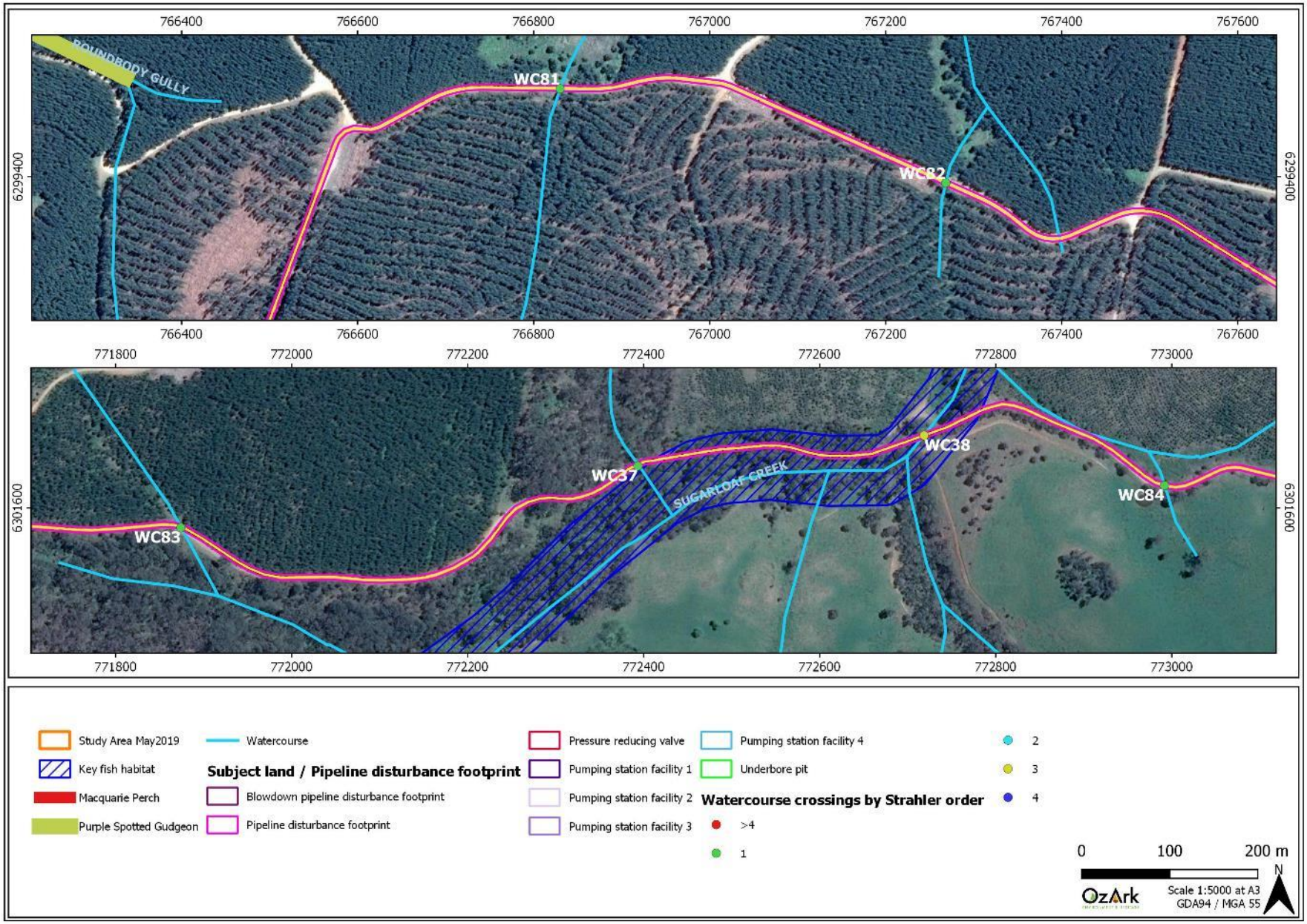
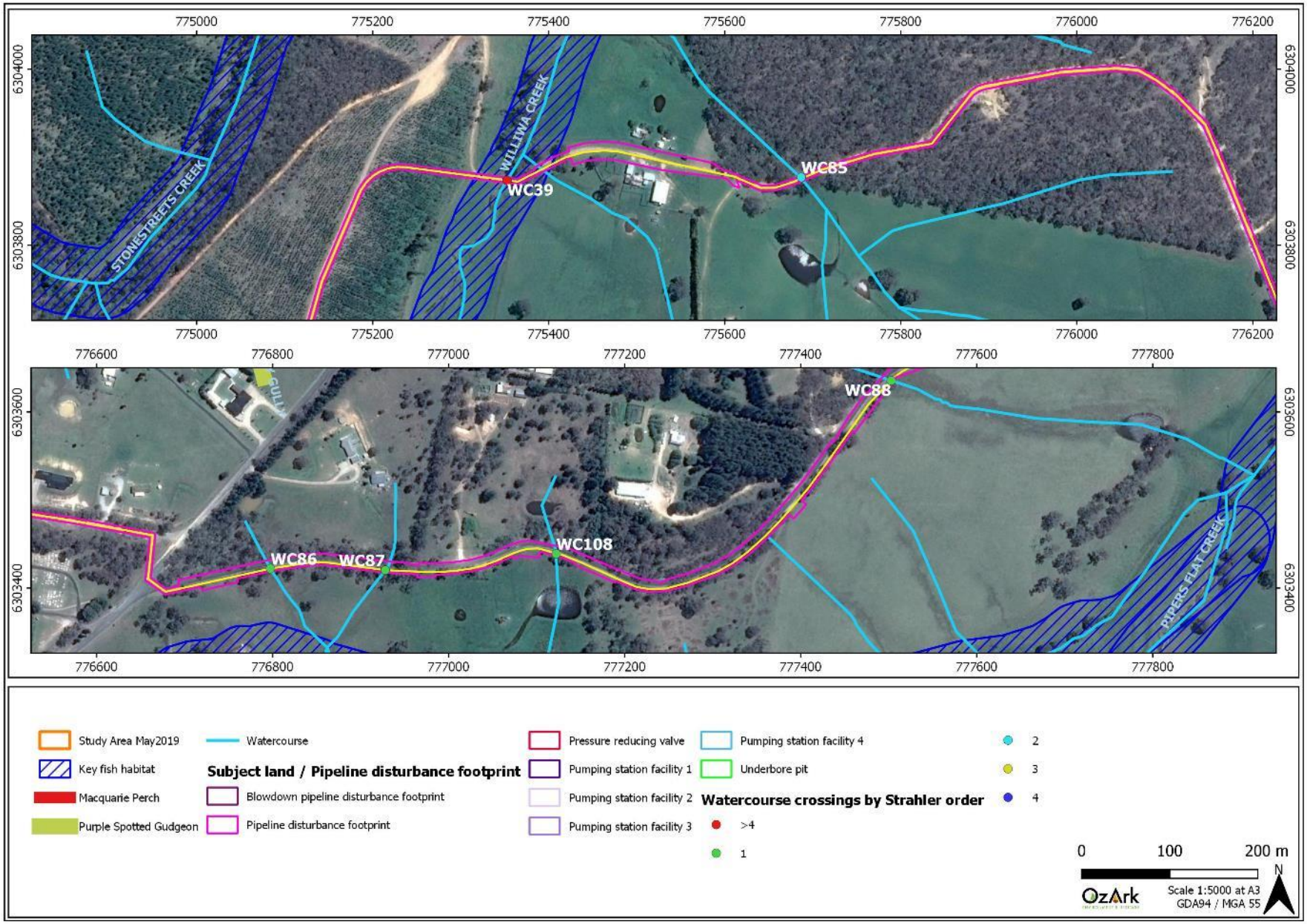
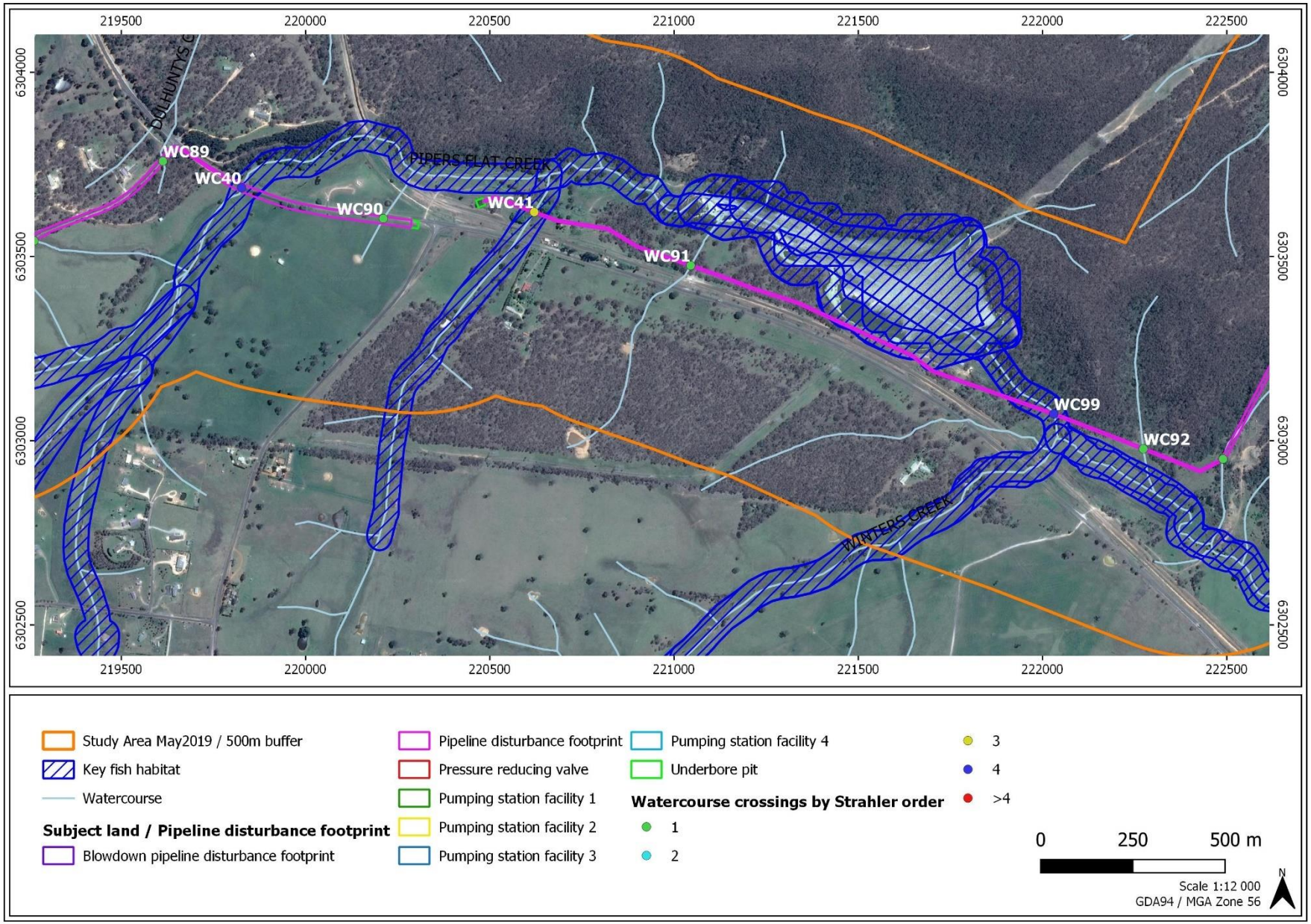
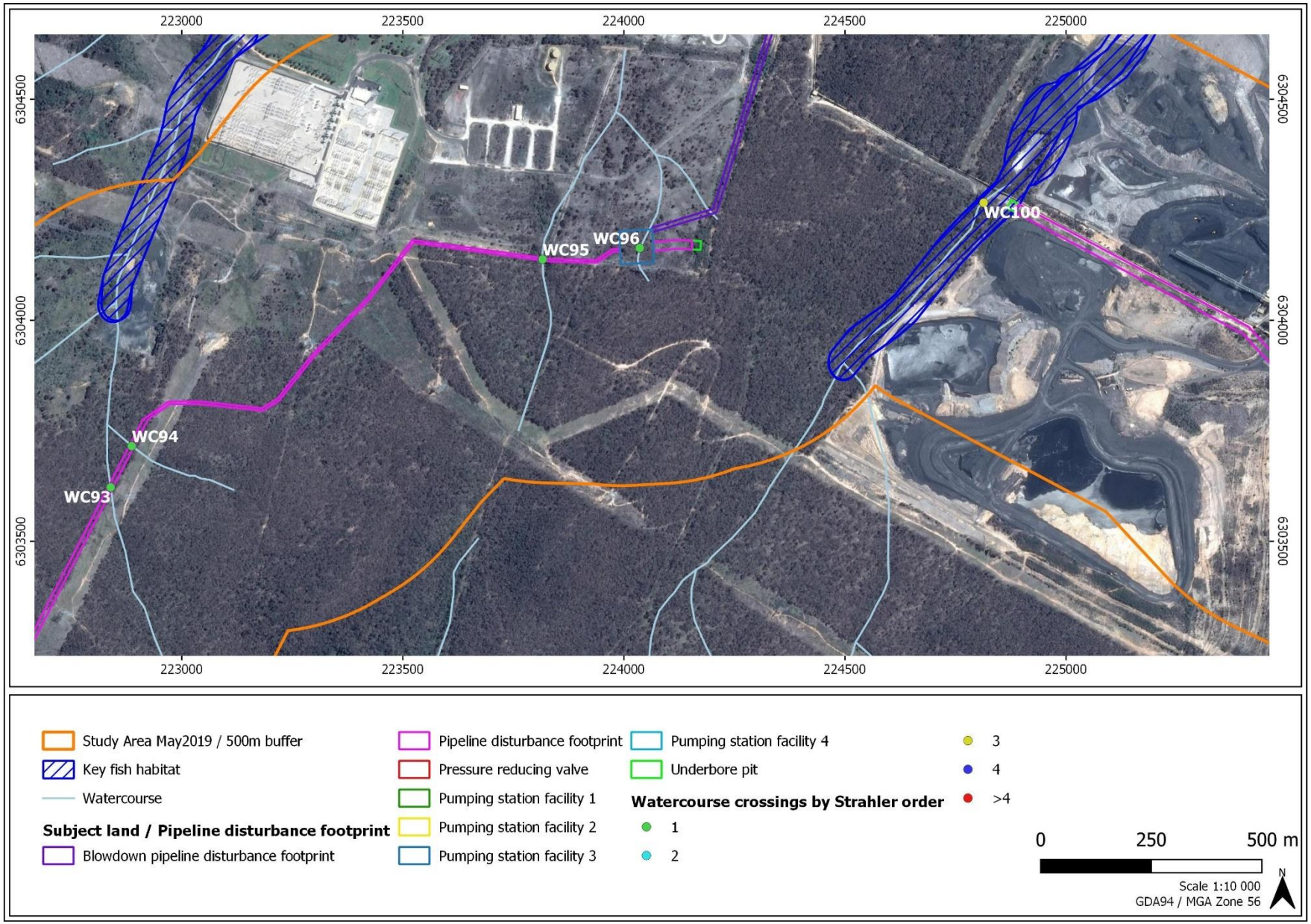
764400
764600
764800
765000
765200
765400
6298400
6298200
6298000
WC35
WC36
WC78
WC79
WC80
Study Area May2019
Key fish habitat
Macquarie Perch
Purple Spotted Gudgeon
Watercourse
Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Watercourse crossings by Strahler order
>4
1
2
3
4
0
100
200 m
N
OzArk
Scale 1:5000 at A3
GDA94 / MGA 55


766400
766600
766800
767000
767200
767400
767600
6299400
ROUNDBODY GULLY
WC81
WC82
771800
772000
772200
772400
772600
772800
773000
6301600
WC83
WC37
SUGARLOAF CREEK
WC38
WC84
Study Area May2019
Key fish habitat
Macquarie Perch
Purple Spotted Gudgeon
Watercourse
Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Watercourse crossings by Strahler order
>4
1
2
3
4
0
100
200 m
N
OzArk
Scale 1:5000 at A3
GDA94 / MGA 55


775000
775200
775400
775600
775800
776000
776200
6304000
6303800
STONESTREETS CREEK
WILLIWA CREEK
WC39
WC85
776600
776800
777000
777200
777400
777600
777800
6303600
6303400
WC88
WC86
WC87
WC108
PIPERS FLAT CREEK
Study Area May2019
Watercourse
Key fish habitat
Macquarie Perch
Purple Spotted Gudgeon
Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Watercourse crossings by Strahler order
>4
1
2
3
4
0
100
200 m
N
OzArk
Scale 1:5000 at A3
GDA94 / MGA 55


219500
220000
220500
221000
221500
222000
222500
6304000
6303500
6303000
6302500
WC89
WC40
WC90
WC41
WC91
WC99
WC92
PIPERS FLAT CREEK
WINTERS CREEK
Study Area May2019 / 500m buffer
Key fish habitat
Watercourse
Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Watercourse crossings by Strahler order
1
2
3
4
>4
0
250
500 m
Scale 1:12 000
GDA94 / MGA Zone 56
N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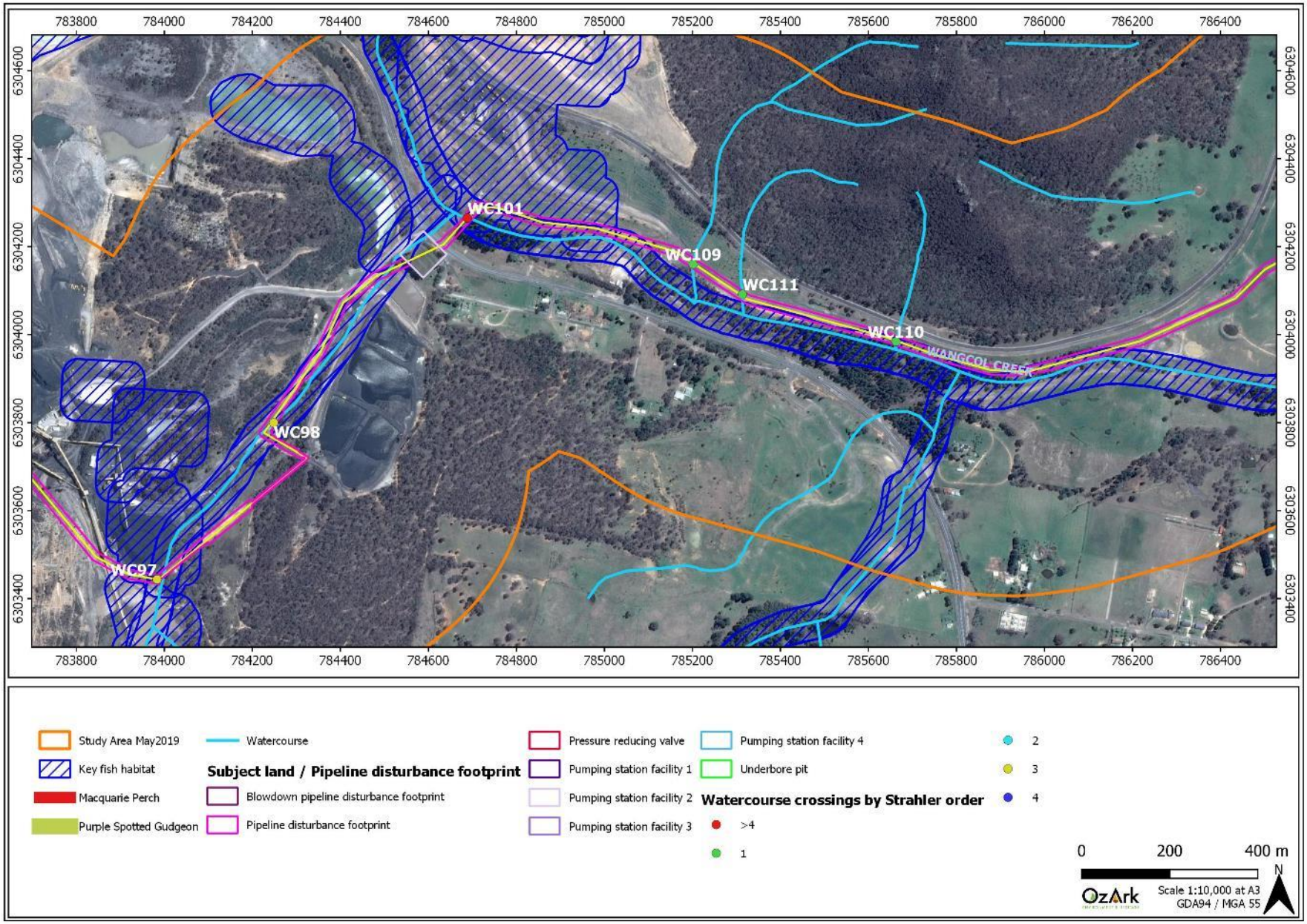
223500
224000
224500
225000
6304500
6304000
6303500
WC93
WC94
WC95
WC96
WC100
Study Area May2019 / 500m buffer
Key fish habitat
Watercourse
Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Watercourse crossings by Strahler order
1
2
3
4
>4
0
250
500 m
Scale 1:10 000
GDA94 / MGA Zone 56
N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784200
784400
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784800
785000
785200
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785600
785800
786000
786200
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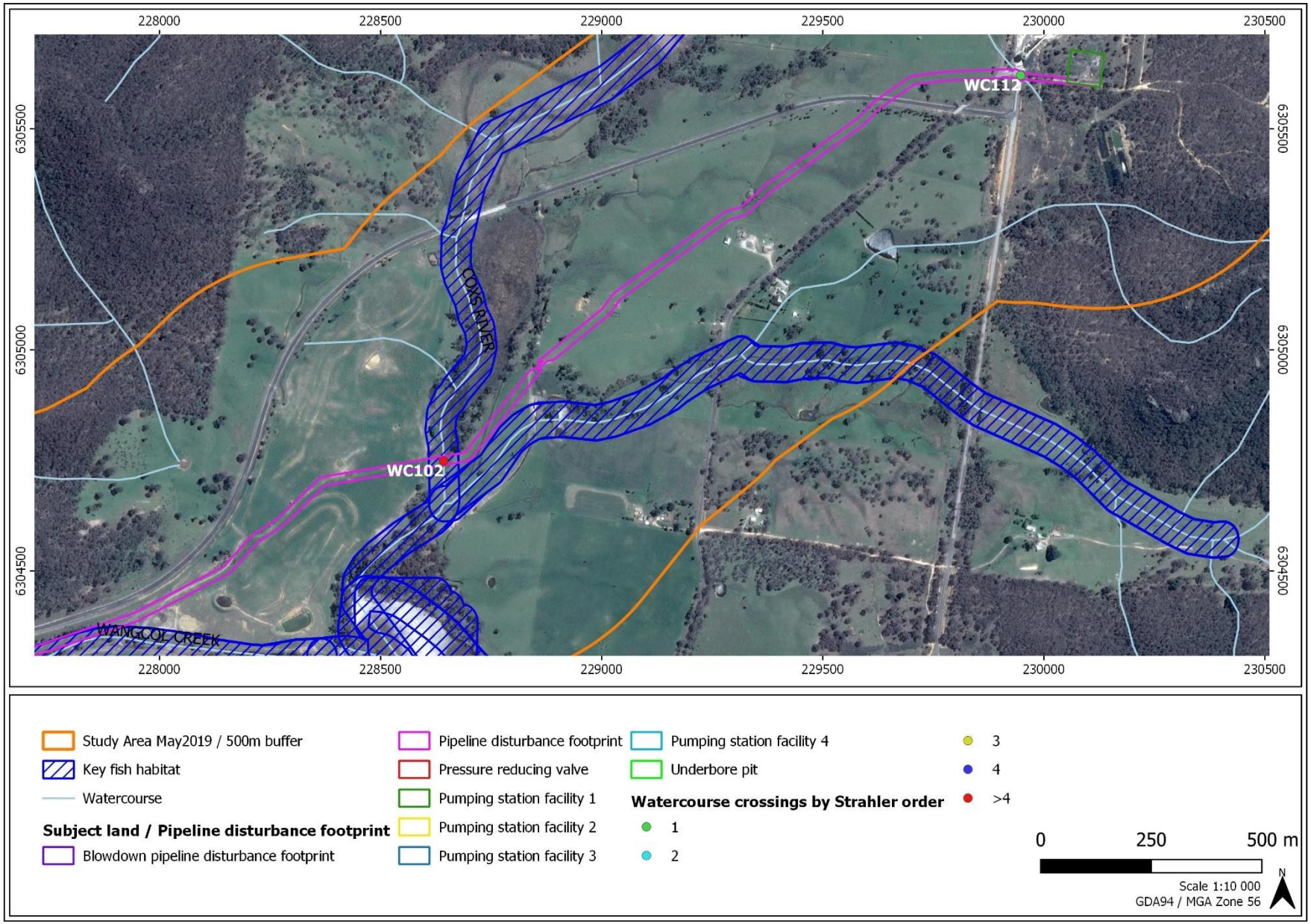
6304600
6304400
6304200
6304000
6303800
6303600
6303400
WC101
WC109
WC111
WC110
WANGCOL CREEK
WC98
WC97
Study Area May2019
Watercourse
Key fish habitat
Subject land / Pipeline disturbance footprint
Macquarie Perch
Blowdown pipeline disturbance footprint
Purple Spotted Gudgeon
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Watercourse crossings by Strahler order
>4
1
2
3
4
0
200
400 m
N
OzArk
Scale 1:10,000 at A3
GDA94 / MGA 55


228000
228500
229000
229500
230000
230500
6305500
6305000
6304500
WC112
WC102
COXS RIVER
WANGCOL CREEK
Study Area May2019 / 500m buffer
Key fish habitat
Watercourse
Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Watercourse crossings by Strahler order
1
2
3
4
>4
0
250
500 m
Scale 1:10 000
GDA94 / MGA Zone 56
N

# APPENDIX 2: SURVEY DATA

## Fauna recorded during the field survey

| Group | Species Name | Common Name | Native / Exotic |
|---|---|---|---|
| Fish | *Gambusia holbrooki* | Eastern Gambusia | E |
| Fish | *Cyprinus carpio* | European Carp | E |
| Frog | *Crinia signifera* | Common Eastern Froglet | N |
| Reptile | *Tiliqua rugosa* | Shingleback | N |
| Reptile | *Pogona barbata* | Eastern Bearded Dragon | N |
| Reptile | *Amphibolurus muricatus* | Jacky Lizard | N |
| Bird | *Cracticus nigrogularis* | Pied Butcherbird | N |
| Bird | *Psephotus haematonotus* | Red-rumped Parrot | N |
| Bird | *Cracticus tibicen* | Australian Magpie | N |
| Bird | *Platycercus eximus* | Eastern Rosella | N |
| Bird | *Cracticus torquatus* | Grey Butcherbird | N |
| Bird | *Alauda arvensis* | Skylark | E |
| Bird | *Sericornis frontalis* | White-browed Scrub-wren | N |
| Bird | *Calyptorhynchus funereus* | Yellow-tailed Black Cockatoo | N |
| Bird | *Elanus axillaris* | Black-shouldered Kite | N |
| Bird | *Malurus cyaneus* | Superb Fairy Wren | N |
| Bird | *Hieraaetus morphnoides* | Little Eagle | N |
| Bird | *Platycercus elegans* | Crimson Rosella | N |
| Bird | *Corcorax melanoramphos* | White-winged Chough | N |
| Bird | *Acanthorhynchus tenuirostris* | Eastern Spinebill | N |
| Bird | *Anthochaera carunculata* | Red Wattlebird | N |
| Bird | *Caligavis chrysops* | Yellow-faced Honeyeater | N |
| Bird | *Acanthiza lineata* | Striated Thornbill | N |
| Bird | *Acanthiza chrysorrhoa* | Yellow-rumped Thornbill | N |
| BIRD | *Acanthiza reguloides* | Buff-rumped Thornbill | N |
| Bird | *Corvus coronoides* | Australian Raven | N |
| Bird | *Strepera graculina* | Pied Currawong | N |
| Bird | *Cormobates leucophaea* | White-throated Treecreeper | N |
| Bird | *Pachycephala pectoralis* | Golden Whistler | N |
| Bird | *Pachycephala rufiventris* | Rufous Whistler | N |
| Bird | *Colluricincla harmonica* | Grey Shrike-thrush | N |
| Bird | *Cacatua galerita* | Sulphur-crested Cockatoo | N |
| Bird | *Falco peregrinus* | Peregrine Falcon | N |
| | *Falco longipennis* | Australian Hobby | N |
| Bird | *Coracina novaehollandiaea* | Black-faced Cuckoo-shrike | N |
| Bird | *Callocephalon fimbriatum* | Gang Gang Cockatoo | N |
| Bird | *Philemon corniculatus* | Noisy Friarbird | N |
| Bird | *Nesoptilotus leucotis* | White-eared Honeyeater | N |
| Bird | *Smircornis brevirostris* | Weebill | N |
| Bird | *Accipiter fasciatus* | Brown Goshawk | N |
| Bird | *Rhipidura leucophrys* | Willy Wagtail | N |
| Bird | *Rhipidura albiscapa* | Grey Fantail | N |
| Bird | *Pardalotus striatus* | Striated Pardalote | N |

| Group | Species Name | Common Name | Native / Exotic |
|---|---|---|---|
| Bird | *Cincloramphus mathewsi* | Rufous Songlark | N |
| Bird | *Artamus supercilliosus* | White-browed Woodswallow | N |
| Bird | *Cincloramphus cruralis* | Brown Songlark | N |
| Bird | *Eolophus roseicapilla* | Galah | N |
| Bird | *Manorina melanocephala* | Noisy Miner | N |
| Bird | *Acridotheres tristis* | Indian Mynah | E |
| Bird | *Neochima temporalis* | Red-browed Finch | N |
| Bird | *Zosterops lateralis* | Silvereye | N |
| Bird | *Taeniopygia bichenovii* | Double-barred Finch | N |
| Bird | *Artamus cyanopterus* | Dusky Woodswallow | N |
| Bird | *Circus assimilis* | Spotted Harrier | N |
| Bird | *Aquila audax* | Wedge-tailed Eagle | N |
| Bird | *Cacomantis flabelliformis* | Fan-tailed Cuckoo | N |
| Bird | *Melithreptus lunatus* | White-naped Honeyeater | N |
| Bird | *Melithreptus brevirostris* | Brown-headed Honeyeater | N |
| Bird | *Petroica phoenicea* | Flame Robin | N |
| Bird | *Sturnus vulgaris* | Common Starling | E |
| Bird | *Dicaeum hirundinaceum* | Mistletoebird | N |
| Bird | *Phaps chalcoptera* | Common Bronzewing | N |
| Bird | *Eopsaltria australis* | Eastern Yellow Robin | N |
| Mammal | *Macropus giganteus* | Eastern Grey Kanagroo | N |
| Mammal | *Wallabia bicolor* | Swamp Wallaby | N |
| Mammal | *Macropus rufogriseus* | Red-necked Wallaby | N |
| Mammal | *Oryctolagus cuniculus* | European Rabbit | E |
| Mammal | *Lepus europaeus* | European Hare | E |
| Mammal | *Vombatus ursinus* | Common Wombat | N |
| Mammal | *Sus scrofa* | Feral Pig | E |
| Mammal | *Ovis aries* | Sheep | E |
| Mammal | *Bos taurus* | Cattle | E |
| Mammal | *Vulpes vulpes* | Red Fox | E |

## Plant species recorded during the field survey

| Growth Form | Species Name | Common Name | Native/Exotic | High Threat Weed | Priority Weed |
|---|---|---|---|---|---|
| SG | *Acacia acinacea* | Gold-dust Wattle | N | | |
| SG | *Acacia buxifolia* | Box-leaf Wattle | N | | |
| GG | *Acacia dealbata* | Silver Wattle | N | | |
| SG | *Acacia deanei* | Dean's Wattle | N | | |
| SG | *Acacia falciformis* | Broad-leafed Hickory | N | | |
| SG | *Acacia gunnii* | Ploughshare Wattle | N | | |
| SG | *Acacia implexa* | Hickory Wattle | N | | |
| TG | *Acacia melanoxyon* | Black Wattle | N | | |
| SG | *Acacia nana* | Small Red-leaved Wattle | N | | |
| SG | *Acacia obliquinervia* | Mountain Hickory | N | | |
| FG | *Acaena echinata* | | N | | |
| FG | *Acaena ovina* | | N | | |
| FG | *Aceana novae-zealandiae* | Bidgee Widgee | N | | |
| FG | *Acetosella vulgaris* | Sheep Sorrell | E | HTW | NO |
| SG | *Acrotriche divaricata* | | N | | |
| FG | *Acrotriche serrulata* | Honeypots | N | | |
| GG | *Aira cupaniana* | Silvey Hairgrass | E | | |
| FG | *Alternanthera angustifolia* | | N | | |
| SG | *Amperea xiphoclada* | Broom Spurge | N | | |
| OG | *Amyema miquelli* | *Alternanthera angustifolia* | N | | |
| OG | *Amyema pendula* | mistletoe | N | | |
| OG | *Amyema sp.* | mistletoe | N | | |
| GG | *Anthosachne scabra* | Common Wheatgrass | E | | |
| FG | *Arcteotheca calendula* | Capeweed | E | | |
| GG | *Aristida ramosa* | Purple Wiregrass | N | | |
| GG | *Aristida vagans* | Threeawn Speargrass | N | | |
| FG | *Asperula conferta* | Common Woodruff | N | | |
| FG | *Asperula scoparia* | Prickly Woodruff | N | | |
| SG | *Astroloma humisifusum* | Native Cranberry | N | | |
| GG | *Rytidosperma racemosum* | | N | | |
| GG | *Austrostipa nodosa* | | N | | |
| GG | *Austrostipa scabra* | Speargrass | N | | |
| GG | *Austrostipa sp.* | | N | | |
| GG | *Avena barbata* | Bearded Oats | E | | |
| GG | *Avena fatua* | Wild Oats | E | | |
| FG | *Avena sativa* | Oats | E | | |
| OG | *Billardiera scandens* | Hairy Apple Berry | N | | |
| EG | *Blechnum sp.* | | N | | |
| FG | *Bossiaea buxifolia* | | N | | |
| FG | *Bossiaea prostrata* | | N | | |
| GG | *Bothriochloa macra* | Red Grass | N | | |
| SG | *Brachyloma daphnoides* | Daphne Heath | N | | |

| Growth Form | Species Name | Common Name | Native/Exotic | High Threat Weed | Priority Weed |
|---|---|---|---|---|---|
| FG | *Brachyscome decipiens* | Field Daisy | N | | |
| FG | *Brachyscome rigidula* | Cut-leaf Daisy | N | | |
| FG | *Brassica oleracea* | Collards | E | | |
| FG | *Brassica sp.* | | E | | |
| FG | *Brassica tournefortii* | Mediterranean Turnip | E | HTW | NO |
| GG | *Bromus catharticus* | Praire Grass | E | | NO |
| GG | *Bromus diandrus* | Great Brome | E | HTW | NO |
| GG | *Bromus hordeaceus* | Soft Brome | E | | |
| SG | *Bursaria spinosa* | Australian Blackthorn | N | | |
| SG | *Callistemon citrinus* | River Bottlebrush | N | | |
| GG | *Carex appressa* | Tall Sedge | N | | |
| GG | *Carex bichenoviana* | | N | | |
| GG | *Carex fascicularis* | Tassel Sedge | N | | |
| SG | *Cassinia aculeata* | Common Cassinia | N | | |
| SG | *Cassinia laevis* | Cough Bush | N | | |
| SG | *Cassinia longifolia* | | N | | |
| SG | *Cassinia quinquefaria* | | N | | |
| TG | *Casuarina cunninghamiana* | River Oak | N | | |
| GG | *Cenchrus clandestinus* | Kikuyu | E | | |
| EG | *Cheilanthes sp.* | | N | | |
| FG | *Chenopodium album* | Fat Hen | E | | |
| GG | *Chloris truncata* | Windmill Grass | N | | |
| FG | *Chrysocephalum apiculatum* | Common Everlasting | N | | |
| FG | *Chrysocephalum semipapposum* | Clustered Everlasting | N | | |
| OG | *Convolvulus angustissimus* | Australian Bindweed | N | | |
| FG | *Conyza sp.* | fleabane | E | | |
| FG | *Coronidium rutidolepsis* | | N | | |
| SG | *Cotoneaster glaucophyllus* | Cotoneaster | E | HTW | |
| SG | *Crataegus monogyna* | Hawthorn | E | | |
| FG | *Cymbonotus lawsonianus* | Bear's Ear | N | | |
| FG | *Cymbonotus preissianus* | Austral Bear's Ear | N | | |
| GG | *Cynodon dactylon* | Couch | E | | |
| GG | *Cyperus brevifolius* | Mullimbimbi Couch | N | | |
| GG | *Cyperus lhotskyanus* | | N | | |
| SG | *Cytisus scoparius* | Scotch Broom | E | HTW | NO |
| GG | *Dactylis glomerata* | Cocksfoot | E | | |
| SG | *Daviesia leptophylla* | | N | | |
| FG | *Desmodium gunnii* | Slender Tick Trefoil | N | | |
| GG | *Dianella longifolia* | Blue Flax-lily | N | | |
| GG | *Dianella revoluta* | Blue Flax-lily | N | | |
| GG | *Dianella sp.* | flax-lily | N | | |
| FG | *Dichondra repens* | Kidney Weed | N | | |
| SG | *Dillwynia cinerascens* | | N | | |
| SG | *Dillwynia phylicoides* | | N | | |

| Growth Form | Species Name | Common Name | Native/Exotic | High Threat Weed | Priority Weed |
|---|---|---|---|---|---|
| SG | *Dillwynia serricea* | Showy Parrot-pea | N | | |
| FG | *Drosera peltata* | | N | | |
| FG | *Dysphania pumilio* | Small Crumbweed | N | | |
| GG | *Echinopogon ovatus* | Forest Hedgehog Grass | N | | |
| FG | *Echium plantagineum* | Patterson's Curse | E | | |
| FG | *Einadia nutans* | Climbing Saltbush | N | | |
| GG | *Eleocharis acuta* | | N | | |
| FG | *Eleusine tristachya* | Goose Grass | N | | |
| GG | *Enneapogon nigricans* | Nine-awn Grass | N | | |
| GG | *Eragrostis curvula* | African Lovegrass | E | HTW | N |
| GG | *Eragrostis leptostachya* | Paddock Lovegrass | N | | |
| GG | *Eragrostis parviflora* | Weeping lovegrass | N | | |
| GG | *Eragrostis sp* | lovegrass | N | | |
| FG | *Erodium botrys* | Long Storksbill | E | | |
| FG | *Erodium cicutarium* | Common Storksbill | E | | |
| FG | *Erodium crinitum* | Blue Storksbill | N | | |
| FG | *Erodium malacoides* | | E | | |
| TG | *Eucalyptus blakelyi* | Blakely's Red Gum | N | | |
| TG | *Eucalyptus bridgesiana* | Apple Box | N | | |
| TG | *Eucalyptus cannonii* | Red Stringybark | N | | |
| TG | *Eucalyptus dalrympleana* | Mountain Gum | N | | |
| TG | *Eucalyptus dives* | Broad-leaved Peppermint | N | | |
| TG | *Eucalyptus fastigata* | Brown Barrel | N | | |
| TG | *Eucalyptus goniocalyx* | Long-leaved Box | N | | |
| TG | *Eucalyptus macrorhyncha* | Red Stringybark | N | | |
| TG | *Eucalyptus mannifera* | Brittle Gum | N | | |
| TG | *Eucalyptus melliodora* | Yellow Box | N | | |
| SG | *Eucalyptus pauciflora* | Snow Gum | N | | |
| TG | *Eucalyptus rossii* | Inland Scribbly Gum | N | | |
| TG | *Eucalyptus rubida* | Candlebark | N | | |
| TG | *Eucalyptus stellulata* | Black Sallee | N | | |
| TG | *Eucalyptus viminalis* | Ribbon Gum | N | | |
| FG | *Euchiton japonicus* | Creeping Cudweed | N | | |
| FG | *Euchiton sphaerius* | | N | | |
| FG | *Euphorbia Dallachyana* | Mat Spurge | N | | |
| FG | *Euphorbia maculata* | Spotted Spurge | E | | |
| SG | *Exocarpos cupressiformis* | Cherry Ballart | N | | |
| SG | *Exocarpos strictus* | Pale-fruit Ballart | N | | |
| FG | *Foeniculum vulgare* | Fennel | E | | |
| FG | *Galium murale* | Small Bedstraw | E | | |
| FG | *Gamochaeta calviceps* | Cudweed | E | | |
| FG | *Geranium graniticola* | | N | | |
| GG | *Geranium molle* | Cranesbill Geranium | E | | |
| FG | *Geranium solanderi* | Native Geranium | N | | |

| Growth Form | Species Name | Common Name | Native/Exotic | High Threat Weed | Priority Weed |
|---|---|---|---|---|---|
| FG | *Glycine clandestina* | | N | | |
| FG | *Glycine microphylla* | Small-leaf Glycine | N | | |
| FG | *Gonocarpus humilis* | | N | | |
| FG | *Gonocarpus tetragynus* | | N | | |
| FG | *Goodenia hederacea* | | N | | |
| FG | *Goodenia sp.* | | N | | |
| FG | *Grataegus monogyna* | | E | | |
| SG | *Hardenbergia violacea* | Purple Coral Pea | N | | |
| FG | *Helichrysum luteoalbum* | Jersey Cudweed | E | | |
| FG | *Helitropium amplexicaule* | Blue Heliotrope | E | HTW | |
| SG | *Hibbertia obtusifolia* | Hoary Guinea Flower | N | | |
| GG | *Holcus lanatus* | Yorkshire Fog | E | | |
| GG | *Hordeum leporinum* | Barley Grass | E | | |
| FG | *Hovea heterophylla* | | N | | |
| FG | *Hydrocotyle laxiflora* | Stinking Pennywort | N | | |
| FG | *Hydrocotyle sibthorpioides* | | N | | |
| FG | *Hypericum gramineum* | Small St John's Wort | N | | |
| FG | *Hypericum perforatum* | St John's Wort | E | HTW | |
| FG | *Hypochaeris glabra* | Smooth Catsear | E | | |
| GG | *Hypoxis vaginata* | Yellow Star | N | | |
| GG | *Isolepis hookeriana* | | N | | |
| GG | *Juncus effusus* | | E | | |
| GG | *Juncus gregiflorus* | | N | | |
| GG | *Juncus homalocaulis* | | N | | |
| GG | *Juncus sp.* | | N | | |
| FG | *Lactuca serriola* | Prickly Lettuce | E | | |
| GG | *Lamarckia aurea* | Goldentop | E | | |
| FG | *Lepidium africanum* | | E | | |
| SG | *Leptospermum myrtifolium* | Myrtle Tea Tree | N | | |
| FG | *Leucopogon appressus* | | N | | |
| SG | *Leucopogon flethcheri* | | N | | |
| SG | *Leucopogon virgatus* | | N | | |
| GG | *Lolium perenne* | Perennial Ryegrass | E | | |
| GG | *Lomandra cylindrica* | Needle Mat-rush | N | | |
| GG | *Lomandra filiformis* | Wattle Mat-rush | N | | |
| GG | *Lomandra longifolia* | Long-leaved Mat Rush | N | | |
| GG | *Lomandra multiflora* | Many-flowered Mat-rush | N | | |
| SG | *Lomatia ilicifolia* | Holy Lomatia | N | | |
| SG | *Lomatia myricoides* | River Lomatia | N | | |
| SG | *Lycium feroccissimum* | African Boxthorn | E | HTW | |
| FG | *Lysimachia arvensis* | Pimpernel | E | | |
| TG | *Malus pumila* | Apple | E | | |
| FG | *Malva neglecta* | Mallow | E | | |
| FG | *Marrubium vulgare* | Horehound | E | | |

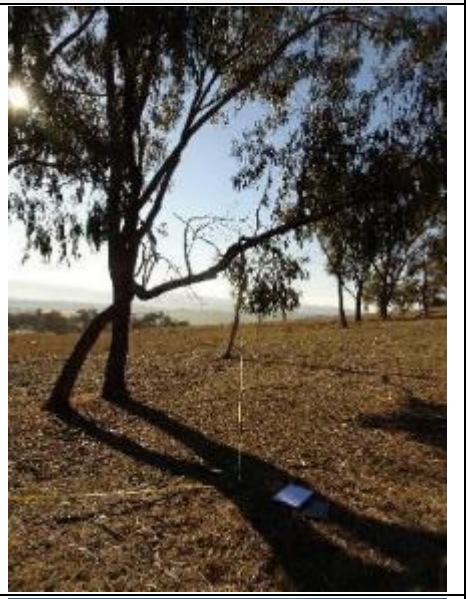
| Growth Form | Species Name | Common Name | Native/Exotic | High Threat Weed | Priority Weed |
|---|---|---|---|---|---|
| FG | *Medicago polymorpha* | Burr Medic | E | | |
| SG | *Melichrus urceolatus* | Urn Heath | N | | |
| SG | *Melicytus dentatus* | Tree Violet | N | | |
| GG | *Microlaena stipoides* | Weeping Grass | N | | |
| FG | *Minuartia mediterranea* | | E | | |
| FG | *Modiola carolinana* | Red-flowered Mallow | E | | |
| FG | *Modiola truncata* | | E | | |
| FG | *Moenchia erecta* | Erect Chickweed | E | | |
| FG | *Monoculus monstrous* | | E | | |
| SG | *Monotoca scoparia* | | N | | |
| SG | *Olearia sp* | | N | | |
| FG | *Onopordum acanthium* | Scotch Thistle | E | | |
| EG | *Ophioglossum lusitanicum* | Adder's Tongue | N | | |
| FG | *Oxalis perennans* | Creeping Oxalis | N | | |
| GG | *Panicum effusum* | Hairy Panic | N | | |
| GG | *Paspalum dilatatum* | Paspalum | E | HTW | N |
| GG | *Pentameris airioides* | | E | | |
| FG | *Persacaria prostrata* | Creeping Knotweed | E | | |
| FG | *Petrohagia sp* | | E | | |
| GG | *Phalaris aquatica* | Phalaris | E | | |
| GG | *Phalaris minor* | Lesser Canary Grass | E | | |
| GG | *Phalaris sp.* | | E | | |
| GG | *Phragmites australis* | Common Reed | N | | |
| TG | *Pinus radiata* | Radiata Pine | E | HTW | NO |
| FG | *Plantago lanceolata* | Plantain | E | | |
| FG | *Plantago sp* | | E | | |
| GG | *Poa annua* | Winter Grass | E | | |
| GG | *Poa induta* | | N | | |
| GG | *Poa labillardierei* | Tussock | N | | |
| GG | *Poa meionectes* | | N | | |
| GG | *Poa sieberiana* | Snow Grass | N | | |
| FG | *Polycarpon tetraphyllum* | Four-leaved Allseed | E | | |
| FG | *Portulaca oleracea* | Pigweed | N | | |
| FG | *Pseudognaphalium luteoalbum* | Jersey Cudweed | N | | |
| EG | *Pteridium esculentum* | Bracken | N | | |
| SG | *Pultenaea microphylla* | | N | | |
| GG | *Rytidosperma caespitosum* | | N | | |
| SG | *Rosa rubignosa* | Sweet Briar | E | HTW | |
| SG | *Rubus fruticosus* | Blackberry | E | HTW | |
| SG | *Rubus parvifolius* | Native Raspberry | N | | |
| FG | *Rumex brownii* | Swamp Dock | N | | |
| FG | *Rumex crispus* | Curled Dock | E | | |
| FG | *Rumex sp.* | dock | E | | |
| GG | *Rytidosperma caespitosum* | Ringed Wallaby Grass | N | | |

| Growth Form | Species Name | Common Name | Native/Exotic | High Threat Weed | Priority Weed |
|---|---|---|---|---|---|
| GG | *Rytidosperma monticola* | | N | | |
| GG | *Rytidosperma pallidum* | Silver-top Wallaby Grass | N | | |
| TG | *Salix fragilis* | Crack Willow | E | HTW | |
| FG | *Scolymus hispanicus* | Golden Thistle | E | | |
| FG | *Senecio diaschides* | | N | | |
| FG | *Senecio prenanthoides* | | N | | |
| FG | *Senecio quadridentatus* | Cotton Fireweed | N | | |
| FG | *Senecio sp* | | N | | |
| GG | *Shoenus apogon* | Common Bog-rush | N | | |
| FG | *Spergularia rubra* | Red Sandspurry | E | | |
| GG | *Sporobolus caroli* | Fairy Grass | N | | |
| FG | *Stellaria media* | Common Chickweed | E | | |
| FG | *Stylidium graminifolium* | Grass Trigger-plant | N | | |
| SG | *Styphelia triflora* | Pink Five Corners | N | | |
| FG | *Taraxacum sp.* | | E | | |
| GG | *Themeda triandra* | Kangaroo Grass | N | | |
| FG | *Tribulus terrestris* | Caltrop | E | | |
| FG | *Trifolium angustifolium* | Narrow-leaved Clover | E | | |
| FG | *Trifolium arvense* | Haresfoot Clover | E | | |
| FG | *Trifolium repens* | White Clover | E | | |
| FG | *Urtica incisca* | Stinging Nettle | N | | |
| FG | *Verbascum virgatum* | Twiggy Mullein | E | | |
| FG | *Veronica calycina* | Hairy Speedwell | N | | |
| FG | *Viola betonicifolia* | Showy Violet | N | | |
| FG | *Vittadinia dissecta* | Dissected New Holland Daisy | N | | |
| GG | *Vulpia myuros* | Rat's Tail Fescue | E | | |
| FG | *Wahlenbergia communis* | Tufted Bluebell | N | | |
| FG | *Wahlenbergia gracilenta* | Annual Bluebell | N | | |
| FG | *Wahlenbergia gracilis* | Sprawling Bluebell | N | | |
| FG | *Wahlenbergia sp* | | N | | |
| FG | *Wahlenbergia stricta* | Australian Bluebell | N | | |
| GG | *Wurmbea dioica* | Early Nancy | N | | |
| FG | *Xerochrysum viscosum* | Sticky Everlasting | N | | |
| SG | *Zieria cytisoides* | Downy Zieria | N | | |
| TG | *Populus nigra* | Poplar | E | | |

## BAM Plot Data

| BAM Plot | PCT | Condition Class | Zone | Easting | Northing | Bearing | comp Tree | comp Shrub | comp Grass | comp Forbs | comp Ferns | comp Other | struc Tree | struc Shrub | struc Grass | struc Forbs | struc Ferns | struc Other | fun Large Trees | fun Hollow trees | fun Litter Cover | fun Fallen Logs | fun Tree Stem Sto9 | fun Tree Stem 10to19 | fun Tree Stem 20to29 | fun Tree Stem 30to49 | fun Tree Stem 50to79 | fun Tree Regen | fun High Threat Exotic |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAC12 | 1197.00 | Poor | 55 | 765279 | 6298330.0 | 125 | 0 | 2 | 3 | 4 | 0 | 0 | 0.0 | 0.2 | 0.1 | 0.4 | 0.0 | 0.0 | 0 | 0 | 87.0 | 9.0 | 0 | 0 | 0 | 0 | 0 | 1 | 5.7 |
| MAC04 | 1093 | Poor | 55 | 757909 | 6295189.0 | 98 | 0 | 1 | 5 | 1 | 1 | 0 | 0.0 | 10.0 | 23.0 | 0.1 | 0.1 | 0.0 | 0 | 0 | 63.0 | 17.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 |
| MAC07 | 1093 | Good | 55 | 758988 | 6296050.0 | 255 | 2 | 7 | 2 | 4 | 0 | 1 | 95.0 | 54.2 | 10.5 | 0.4 | 0.0 | 5.0 | 1 | 1 | 87.0 | 3.0 | 1 | 1 | 1 | 0 | 1 | 1 | 0.1 |
| MAC13 | 654 | Moderate | 55 | 737667 | 6293982.0 | 260 | 1 | 0 | 7 | 4 | 0 | 1 | 15.0 | 0.0 | 12.8 | 7.1 | 0.0 | 0.5 | 2 | 1 | 92.0 | 45.5 | 0 | 0 | 0 | 1 | 1 | 1 | 5.1 |
| MAC01 | 654 | Poor | 55 | 737872 | 6293936.0 | 98 | 1 | 0 | 1 | 1 | 0 | 1 | 30.0 | 0.0 | 5.0 | 0.1 | 0.0 | 0.5 | 0 | 0 | 64.0 | 0.0 | 0 | 0 | 1 | 1 | 0 | 1 | 5.1 |
| MAC09 | 727 | Poor | 55 | 761016 | 6297427.0 | 105 | 1 | 4 | 4 | 10 | 1 | 0 | 5.0 | 1.3 | 95.1 | 9.9 | 5.0 | 0.0 | 0 | 0 | 83.0 | 0.0 | 0 | 1 | 0 | 0 | 0 | 1 | 0.5 |
| 29011902 | 731 | Good | 56 | 223568 | 6304157.0 | 90 | 3 | 4 | 8 | 4 | 0 | 0 | 45.0 | 31.5 | 30.7 | 0.8 | 0.0 | 0.0 | 1 | 0 | 89.0 | 6.0 | 1 | 1 | 1 | 1 | 1 | 1 | 1.5 |
| 29011901 | 731 | Poor | 56 | 276423 | 6304609.0 | 92 | 0 | 1 | 1 | 0 | 0 | 0 | 0.0 | 0.1 | 95.0 | 0.0 | 0.0 | 0.0 | 0 | 0 | 96.0 | 0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 |
| MAC03 | 85 | Poor | 55 | 742728 | 6294271.0 | 188 | 1 | 0 | 3 | 0 | 0 | 0 | 5.0 | 0.0 | 45.1 | 0.0 | 0.0 | 0.0 | 0 | 0 | 86.0 | 0.0 | 0 | 0 | 1 | 0 | 0 | 0 | 0.6 |
| MAC11 | 765 | Moderate | 55 | 763094 | 6298435.0 | 197 | 0 | 0 | 6 | 1 | 1 | 0 | 0.0 | 0.0 | 56.1 | 70.0 | 0.1 | 0.0 | 0 | 0 | 90.0 | 2.0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.0 |
| 29011903 | 731 | Poor | 56 | 223456 | 6304085.0 | 253 | 1 | 5 | 7 | 7 | 0 | 0 | 25.0 | 41.5 | 41.6 | 6.0 | 0.0 | 0.0 | 0 | 0 | 80.0 | 2.0 | 1 | 1 | 1 | 1 | 0 | 1 | 10.1 |
| MAC02 | | Non-native | 55 | 738582 | 6293807.0 | 255 | 0 | 0 | 2 | 0 | 0 | 0 | 0.0 | 0.0 | 5.5 | 0.0 | 0.0 | 0.0 | 0 | 0 | 61.0 | 0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 10.1 |
| MAC08 | 727 | Good | 55 | 760691 | 6297634.0 | 27 | 2 | 3 | 4 | 9 | 1 | 0 | 75.0 | 7.0 | 95.0 | 3.0 | 15.0 | 0.0 | 1 | 0 | 80.0 | 4.0 | 1 | 1 | 0 | 0 | 1 | 1 | 6.1 |
| MAC10 | | Non-native | 55 | 761920 | 6297937.0 | 78 | 0 | 0 | 1 | 0 | 1 | 0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.5 | 0.0 | 0 | 0 | 100.0 | 57.0 | 0 | 0 | 0 | 0 | 0 | 0 | 105.0 |
| MAC05 | 1093 | Good | 55 | 758984 | 6295194.0 | | 3 | 4 | 6 | 4 | 0 | 1 | 75.0 | 15.6 | 20.9 | 1.2 | 0.0 | 5.0 | 1 | 1 | 85.0 | 0.0 | 0 | 1 | 1 | 1 | 1 | 1 | 0.6 |
| MAC67 | 1330 | Poor | 55 | 720422 | 6293623.0 | 73 | 1 | 0 | 1 | 2 | 0 | 0 | 50.0 | 0.0 | 10.0 | 0.6 | 0.0 | 0.0 | 2 | 1 | 50.0 | 3.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 |
| MAC68 | | Non-native | 55 | 721000 | 6293615.0 | 105 | 1 | 1 | 3 | 1 | 0 | 0 | 0.1 | 0.1 | 0.3 | 0.1 | 0.0 | 0.0 | 0 | 0 | 99.0 | 52.5 | 0 | 0 | 0 | 0 | 0 | 1 | 31.0 |
| MAC66 | | Non-native | 55 | 718253 | 6293971.0 | 102 | 0 | 1 | 1 | 1 | 0 | 0 | 0.0 | 0.1 | 5.0 | 0.1 | 0.0 | 0.0 | 0 | 0 | 89.0 | 22.0 | 0 | 0 | 0 | 0 | 0 | 0 | 85.0 |
| MAC75 | | Non-native | 55 | 722373 | 6292184.0 | 301 | 0 | 0 | 2 | 1 | 0 | 0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0 | 0 | 93.0 | 0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 |
| MAC77 | 1330 | Poor | 55 | 722520 | 6291556.0 | 150 | 1 | 0 | 2 | 1 | 0 | 1 | 25.0 | 0.0 | 0.2 | 0.1 | 0.0 | 1.0 | 1 | 0 | 60.0 | 0.0 | 0 | 0 | 0 | 0 | 1 | 1 | 0.2 |
| MAC72 | | Non-native | 55 | 719866 | 6293648.0 | 255 | 1 | 1 | 0 | 0 | 0 | 0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 0 | 95.0 | 50.0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.1 |
| 30011901 | 732 | Poor | 56 | 223895 | 6304150.0 | 266 | 2 | 3 | 3 | 1 | 0 | 0 | 35.0 | 20.6 | 5.2 | 0.1 | 0.0 | 0.0 | 0 | 0 | 67.0 | 3.0 | 1 | 1 | 1 | 0 | 0 | 1 | 0.2 |
| MAC41201 | | Non-native | 55 | 725707 | 6290584.0 | | 0 | 0 | 3 | 0 | 0 | 0 | 0.0 | 0.0 | 1.1 | 0.0 | 0.0 | 0.0 | 0 | 0 | 34.0 | 0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 11.0 |
| MAC61201 | | Non-native | 55 | 738954 | 6293612.0 | 236 | 0 | 0 | 1 | 1 | 0 | 0 | 0.0 | 0.0 | 0.5 | 0.1 | 0.0 | 0.0 | 0 | 0 | 40.0 | 0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.5 |
| MAC51202 | | Non-native | 55 | 733226 | 6291844.0 | 87 | 0 | 0 | 0 | 2 | 0 | 0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 | 0 | 0 | 85.0 | 0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 35.0 |
| MAC41207 | | Non-native | 55 | 728739 | 6289513.0 | 255 | 0 | 0 | 4 | 6 | 0 | 0 | 0.0 | 0.0 | 1.7 | 1.4 | 0.0 | 0.0 | 0 | 0 | 34.0 | 0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.6 |
| MAC41205 | | Non-native | 55 | 726508 | 6290615.0 | 301 | 0 | 0 | 3 | 2 | 0 | 0 | 0.0 | 0.0 | 0.7 | 0.2 | 0.0 | 0.0 | 0 | 0 | 17.0 | 0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| MAC41204 | 287 | Good | 55 | 726341 | 6290330 | 325 | 1 | 0 | 4 | 3 | 0 | 0 | 25.0 | 0.0 | 12.0 | 0.3 | 0.0 | 0.0 | 2 | 1 | 60.0 | 2.0 | 0 | 0 | 0 | 1 | 1 | 0 | 1.3 |
| MAC41203 | | Non-native | 55 | 726299 | 6290299.0 | 24 | 0 | 0 | 2 | 3 | 0 | 0 | 0.0 | 0.0 | 1.5 | 0.3 | 0.0 | 0.0 | 0 | 0 | 83.0 | 0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| MAC41202 | | Non-native | 55 | 724660 | 6290788.0 | 22 | 0 | 0 | 1 | 1 | 0 | 0 | 0.0 | 0.0 | 5.0 | 0.1 | 0.0 | 0.0 | 0 | 0 | 48.0 | 0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.5 |
| MAC65 | 1330 | Poor | 55 | 720248 | 6293604 | 74 | 2 | 0 | 0 | 1 | 0 | 1 | 50.0 | 0.0 | 0.0 | 0.1 | 0.0 | 5.0 | 1 | 0 | 60.0 | 2.0 | 0 | 0 | 0 | 0 | 1 | 0 | 0.0 |
| 29011901 | 731 | Poor | 56 | 226450 | 6304620 | 92 | 0 | 1 | 1 | 0 | 0 | 0 | 0.0 | 0.1 | 95.0 | 0.0 | 0.0 | 0.0 | 0 | 0 | 96.0 | 0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 |
| MAC250901 | 1197 | Moderate | 55 | 770902 | 6301001 | 29 | 2 | 1 | 4 | 4 | 1 | 0 | 10.0 | 5.0 | 21.1 | 0.4 | 35.0 | 0.0 | 0 | 0 | 86.0 | 0.0 | 1 | 1 | 1 | 0 | 0 | 1 | 50.1 |
| MAC250906 | 649 | Poor | 55 | 773549 | 6301893 | 318 | 1 | 6 | 5 | 3 | 0 | 1 | 10.0 | 11.9 | 50.7 | 0.3 | 0.0 | 0.1 | 0 | 0 | 58.0 | 120.0 | 1 | 0 | 0 | 0 | 0 | 1 | 51.0 |
| 29011902 | 731 | Good | 56 | 223568 | 6304157 | 90 | 3 | 4 | 8 | 4 | 0 | 0 | 45.0 | 31.5 | 30.7 | 0.8 | 0.0 | 0.0 | 1 | 0 | 89.0 | 6.0 | 0 | 1 | 1 | 1 | 1 | 1 | 1.5 |
| MAC250902 | 1197 | Poor | 55 | 771524 | 6301631 | 77 | 1 | 1 | 3 | 5 | 1 | 0 | 5.0 | 0.1 | 0.1 | 0.5 | 5.0 | 0.0 | 0 | 0 | 93.0 | 87.0 | 0 | 1 | 0 | 0 | 0 | 1 | 100.1 |
| MAC250903 | 1197 | Poor | 55 | 771905 | 6301567 | 135 | 2 | 0 | 6 | 4 | 0 | 0 | 10.0 | 0.0 | 11.2 | 0.8 | 0.0 | 0.0 | 0 | 0 | 90.0 | 92.0 | 1 | 0 | 1 | 0 | 0 | 0 | 120.0 |
| MAC240902 | 1197 | Good | 55 | 771266 | 6301507 | 359 | 3 | 4 | 5 | 10 | 0 | 1 | 95.0 | 0.8 | 65.2 | 1.9 | 0.0 | 0.1 | 1 | 0 | 90.0 | 73.0 | 1 | 1 | 1 | 1 | 1 | 1 | 0.2 |
| MAC240901 | 1197 | Good | 55 | 770658 | 6300945 | 31 | 3 | 4 | 3 | 8 | 1 | 0 | 76.0 | 0.8 | 45.2 | 0.8 | 20.0 | 0.0 | 1 | 2 | 93.0 | 48.0 | 1 | 1 | 1 | 1 | 1 | 1 | 0.0 |
| MAC250904 | 1197 | Good | 55 | 772765 | 6301702 | 1 | 3 | 1 | 5 | 10 | 2 | 3 | 85.0 | 5.0 | 20.6 | 2.7 | 25.1 | 1.6 | 0 | 1 | 87.0 | 78.0 | 1 | 1 | 1 | 1 | 1 | 1 | 20.1 |
| MAC250907 | 1191 | Poor | 55 | 775386 | 6303894 | 53 | 1 | 0 | 1 | 0 | 0 | 0 | 80.0 | 0.0 | 25.0 | 0.0 | 0.0 | 0.0 | 2 | 1 | 30.0 | 25.0 | 1 | 1 | 1 | 0 | 0 | 1 | 21.0 |
| 31011905 | 1093 | Poor | 55 | 758708 | 6295121 | 65 | 1 | 11 | 6 | 2 | 1 | 0 | 5.0 | 9.5 | 51.6 | 0.2 | 0.1 | 0.0 | 0 | 0 | 70.0 | 5.0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.0 |
| 31011904 | 1093 | Moderate | 56 | 221415 | 6303341 | 245 | 2 | 2 | 6 | 2 | 0 | 0 | 50.0 | 0.6 | 10.4 | 5.1 | 0.0 | 0.0 | 1 | 1 | 90.0 | 13.0 | 1 | 1 | 1 | 1 | 0 | 1 | 0.7 |
| MAC250910 | 1093 | Good | 55 | 776240 | 6303718 | 322 | 3 | 2 | 5 | 3 | 0 | 0 | 55.0 | 5.5 | 45.7 | 0.7 | 0.0 | 0.0 | 0 | 1 | 76.0 | 10.0 | 0 | 1 | 1 | 1 | 1 | 1 | 0.3 |
| MAC71201 | 1093 | Good | 55 | 776650 | 6303448 | 266 | 2 | 7 | 7 | 8 | 0 | 0 | 70.0 | 8.7 | 86.6 | 1.2 | 0.0 | 0.0 | 0 | 0 | 90.0 | 12.0 | 1 | 1 | 1 | 1 | 0 | 1 | 0.6 |
| 30011904 | 1093 | Good | 56 | 223246 | 6303812 | 317 | 3 | 5 | 8 | 12 | 1 | 0 | 70.0 | 2.3 | 26.2 | 6.5 | 0.1 | 0.0 | 0 | 9 | 88.0 | 95.0 | 1 | 1 | 1 | 1 | 1 | 1 | 0.3 |
| 30011902 | 1093 | Good | 56 | 223568 | 6304159 | 150 | 4 | 6 | 4 | 9 | 0 | 0 | 65.0 | 15.4 | 16.1 | 1.9 | 0.0 | 0.0 | 0 | 0 | 92.0 | 5.0 | 1 | 1 | 1 | 1 | 0 | 1 | 0.0 |
| MAC61203 | 1330 | Moderate | 55 | 752673 | 6293748 | 56 | 2 | 3 | 2 | 4 | 0 | 0 | 2.0 | 11.0 | 0.6 | 1.3 | 0.0 | 0.0 | 0 | 0 | 87.0 | 0.0 | 1 | 1 | 0 | 0 | 0 | 0 | 1.5 |
| MAC51201 | 1330 | Moderate | 55 | 732380 | 6291751 | 189 | 3 | 0 | 5 | 3 | 0 | 0 | 46.0 | 0.0 | 5.8 | 5.6 | 0.0 | 0.0 | 0 | 2 | 90.0 | 73.0 | 0 | 1 | 1 | 1 | 1 | 0 | 25.5 |
| MAC41206 | 1330 | Poor | 55 | 727403 | 6289658 | 63 | 1 | 0 | 2 | 2 | 0 | 0 | 50.0 | 0.0 | 10.1 | 0.2 | 0.0 | 0.0 | 0 | 1 | 49.0 | 8.0 | 0 | 0 | 0 | 1 | 1 | 0 | 0.0 |
| MAC61202 | 1330 | Poor | 55 | 756516 | 6294485 | 230 | 1 | 0 | 0 | 3 | 0 | 0 | 25.0 | 0.0 | 0.0 | 0.7 | 0.0 | 0.0 | 0 | 1 | 78.0 | 10.0 | 0 | 0 | 0 | 0 | 0 | 0 | 25.3 |
| MAC71 | 287 | Good | 55 | 721635 | 6293317 | 131 | 3 | 2 | 2 | 8 | 0 | 0 | 70.0 | 2.0 | 10.1 | 2.5 | 0.0 | 0.0 | 5 | 2 | 74.0 | 64.0 | 1 | 1 | 1 | 1 | 1 | 0 | 5.1 |
| MAC70 | 287 | Good | 55 | 721357 | 6293493 | 131 | 3 | 3 | 3 | 4 | 0 | 0 | 60.0 | 0.3 | 11.1 | 0.4 | 0.0 | 0.0 | 6 | 3 | 66.0 | 74.0 | 0 | 1 | 0 | 1 | 1 | 1 | 5.0 |
| 30011903 | 1093 | Poor | 56 | 223456 | 6304085 | 224 | 1 | 4 | 5 | 5 | 1 | 0 | 0.5 | 50.6 | 21.2 | 0.5 | 0.1 | 0.0 | 0 | 0 | 66.0 | 7.0 | 0 | 0 | 0 | 0 | 0 | 1 | 2.1 |
| 30011901 | 732 | Poor | 56 | 223895 | 6304150 | 266 | 2 | 3 | 3 | 1 | 0 | 0 | 35.0 | 20.6 | 5.2 | 0.1 | 0.0 | 0.0 | 0 | 0 | 67.0 | 3.0 | 1 | 1 | 1 | 0 | 0 | 1 | 0.2 |
| MAC250909 | 732 | Good | 55 | 775801 | 6303916 | 13 | 2 | 1 | 3 | 8 | 0 | 0 | 65.0 | 5.0 | 15.1 | 1.2 | 0.0 | 0.0 | 0 | 4 | 83.0 | 7.0 | 1 | 1 | 1 | 1 | 1 | 1 | 0.7 |
| 30011905 | 731 | Poor | 56 | 222854 | 6303600 | 202 | 1 | 3 | 4 | 3 | 0 | 0 | 0.1 | 21.0 | 36.5 | 0.3 | 0.0 | 0.0 | 0 | 0 | 45.0 | 97.0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.1 |
| 30011906 | 731 | Good | 56 | 222740 | 6303424 | 263 | 3 | 3 | 6 | 7 | 1 | 0 | 60.0 | 2.1 | 22.0 | 6.4 | 0.1 | 0.0 | 0 | 2 | 92.0 | 8.0 | 1 | 1 | 1 | 1 | 1 | 1 | 0.0 |
| 31011901 | 679 | Poor | 56 | 222472 | 6302959 | 226 | 2 | 0 | 2 | 3 | 0 | 0 | 6.0 | 0.0 | 30.0 | 5.6 | 0.0 | 0.0 | 0 | 0 | 82.0 | 2.0 | 1 | 0 | 0 | 0 | 0 | 1 | 5.2 |
| 30011907 | 679 | Poor | 56 | 222534 | 6303070 | 224 | 1 | 1 | 4 | 4 | 0 | 0 | 25.0 | 5.0 | 11.2 | 0.4 | 0.0 | 0.0 | 0 | 2 | 88.0 | 137.0 | 1 | 1 | 1 | 1 | 1 | 1 | 10.1 |
| 31011903 | 679 | Good | 56 | 222162 | 6303022 | 331 | 3 | 2 | 4 | 7 | 0 | 0 | 55.0 | 1.1 | 15.1 | 20.7 | 0.0 | 0.0 | 0 | 2 | 90.0 | 137.0 | 1 | 1 | 1 | 1 | 1 | 1 | 5.7 |
| MAC73 | 654 | Poor | 55 | 722097 | 6292986 | 283 | 1 | 0 | 4 | 2 | 0 | 0 | 5.0 | 0.0 | 5.7 | 0.6 | 0.0 | 0.0 | 0 | 1 | 87.0 | 8.0 | 1 | 1 | 0 | 0 | 0 | 1 | 0.1 |
| MAC51203 | 654 | Moderate | 55 | 736215 | 6293182 | 97 | 1 | 0 | 4 | 8 | 0 | 1 | 25.0 | 0.0 | 21.2 | 1.2 | 0.0 | 1.0 | 0 | 0 | 68.0 | 3.0 | 0 | 1 | 1 | 1 | 1 | 1 | 10.1 |
| MAC76 | 287 | Good | 55 | 722263 | 6291861 | 190 | 1 | 1 | 3 | 7 | 0 | 1 | 40.0 | 5.0 | 6.1 | 1.1 | 0.0 | 0.1 | 0 | 0 | 58.0 | 5.0 | 1 | 1 | 1 | 1 | 0 | 1 | 0.1 |
| MAC74 | 287 | Good | 55 | 722286 | 6292860 | 178 | 2 | 3 | 5 | 10 | 0 | 0 | 80.0 | 0.3 | 13.1 | 1.2 | 0.0 | 0.0 | 0 | 1 | 77.0 | 29.0 | 1 | 1 | 1 | 1 | 1 | 1 | 1.0 |

## Location of BAM plots

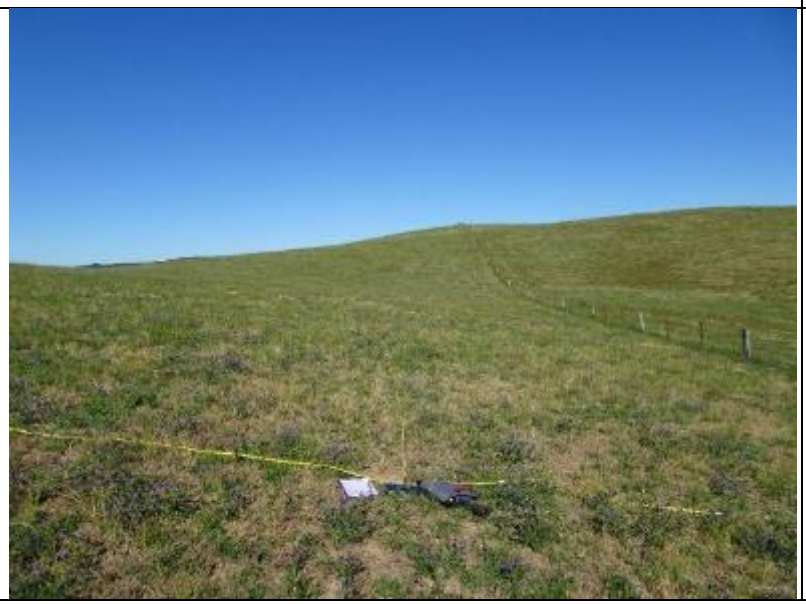
| Name | Zone | Easting | Northing | Site photo 1 | Site photo 2 |
|---|---|---|---|---|---|
| MAC01 | 55H | 737872 | 6293963 |  |  |
| MAC02 | 55H | 738582 | 6293807 |  |  |

| | | | | | |
|---|---|---|---|---|---|
| MAC03 | 55H | 742728 | 6294271 |  |  |
| MAC04 | 55H | 757909 | 6295189 |  |  |

| | | | | | |
|---|---|---|---|---|---|
| MAC05 | 55H | 758984 | 6295194 |  |  |
| MAC07 | 55H | 758988 | 6296050 |  |  |

| | | | | | |
|---|---|---|---|---|---|
| MAC08 | 55H | 760691 | 6297634 |  |  |
| MAC09 | 55H | 761016 | 6297427 |  |  |

| | | | | | |
|---|---|---|---|---|---|
| MAC10 | 55H | 761920 | 6297937 |  |  |
| MAC11 | 55H | 763094 | 6298435 |  |  |

| | | | | | |
|---|---|---|---|---|---|
| MAC12 | 55H | 765279 | 6298330 |  |  |
| MAC13 | 55H | 737667 | 6293982 | | |
| MAC41201 | 55H | 725707 | 6290584 |  |  |

| | | | | | |
|---|---|---|---|---|---|
| MAC41202 | 55H | 724660 | 6290788 |  |  |
| MAC41203 | 55H | 726299 | 6290299 |  |  |

| | | | | | |
|---|---|---|---|---|---|
| MAC41204 | 55H | 726341 | 6290330 |  |  |
| MAC41205 | 55H | 726508 | 6290615 |  |  |

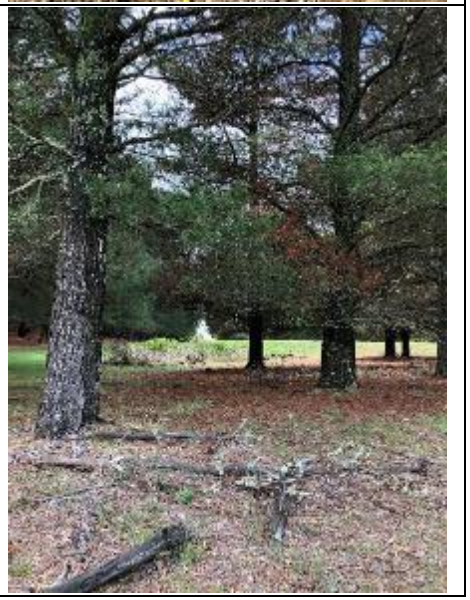
| | | | | | |
|---|---|---|---|---|---|
| MAC41506 | 55H | 727403 | 6289658 |  |  |
| MAC41207 | 55H | 728739 | 6289513 |  |  |

| | | | | | |
|---|---|---|---|---|---|
| MAC51201 | 55H | 732380 | 6291751 |  |  |
| MAC51202 | 55H | 733226 | 6291844 |  |  |

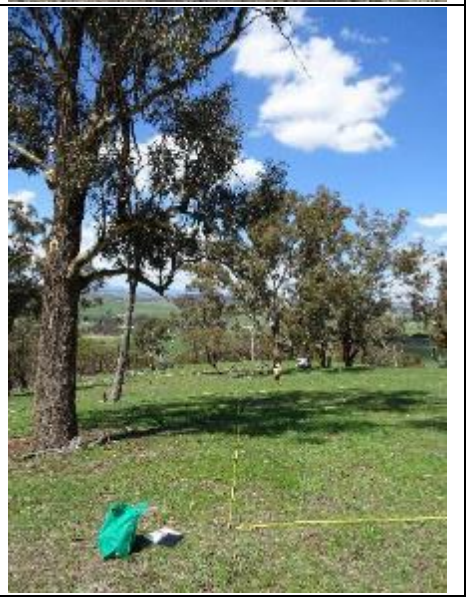
| | | | | | |
|---|---|---|---|---|---|
| MAC51203 | 55H | 736215 | 6293182 |  |  |
| MAC61202 | 55H | 756516 | 6294485 |  |  |

| | | | | | |
|---|---|---|---|---|---|
| MAC61203 | 55H | 752673 | 6293748 |  |  |
| MAC61201 | 55H | 738954 | 6293612 |  |  |

| | | | | | |
|---|---|---|---|---|---|
| MAC71201 | 55H | 776650 | 6303448 |  |  |
| MAC67 | 55H | 720422 | 6293623 |  |  |

| | | | | | |
|---|---|---|---|---|---|
| MAC68 | 55H | 721000 | 6293615 |  |  |
| MAC66 | 55H | 718253 | 6293971 |  |  |

| | | | | | |
|---|---|---|---|---|---|
| MAC70 | 55H | 721357 | 6293493 |  |  |
| MAC75 | 55H | 722373 | 6292184 |  |  |

| | | | | | |
|---|---|---|---|---|---|
| MAC76 | 55H | 722263 | 6291861 |  |  |
| MAC77 | 55H | 722520 | 6291556 |  |  |

| | | | | | |
|---|---|---|---|---|---|
| MAC74 | 55H | 722286 | 6292860 |  |  |
| MAC73 | 55H | 722097 | 6292986 |  |  |

| | | | | | |
|---|---|---|---|---|---|
| MAC72 | 55H | 719866 | 6293648 |  |  |
| MAC71 | 55H | 721635 | 6293317 |  |  |

| | | | | | |
|---|---|---|---|---|---|
| MAC65 | 55H | 720248 | 6293604 |  |  |
| MAC240901 | 55H | 770658 | 6300945 |  |  |

| | | | | | |
|---|---|---|---|---|---|
| MAC240902 | 55H | 771266 | 6301507 |  |  |
| MAC250901 | 55H | 770902 | 6301001 |  |  |

| | | | | | |
|---|---|---|---|---|---|
| MAC250902 | 55H | 771524 | 6301631 |  |  |
| MAC250906 | 55H | 773549 | 6301893 |  |  |

| | | | | | |
|---|---|---|---|---|---|
| MAC250909 | 55H | 775801 | 6303916 |  |  |
| MAC250910 | 55H | 776240 | 6303718 |  |  |

| | | | | | |
|---|---|---|---|---|---|
| MAC250907 | 55H | 775386 | 6303894 |  |  |
| MAC250904 | 55H | 772765 | 6301702 |  |  |

| | | | | | |
|---|---|---|---|---|---|
| MAC250903 | 55H | 771905 | 6301567 |  |  |
| MAC29011901 | 56H | 226450 | 6304620 |  |  |

| | | | | | |
|---|---|---|---|---|---|
| MAC29011902 | 55H | 788353 | 6305066 |  |  |
| MAC29011903 | 55H | 788425 | 6305094 |  |  |

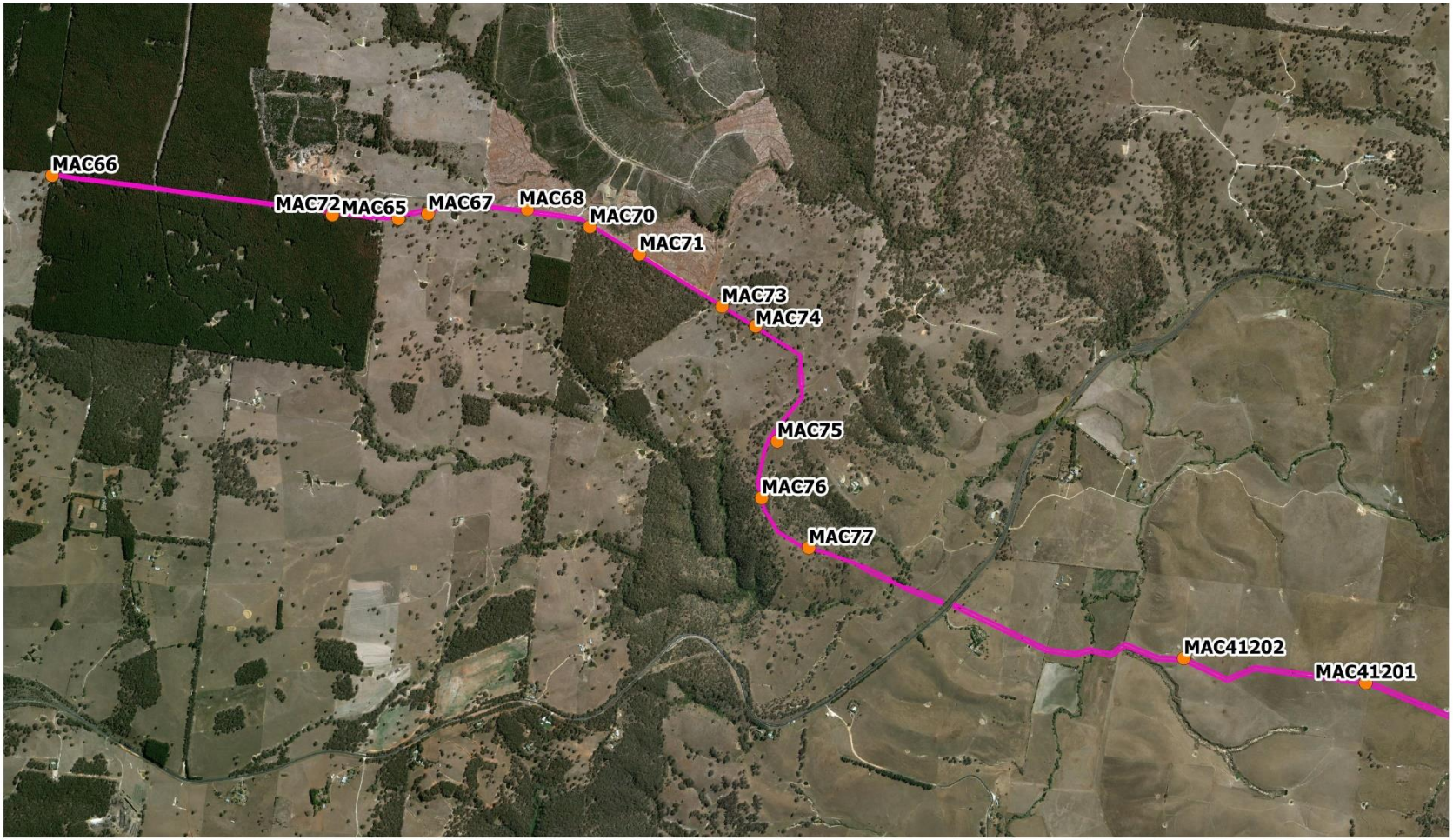
| | | | | | |
|---|---|---|---|---|---|
| MAC30011901 | 55H | 782164 | 6303976 |  |  |
| MAC30011902 | 55H | 781837 | 6304002 |  |  |

| | | | | | |
|---|---|---|---|---|---|
| MAC30011903 | 55H | 781721 | 6303936 |  | |
| MAC30011904 | 55H | 781497 | 6303675 | Can’t find photos | |
| MAC30011905 | 55H | 781093 | 6303487 |  |  |

| | | | | | |
|---|---|---|---|---|---|
| MAC30011906 | 55H | 780969 | 6303317 |  |  |
| MAC30011907 | 55H | 780742 | 6302976 |  |  |

| | | | | | |
|---|---|---|---|---|---|
| MAC31011901 | 55H | 780675 | 6302870 |  |  |
| MAC31011903 | 55H | 780368 | 6302949 |  |  |

| | | | | | |
|---|---|---|---|---|---|
| MAC31011904 | 55H | 779641 | 6303310 |  |  |
| MAC31011905 | 55H | 758708 | 6295121 |  |  |



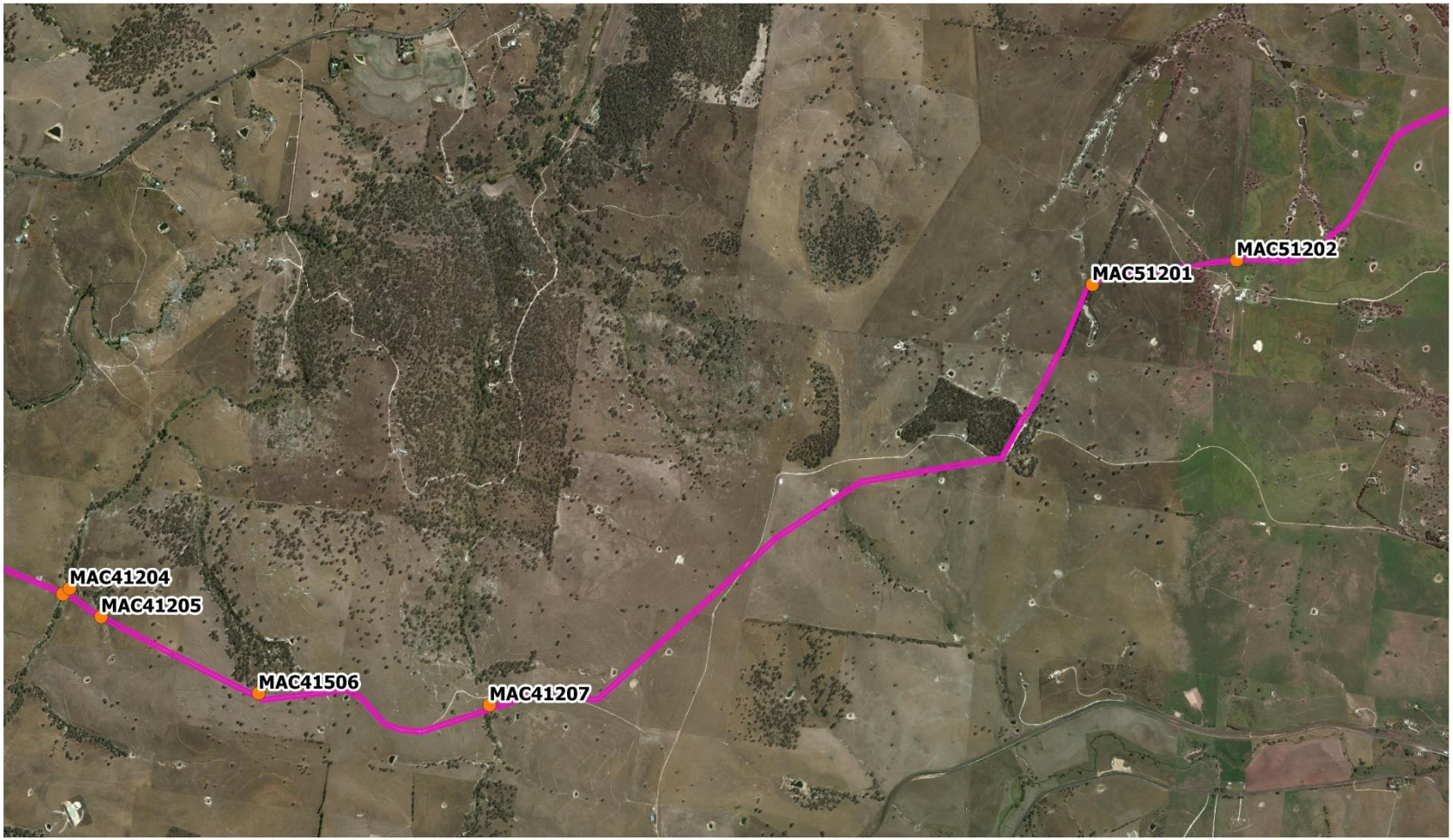

Subject land / pipeline disturbance footprint

BAM survey plots

0 500 1000 m

Scale 1:30 000
GDA94 MGA Zone 55

N



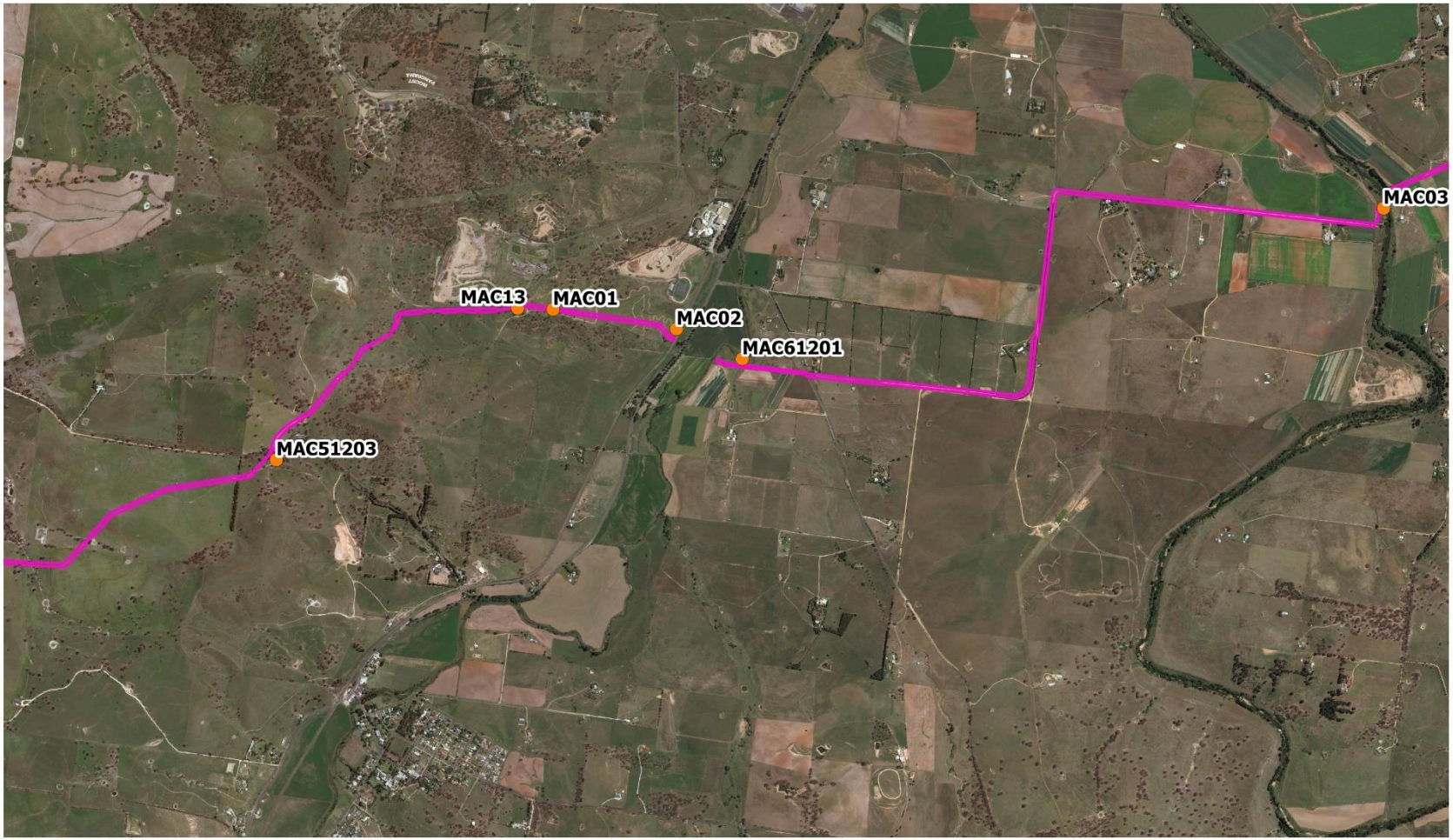

Subject land / pipeline disturbance footprint

BAM survey plots

0 500 1000 m

Scale 1:30 000
GDA94 MGA Zone 55

N



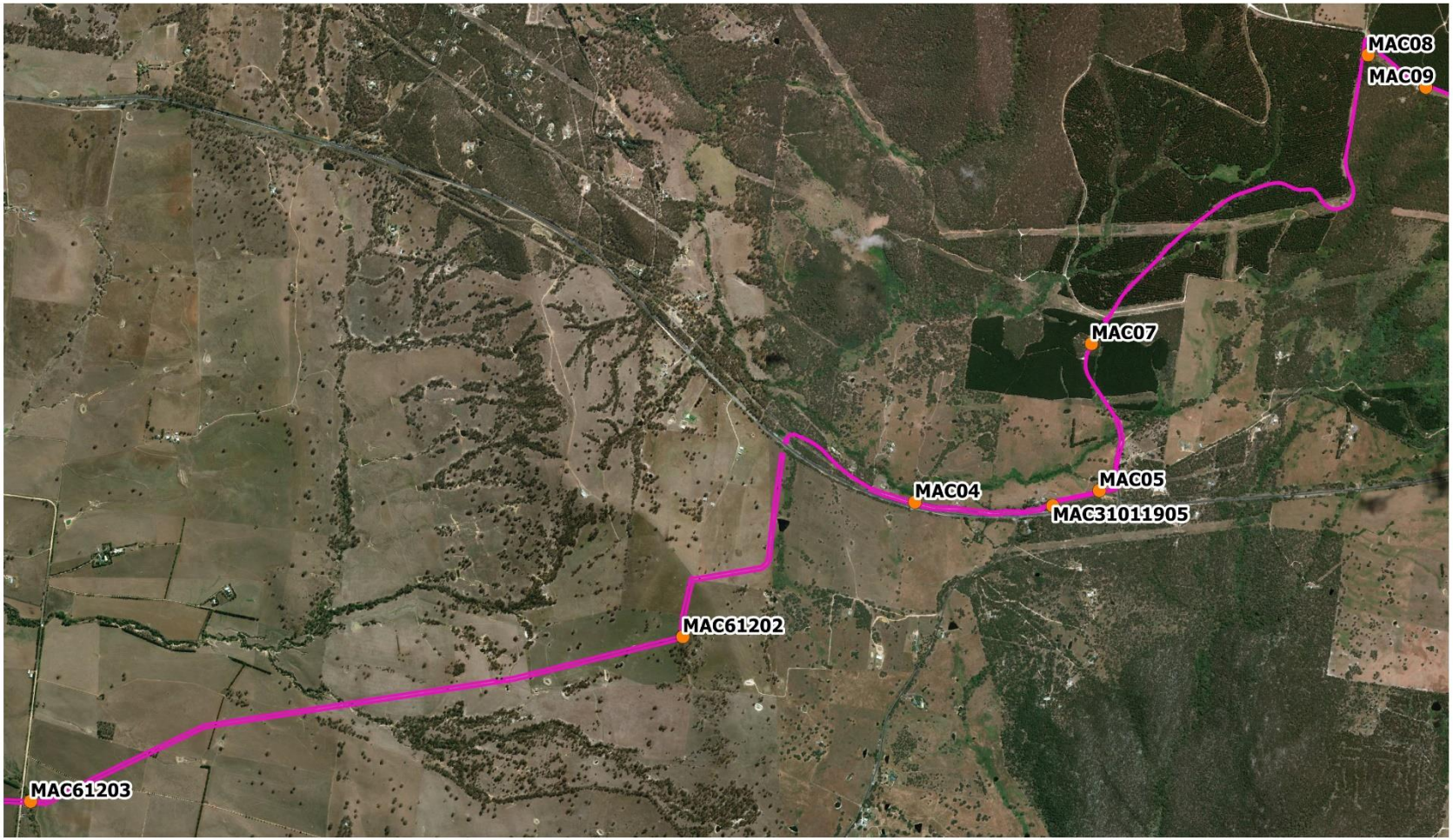

Subject land / pipeline disturbance footprint

BAM survey plots

0 500 1000 m

Scale 1:30 000
GDA94 MGA Zone 55

N



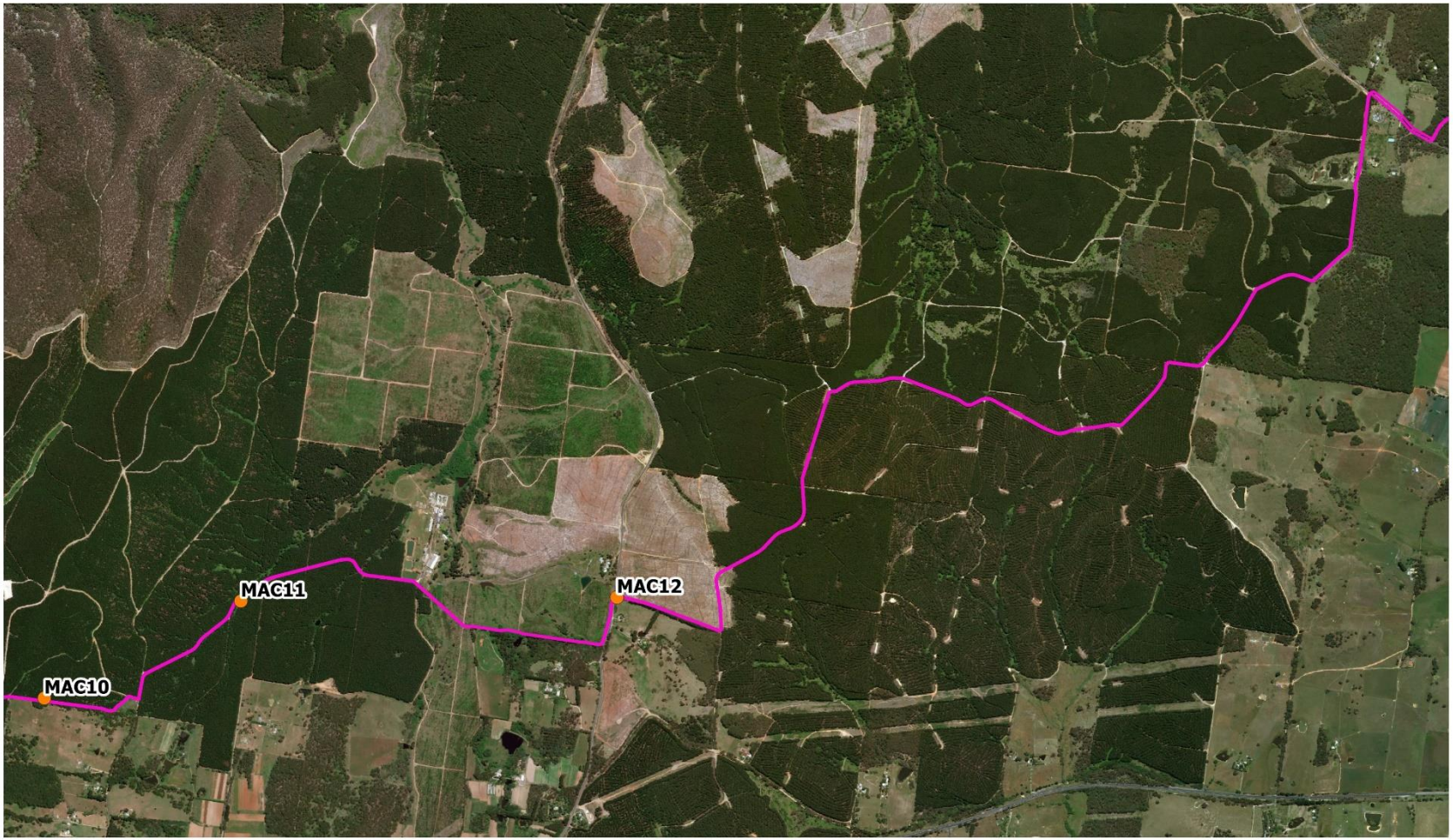

Subject land / pipeline disturbance footprint

BAM survey plots

0 500 1000 m

Scale 1:30 000
GDA94 MGA Zone 55

N



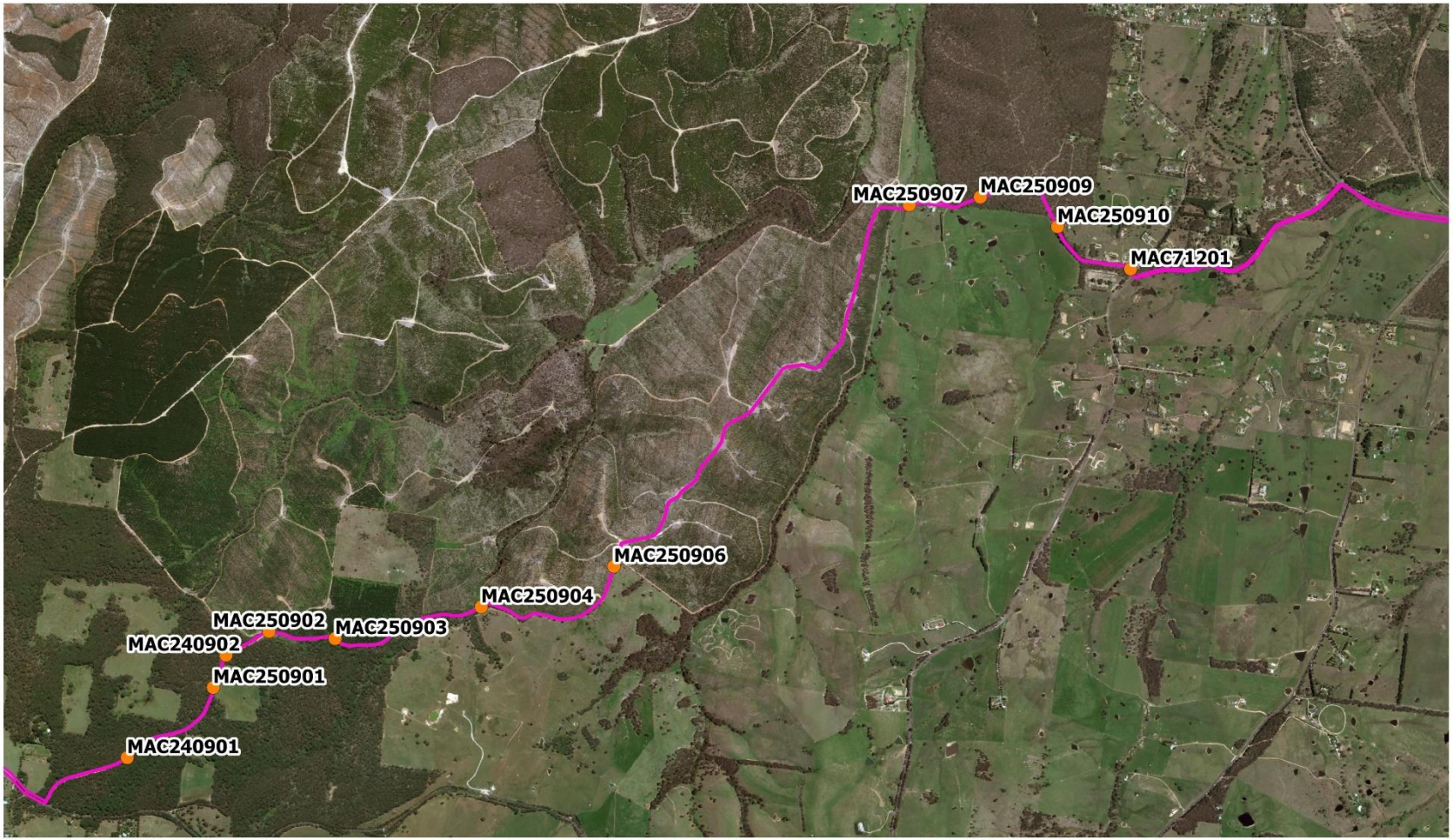

Subject land / pipeline disturbance footprint

BAM survey plots

0 500 1000 m

Scale 1:30 000
GDA94 MGA Zone 55

N



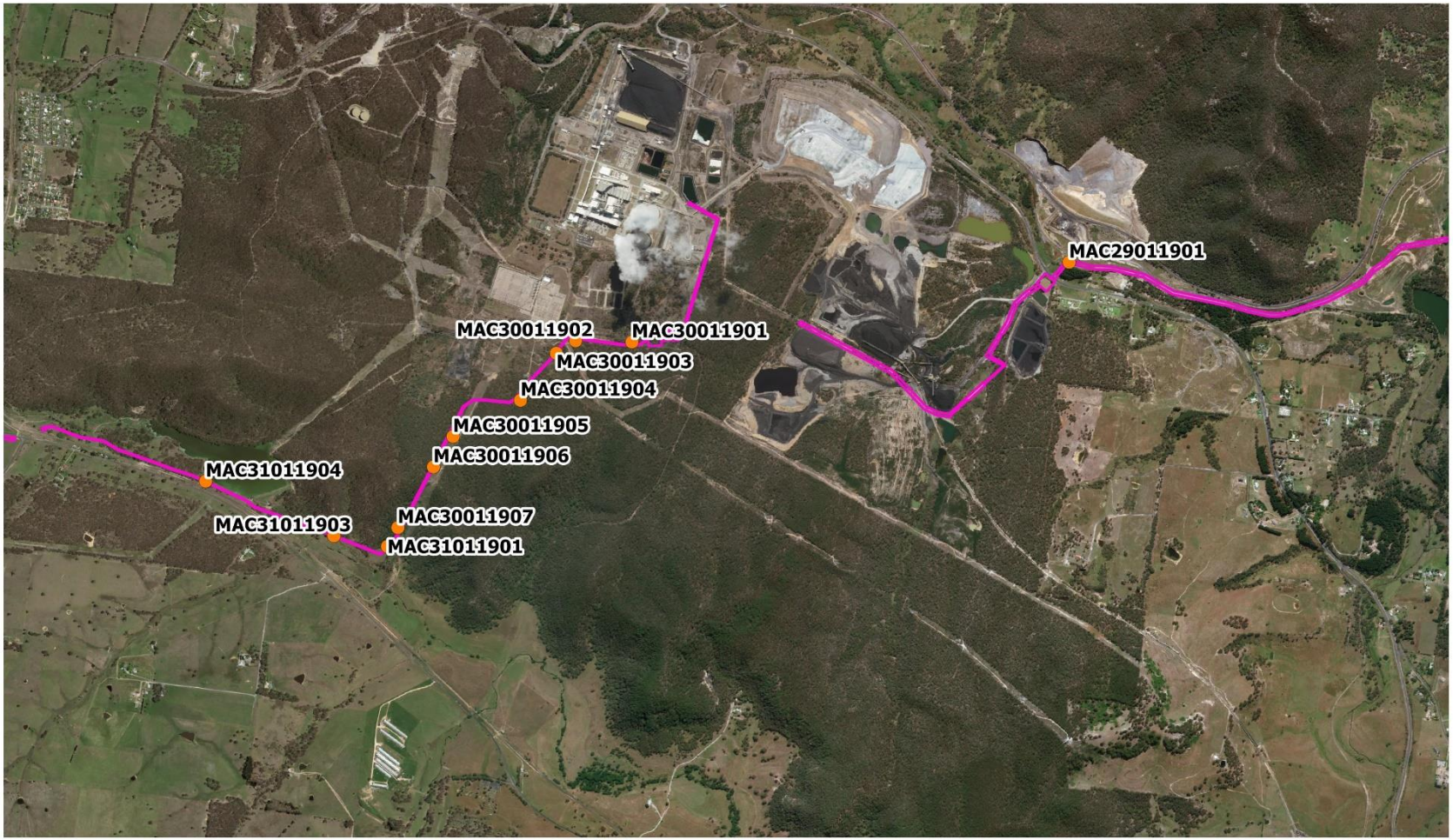

Subject land / pipeline disturbance footprint

BAM survey plots

0 500 1000 m

Scale 1:30 000
GDA94 MGA Zone 55

N



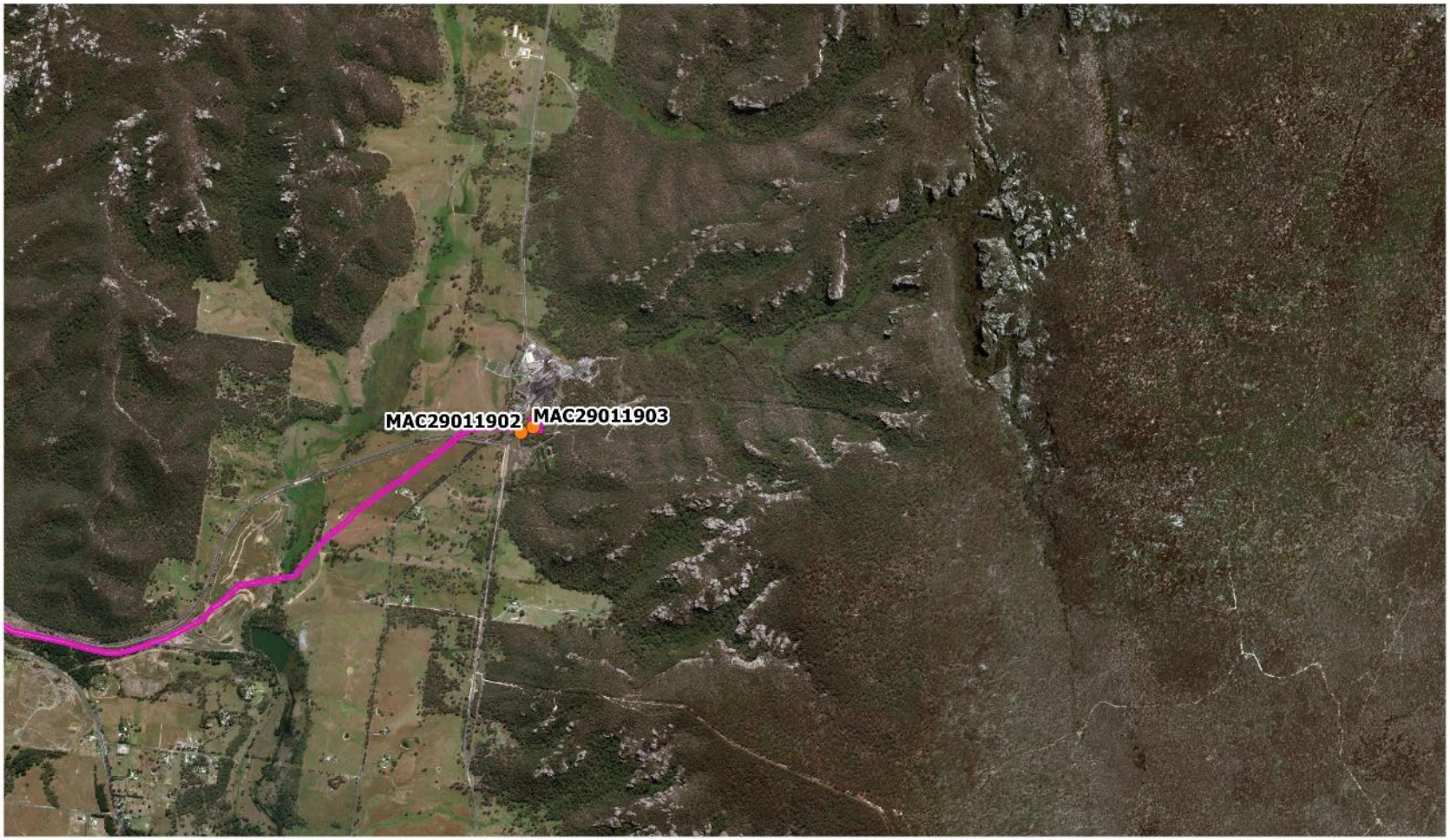

Subject land / pipeline disturbance footprint

BAM survey plots

0 500 1000 m

Scale 1:30 000
GDA94 MGA Zone 55

N




Subject land / pipeline disturbance footprint

BAM survey plots

0 500 1000 m

Scale 1:30 000
GDA94 MGA Zone 55

N

# APPENDIX 3: NATIVE VEGETATION MAPS

## Plant Community Types


**Subject land / Pipeline disturbance footprint**

- Blowdown pipeline disturbance footprint
- Pipeline disturbance footprint
- Pressure reducing valve
- Pumping station facility 1
- Pumping station facility 2
- Pumping station facility 3
- Pumping station facility 4
- Underbore pit

**Strahler stream order**

- 1
- 2
- 3
- 4
- >4

**WhiteBox YellowBox Blakelys Red Gum Woodland**

- BC Act EEC
- EPBC CEEC / BC Act EEC

**Subject land PCT_May2019**

- Non-native
- Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion

OzArk

0 100 200 m

Scale 1:5000
GDA94 / MGA 55

N


Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Strahler stream order
1
2
3
4
>4
WhiteBox YellowBox Blakelys Red Gum Woodland
BC Act EEC
EPBC CEEC / BC Act EEC
Subject land PCT_May2019
Apple Box - Yellow Box dry grassy woodland of the South Eastern Highlands Bioregion
Long-leaved Box - Red Box - Red Stringybark mixed open forest on hills and hillslopes in the NSW South Western Slopes bioregion
Non-native
OzArk
0
100
200 m
N
Scale 1:5000
GDA94 / MGA 55


**Subject land / Pipeline disturbance footprint**

- Blowdown pipeline disturbance footprint
- Pipeline disturbance footprint
- Pressure reducing valve
- Pumping station facility 1
- Pumping station facility 2
- Pumping station facility 3
- Pumping station facility 4
- Underbore pit

**Strahler stream order**

- 1
- 2
- 3
- 4
- >4

**WhiteBox YellowBox Blakelys Red Gum Woodland**

- BC Act EEC
- EPBC CEEC / BC Act EEC

**Subject land PCT_May2019**

- Long-leaved Box - Red Box - Red Stringybark mixed open forest on hills and hillslopes in the NSW South Western Slopes bioregion
- Non-native
- Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion

OzArk

0 100 200 m

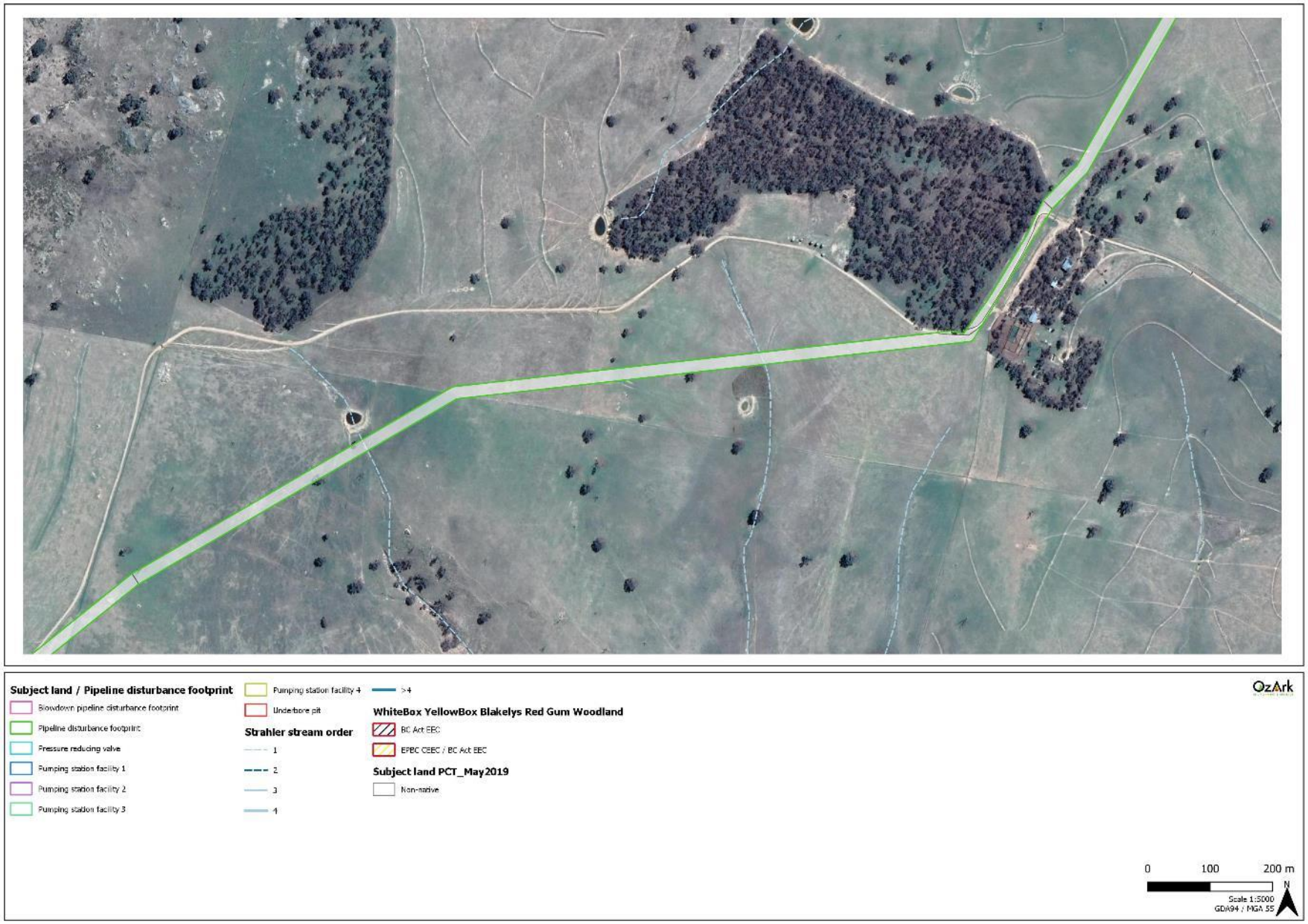
Scale 1:5000
GDA94 / MGA 55

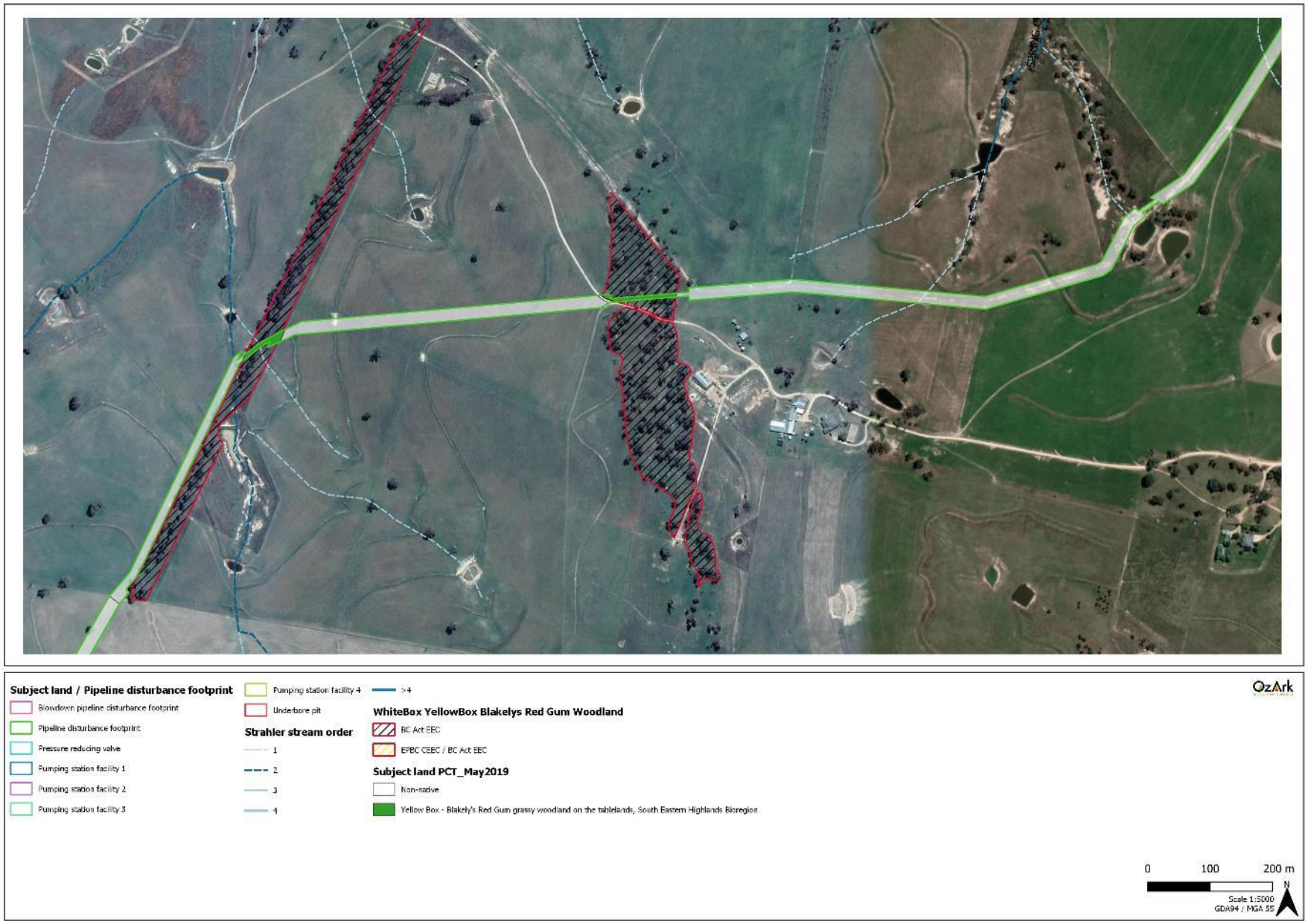
N

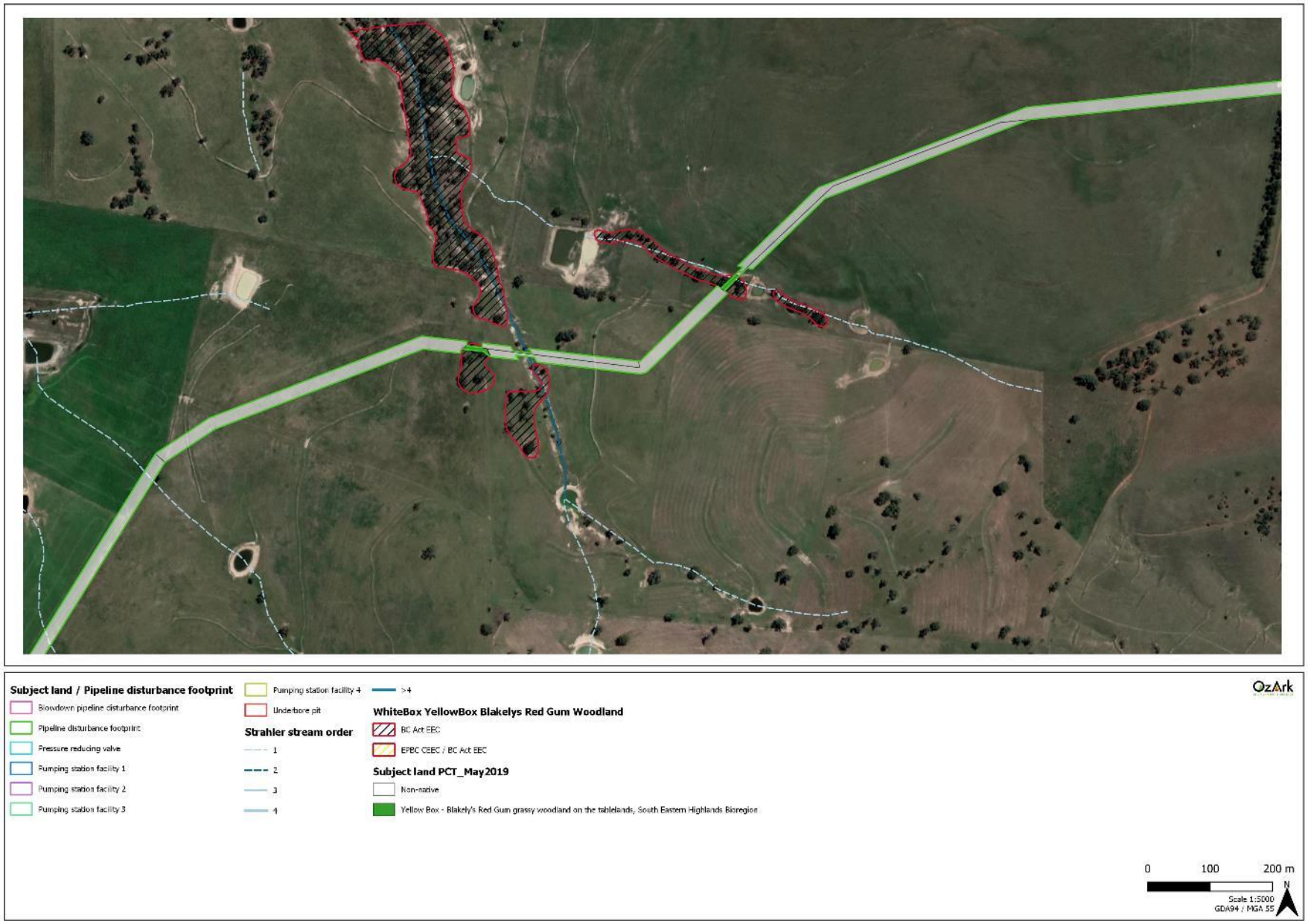

EVANS PLAINS CREEK
Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Strahler stream order
1
2
3
4
>4
WhiteBox YellowBox Blakelys Red Gum Woodland
BC Act EEC
EPBC CEEC / BC Act EEC
Subject land PCT_May2019
Non-native
OzArk
0
100
200 m
N
Scale 1:5000
GDA94 / MGA 55


Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Strahler stream order
1
2
3
4
>4
WhiteBox YellowBox Blakelys Red Gum Woodland
BC Act EEC
EPBC CEEC / BC Act EEC
Subject land PCT_May2019
Non-native
OzArk
0
100
200 m
N
Scale 1:5000
GDA94 / MGA 55


Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Strahler stream order
1
2
3
4
>4
WhiteBox YellowBox Blakelys Red Gum Woodland
BC Act EEC
EPBC CEEC / BC Act EEC
Subject land PCT_May2019
Non-native
OzArk
0
100
200 m
N
Scale 1:5000
GDA94 / MGA 55


Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Strahler stream order
1
2
3
4
>4
WhiteBox YellowBox Blakelys Red Gum Woodland
BC Act EEC
EPBC CEEC / BC Act EEC
Subject land PCT_May2019
Non-native
OzArk
0
100
200 m
N
Scale 1:5000
GDA94 / MGA 55


Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Strahler stream order
1
2
3
4
>4
WhiteBox YellowBox Blakelys Red Gum Woodland
BC Act EEC
EPBC CEEC / BC Act EEC
Subject land PCT_May2019
Non-native
Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion
OzArk
0
100
200 m
N
Scale 1:5000
GDA94 / MGA 55


Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Strahler stream order
1
2
3
4
>4
WhiteBox YellowBox Blakelys Red Gum Woodland
BC Act EEC
EPBC CEEC / BC Act EEC
Subject land PCT_May2019
Non-native
Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion
OzArk
0
100
200 m
N
Scale 1:5000
GDA94 / MGA 55

**Subject land / Pipeline disturbance footprint**

- Blowdown pipeline disturbance footprint
- Pipeline disturbance footprint
- Pressure reducing valve
- Pumping station facility 1
- Pumping station facility 2
- Pumping station facility 3
- Pumping station facility 4
- Underbore pit

**Strahler stream order**

- 1
- 2
- 3
- 4
- >4

**WhiteBox YellowBox Blakelys Red Gum Woodland**

- BC Act EEC
- EPBC CEEC / BC Act EEC

**Subject land PCT_May2019**

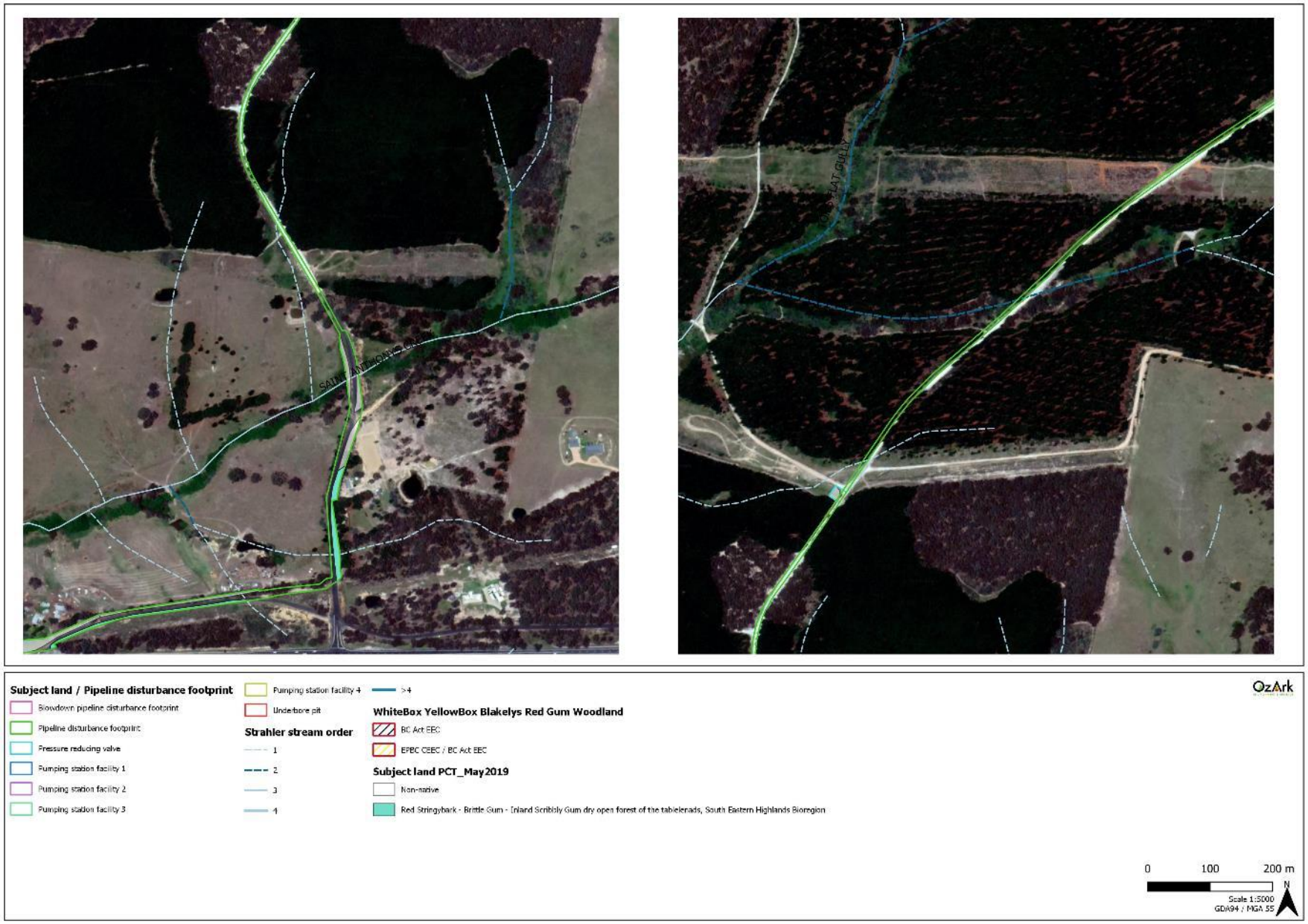
- Apple Box - Yellow Box dry grassy woodland of the South Eastern Highlands Bioregion
- Non-native

OzArk

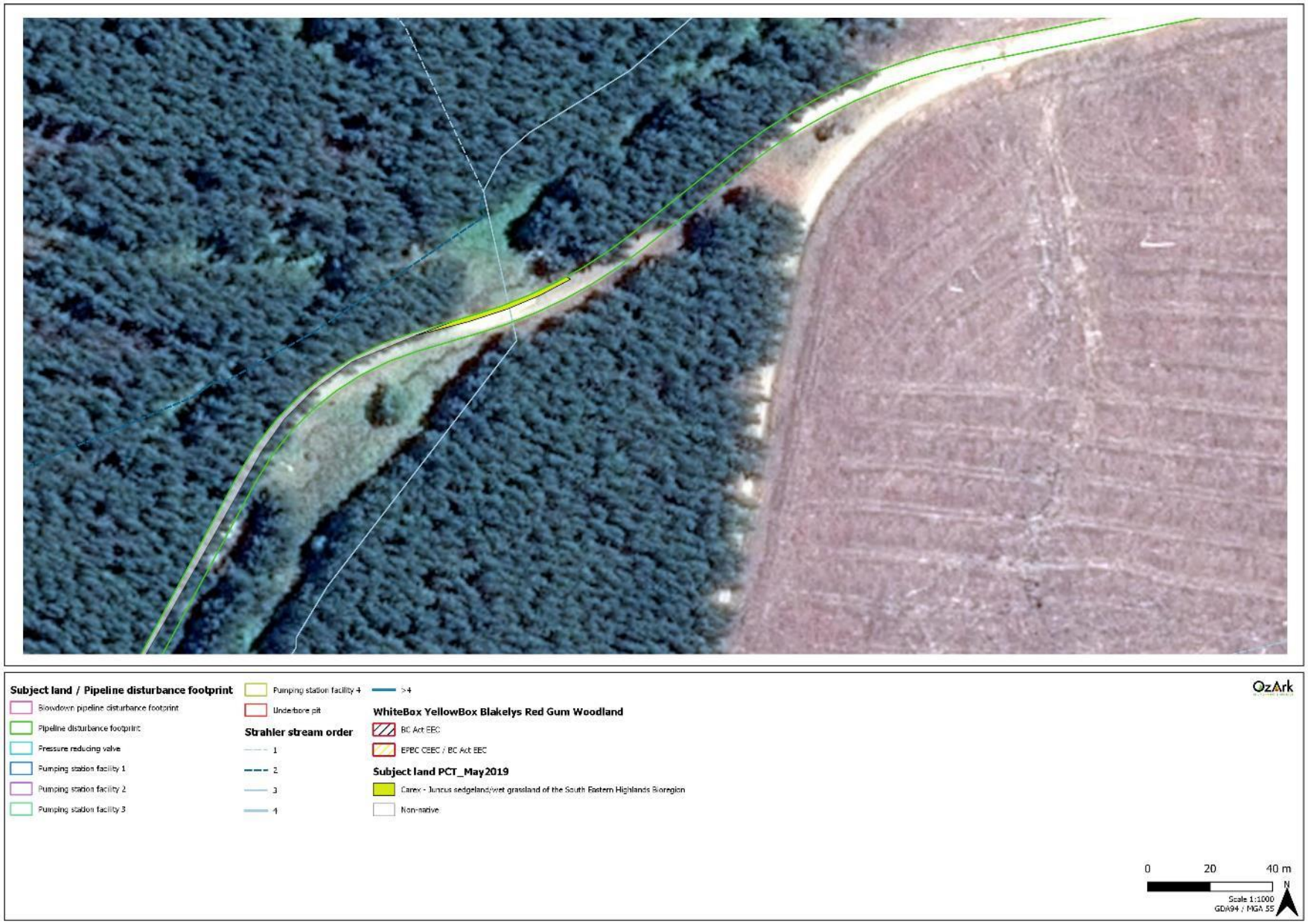
0 100 200 m

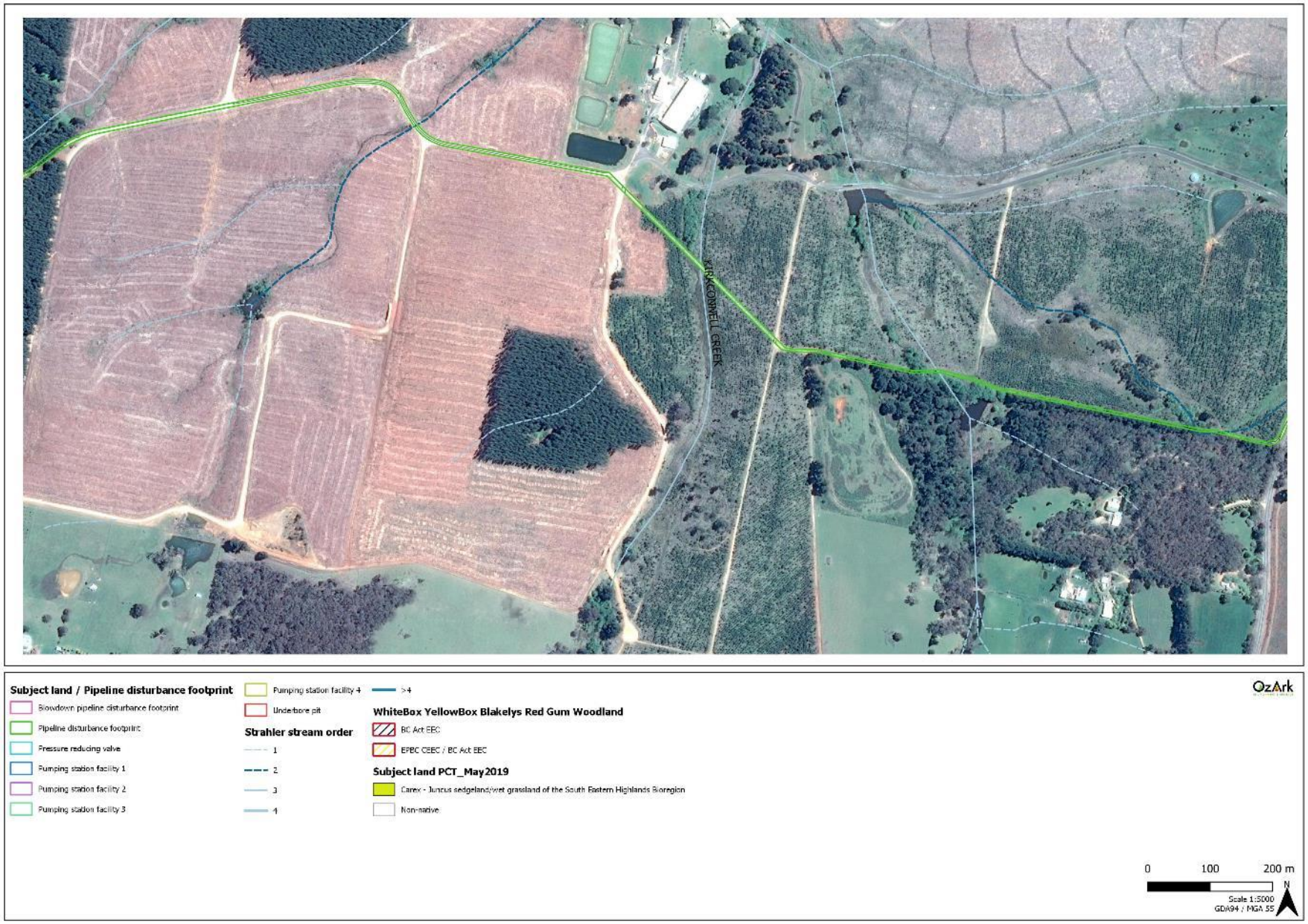
Scale 1:5000
GDA94 / MGA 55

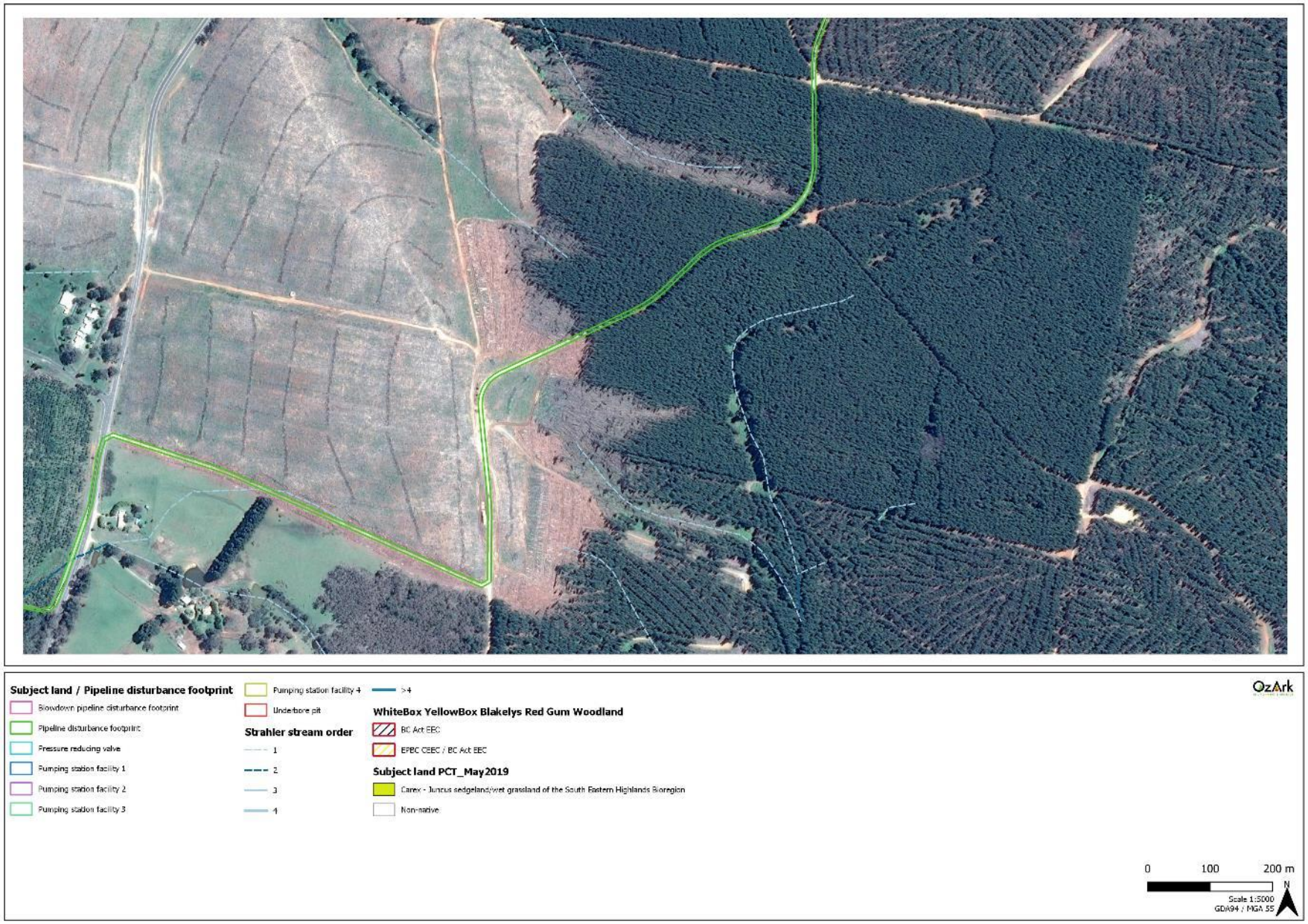
N


Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Strahler stream order
1
2
3
4
>4
WhiteBox YellowBox Blakelys Red Gum Woodland
BC Act EEC
EPBC CEEC / BC Act EEC
Subject land PCT_May2019
Non-native
Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion
OzArk
0
100
200 m
N
Scale 1:5000
GDA94 / MGA 55


Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Strahler stream order
1
2
3
4
>4
WhiteBox YellowBox Blakelys Red Gum Woodland
BC Act EEC
EPBC CEEC / BC Act EEC
Subject land PCT_May2019
Non-native
Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion
OzArk
0
100
200 m
N
Scale 1:5000
GDA94 / MGA 55


Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Strahler stream order
1
2
3
4
>4
WhiteBox YellowBox Blakelys Red Gum Woodland
BC Act EEC
EPBC CEEC / BC Act EEC
Subject land PCT_May2019
Carex - Juncus sedgeland/wet grassland of the South Eastern Highlands Bioregion
Non-native
OzArk
0
20
40 m
N
Scale 1:1000
GDA94 / MGA 55


KIRKCONNELL CREEK
Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Strahler stream order
1
2
3
4
>4
WhiteBox YellowBox Blakelys Red Gum Woodland
BC Act EEC
EPBC CEEC / BC Act EEC
Subject land PCT_May2019
Carex - Juncus sedgeland/wet grassland of the South Eastern Highlands Bioregion
Non-native
OzArk
0
100
200 m
N
Scale 1:5000
GDA94 / MGA 55


Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Strahler stream order
1
2
3
4
>4
WhiteBox YellowBox Blakelys Red Gum Woodland
BC Act EEC
EPBC CEEC / BC Act EEC
Subject land PCT_May2019
Carex - Juncus sedgeland/wet grassland of the South Eastern Highlands Bioregion
Non-native
OzArk
0
100
200 m
N
Scale 1:5000
GDA94 / MGA 55


Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Strahler stream order
1
2
3
4
>4
WhiteBox YellowBox Blakelys Red Gum Woodland
BC Act EEC
EPBC CEEC / BC Act EEC
Subject land PCT_May2019
Non-native
OzArk
0
100
200 m
N
Scale 1:5000
GDA94 / MGA 55


**Subject land / Pipeline disturbance footprint**

- Blowdown pipeline disturbance footprint
- Pipeline disturbance footprint
- Pressure reducing valve
- Pumping station facility 1
- Pumping station facility 2
- Pumping station facility 3
- Pumping station facility 4
- Underbore pit

**Strahler stream order**

- 1
- 2
- 3
- 4
- >4

**WhiteBox YellowBox Blakelys Red Gum Woodland**

- BC Act EEC
- EPBC CEEC / BC Act EEC

**Subject land PCT_May2019**

- Non-native
- Snow Gum - Mountain Gum tussock grass-herb forest of the South Eastern Highlands Bioregion

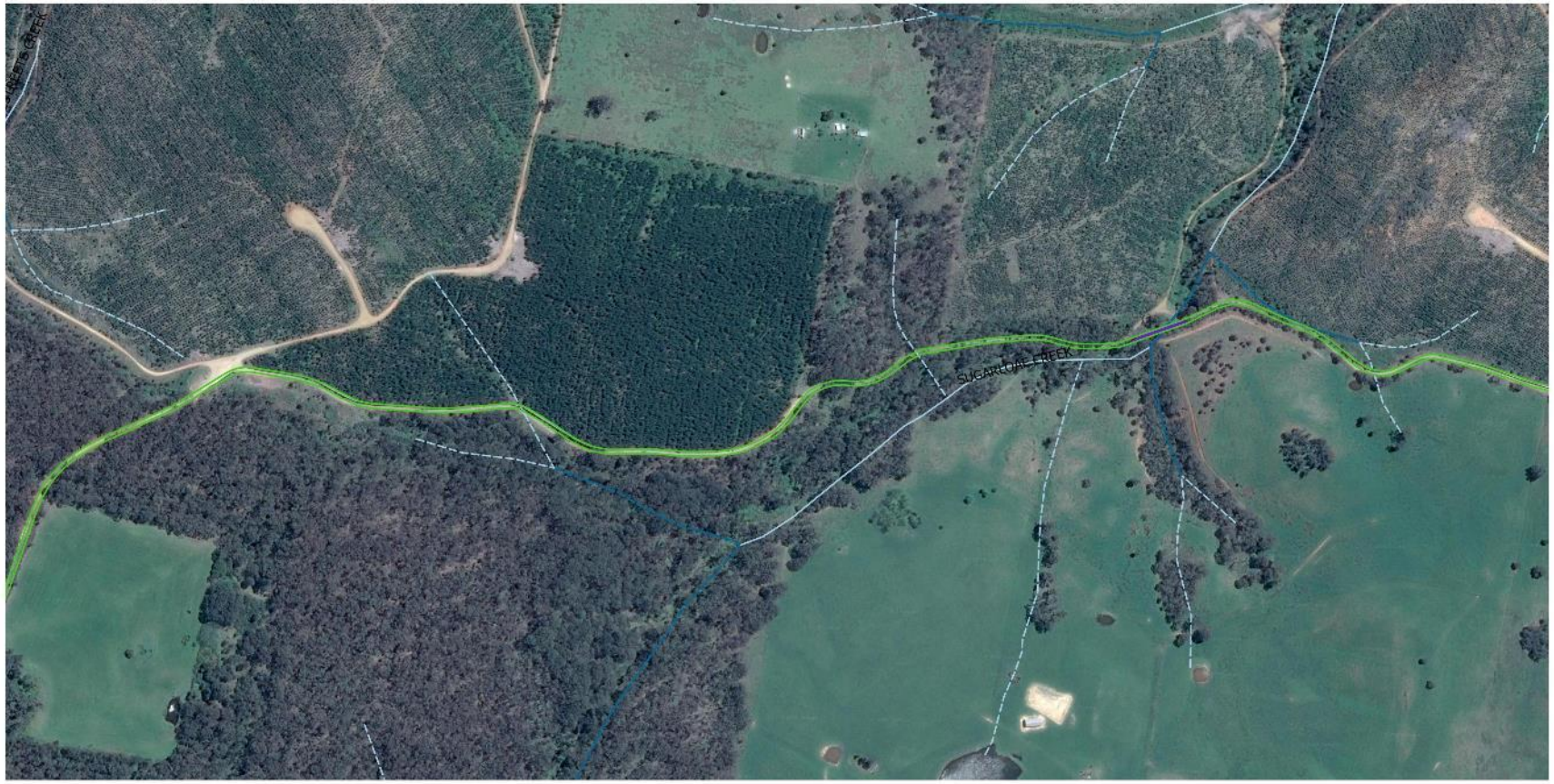
OzArk

0 100 200 m

Scale 1:5000
GDA94 / MGA 55

N


LONESTREETS CREEK
SUGARLOAF CREEK
Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Strahler stream order
1
2
3
4
>4
WhiteBox YellowBox Blakelys Red Gum Woodland
BC Act EEC
EPBC CEEC / BC Act EEC
Subject land PCT_May2019
Non-native
Snow Gum - Mountain Gum tussock grass-herb forest of the South Eastern Highlands Bioregion
OzArk
0
100
200 m
N
Scale 1:5000
GDA94 / MGA 55




**Subject land / Pipeline disturbance footprint**

- Blowdown pipeline disturbance footprint
- Pipeline disturbance footprint
- Pressure reducing valve
- Pumping station facility 1
- Pumping station facility 2
- Pumping station facility 3
- Pumping station facility 4
- Underbore pit

**Strahler stream order**

- 1
- 2
- 3
- 4
- >4

**WhiteBox YellowBox Blakelys Red Gum Woodland**

- BC Act EEC
- EPBC CEEC / BC Act EEC

**Subject land PCT_May2019**

- Non-native
- Snow Gum - Mountain Gum tussock grass-herb forest of the South Eastern Highlands Bioregion

OzArk

0 100 200 m

Scale 1:5000
GDA94 / MGA 55

N


WILLIWA CREEK
MARYS LANE GULLY
Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Strahler stream order
1
2
3
4
>4
WhiteBox YellowBox Blakelys Red Gum Woodland
BC Act EEC
EPBC CEEC / BC Act EEC
Subject land PCT_May2019
Non-native
OzArk
0
200
400 m
N
Scale 1:10 000
GDA94 / MGA 55


YALLWA CREEK
Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Strahler stream order
1
2
3
4
>4
WhiteBox YellowBox Blakelys Red Gum Woodland
BC Act EEC
EPBC CEEC / BC Act EEC
Subject land PCT_May2019
Non-native
Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion
OzArk
0
50
100 m
N
Scale 1:2500
GDA94 / MGA 55


GRASSY GULLY
PIPERS FLAT CREEK
Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Strahler stream order
1
2
3
4
>4
WhiteBox YellowBox Blakelys Red Gum Woodland
BC Act EEC
EPBC CEEC / BC Act EEC
Subject land PCT_May2019
Non-native
Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion
OzArk
0
100
200 m
N
Scale 1:5000
GDA94 / MGA 55


PIPERS FLAT CREEK
Subject land / Pipeline disturbance footprint
Blowdown pipeline disturbance footprint
Pipeline disturbance footprint
Pressure reducing valve
Pumping station facility 1
Pumping station facility 2
Pumping station facility 3
Pumping station facility 4
Underbore pit
Strahler stream order
1
2
3
4
>4
WhiteBox YellowBox Blakelys Red Gum Woodland
BC Act EEC
EPBC CEEC / BC Act EEC
Subject land PCT_May2019
Non-native
Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion
OzArk
0
100
200 m
N
Scale 1:5000
GDA94 / MGA 56


**Subject land / Pipeline disturbance footprint**

- Blowdown pipeline disturbance footprint
- Pipeline disturbance footprint
- Pressure reducing valve
- Pumping station facility 1
- Pumping station facility 2
- Pumping station facility 3
- Pumping station facility 4
- Underbore pit

**Strahler stream order**

- 1
- 2
- 3
- 4
- >4

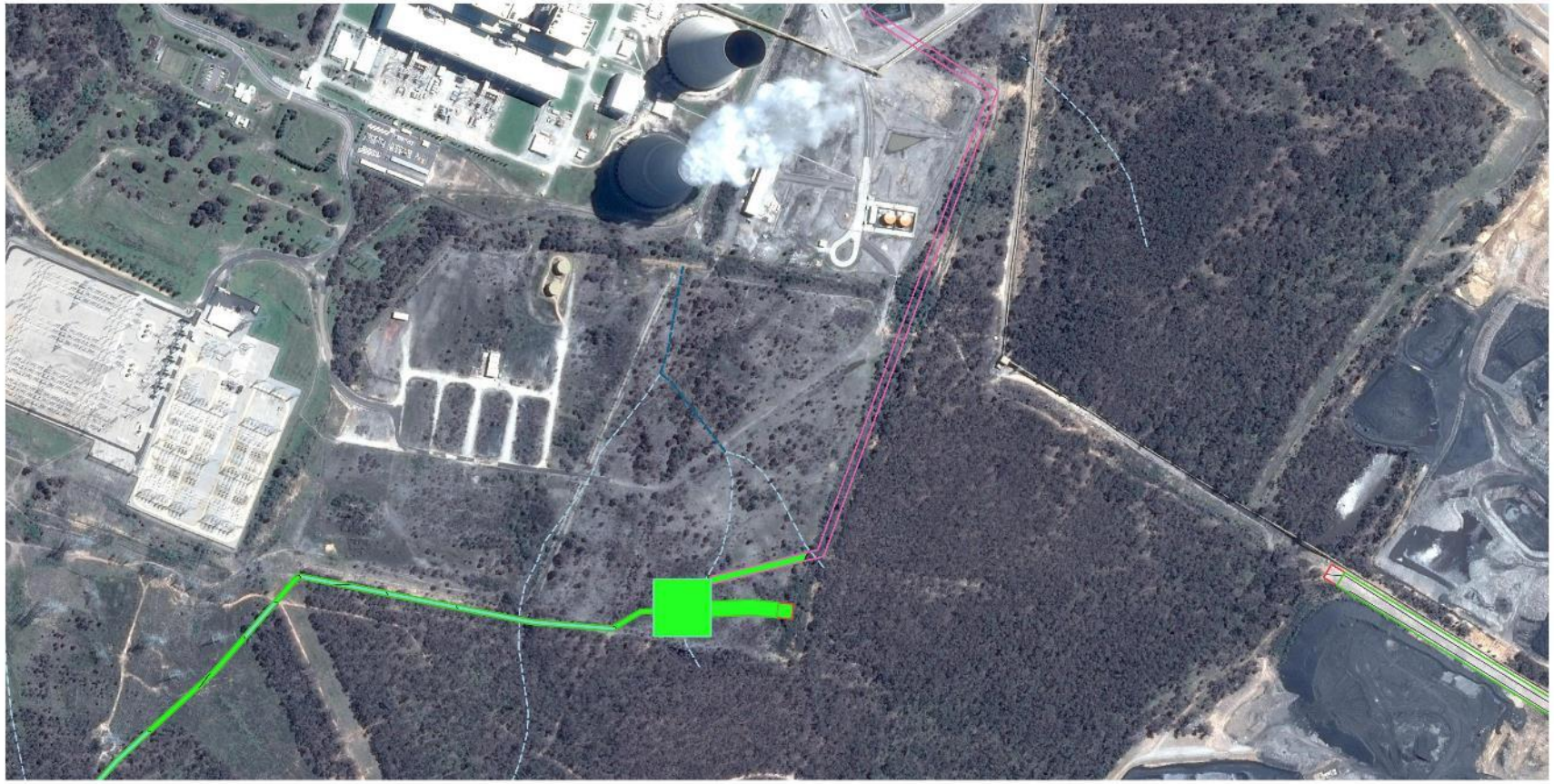
**Subject land PCT_May2019**

- Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion
- Broad-leaved Peppermint - Red Stringybark grassy open forest on undulating hills, South Eastern Highlands Bioregion
- Non-native
- Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion

0 100 200 m

Scale 1:5000
GDA94 / MGA 56

N



**Subject land / Pipeline disturbance footprint**

- Blowdown pipeline disturbance footprint
- Pipeline disturbance footprint
- Pressure reducing valve
- Pumping station facility 1
- Pumping station facility 2
- Pumping station facility 3
- Pumping station facility 4
- Underbore pit

**Strahler stream order**

- 1
- 2
- 3
- 4
- >4

**Subject land PCT_May2019**

- Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion
- Non-native
- Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion

0 100 200 m

Scale 1:5000
GDA94 / MGA 56

N


**Subject land / Pipeline disturbance footprint**

- Blowdown pipeline disturbance footprint
- Pipeline disturbance footprint
- Pressure reducing valve
- Pumping station facility 1
- Pumping station facility 2
- Pumping station facility 3
- Pumping station facility 4
- Underbore pit

**Strahler stream order**

- 1
- 2
- 3
- 4
- >4

**Subject land PCT_May2019**

- Broad-leaved Peppermint - Red Stringybark grassy open forest on undulating hills, South Eastern Highlands Bioregion
- Non-native

0 100 200 m

Scale 1:5000
GDA94 / MGA 56

N


**Subject land / Pipeline disturbance footprint**

- Blowdown pipeline disturbance footprint
- Pipeline disturbance footprint
- Pressure reducing valve
- Pumping station facility 1
- Pumping station facility 2
- Pumping station facility 3
- Pumping station facility 4
- Underbore pit

**Strahler stream order**

- 1
- 2
- 3
- 4
- >4

**Subject land PCT_May2019**

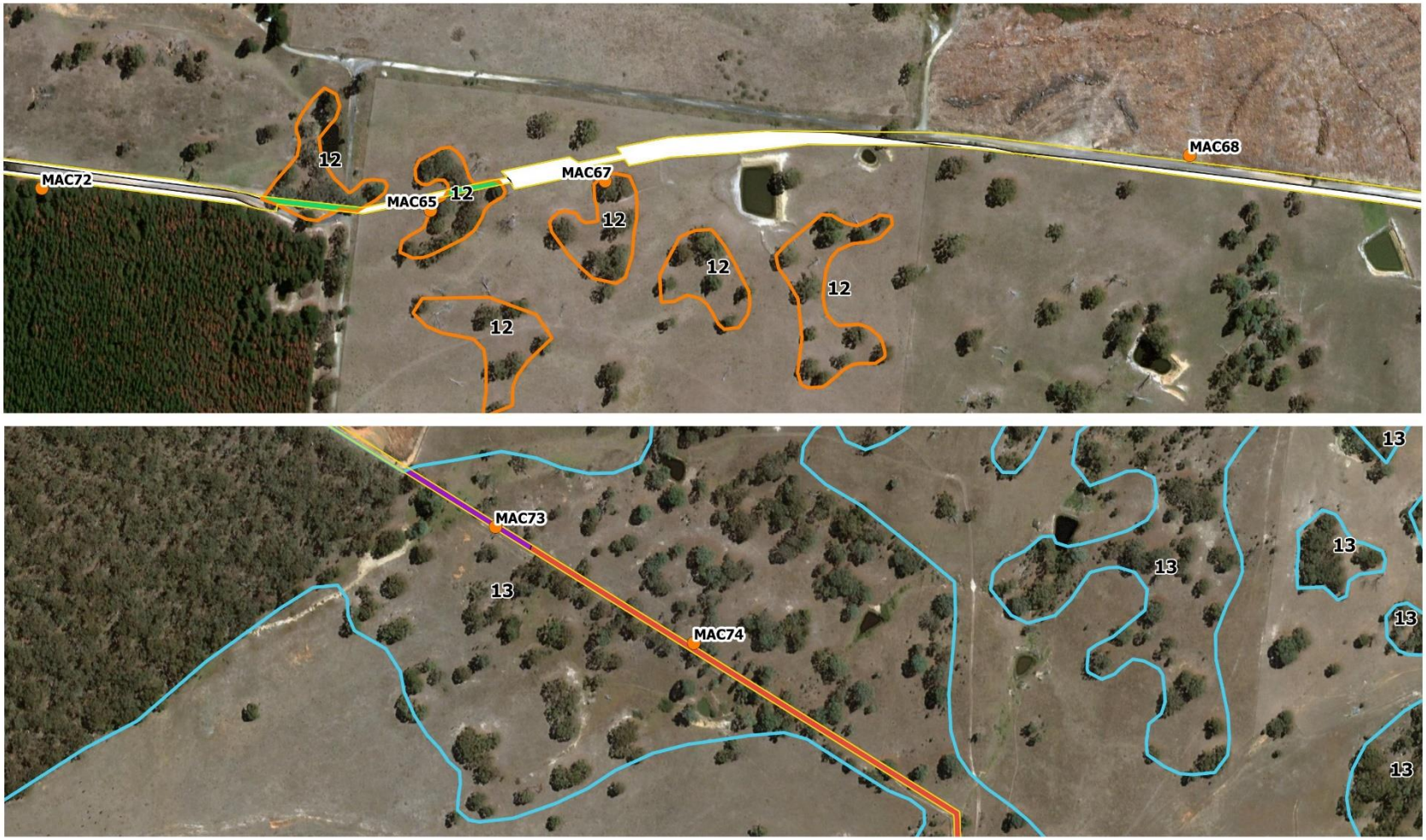
- Broad-leaved Peppermint - Red Stringybark grassy open forest on undulating hills, South Eastern Highlands Bioregion
- Non-native

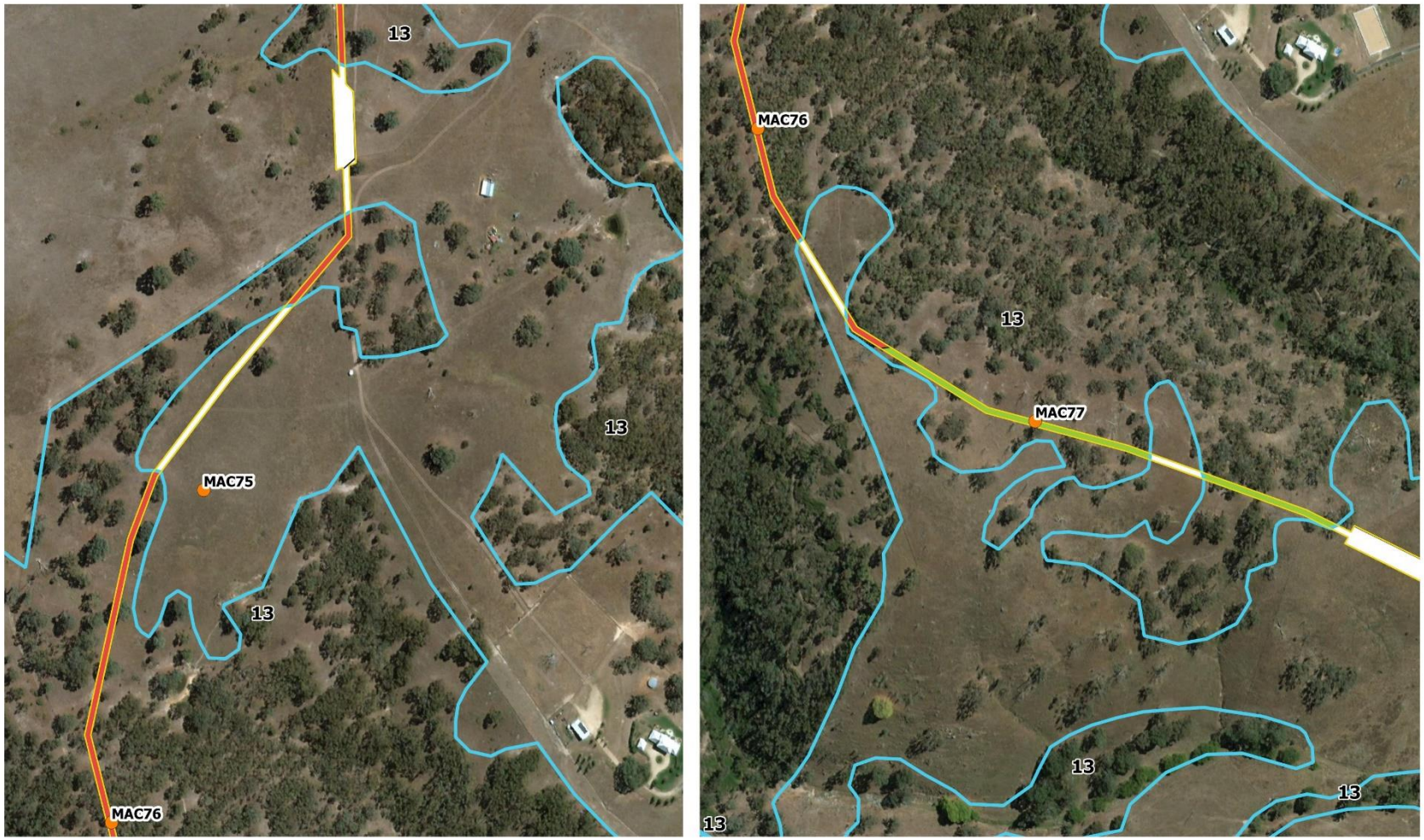
0 100 200 m

Scale 1:5000
GDA94 / MGA 56

N

## Vegetation patches and zones


MAC72
MAC65
MAC67
MAC68
12
MAC73
MAC74
13
Subject land / pipeline disturbance footprint
Non-native
Subject land Vegetation Zones
1330 Poor
287 Good
654 Poor
Native Vegetation Patches
12
13
0
100
200 m
N
Scale 1:5000
GDA94 MGA Zone 55




Subject land / pipeline disturbance footprint

**Native Vegetation Patches**

12 12

13 13

**Subject land Vegetation Zones**

1330 Poor 01

287 Good

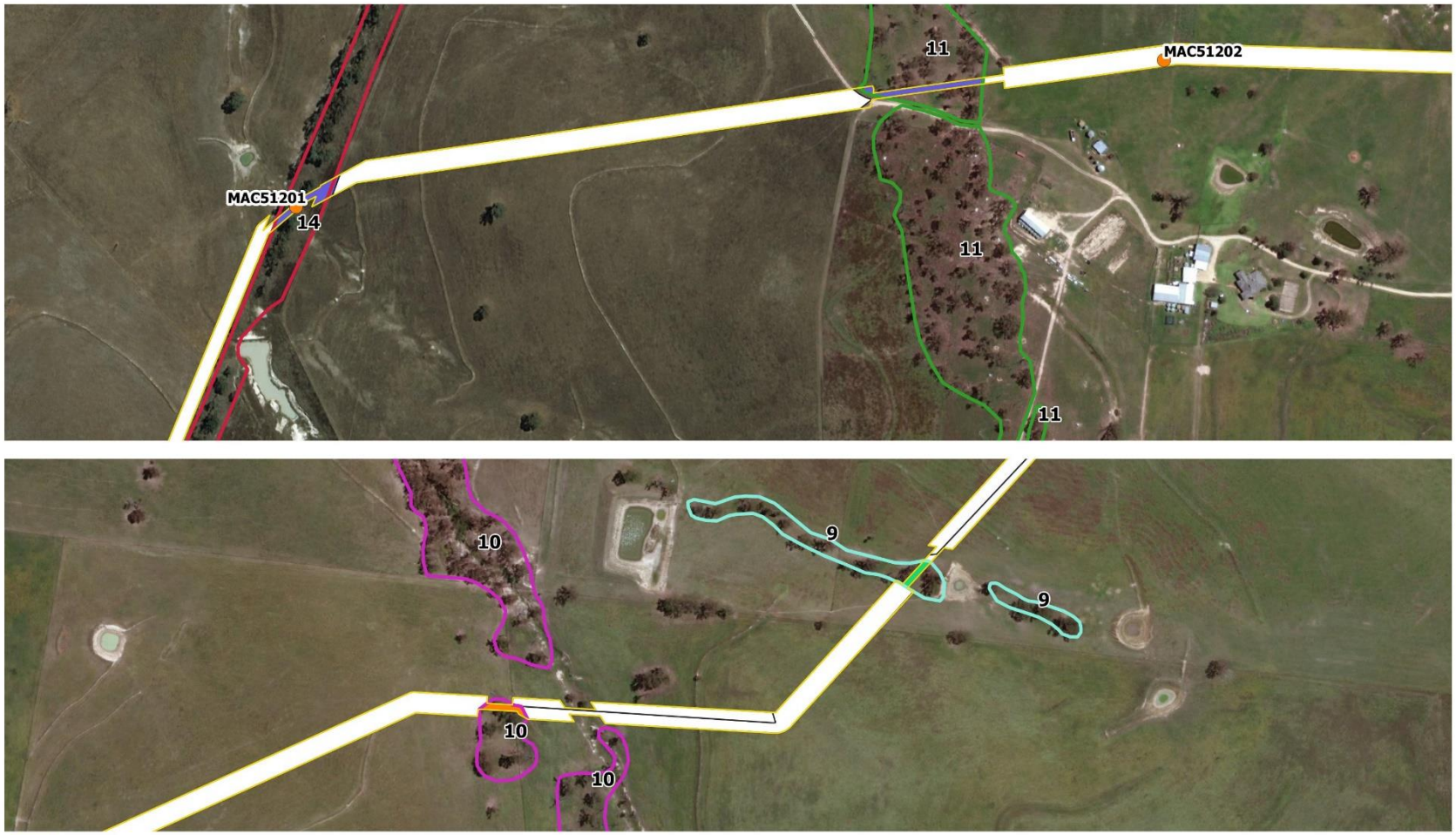
Non-native

0 100 200 m

Scale 1:5000

GDA94 MGA Zone 55

N




Subject land / pipeline disturbance footprint

**Native Vegetation Patches**

- 9 — 9
- 10 — 10
- 11 — 11
- 14 — 14

**Subject land Vegetation Zones**

- 1330 Moderate
- 1330 Poor
- 1330 Poor 02
- Non-native

0 100 200 m

Scale 1:5000

GDA94 MGA Zone 55

N


Subject land / pipeline disturbance footprint

**Native Vegetation Patches**

8 8

**Subject land Vegetation Zones**

654 Moderate

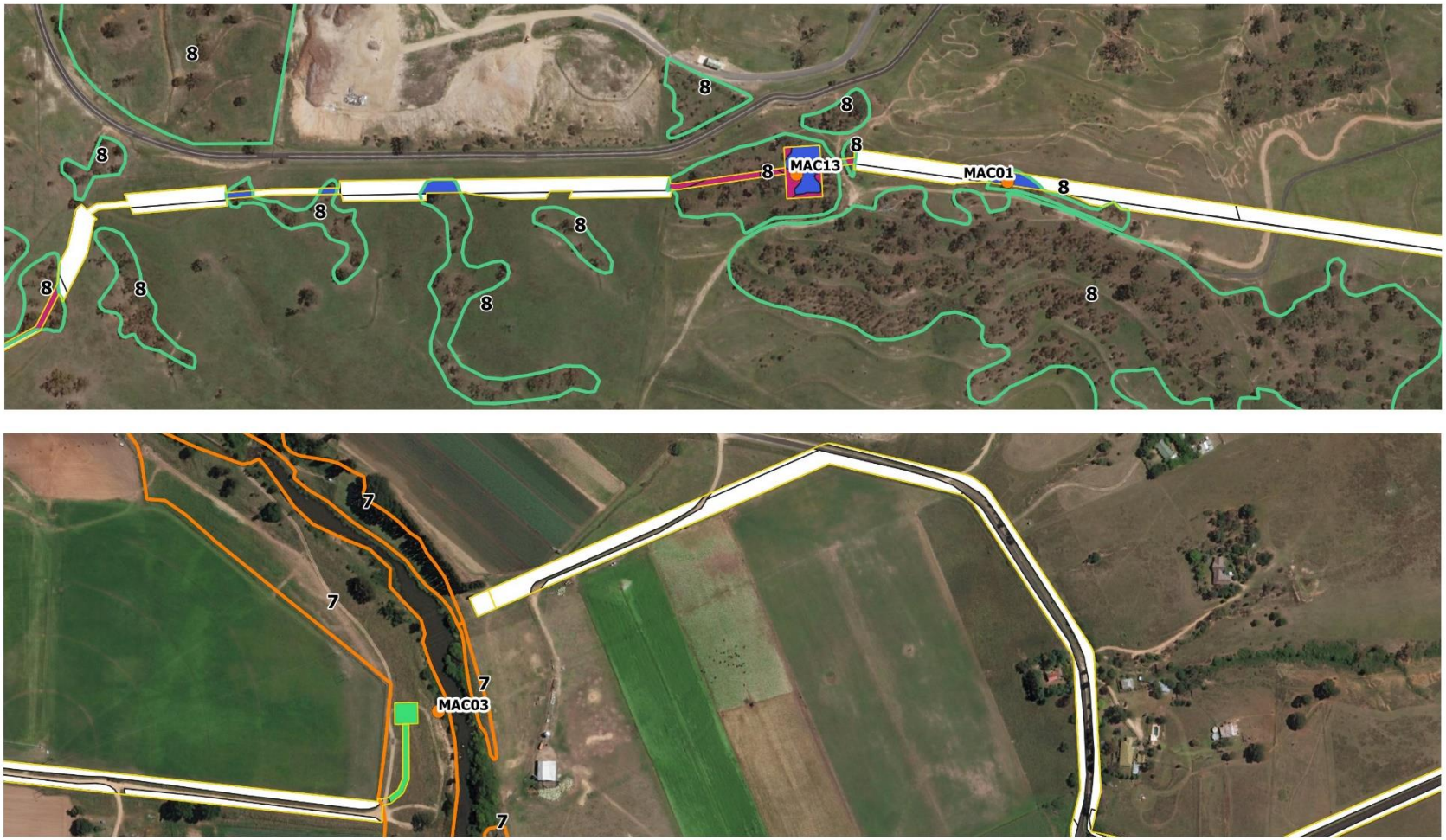
Non-native

0 100 200 m

Scale 1:5000

GDA94 MGA Zone 55

N




Subject land / pipeline disturbance footprint

**Native Vegetation Patches**

7 7

8 8

**Subject land Vegetation Zones**

654 Moderate

654 Poor 01

85 Poor

Non-native

0 100 200 m

Scale 1:5000

GDA94 MGA Zone 55

N


Subject land / pipeline disturbance footprint

**Native Vegetation Patches**

5 5

6 6

**Subject land Vegetation Zones**

1093 Poor

1330 Poor 03

Non-native

0 100 200 m

N

Scale 1:5000

GDA94 MGA Zone 55


Subject land / pipeline disturbance footprint

**Native Vegetation Patches**

- 4 4
- 5 5

**Subject land Vegetation Zones**

- 1093 Poor
- 727 Poor
- Non-native

N


Subject land / pipeline disturbance footprint

**Native Vegetation Patches**

3 3

15 15

**Subject land Vegetation Zones**

1197 Poor

765 Poor

Non-native

N



Subject land / pipeline disturbance footprint

**Native Vegetation Patches**

3 3

**Subject land Vegetation Zones**

1197 Good

1197 Poor

Non-native

0 50 100 m

Scale 1:2500

GDA94 MGA Zone 55

N


Subject land / pipeline disturbance footprint

**Native Vegetation Patches**

3 3

**Subject land Vegetation Zones**

1197 Good

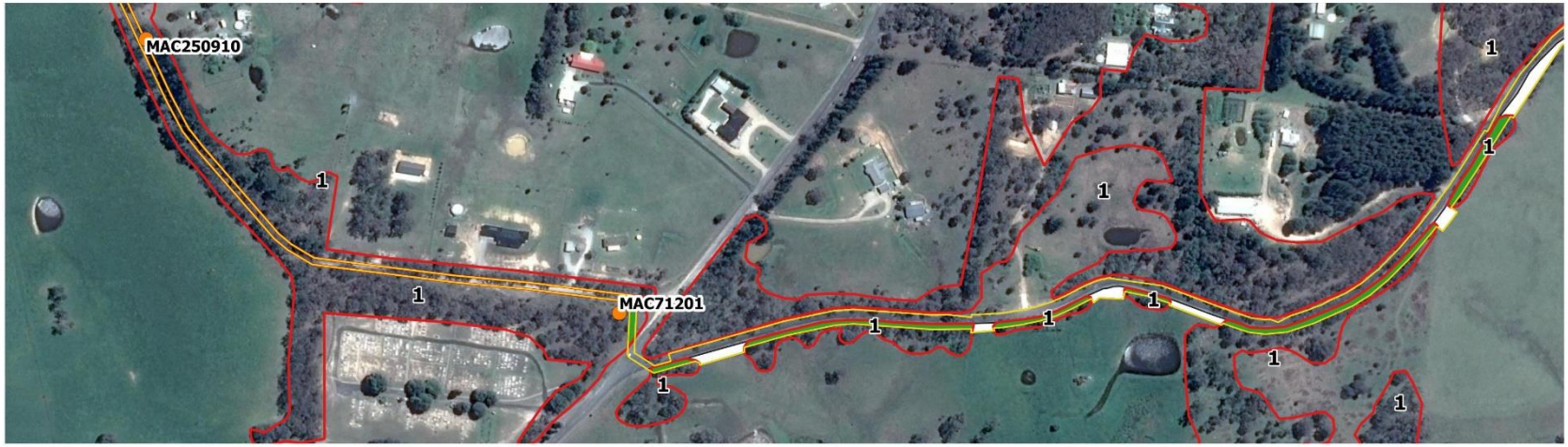
Non-native

0 100 200 m

Scale 1:5000

GDA94 MGA Zone 55

N


Subject land / pipeline disturbance footprint

**Native Vegetation Patches**

1 1

2 2

**Subject land Vegetation Zones**

1093 Good

1191 Poor

Non-native

0 100 200 m

Scale 1:5000

GDA94 MGA Zone 55

N


Subject land / pipeline disturbance footprint

**Native Vegetation Patches**

1 1

**Subject land Vegetation Zones**

1093 Good

1093 Moderate

Non-native

0 100 200 m

Scale 1:5000

GDA94 MGA Zone 56

N


Subject land / pipeline disturbance footprint

**Native Vegetation Patches**

1 1

**Subject land Vegetation Zones**

1093 Moderate

679 Good

679 Poor

731 Good

731 Poor

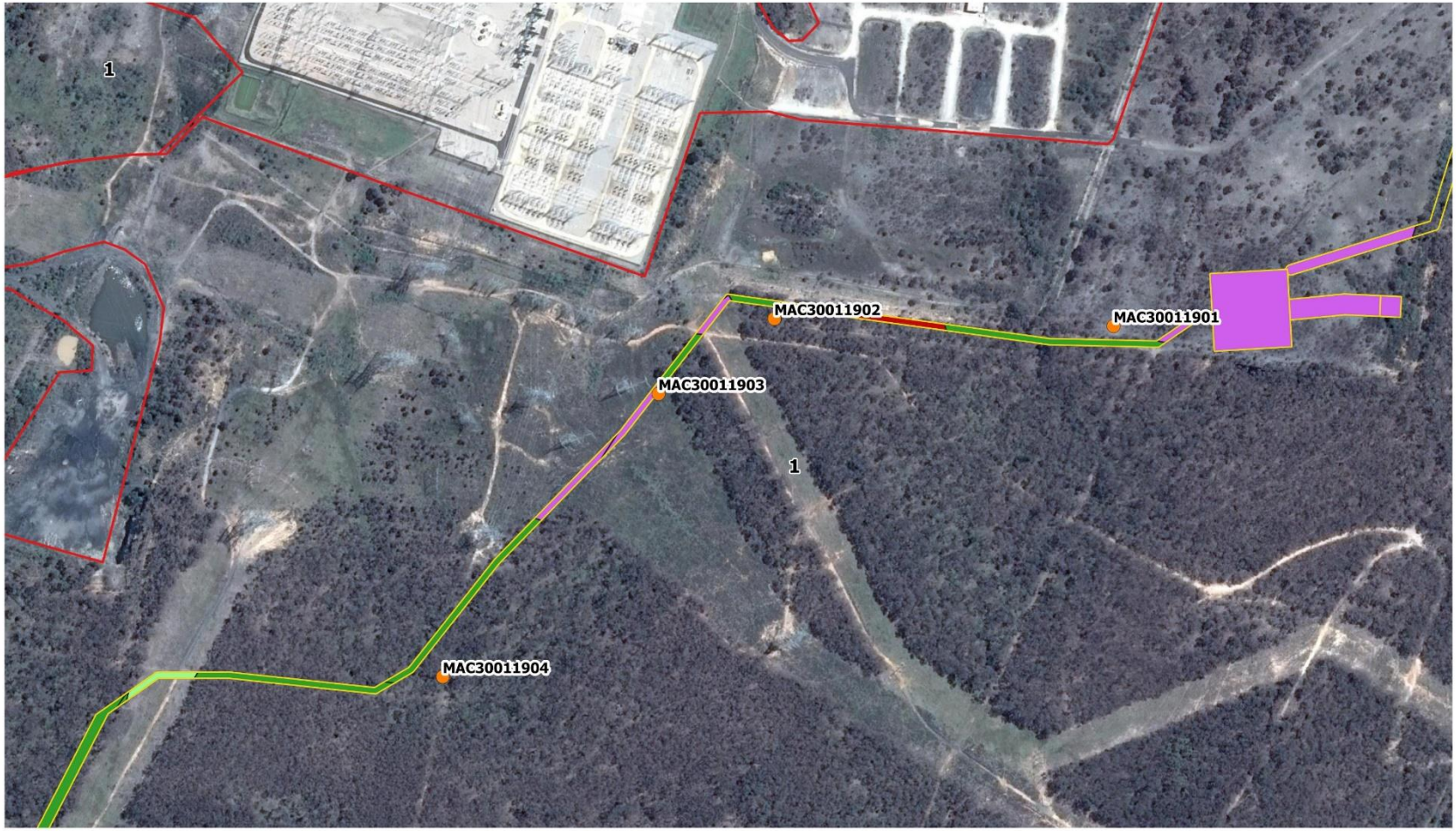
Non-native

0 100 200 m

Scale 1:5000

GDA94 MGA Zone 56

N




Subject land / pipeline disturbance footprint

**Native Vegetation Patches**

1 1

**Subject land Vegetation Zones**

1093 Poor

731 Good

731 Poor

732 Poor

Non-native

0 100 200 m

Scale 1:5000

GDA94 MGA Zone 56

N


Subject land / pipeline disturbance footprint

**Native Vegetation Patches**

1 1

**Subject land Vegetation Zones**

1093 Good

731 Poor

Non-native

0 100 200 m

Scale 1:5000

GDA94 MGA Zone 56

N


Subject land / pipeline disturbance footprint

**Native Vegetation Patches**

1 1

**Subject land Vegetation Zones**

731 Good

731 Poor

Non-native

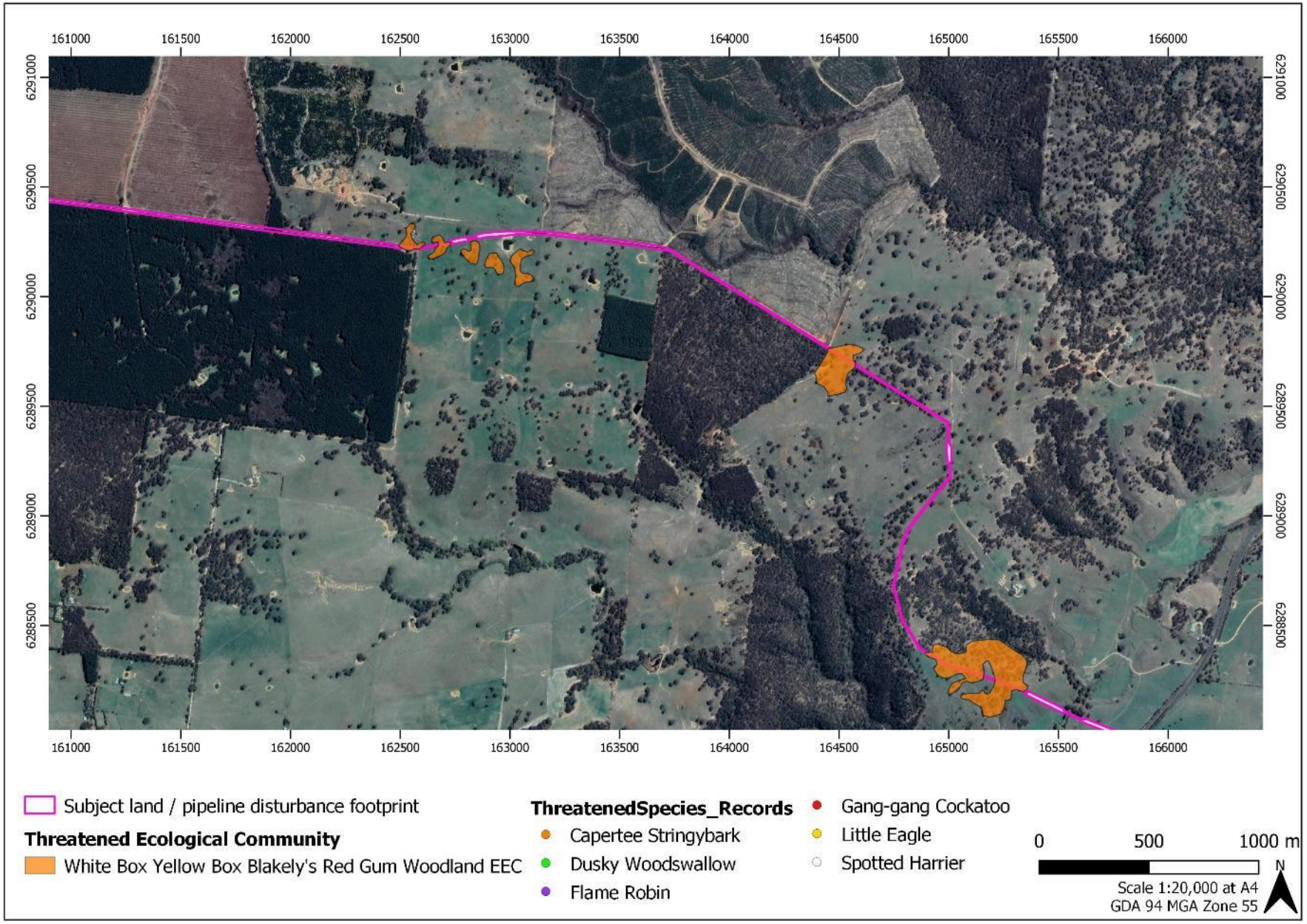
0 50 100 m

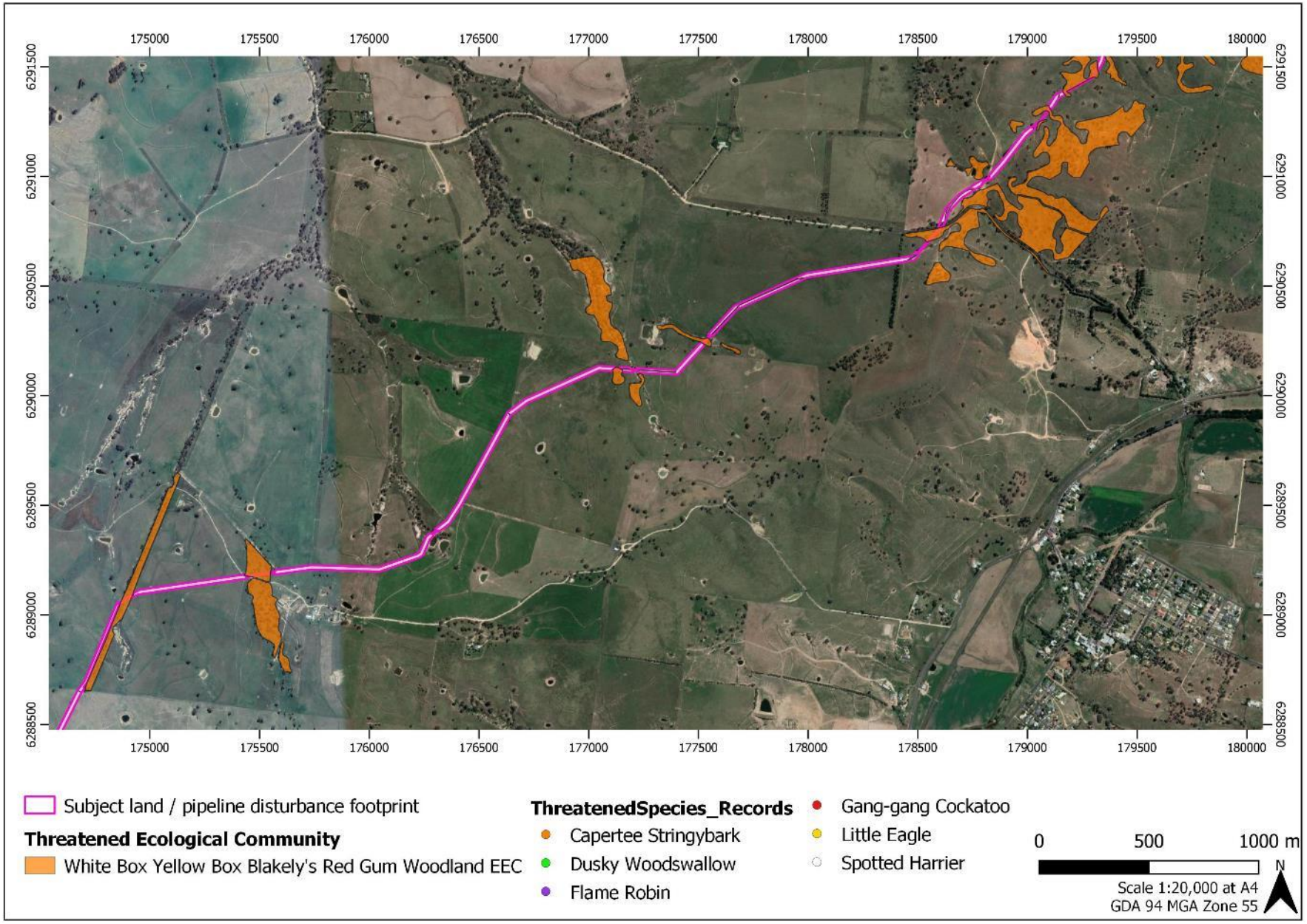
Scale 1:2500

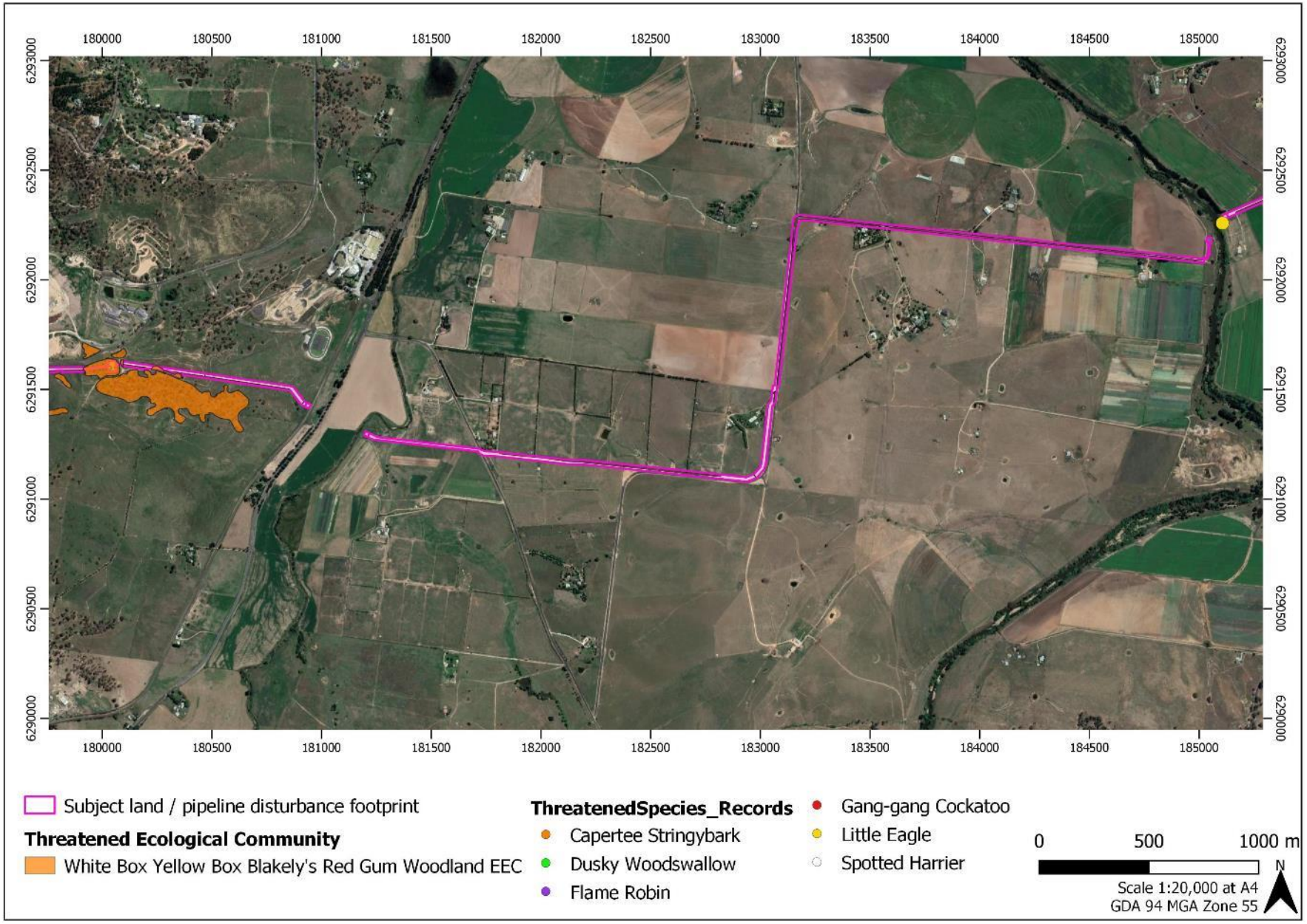
GDA94 MGA Zone 56

N

# APPENDIX 4: SPECIES POLYGON MAPS


161000
161500
162000
162500
163000
163500
164000
164500
165000
165500
166000
6291000
6290500
6290000
6289500
6289000
6288500
Subject land / pipeline disturbance footprint
Threatened Ecological Community
White Box Yellow Box Blakely's Red Gum Woodland EEC
ThreatenedSpecies_Records
Capertee Stringybark
Dusky Woodswallow
Flame Robin
Gang-gang Cockatoo
Little Eagle
Spotted Harrier
0
500
1000 m
N
Scale 1:20,000 at A4
GDA 94 MGA Zone 55


175000
175500
176000
176500
177000
177500
178000
178500
179000
179500
180000
6291500
6291000
6290500
6290000
6289500
6289000
6288500
Subject land / pipeline disturbance footprint
Threatened Ecological Community
White Box Yellow Box Blakely's Red Gum Woodland EEC
ThreatenedSpecies_Records
Capertee Stringybark
Dusky Woodswallow
Flame Robin
Gang-gang Cockatoo
Little Eagle
Spotted Harrier
0
500
1000 m
N
Scale 1:20,000 at A4
GDA 94 MGA Zone 55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181500
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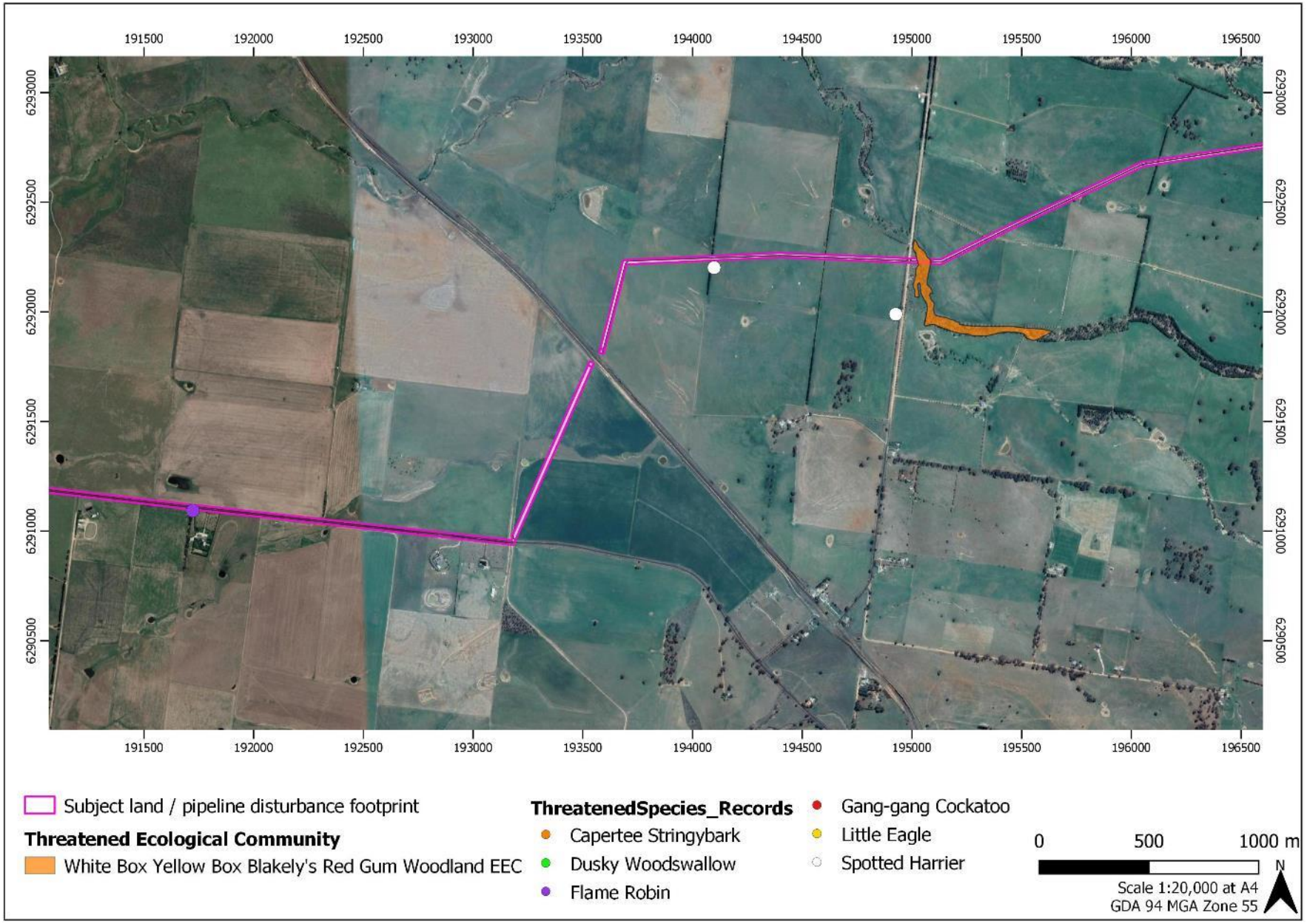
182500
183000
183500
184000
184500
185000
6293000
6292500
6292000
6291500
6291000
6290500
6290000
Subject land / pipeline disturbance footprint
Threatened Ecological Community
White Box Yellow Box Blakely's Red Gum Woodland EEC
ThreatenedSpecies_Records
Capertee Stringybark
Dusky Woodswallow
Flame Robin
Gang-gang Cockatoo
Little Eagle
Spotted Harrier
0
500
1000 m
N
Scale 1:20,000 at A4
GDA 94 MGA Zone 55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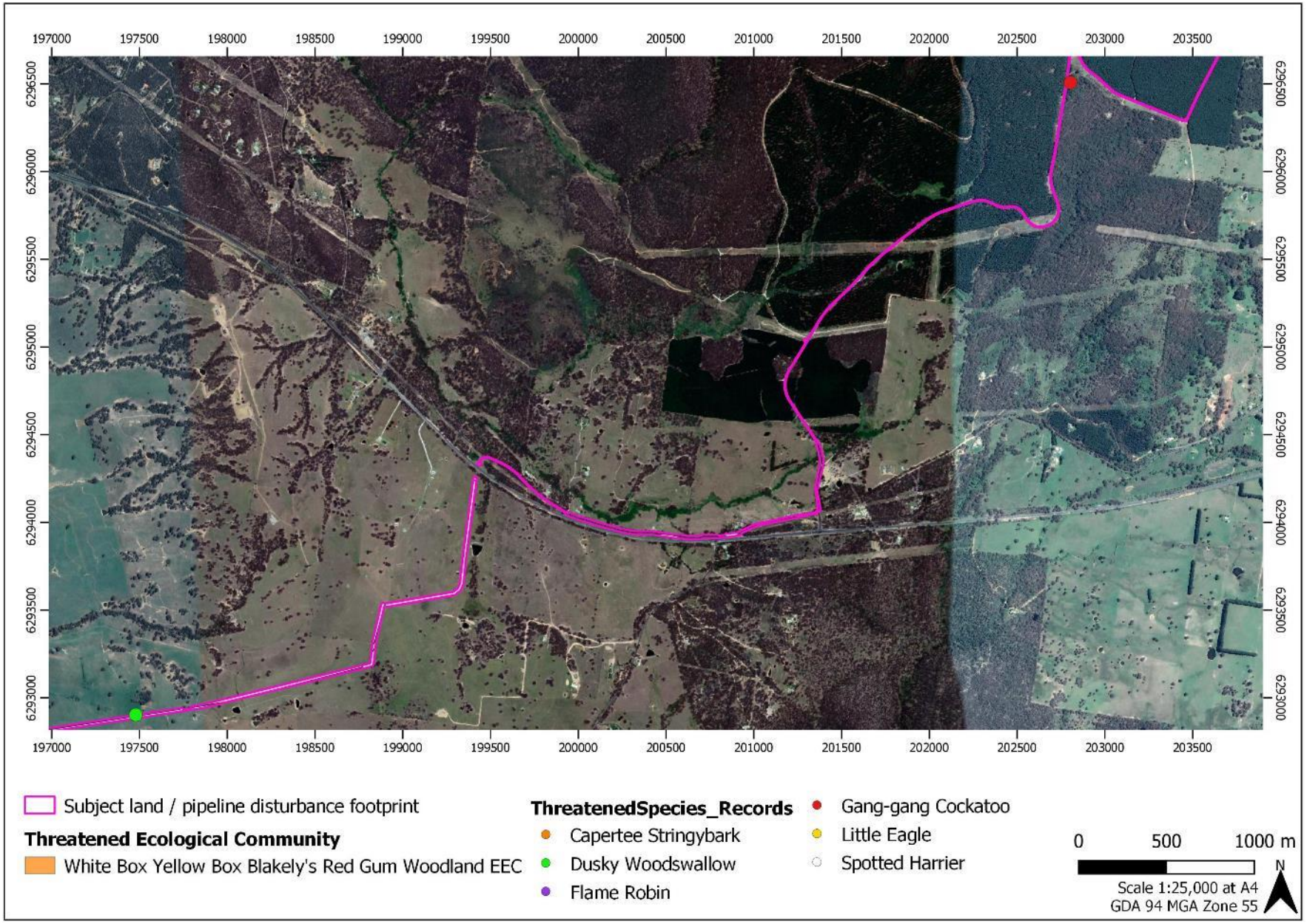
192000
192500
193000
193500
194000
194500
195000
195500
196000
196500
6293000
6292500
6292000
6291500
6291000
6290500
Subject land / pipeline disturbance footprint
Threatened Ecological Community
White Box Yellow Box Blakely's Red Gum Woodland EEC
ThreatenedSpecies_Records
Capertee Stringybark
Dusky Woodswallow
Flame Robin
Gang-gang Cockatoo
Little Eagle
Spotted Harrier
0
500
1000 m
N
Scale 1:20,000 at A4
GDA 94 MGA Zone 55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199500
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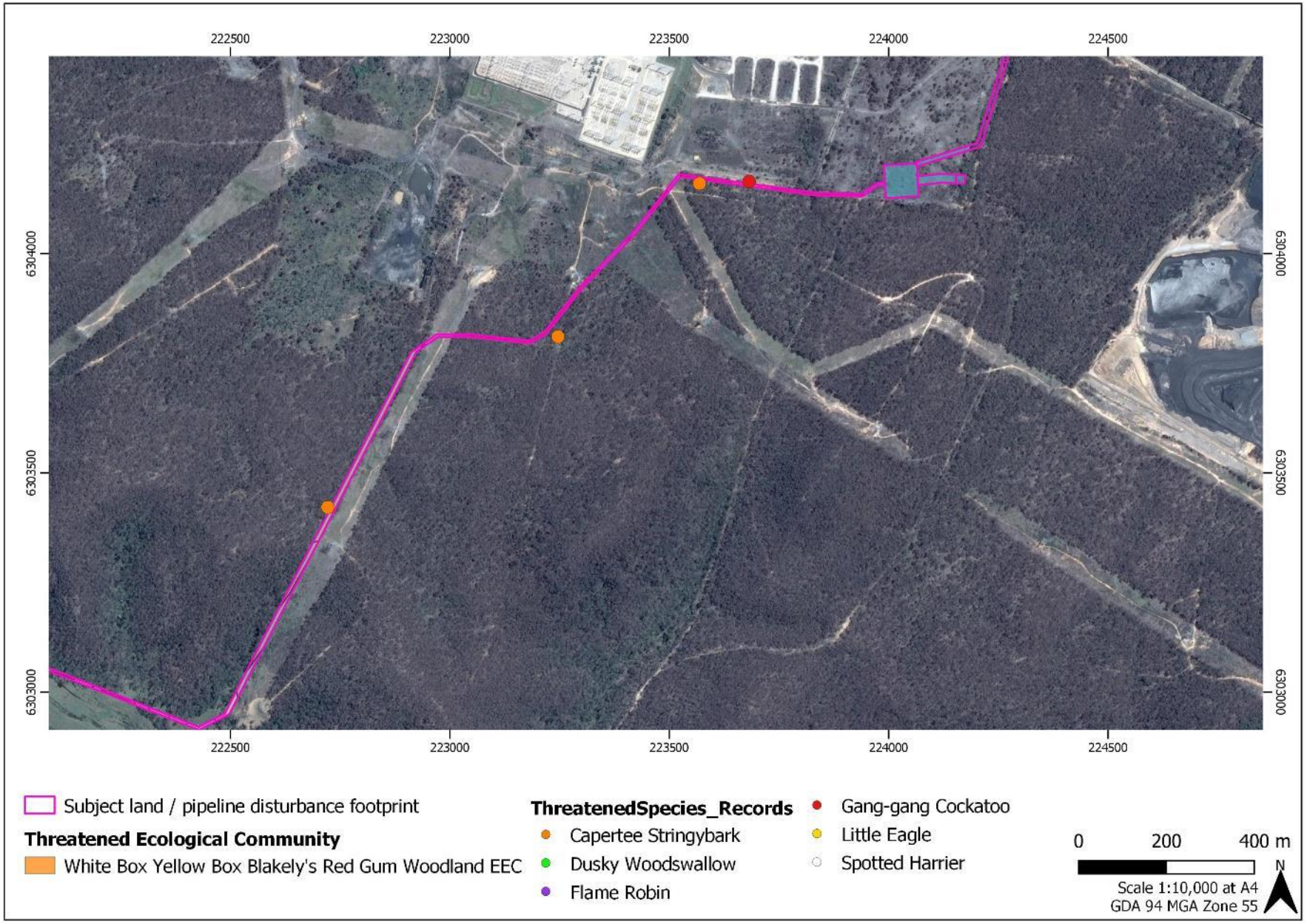
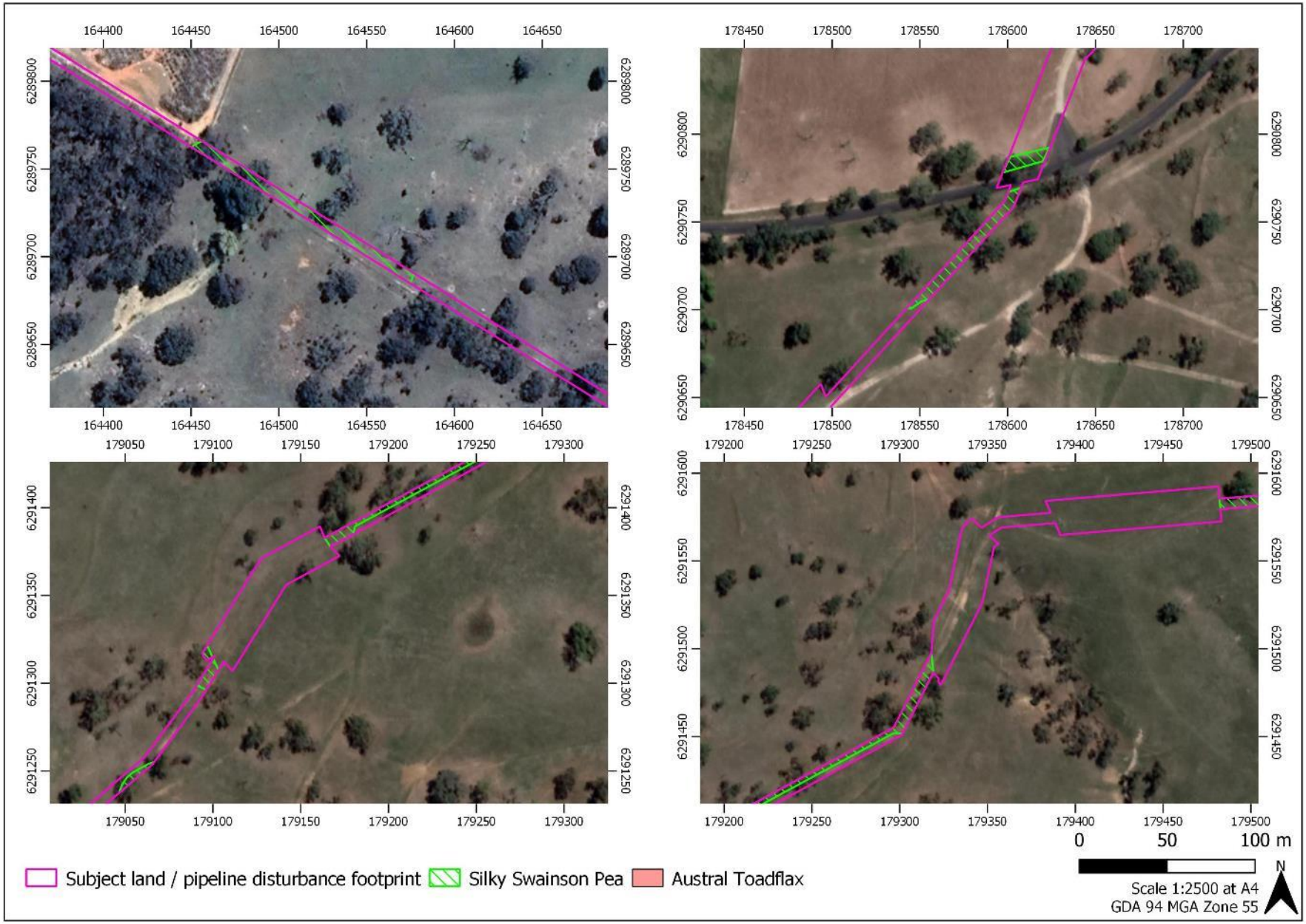
201000
201500
202000
202500
203000
203500
6296500
6296000
6295500
6295000
6294500
6294000
6293500
6293000
Subject land / pipeline disturbance footprint
Threatened Ecological Community
White Box Yellow Box Blakely's Red Gum Woodland EEC
ThreatenedSpecies_Records
Capertee Stringybark
Dusky Woodswallow
Flame Robin
Gang-gang Cockatoo
Little Eagle
Spotted Harrier
0
500
1000 m
N
Scale 1:25,000 at A4
GDA 94 MGA Zone 55


222500
223000
223500
224000
224500
6304000
6303500
6303000
Subject land / pipeline disturbance footprint
Threatened Ecological Community
White Box Yellow Box Blakely's Red Gum Woodland EEC
ThreatenedSpecies_Records
Capertee Stringybark
Dusky Woodswallow
Flame Robin
Gang-gang Cockatoo
Little Eagle
Spotted Harrier
0
200
400 m
N
Scale 1:10,000 at A4
GDA 94 MGA Zone 55


732400
732500
732600
732700
732800
732900
733000
6291900
6291800
6291700
Subject land / Pipeline disturbance footprint
Silky Swainson Pea
0
50
100 m
Scale 1:2500
GDA94 / MGA Zone 55
N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164650
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6289750
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178450
178500
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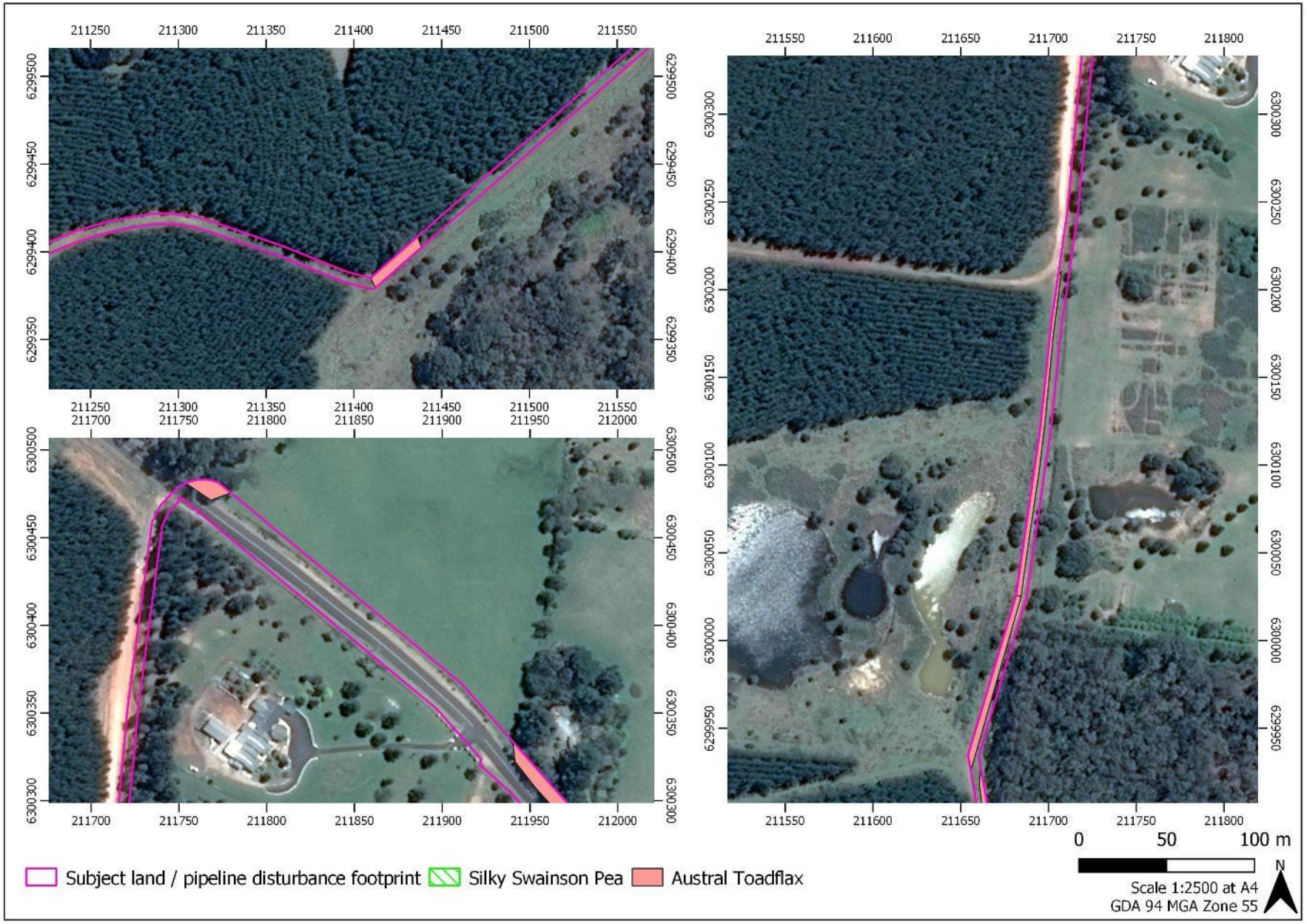
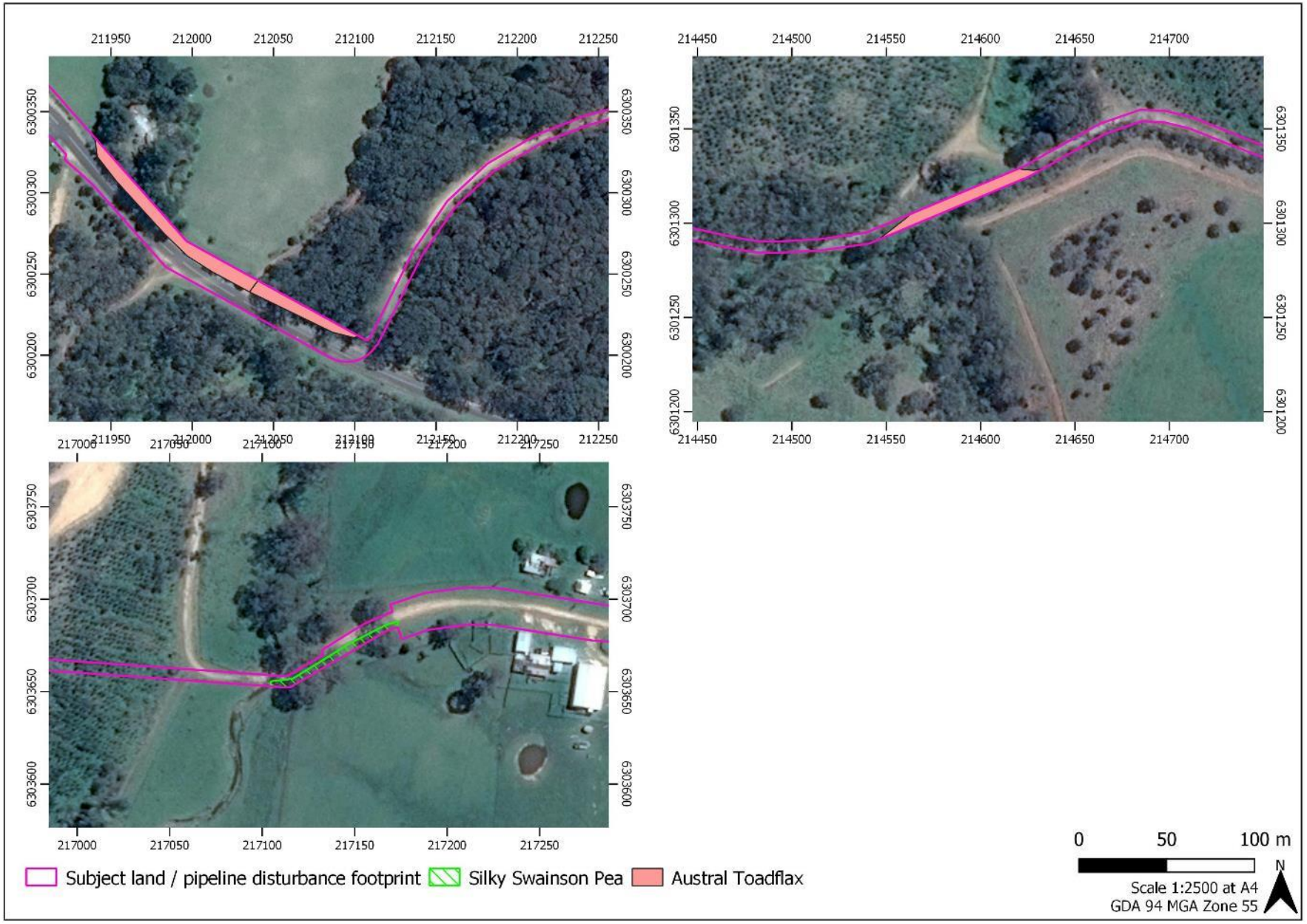
178600
178650
178700
6290800
6290750
6290700
6290650
179050
179100
179150
179200
179250
179300
6291400
6291350
6291300
6291250
179200
179250
179300
179350
179400
179450
179500
6291600
6291550
6291500
6291450
0
50
100 m
Subject land / pipeline disturbance footprint
Silky Swainson Pea
Austral Toadflax
N
Scale 1:2500 at A4
GDA 94 MGA Zone 55


179300
179350
179400
179450
179500
179550
179600
179650
179700
179750
179800
179850
179900
179950
6291650
6291600
6291550
6291500
179900
179950
180000
180050
180100
180150
180200
180250
180300
180350
180400
180450
180500
180550
0
50
100 m
Subject land / pipeline disturbance footprint
Silky Swainson Pea
Austral Toadflax
N
Scale 1:2500 at A4
GDA 94 MGA Zone 55


Subject land / pipeline disturbance footprint
Silky Swainson Pea
Austral Toadflax
0 50 100 m
Scale 1:2500 at A4
GDA 94 MGA Zone 55
N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212100
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212200
212250
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6300300
6300250
6300200
214450
214500
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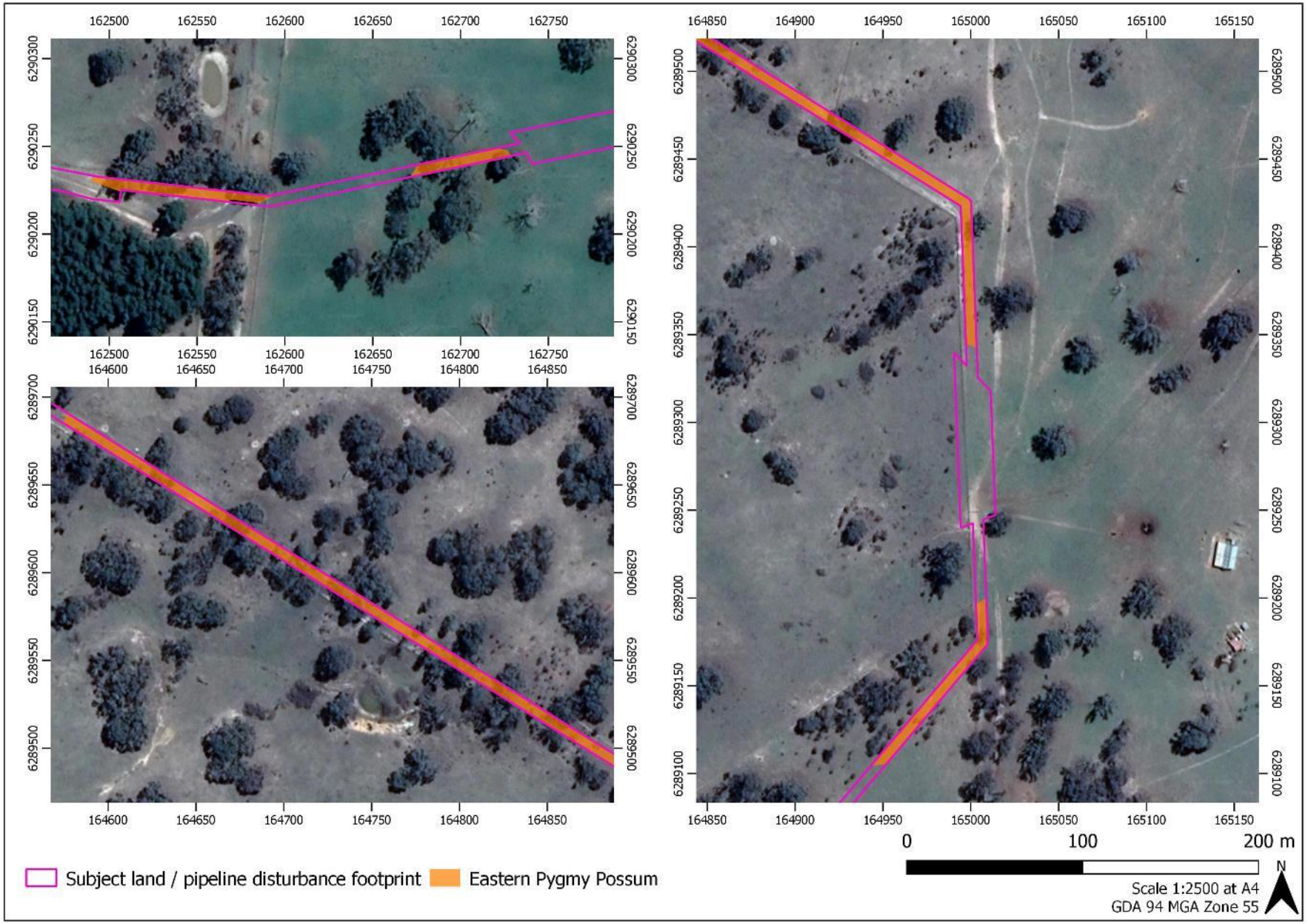
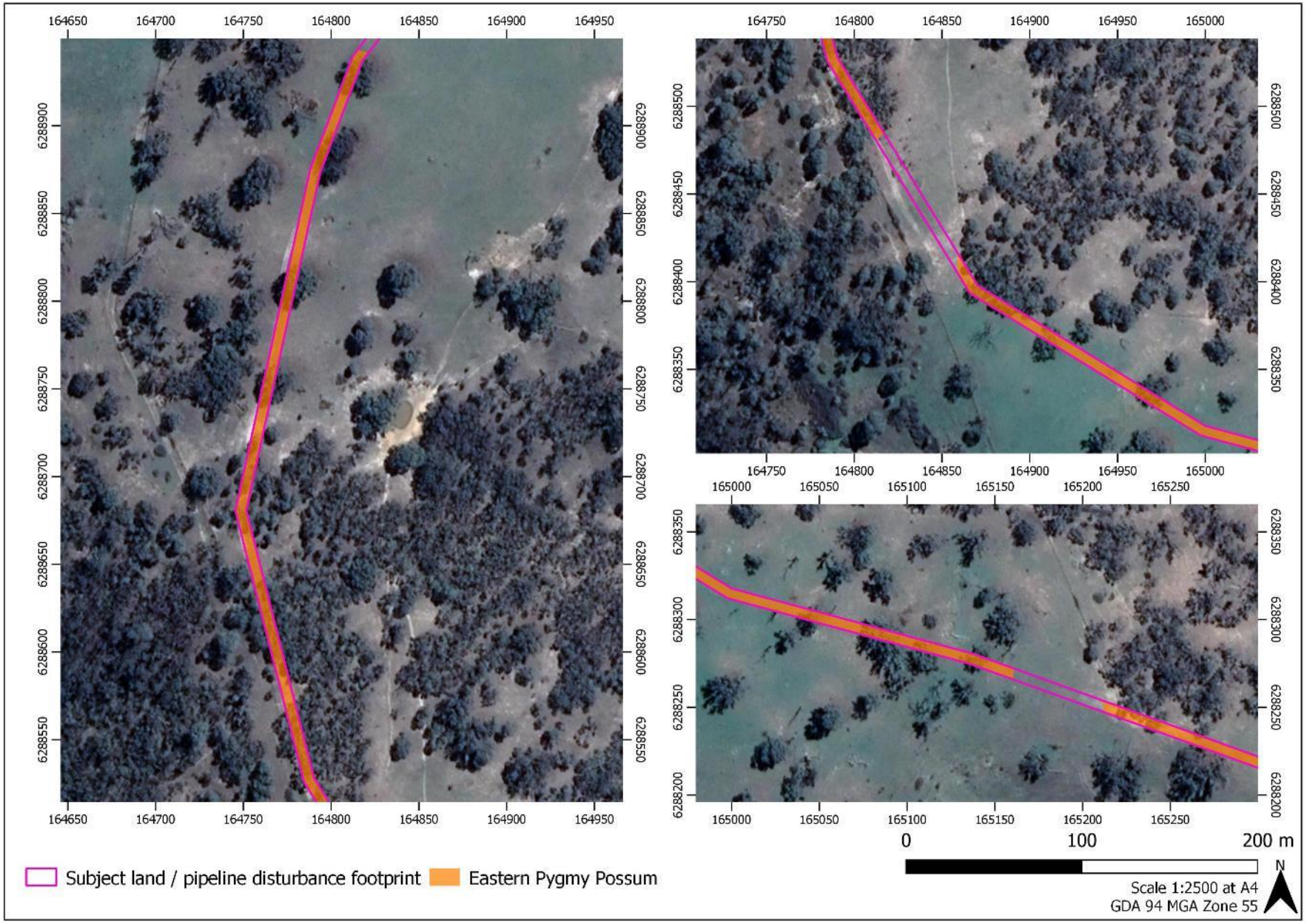
214600
214650
214700
6301350
6301300
6301250
6301200
217000
217050
217100
217150
217200
217250
6303750
6303700
6303650
6303600
Subject land / pipeline disturbance footprint
Silky Swainson Pea
Austral Toadflax
0
50
100 m
N
Scale 1:2500 at A4
GDA 94 MGA Zone 55


Subject land / pipeline disturbance footprint
Eastern Pygmy Possum
0
100
200 m
N
Scale 1:2500 at A4
GDA 94 MGA Zone 55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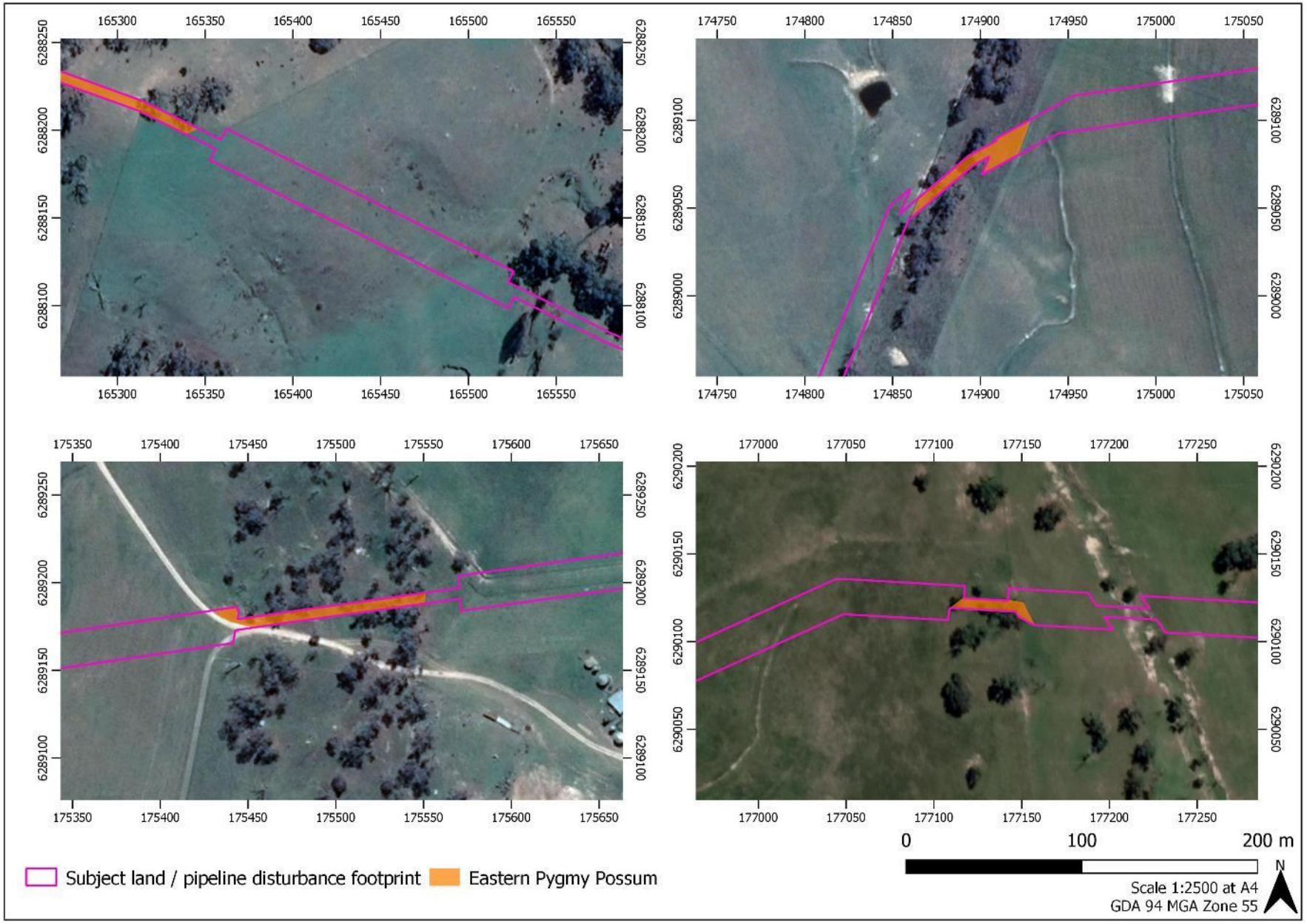
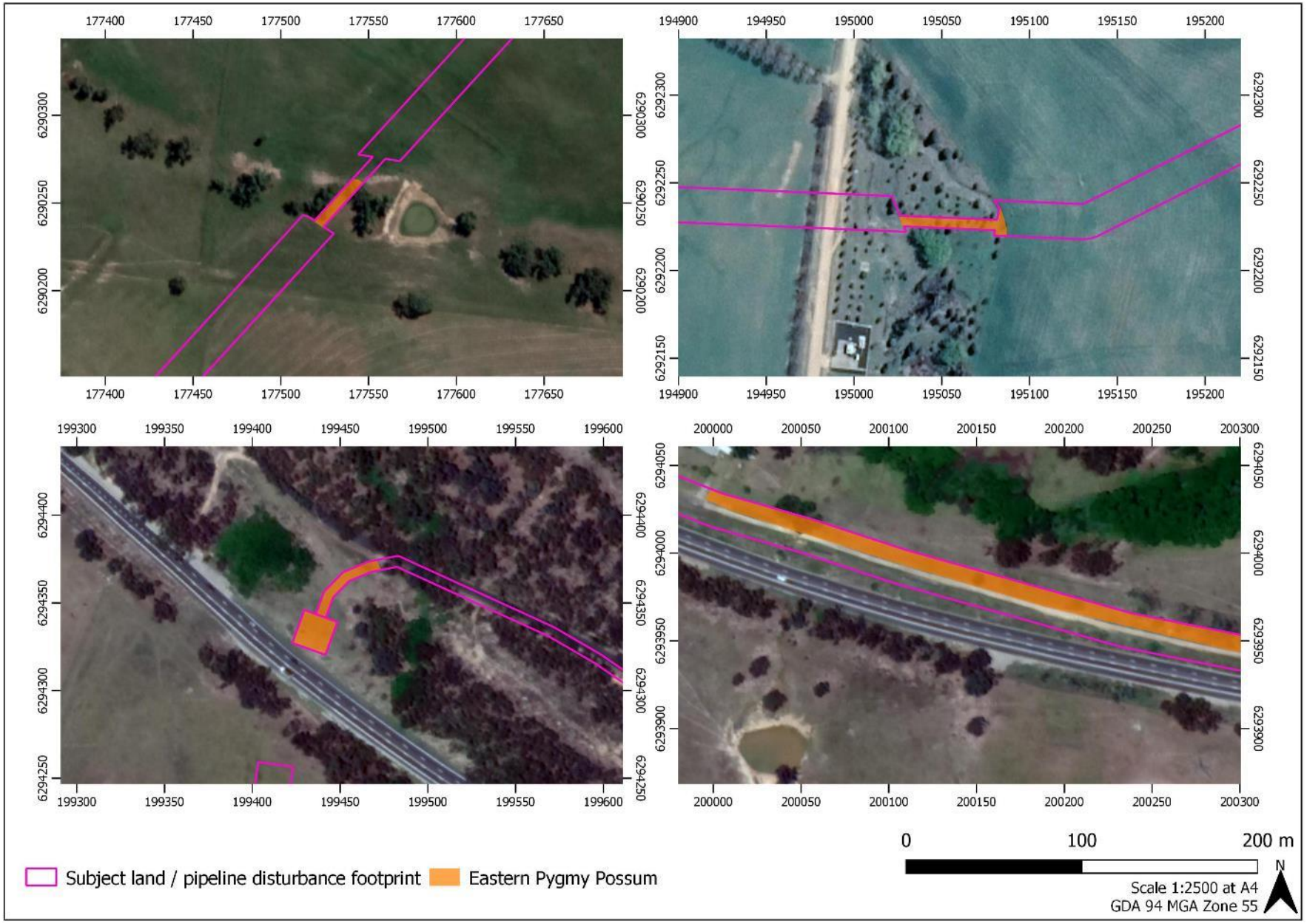
6288550
164750
164800
164850
164900
164950
165000
6288500
6288450
6288400
6288350
165000
165050
165100
165150
165200
165250
6288350
6288300
6288250
6288200
0
100
200 m
N
Subject land / pipeline disturbance footprint
Eastern Pygmy Possum
Scale 1:2500 at A4
GDA 94 MGA Zone 55


Subject land / pipeline disturbance footprint
Eastern Pygmy Possum
0
100
200 m
N
Scale 1:2500 at A4
GDA 94 MGA Zone 55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177650
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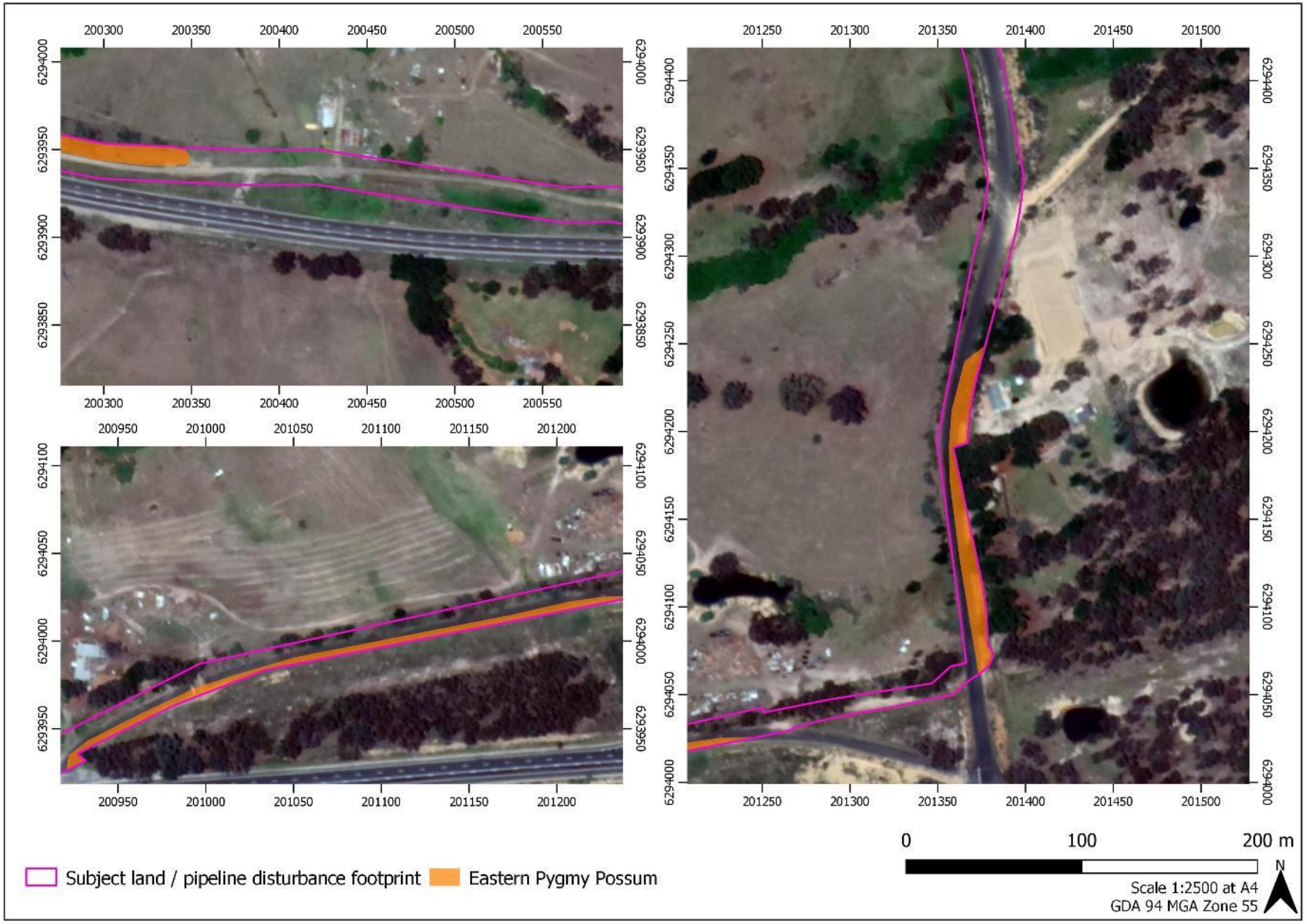
6290250
6290200
194900
194950
195000
195050
195100
195150
195200
6292300
6292250
6292200
6292150
199300
199350
199400
199450
199500
199550
199600
6294400
6294350
6294300
6294250
200000
200050
200100
200150
200200
200250
200300
6294050
6294000
6293950
6293900
0
100
200 m
N
Subject land / pipeline disturbance footprint
Eastern Pygmy Possum
Scale 1:2500 at A4
GDA 94 MGA Zone 55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200450
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6293900
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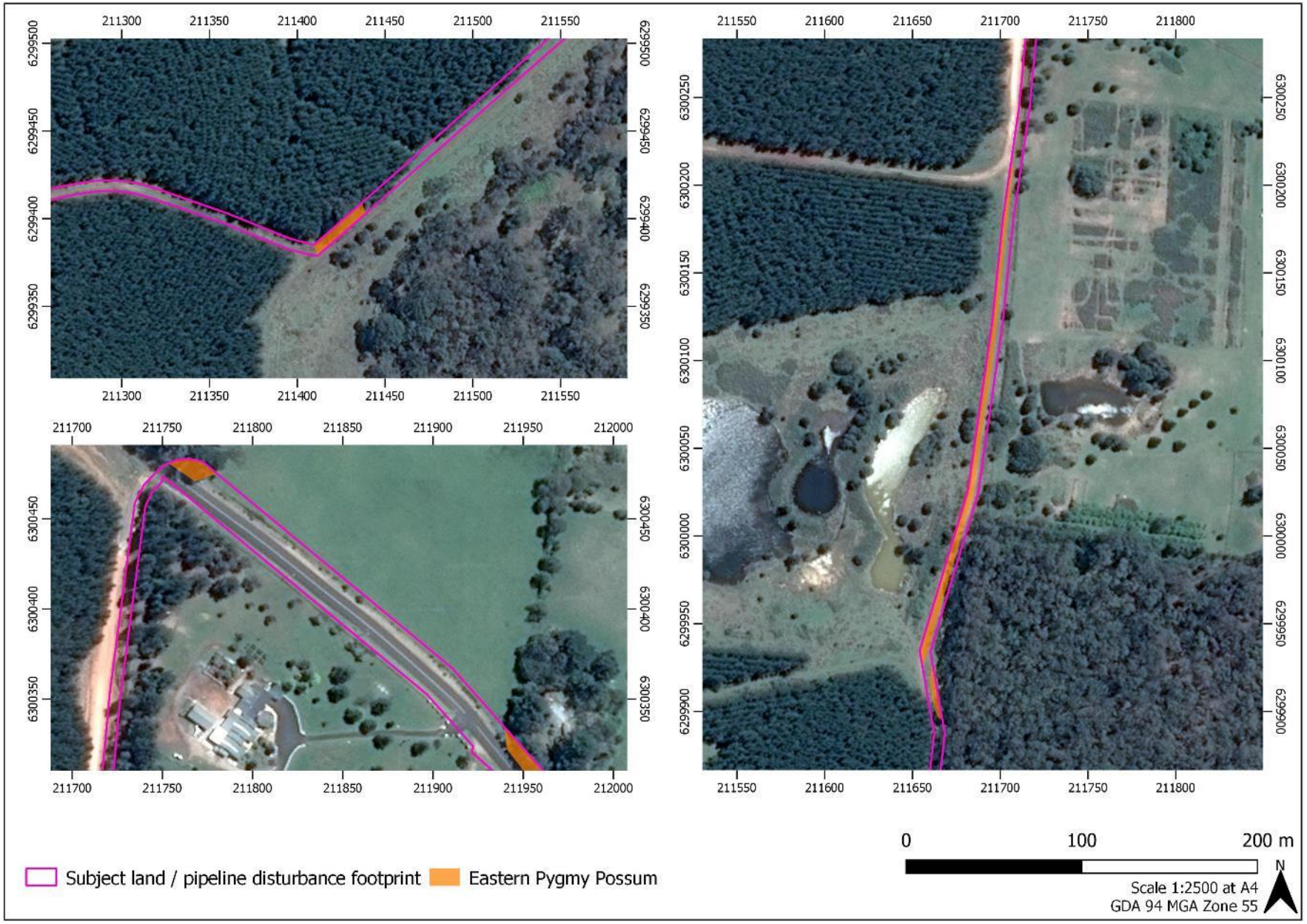
200950
201000
201050
201100
201150
201200
6294100
6294050
6294000
6293950
201250
201300
201350
201400
201450
201500
6294400
6294350
6294300
6294250
6294200
6294150
6294100
6294050
6294000
0
100
200 m
N
Scale 1:2500 at A4
GDA 94 MGA Zone 55
Subject land / pipeline disturbance footprint
Eastern Pygmy Possum


Subject land / pipeline disturbance footprint
Eastern Pygmy Possum
0
100
200 m
N
Scale 1:2500 at A4
GDA 94 MGA Zone 55


211900
211950
212000
212050
212100
212150
6300350
6300300
6300250
6300200
217000
217050
217100
217150
217200
217250
217300
6303700
6303650
6303600
214450
214500
214550
214600
214650
214700
214750
6301350
6301300
6301250
218400
218450
218500
218550
218600
218650
218700
6303350
6303300
6303250
6303200
0
100
200 m
N
Subject land / pipeline disturbance footprint
Eastern Pygmy Possum
Scale 1:2500 at A4
GDA 94 MGA Zone 55


Subject land / pipeline disturbance footprint
Eastern Pygmy Possum
0
100
200 m
Scale 1:2500 at A4
GDA 94 MGA Zone 55
N


220800
220850
220900
220950
221000
221050
221100
221150
221200
221250
221300
221350
221400
221450
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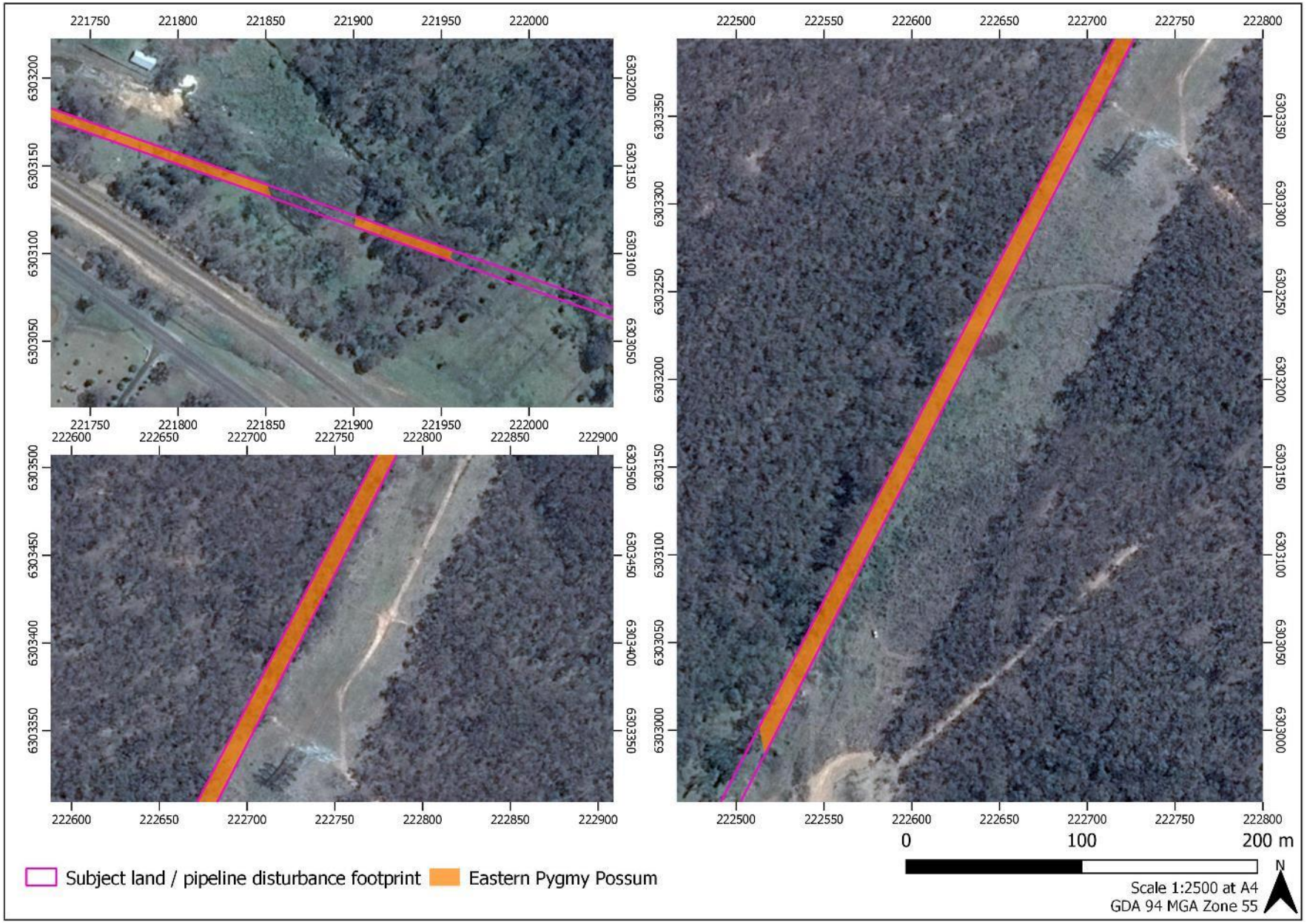
221500
221550
221600
221650
221700
221750
221800
221850
221900
6303350
6303300
6303250
6303200
0
100
200 m
N
Subject land / pipeline disturbance footprint
Eastern Pygmy Possum
Scale 1:2500 at A4
GDA 94 MGA Zone 55


Subject land / pipeline disturbance footprint
Eastern Pygmy Possum
0
100
200 m
Scale 1:2500 at A4
GDA 94 MGA Zone 55
N


222800
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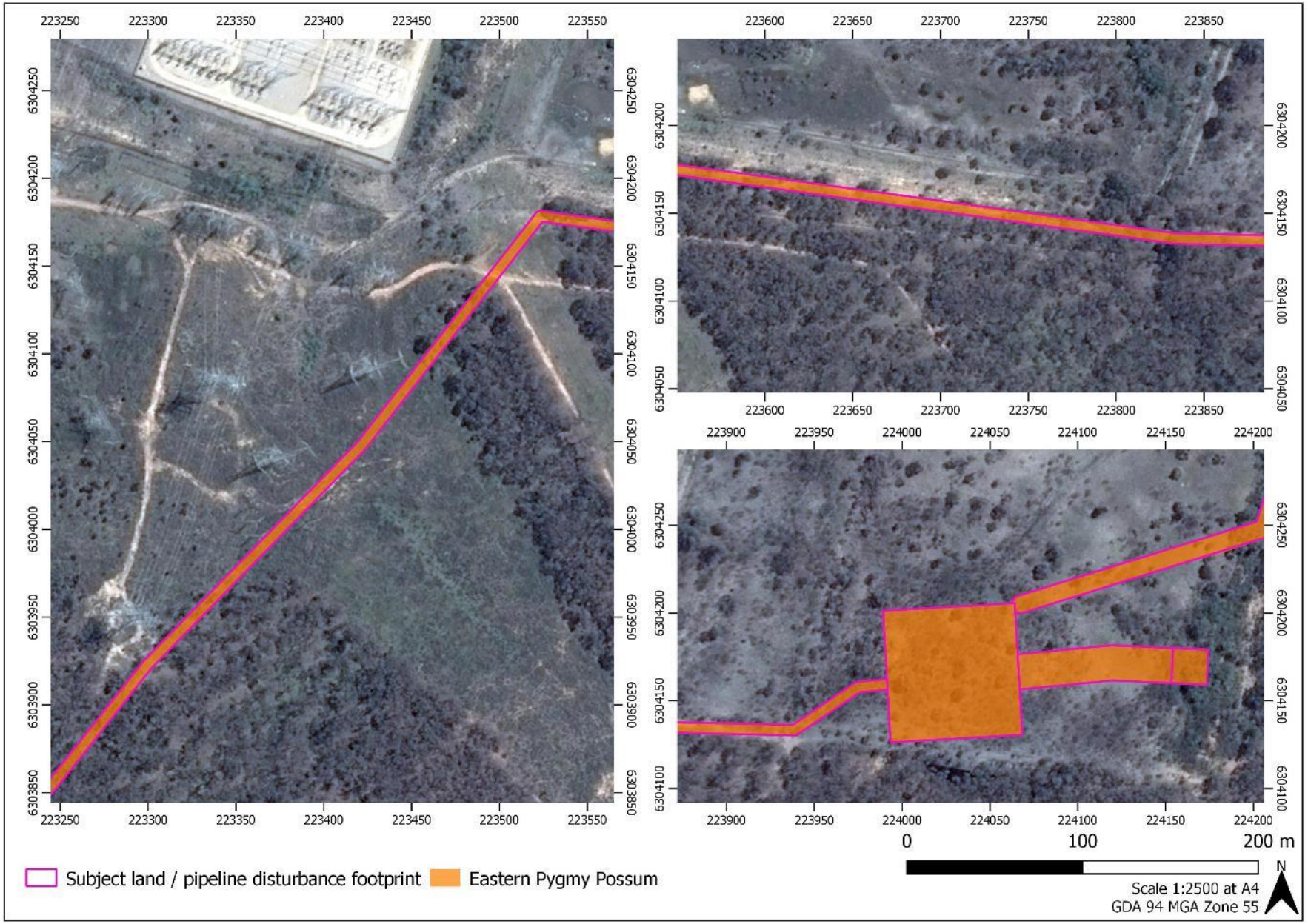
222950
223000
223050
6303850
6303800
6303750
6303700
6303650
6303600
6303550
6303500
6303450
223100
223150
223200
223250
223300
223350
6304100
6304050
6304000
6303950
6303900
6303850
6303800
6303750
0
100
200 m
N
Subject land / pipeline disturbance footprint
Eastern Pygmy Possum
Scale 1:2500 at A4
GDA 94 MGA Zone 55


Subject land / pipeline disturbance footprint
Eastern Pygmy Possum
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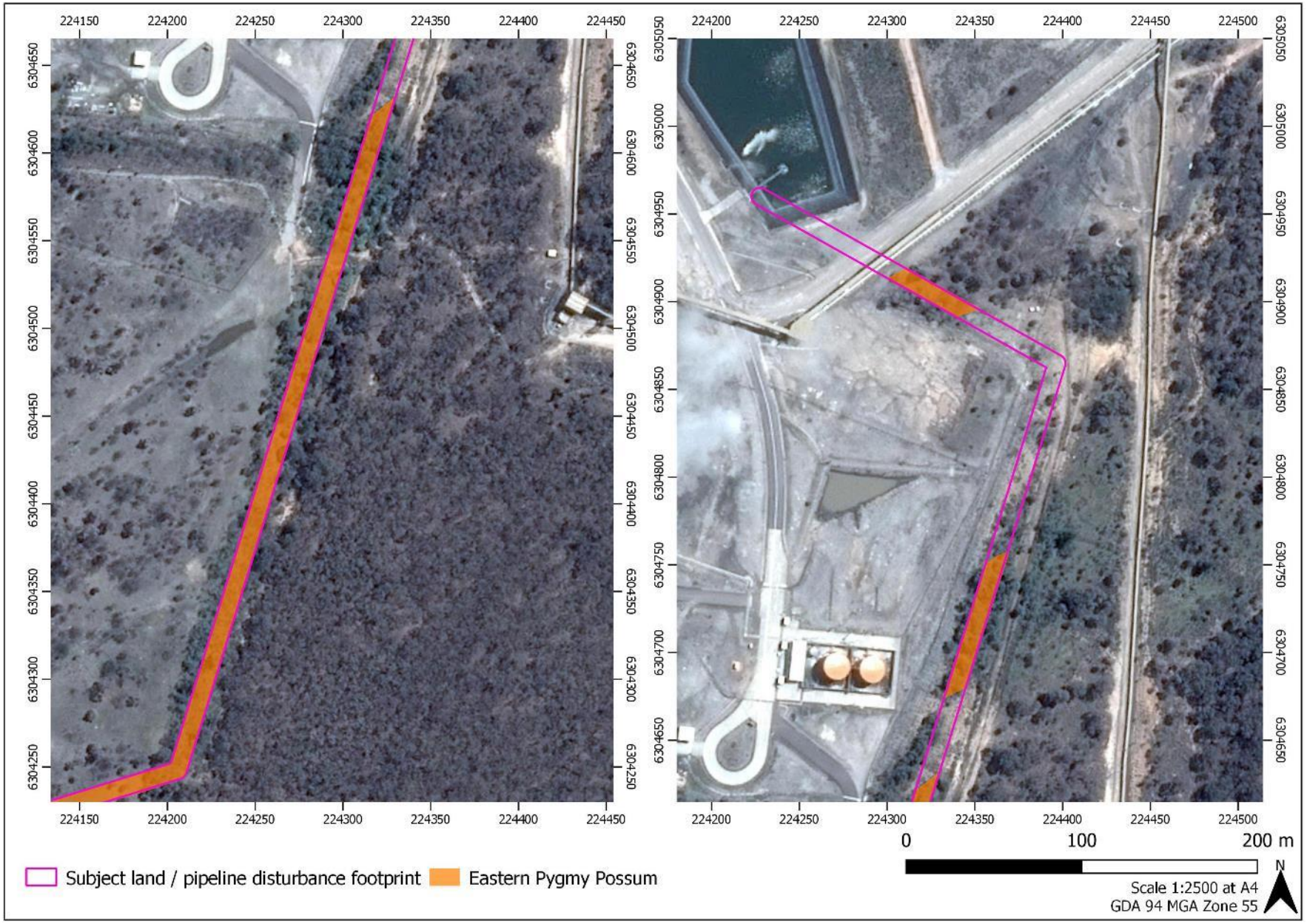
100
200 m
Scale 1:2500 at A4
GDA 94 MGA Zone 55
N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6304500
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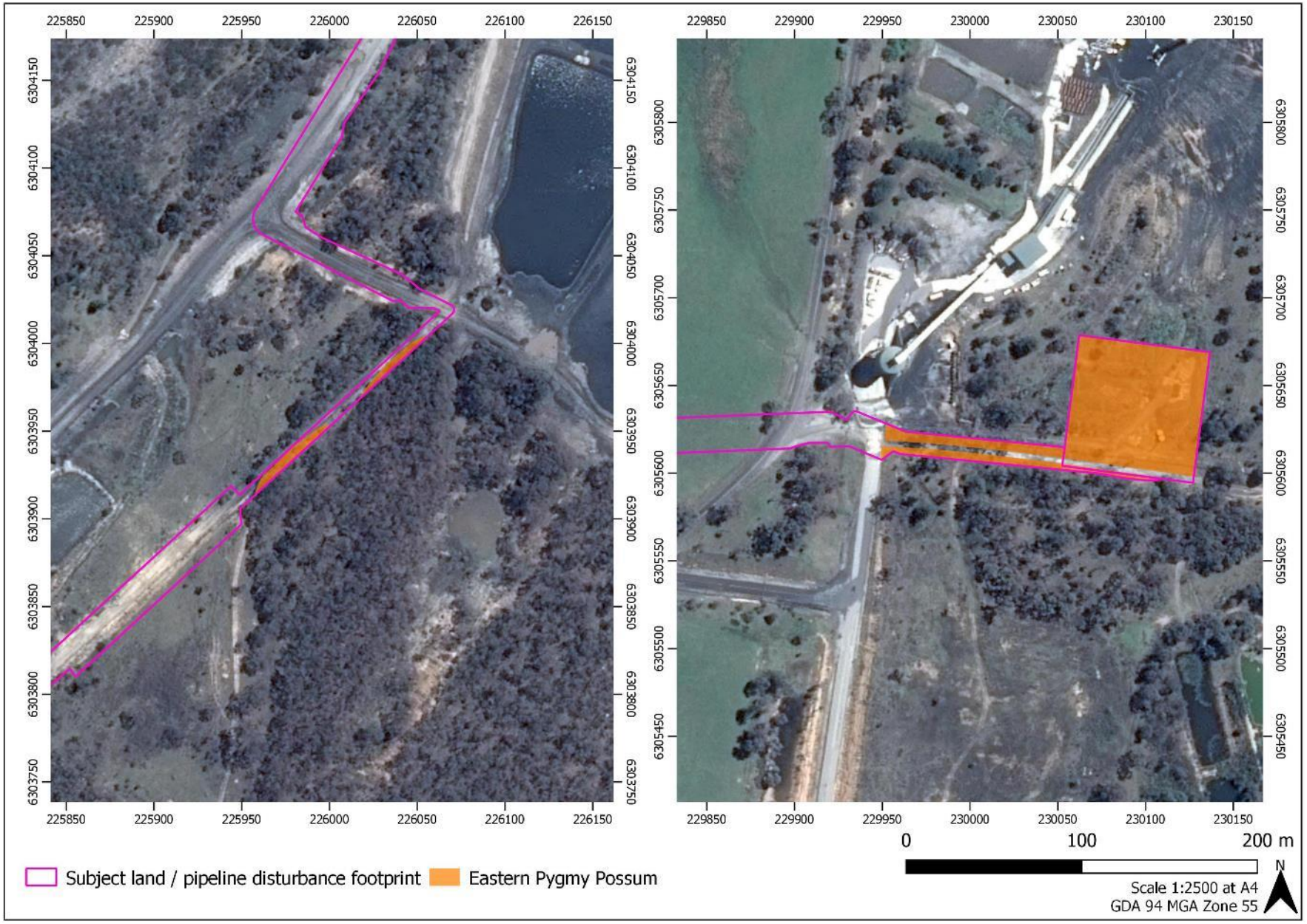
6305050
6305000
6304950
6304900
6304850
6304800
6304750
6304700
6304650
0
100
200 m
Subject land / pipeline disturbance footprint
Eastern Pygmy Possum
Scale 1:2500 at A4
GDA 94 MGA Zone 55
N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6303950
6303900
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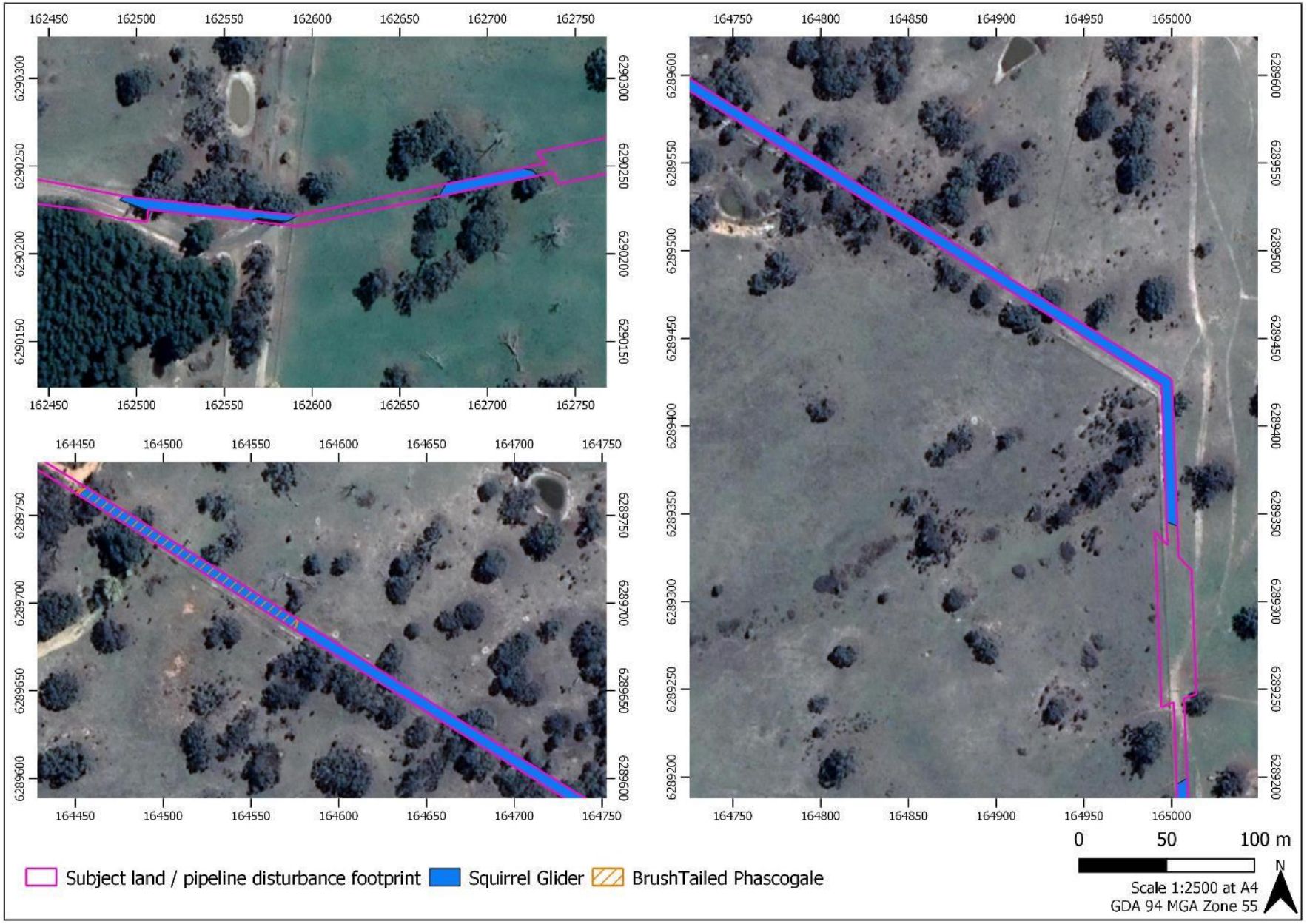
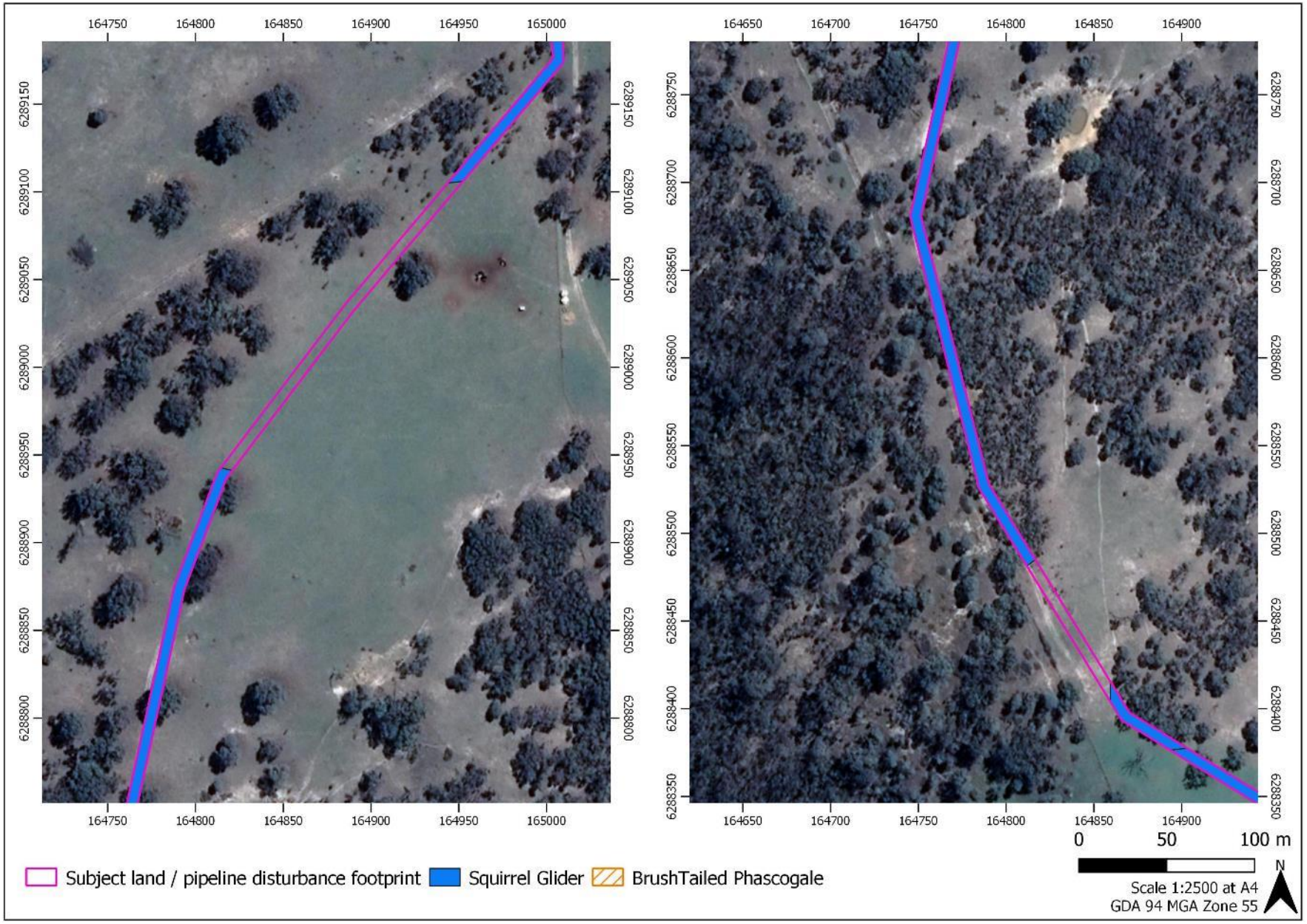
6303750
229850
229900
229950
230000
230050
230100
230150
6305800
6305750
6305700
6305650
6305600
6305550
6305500
6305450
0
100
200 m
N
Scale 1:2500 at A4
GDA 94 MGA Zone 55
Subject land / pipeline disturbance footprint
Eastern Pygmy Possum


Subject land / pipeline disturbance footprint
Squirrel Glider
BrushTailed Phascogale
0
50
100 m
N
Scale 1:2500 at A4
GDA 94 MGA Zone 55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6288950
6288900
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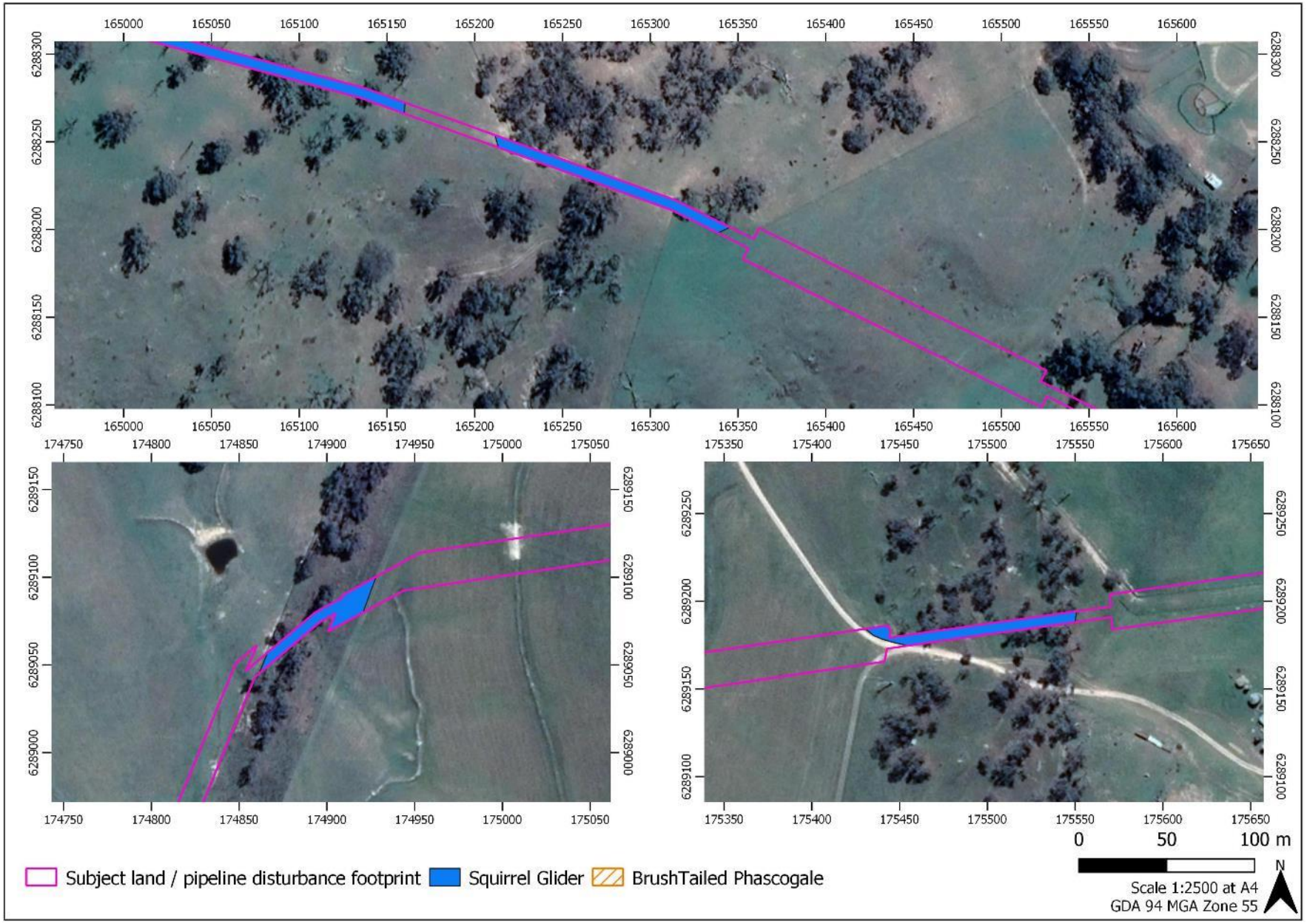
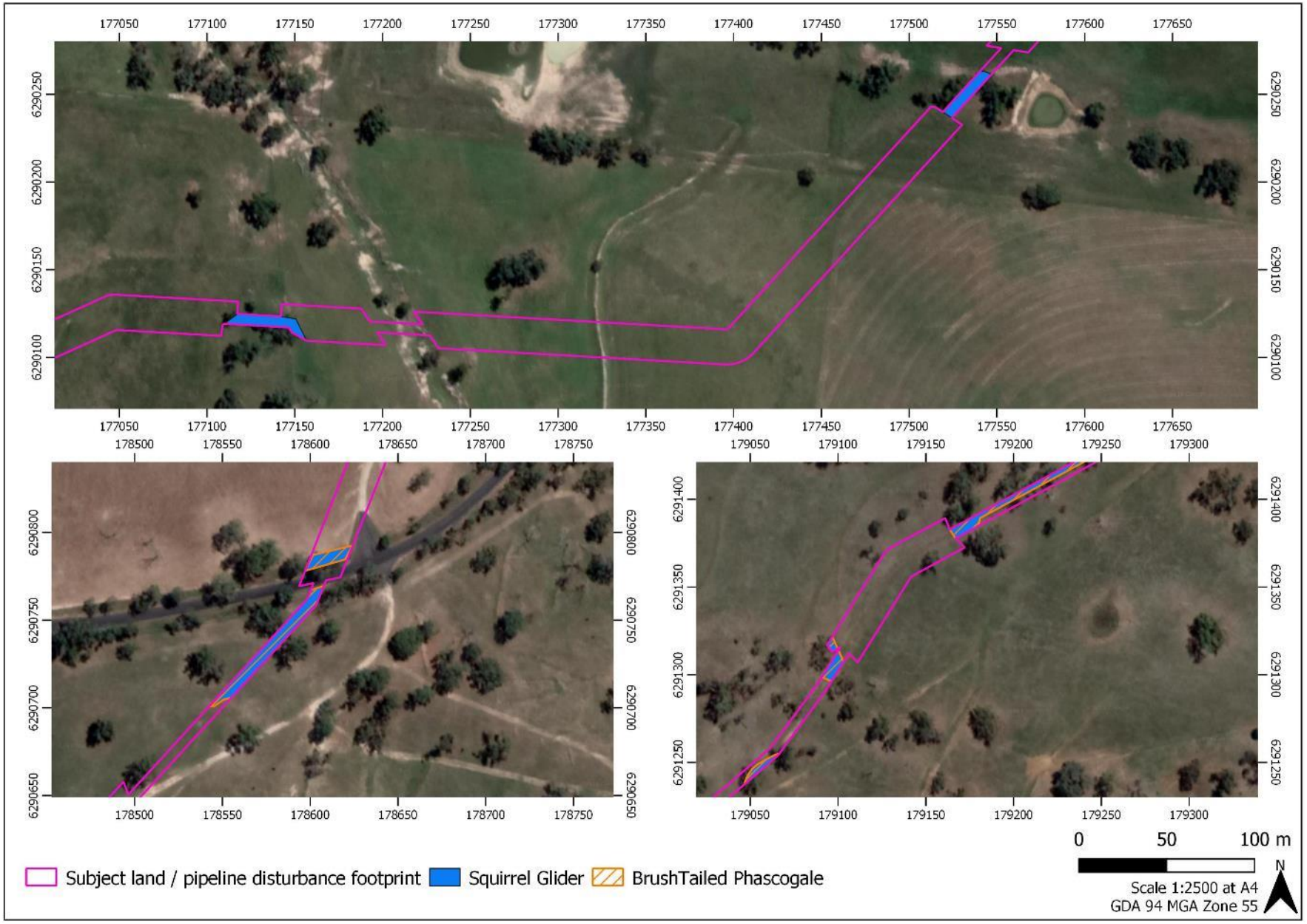
164700
164750
164800
164850
164900
6288750
6288700
6288650
6288600
6288550
6288500
6288450
6288400
6288350
0
50
100 m
Subject land / pipeline disturbance footprint
Squirrel Glider
BrushTailed Phascogale
Scale 1:2500 at A4
GDA 94 MGA Zone 55
N


Subject land / pipeline disturbance footprint
Squirrel Glider
BrushTailed Phascogale
0 50 100 m
Scale 1:2500 at A4
GDA 94 MGA Zone 55
N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178600
178650
178700
178750
6290800
6290750
6290700
6290650
179050
179100
179150
179200
179250
179300
6291400
6291350
6291300
6291250
0
50
100 m
Subject land / pipeline disturbance footprint
Squirrel Glider
BrushTailed Phascogale
N
Scale 1:2500 at A4
GDA 94 MGA Zone 55


179150
179200
179250
179300
179350
179400
179450
179500
179550
179600
179650
179700
179750
179800
6291600
6291550
6291500
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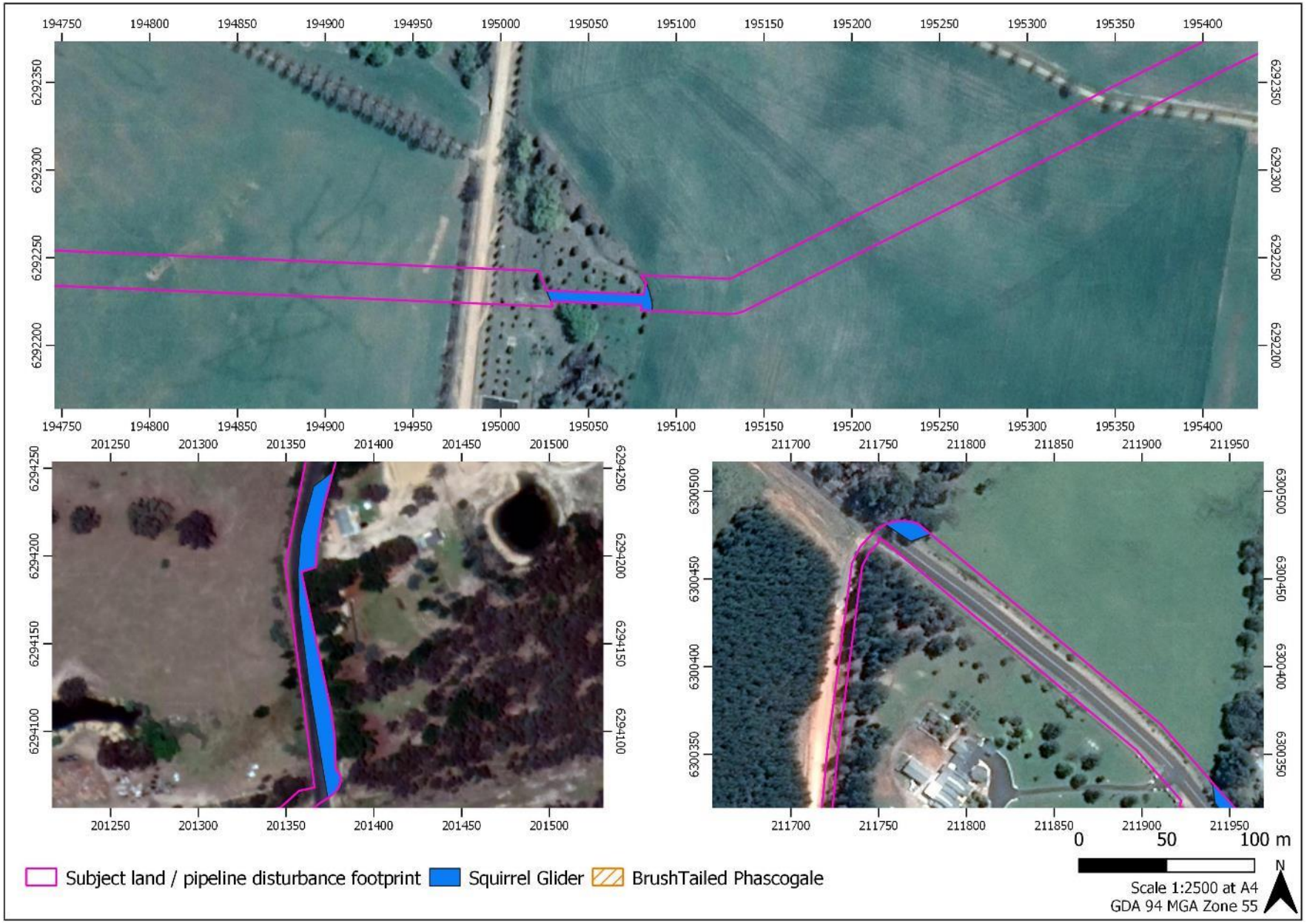
179900
179950
180000
180050
180100
180150
180200
180250
180300
180350
180400
180450
6291650
0
50
100 m
Subject land / pipeline disturbance footprint
Squirrel Glider
BrushTailed Phascogale
N
Scale 1:2500 at A4
GDA 94 MGA Zone 55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195350
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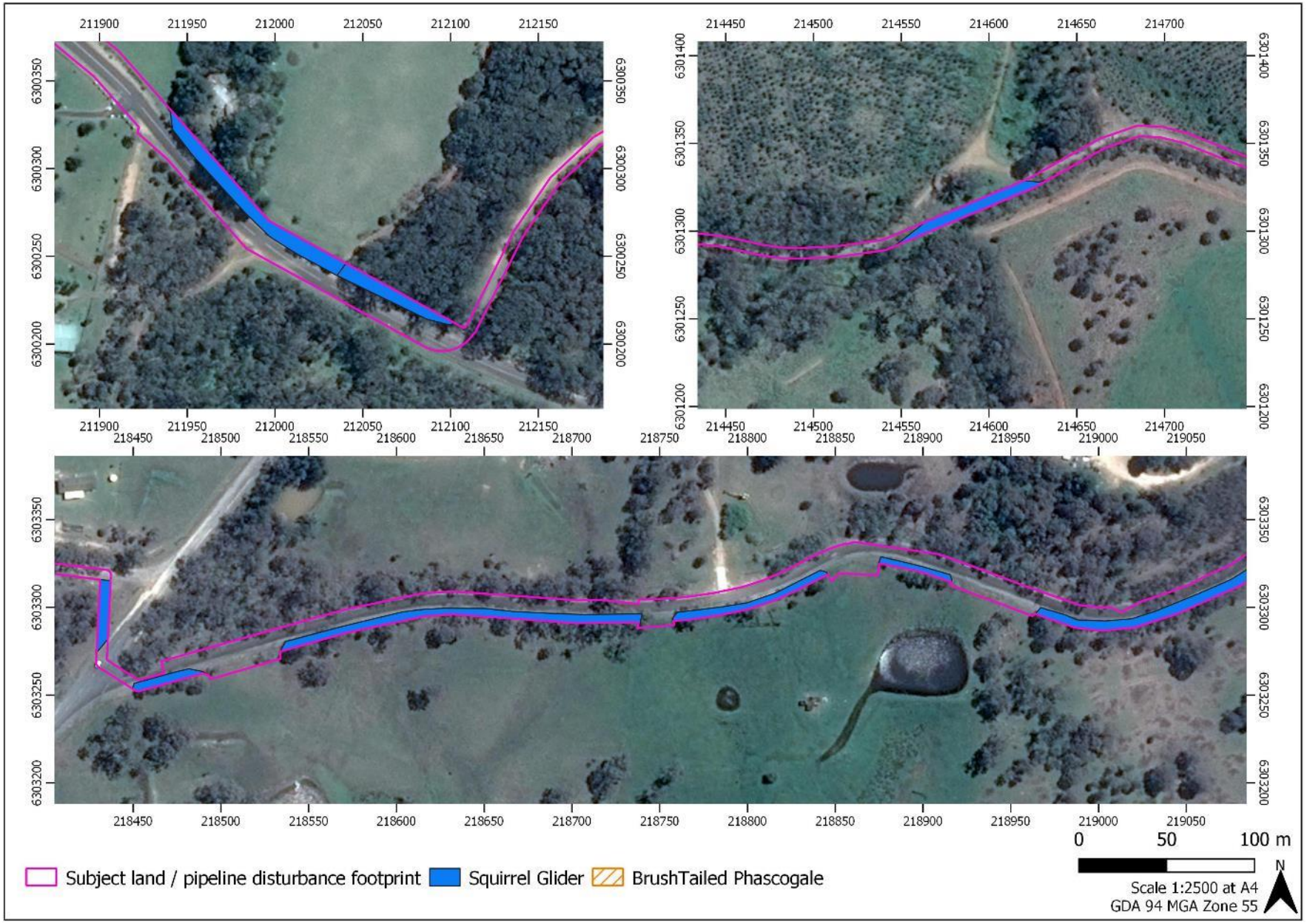
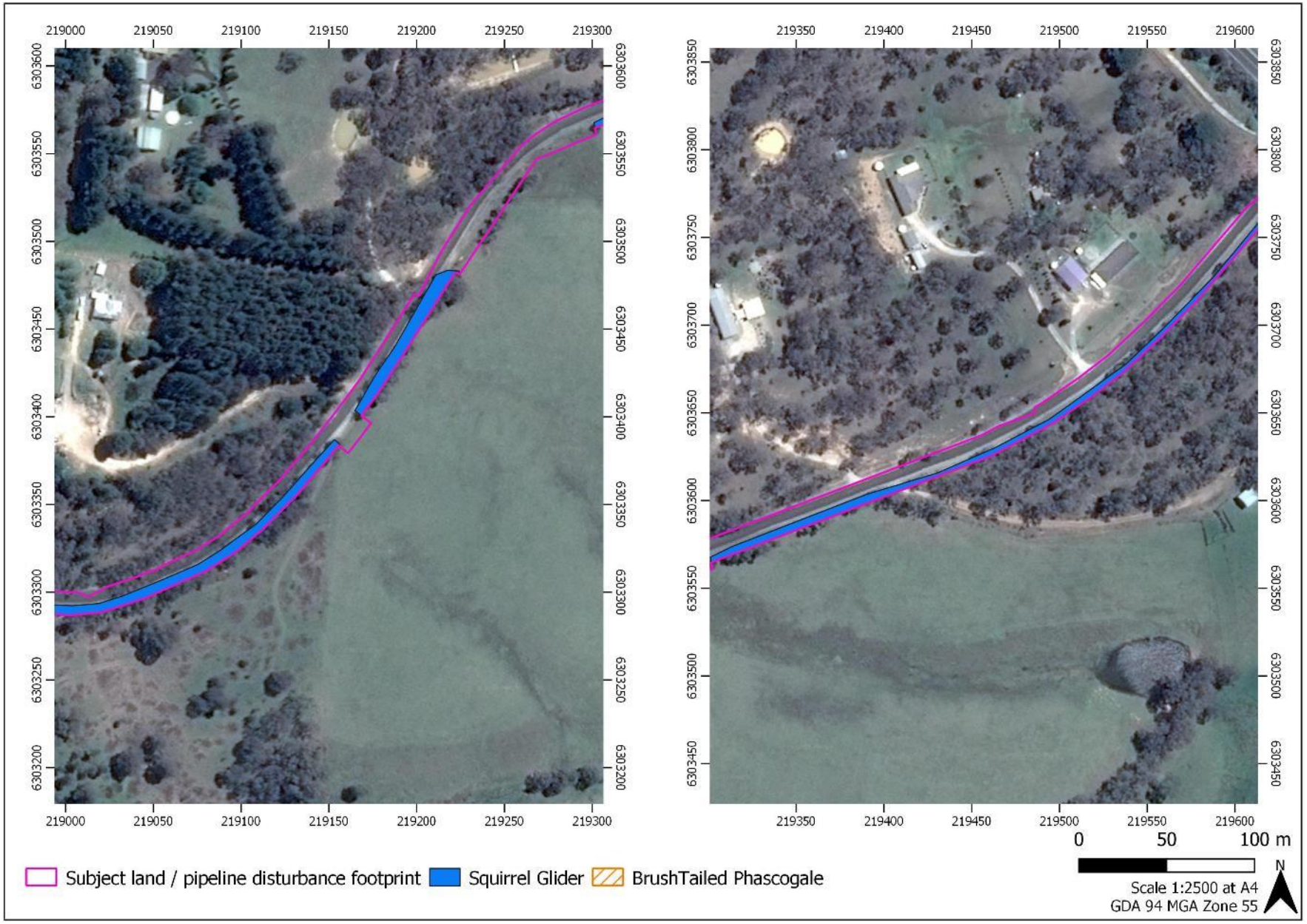
6292300
6292250
6292200
201250
201300
201350
201400
201450
201500
6294250
6294200
6294150
6294100
211700
211750
211800
211850
211900
211950
6300500
6300450
6300400
6300350
0
50
100 m
Subject land / pipeline disturbance footprint
Squirrel Glider
BrushTailed Phascogale
Scale 1:2500 at A4
GDA 94 MGA Zone 55
N


Subject land / pipeline disturbance footprint
Squirrel Glider
BrushTailed Phascogale
0 50 100 m
Scale 1:2500 at A4
GDA 94 MGA Zone 55
N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219050
219100
219150
219200
219250
219300
6303600
6303550
6303500
6303450
6303400
6303350
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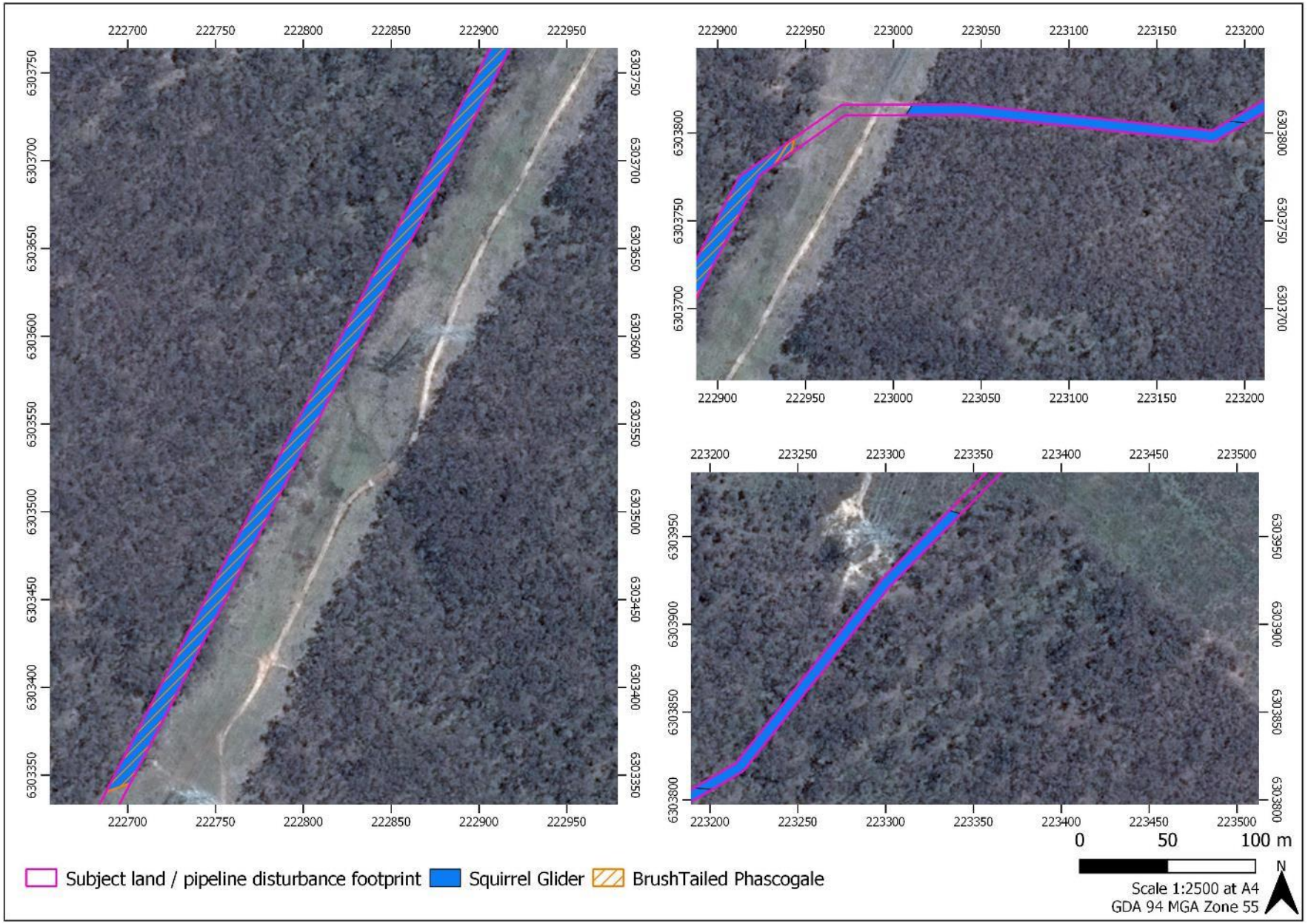
6303250
6303200
219350
219400
219450
219500
219550
219600
6303850
6303800
6303750
6303700
6303650
6303600
6303550
6303500
6303450
0
50
100 m
N
Scale 1:2500 at A4
GDA 94 MGA Zone 55
Subject land / pipeline disturbance footprint
Squirrel Glider
BrushTailed Phascogale


220800
220850
220900
220950
221000
221050
221100
221150
221200
221250
221300
221350
221400
221450
6303600
6303550
6303500
6303450
6303400
6303350
6303300
6303250
0
50
100 m
Subject land / pipeline disturbance footprint
Squirrel Glider
BrushTailed Phascogale
N
Scale 1:2500 at A4
GDA 94 MGA Zone 55


221700
221750
221800
221850
221900
221950
222000
222050
222100
222150
222200
222250
222300
222350
6303300
6303250
6303200
6303150
6303100
6303050
6303000
6302950
6302900
0
50
100 m
N
Subject land / pipeline disturbance footprint
Squirrel Glider
BrushTailed Phascogale
Scale 1:2500 at A4
GDA 94 MGA Zone 55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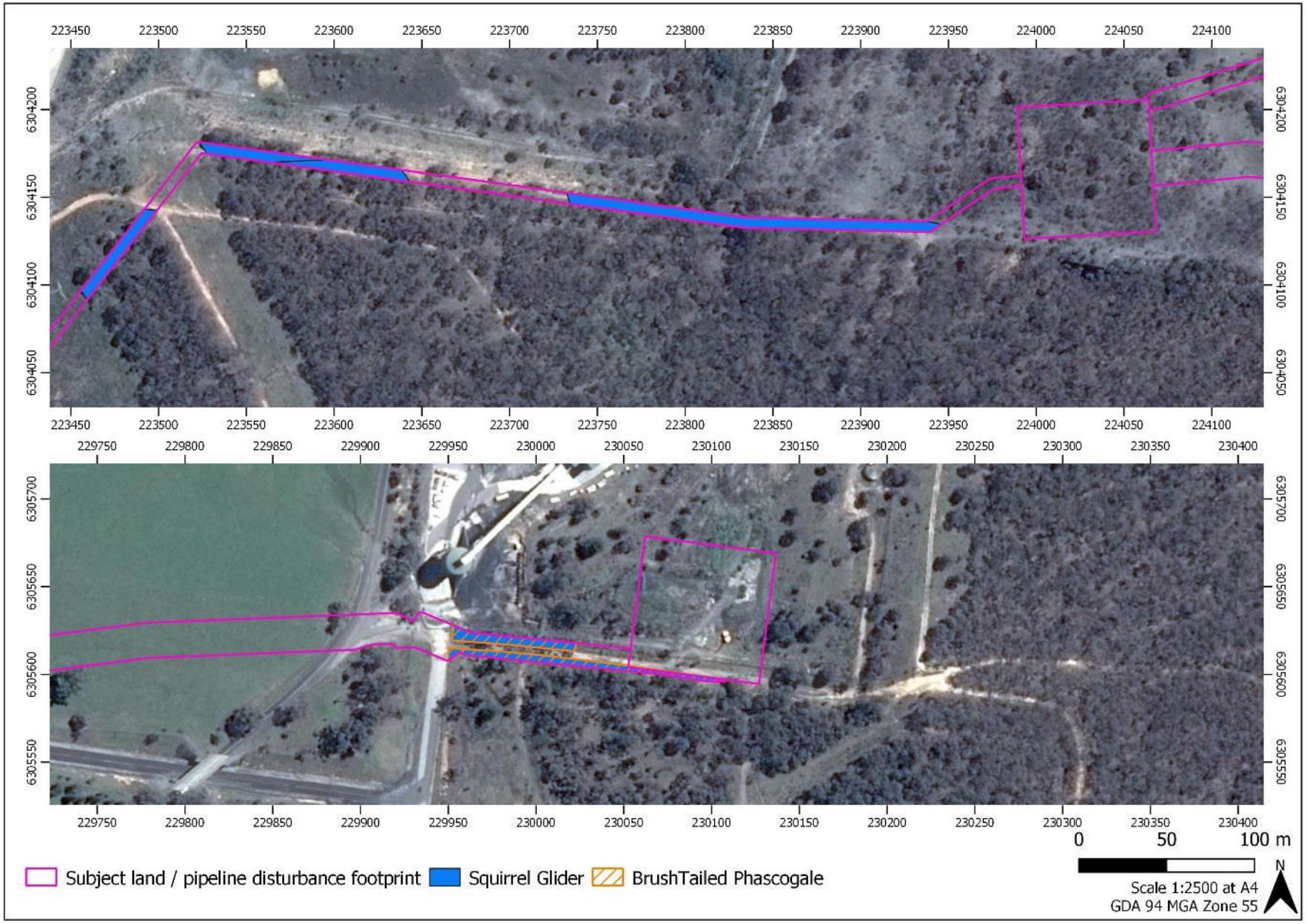
Scale 1:2500 at A4
GDA 94 MGA Zone 55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230050
230100
230150
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230250
230300
230350
230400
6305700
6305650
6305600
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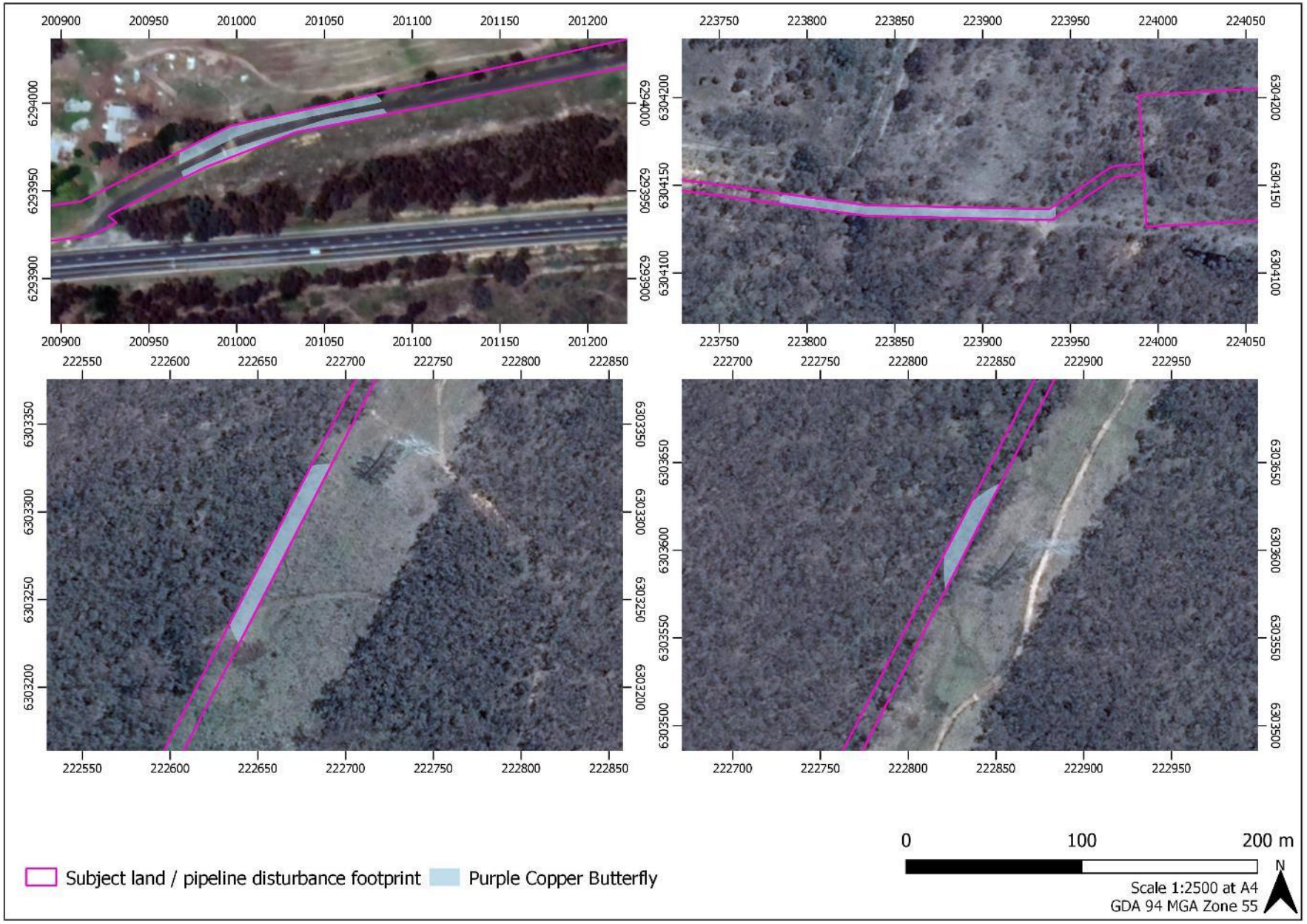
50
100 m
Subject land / pipeline disturbance footprint
Squirrel Glider
BrushTailed Phascogale
N
Scale 1:2500 at A4
GDA 94 MGA Zone 55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222750
222800
222850
222900
222950
6303650
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100
200 m
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Subject land / pipeline disturbance footprint
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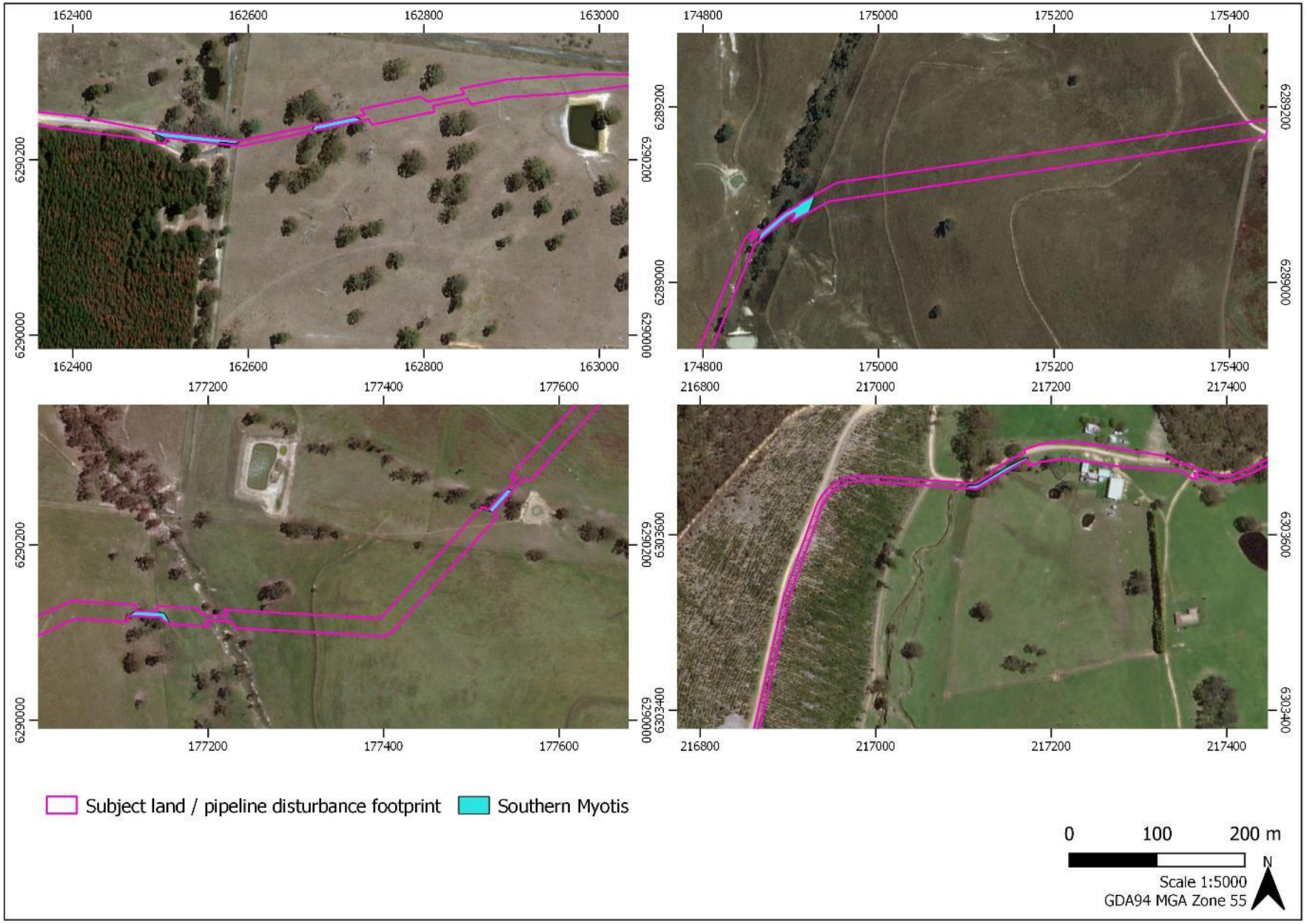
Scale 1:2500 at A4
GDA 94 MGA Zone 55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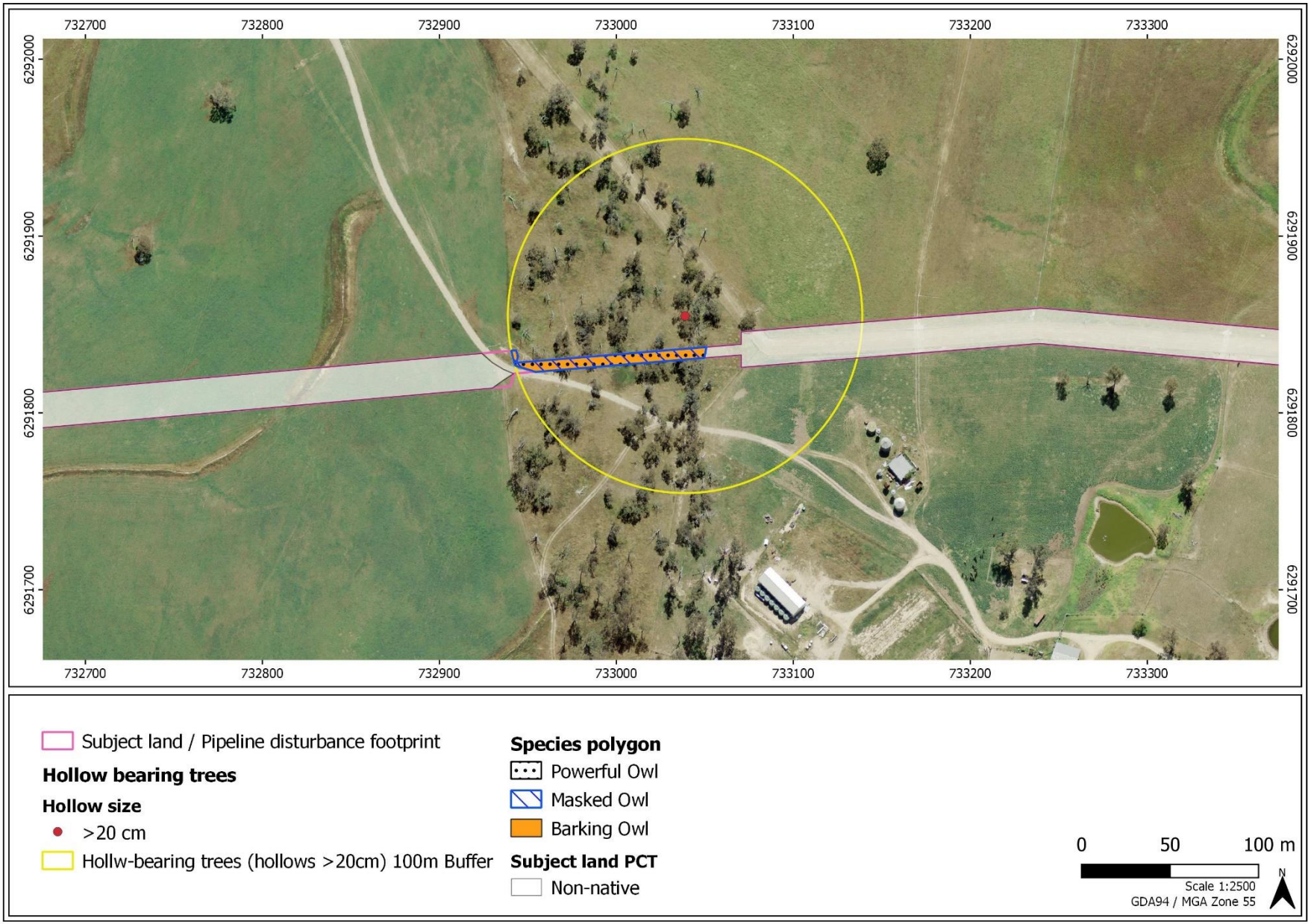
177600
216800
217000
217200
217400
6303600
6303400
Subject land / pipeline disturbance footprint
Southern Myotis
0
100
200 m
N
Scale 1:5000
GDA94 MGA Zone 55


732100
732200
732300
732400
732500
732600
732700
6291900
6291800
6291700
6291600
Subject land / Pipeline disturbance footprint
Hollow bearing trees
Hollow size
>20 cm
Hollw-bearing trees (hollows >20cm) 100m Buffer
Species polygon
Powerful Owl
Masked Owl
Barking Owl
Subject land PCT
Non-native
0
50
100 m
Scale 1:2500
GDA94 / MGA Zone 55
N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733100
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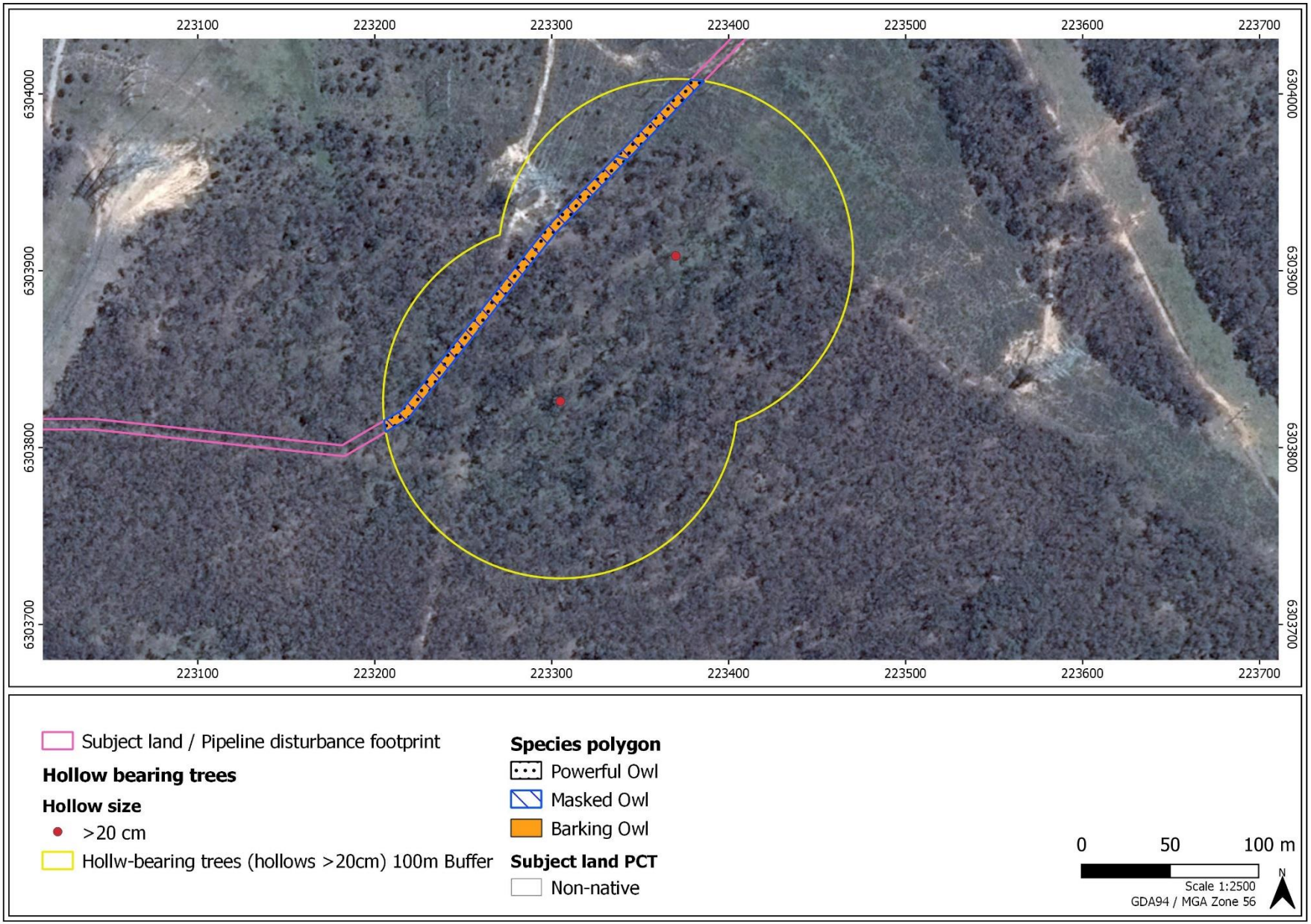
6292000
6291900
6291800
6291700
Subject land / Pipeline disturbance footprint
Hollow bearing trees
Hollow size
>20 cm
Hollw-bearing trees (hollows >20cm) 100m Buffer
Species polygon
Powerful Owl
Masked Owl
Barking Owl
Subject land PCT
Non-native
0
50
100 m
Scale 1:2500
GDA94 / MGA Zone 55
N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223300
223400
223500
223600
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6304000
6303900
6303800
6303700
Subject land / Pipeline disturbance footprint
Hollow bearing trees
Hollow size
>20 cm
Hollw-bearing trees (hollows >20cm) 100m Buffer
Species polygon
Powerful Owl
Masked Owl
Barking Owl
Subject land PCT
Non-native
0
50
100 m
Scale 1:2500
GDA94 / MGA Zone 56
N

# APPENDIX 5: EPBC ACT PROTECTED MATTERS SEARCH

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: 10/06/19 22:17:54


Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements


This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

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: | 5 |
| Great Barrier Reef Marine Park: | None |
| Commonwealth Marine Area: | None |
| Listed Threatened Ecological Communities: | 3 |
| Listed Threatened Species: | 49 |
| Listed Migratory Species: | 12 |

### 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: | 11 |
| Commonwealth Heritage Places: | None |
| Listed Marine Species: | 19 |
| Whales and Other Cetaceans: | None |
| Critical Habitats: | None |
| Commonwealth Reserves Terrestrial: | None |
| Australian Marine Parks: | None |

### Extra Information

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

| | |
|---|---|
| State and Territory Reserves: | 5 |
| Regional Forest Agreements: | None |
| Invasive Species: | 34 |
| Nationally Important Wetlands: | None |
| Key Ecological Features (Marine) | None |

## Details

### Matters of National Environmental Significance

| Wetlands of International Importance (Ramsar) | [ Resource Information ] |
|---|---|
| Name | Proximity |
| Banrock station wetland complex | 800 - 900km upstream |
| Hattah-kulkyne lakes | 600 - 700km upstream |
| Riverland | 700 - 800km upstream |
| The coorong, and lakes alexandrina and albert wetland | 900 - 1000km upstream |
| The macquarie marshes | 300 - 400km upstream |

**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 |
|---|---|---|
| Natural Temperate Grassland of the South Eastern Highlands | Critically Endangered | Community likely to occur within area |
| Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion | Endangered | Community may occur within area |
| White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland | Critically Endangered | Community likely to occur within area |

**Listed Threatened Species** [ Resource Information ]

| Name | Status | Type of Presence |
|---|---|---|
| **Birds** | | |
| Anthochaera phrygia<br>Regent Honeyeater [82338] | Critically Endangered | Breeding known to occur within area |
| Calidris ferruginea<br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat may occur within area |
| Grantiella picta<br>Painted Honeyeater [470] | Vulnerable | Species or species habitat known to occur within area |
| Lathamus discolor<br>Swift Parrot [744] | Critically Endangered | Species or species habitat likely to occur within area |
| Leipoa ocellata<br>Malleefowl [934] | Vulnerable | Species or species habitat likely to occur within area |
| Numenius madagascariensis<br>Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat may occur within area |
| Polytelis swainsonii<br>Superb Parrot [738] | Vulnerable | Species or species habitat known to occur within area |
| Rostratula australis<br>Australian Painted-snipe, Australian Painted Snipe [77037] | Endangered | Species or species habitat may occur within area |
| **Fish** | | |
| Maccullochella macquariensis<br>Trout Cod [26171] | Endangered | Species or species habitat may occur within area |
| Maccullochella peelii<br>Murray Cod [66633] | Vulnerable | Species or species habitat may occur within area |
| Macquaria australasica<br>Macquarie Perch [66632] | Endangered | Species or species habitat known to occur within area |
| Prototroctes maraena<br>Australian Grayling [26179] | Vulnerable | Species or species habitat may occur within area |
| **Frogs** | | |
| Heleioporus australiacus<br>Giant Burrowing Frog [1973] | Vulnerable | Species or species habitat may occur within area |
| Litoria aurea<br>Green and Golden Bell Frog [1870] | Vulnerable | Species or species habitat known to occur within area |
| Litoria booroolongensis<br>Booroolong Frog [1844] | Endangered | Species or species habitat known to occur within area |
| Litoria castanea<br>Yellow-spotted Tree Frog, Yellow-spotted Bell Frog [1848] | Endangered | Species or species habitat likely to occur within area |
| Litoria littlejohni<br>Littlejohn's Tree Frog, Heath Frog [64733] | Vulnerable | Species or species habitat may occur within area |
| **Insects** | | |
| Paralucia spinifera<br>Bathurst Copper Butterfly, Purple Copper Butterfly, Bathurst Copper, Bathurst Copper Wing, Bathurst-Lithgow Copper, Purple Copper [26335] | Vulnerable | Species or species habitat likely to occur within area |
| **Mammals** | | |
| Chalinolobus dwyeri<br>Large-eared Pied Bat, Large Pied Bat [183] | Vulnerable | Species or species habitat known to occur within area |
| Dasyurus maculatus maculatus (SE mainland population)<br>Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184] | Endangered | Species or species habitat known to occur within area |
| Nyctophilus corbeni<br>Corben's Long-eared Bat, South-eastern Long-eared Bat [83395] | Vulnerable | Species or species habitat may occur within area |
| Petauroides volans<br>Greater Glider [254] | Vulnerable | Species or species habitat known to occur within area |
| Petrogale penicillata<br>Brush-tailed Rock-wallaby [225] | Vulnerable | Species or species habitat likely to occur within area |
| Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)<br>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<br>New Holland Mouse, Pookila [96] | Vulnerable | Species or species habitat likely to occur within area |
| Pteropus poliocephalus<br>Grey-headed Flying-fox [186] | Vulnerable | Foraging, feeding or |

| Name | Status | Type of Presence |
|---|---|---|
| | | related behaviour may occur within area |
| **Plants** | | |
| Acacia bynoeana<br>Bynoe's Wattle, Tiny Wattle [8575] | Vulnerable | Species or species habitat may occur within area |
| Boronia deanei<br>Deane's Boronia [8397] | Vulnerable | Species or species habitat likely to occur within area |
| Cryptostylis hunteriana<br>Leafless Tongue-orchid [19533] | Vulnerable | Species or species habitat may occur within area |
| Dichanthium setosum<br>bluegrass [14159] | Vulnerable | Species or species habitat likely to occur within area |
| Eucalyptus aggregata<br>Black Gum [20890] | Vulnerable | Species or species habitat known to occur within area |
| Eucalyptus pulverulenta<br>Silver-leaved Mountain Gum, Silver-leaved Gum [21537] | Vulnerable | Species or species habitat known to occur within area |
| Eucalyptus robertsonii subsp. hemisphaerica<br>Robertson's Peppermint [56223] | Vulnerable | Species or species habitat known to occur within area |
| Euphrasia arguta<br>[4325] | Critically Endangered | Species or species habitat may occur within area |
| Lepidium hyssopifolium<br>Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed [16542] | Endangered | Species or species habitat known to occur within area |
| Leucochrysum albicans var. tricolor<br>Hoary Sunray, Grassland Paper-daisy [56204] | Endangered | Species or species habitat likely to occur within area |
| Persoonia marginata<br>Clandulla Geebung [10852] | Vulnerable | Species or species habitat known to occur within area |
| Philotheca ericifolia<br>[64942] | Vulnerable | Species or species habitat may occur within area |
| Prasophyllum petilum<br>Tarengo Leek Orchid [55144] | Endangered | Species or species habitat may occur within area |
| Prasophyllum sp. Wybong (C.Phelps ORG 5269)<br>a leek-orchid [81964] | Critically Endangered | Species or species habitat may occur within area |
| Pultenaea glabra<br>Smooth Bush-pea, Swamp Bush-pea [11887] | Vulnerable | Species or species habitat likely to occur within area |
| Swainsona recta<br>Small Purple-pea, Mountain Swainson-pea, Small Purple Pea [7580] | Endangered | Species or species habitat may occur within area |
| Thesium australe<br>Austral Toadflax, Toadflax [15202] | Vulnerable | Species or species habitat known to occur within area |
| Xerochrysum palustre<br>Swamp Everlasting, Swamp Paper Daisy [76215] | Vulnerable | Species or species |

| Name | Status | Type of Presence |
|---|---|---|
| | | habitat likely to occur within area |
| Zieria obcordata<br>[3240] | Endangered | Species or species habitat known to occur within area |
| **Reptiles** | | |
| Aprasia parapulchella<br>Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665] | Vulnerable | Species or species habitat may occur within area |
| Delma impar<br>Striped Legless Lizard [1649] | Vulnerable | Species or species habitat may occur within area |
| Eulamprus leuraensis<br>Blue Mountains Water Skink [59199] | Endangered | Species or species habitat may occur within area |
| Hoplocephalus bungaroides<br>Broad-headed Snake [1182] | Vulnerable | Species or species habitat known to 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<br>Fork-tailed Swift [678] | | Species or species habitat likely to occur within area |
| **Migratory Terrestrial Species** | | |
| Hirundapus caudacutus<br>White-throated Needletail [682] | | Species or species habitat known to occur within area |
| Monarcha melanopsis<br>Black-faced Monarch [609] | | Species or species habitat known to occur within area |
| Motacilla flava<br>Yellow Wagtail [644] | | Species or species habitat may occur within area |
| Myiagra cyanoleuca<br>Satin Flycatcher [612] | | Species or species habitat known to occur within area |
| Rhipidura rufifrons<br>Rufous Fantail [592] | | Species or species habitat known to occur within area |
| **Migratory Wetlands Species** | | |
| Actitis hypoleucos<br>Common Sandpiper [59309] | | Species or species habitat may occur within area |
| Calidris acuminata<br>Sharp-tailed Sandpiper [874] | | Species or species habitat likely to occur within area |
| Calidris ferruginea<br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat may occur within area |
| Calidris melanotos<br>Pectoral Sandpiper [858] | | Species or species habitat may occur within area |
| Gallinago hardwickii<br>Latham's Snipe, Japanese Snipe [863] | | Species or species |

| Name | Threatened | Type of Presence |
|---|---|---|
| | | habitat may occur within area |
| Numenius madagascariensis<br>Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | 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 - |
| Commonwealth Land - Australian Postal Commission |
| Commonwealth Land - Australian Telecommunications Commission |
| Commonwealth Land - Australian Telecommunications Corporation |
| Commonwealth Land - Commonwealth Trading Bank of Australia |
| Commonwealth Land - Defence Housing Authority |
| Commonwealth Land - Defence Service Homes Corporation |
| Commonwealth Land - Telstra Corporation Limited |
| Defence - AIRTC BATHURST |
| Defence - KELSO ORDINANCE DEPOT |
| Defence - RACECOURSE DEPOT (BATHURST TRAINING/STORES DEPOT) |

**Listed Marine Species** [ Resource Information ]

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

| Name | Threatened | Type of Presence |
|---|---|---|
| Birds | | |
| Actitis hypoleucos<br>Common Sandpiper [59309] | | Species or species habitat may occur within area |
| Apus pacificus<br>Fork-tailed Swift [678] | | Species or species habitat likely to occur within area |
| Ardea alba<br>Great Egret, White Egret [59541] | | Species or species habitat likely to occur within area |
| Ardea ibis<br>Cattle Egret [59542] | | Species or species habitat may occur within area |
| Calidris acuminata<br>Sharp-tailed Sandpiper [874] | | Species or species habitat likely to occur within area |
| Calidris ferruginea<br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat may occur within area |
| Calidris melanotos<br>Pectoral Sandpiper [858] | | Species or species habitat may occur within area |
| Chrysococcyx osculans<br>Black-eared Cuckoo [705] | | Species or species habitat likely to occur within area |
| Gallinago hardwickii<br>Latham's Snipe, Japanese Snipe [863] | | Species or species habitat may occur within area |
| Haliaeetus leucogaster<br>White-bellied Sea-Eagle [943] | | Species or species habitat likely to occur within area |
| Hirundapus caudacutus<br>White-throated Needletail [682] | | Species or species habitat known to occur within area |
| Lathamus discolor<br>Swift Parrot [744] | Critically Endangered | Species or species habitat likely to occur within area |
| Merops ornatus<br>Rainbow Bee-eater [670] | | Species or species habitat may occur within area |
| Monarcha melanopsis<br>Black-faced Monarch [609] | | Species or species habitat known to occur within area |
| Motacilla flava<br>Yellow Wagtail [644] | | Species or species habitat may occur within area |
| Myiagra cyanoleuca<br>Satin Flycatcher [612] | | Species or species habitat known to occur within area |
| Numenius madagascariensis<br>Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat may occur within area |
| Rhipidura rufifrons<br>Rufous Fantail [592] | | Species or species habitat known to occur within area |
| Rostratula benghalensis (sensu lato)<br>Painted Snipe [889] | Endangered* | Species or species habitat may occur within area |

## Extra Information

**State and Territory Reserves** [ Resource Information ]

| Name | State |
|---|---|
| Eusdale | NSW |
| Forestry Management Areas in Bathurst | NSW |
| Marrangaroo | NSW |
| Wambool | NSW |
| Winburndale | NSW |

**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<br>Common Myna, Indian Myna [387] | | Species or species habitat likely to occur within area |
| Alauda arvensis<br>Skylark [656] | | Species or species habitat likely to occur within area |
| Anas platyrhynchos<br>Mallard [974] | | Species or species habitat likely to occur within area |
| Carduelis carduelis<br>European Goldfinch [403] | | Species or species habitat likely to occur within area |
| Columba livia<br>Rock Pigeon, Rock Dove, Domestic Pigeon [803] | | Species or species habitat likely to occur within area |
| Passer domesticus<br>House Sparrow [405] | | Species or species habitat likely to occur within area |
| Passer montanus<br>Eurasian Tree Sparrow [406] | | Species or species habitat likely to occur within area |
| Pycnonotus jocosus<br>Red-whiskered Bulbul [631] | | Species or species habitat likely to occur within area |
| Streptopelia chinensis<br>Spotted Turtle-Dove [780] | | Species or species habitat likely to occur within area |
| Sturnus vulgaris<br>Common Starling [389] | | Species or species habitat likely to occur within area |
| Turdus merula<br>Common Blackbird, Eurasian Blackbird [596] | | Species or species habitat likely to occur within area |
| **Mammals** | | |
| Bos taurus<br>Domestic Cattle [16] | | Species or species habitat likely to occur within area |
| Canis lupus familiaris<br>Domestic Dog [82654] | | Species or species habitat likely to occur within area |
| Capra hircus<br>Goat [2] | | Species or species habitat likely to occur within area |
| Felis catus<br>Cat, House Cat, Domestic Cat [19] | | Species or species habitat likely to occur within area |
| Feral deer<br>Feral deer species in Australia [85733] | | Species or species habitat likely to occur within area |
| Lepus capensis<br>Brown Hare [127] | | Species or species habitat likely to occur within area |
| Mus musculus<br>House Mouse [120] | | Species or species habitat likely to occur within area |
| Oryctolagus cuniculus<br>Rabbit, European Rabbit [128] | | Species or species habitat likely to occur within area |
| Rattus rattus<br>Black Rat, Ship Rat [84] | | Species or species habitat likely to occur within area |
| Sus scrofa<br>Pig [6] | | Species or species habitat likely to occur within area |
| Vulpes vulpes<br>Red Fox, Fox [18] | | Species or species habitat likely to occur within area |
| **Plants** | | |
| Cytisus scoparius<br>Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934] | | Species or species habitat likely to occur within area |
| Genista monspessulana<br>Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126] | | Species or species habitat likely to occur within area |
| Genista sp. X Genista monspessulana<br>Broom [67538] | | Species or species habitat may occur within area |
| Lycium ferocissimum<br>African Boxthorn, Boxthorn [19235] | | Species or species habitat likely to occur within area |
| Nassella neesiana<br>Chilean Needle grass [67699] | | Species or species habitat likely to occur within area |
| Nassella trichotoma<br>Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884] | | Species or species habitat likely to occur within area |
| Opuntia spp.<br>Prickly Pears [82753] | | Species or species habitat likely to occur within area |
| Pinus radiata<br>Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780] | | Species or species habitat may occur within area |
| Rubus fruticosus aggregate<br>Blackberry, European Blackberry [68406] | | Species or species habitat likely to occur within area |
| Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii<br>Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497] | | Species or species habitat likely to occur within area |
| Senecio madagascariensis<br>Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624] | | Species or species habitat likely to occur within area |
| Ulex europaeus<br>Gorse, Furze [7693] | | Species or species habitat likely to occur within area |

## Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

## Coordinates

-33.476643 149.335757,-33.448001 149.584323,-33.391836 149.78757,-33.374635 150.038882

## Acknowledgements

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

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

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

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


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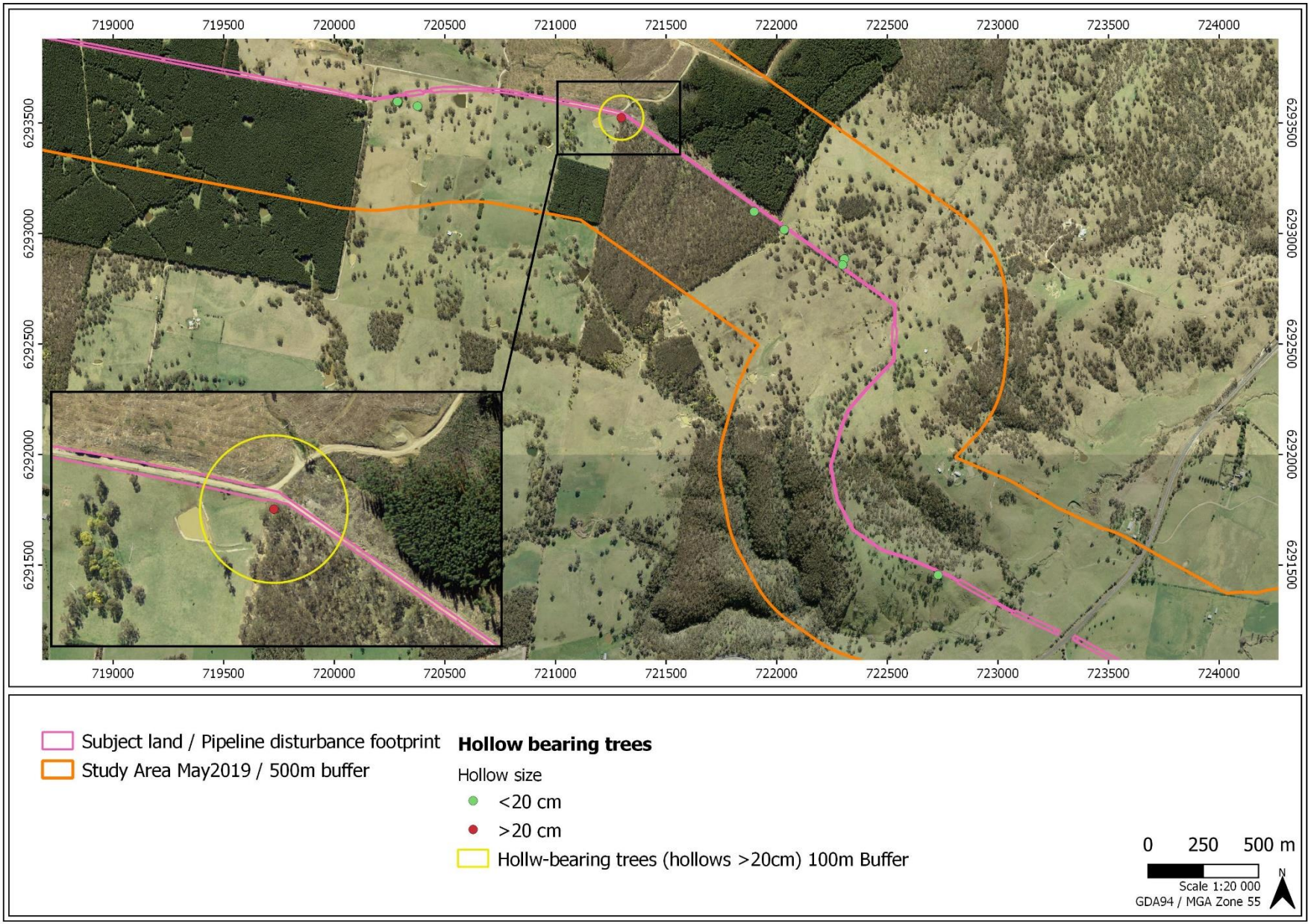
# APPENDIX 6: HOLLOW BEARING TREES RECORDED DURING THE FIELD SURVEY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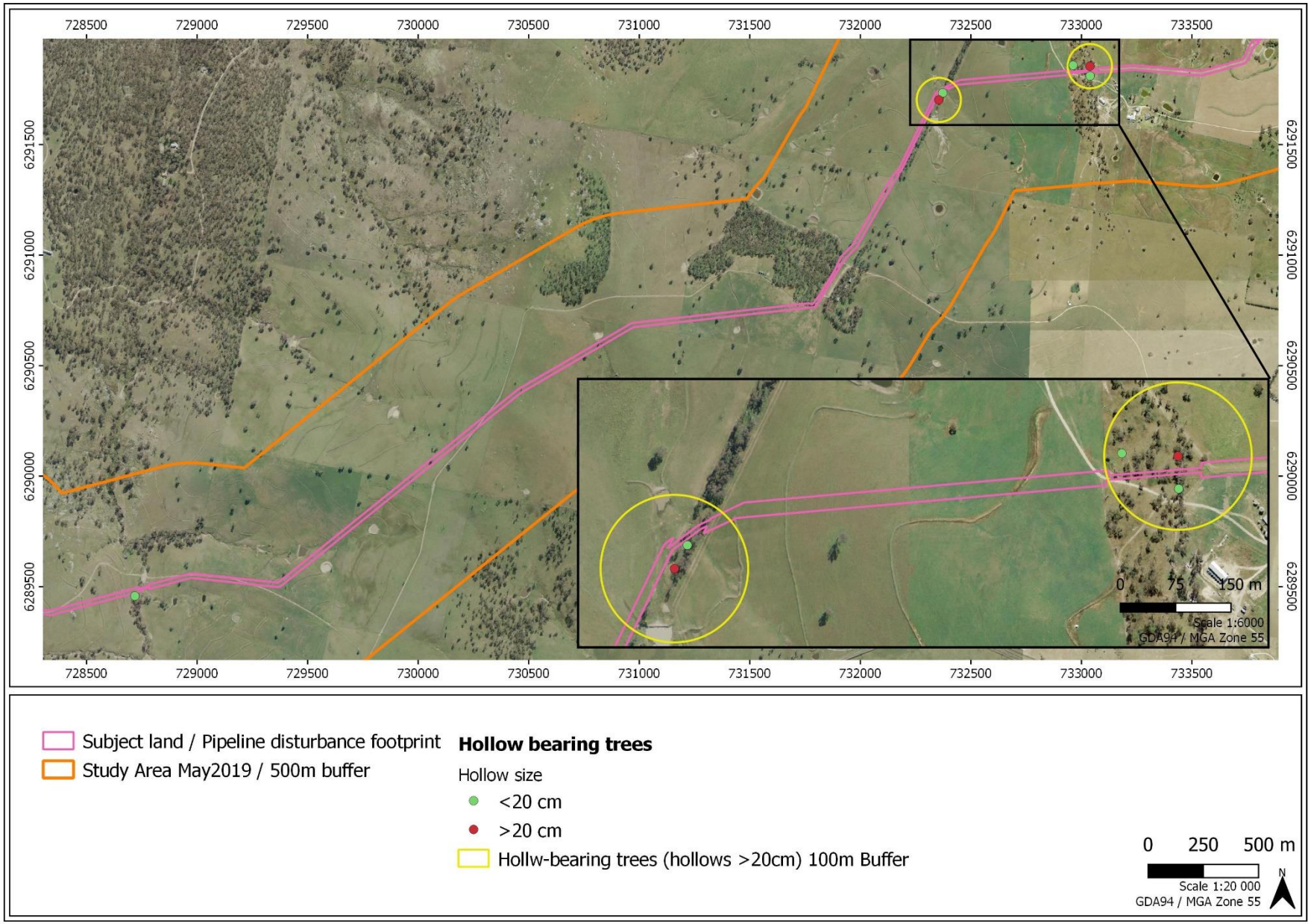
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Hollow bearing trees
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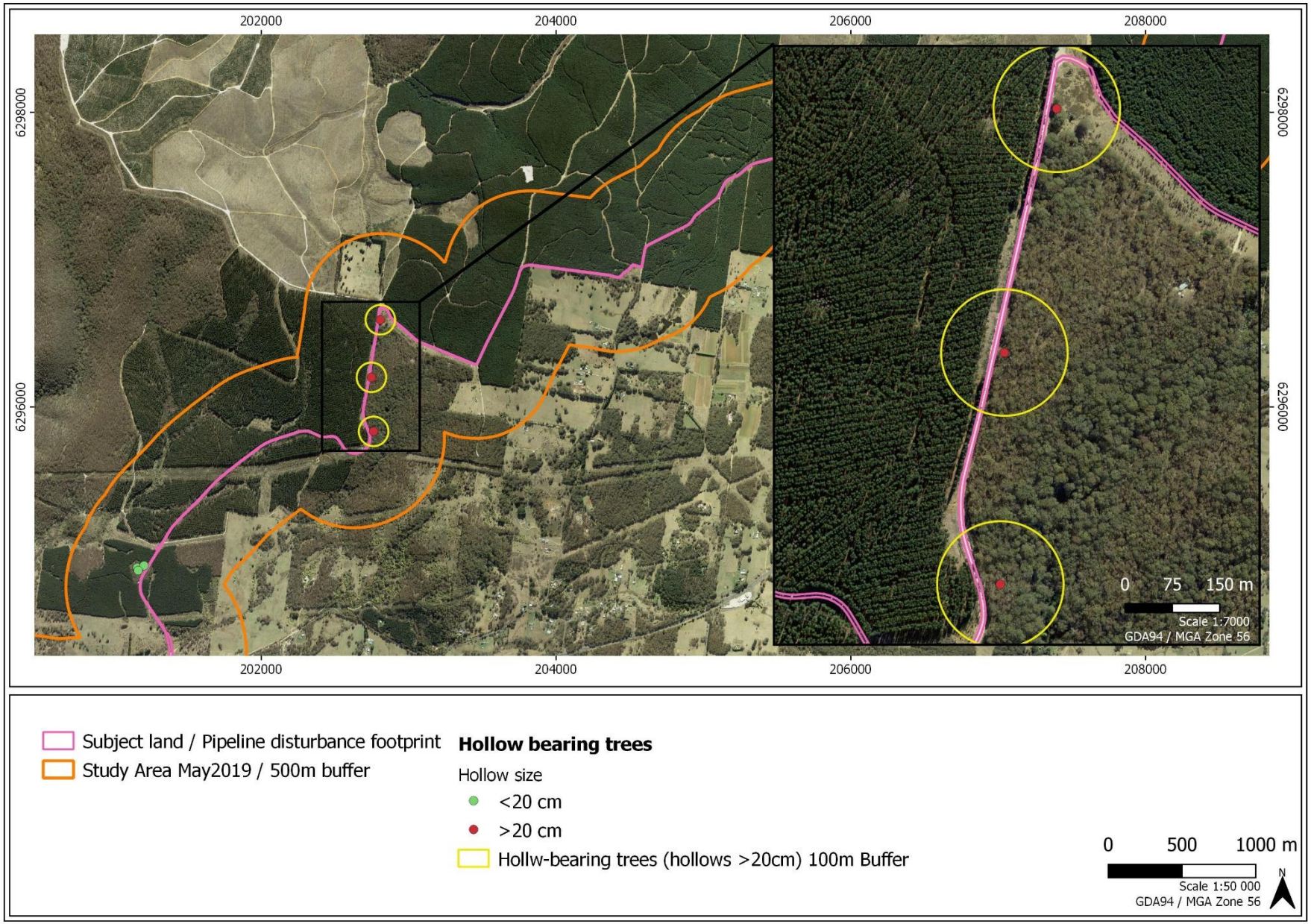
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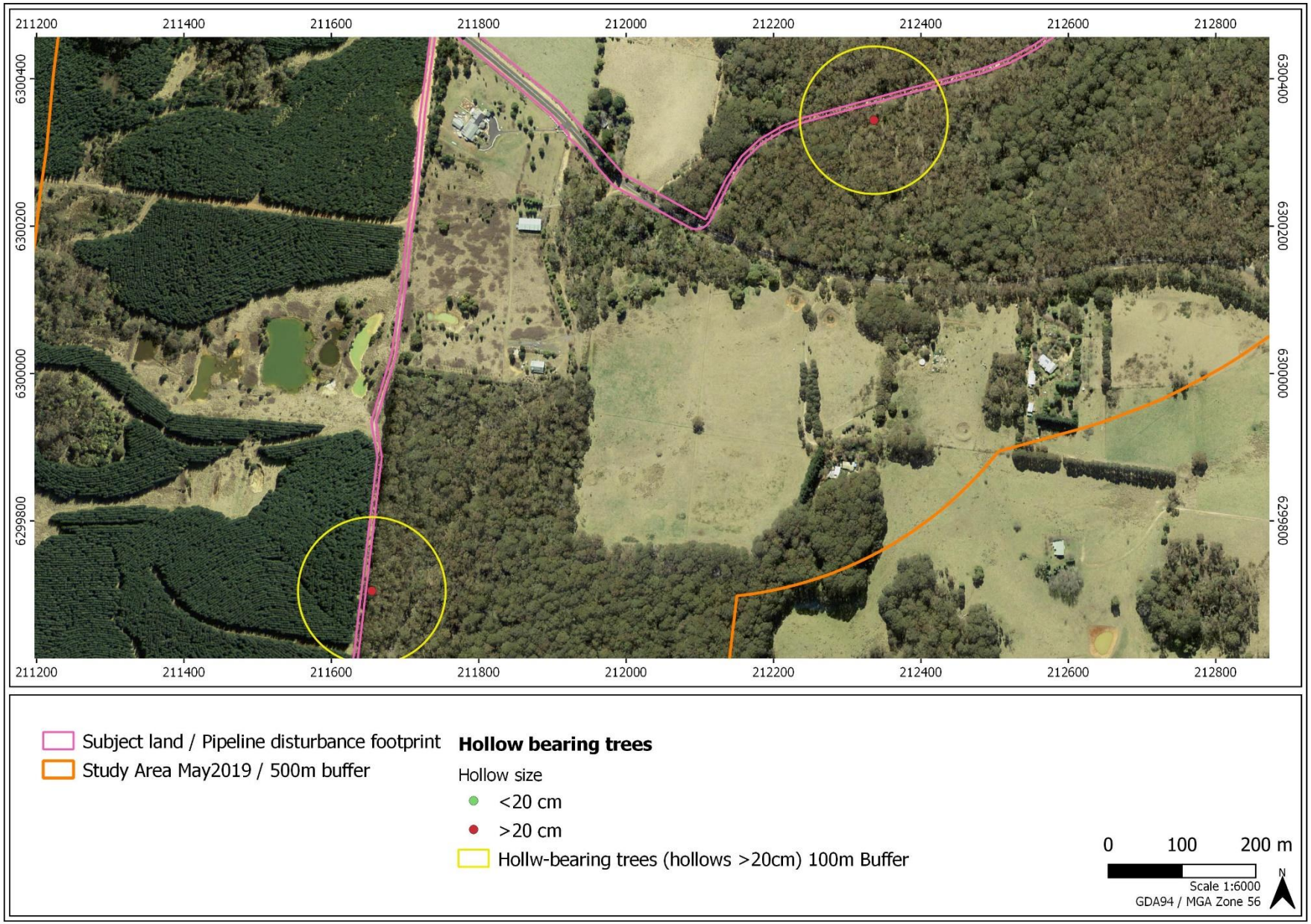
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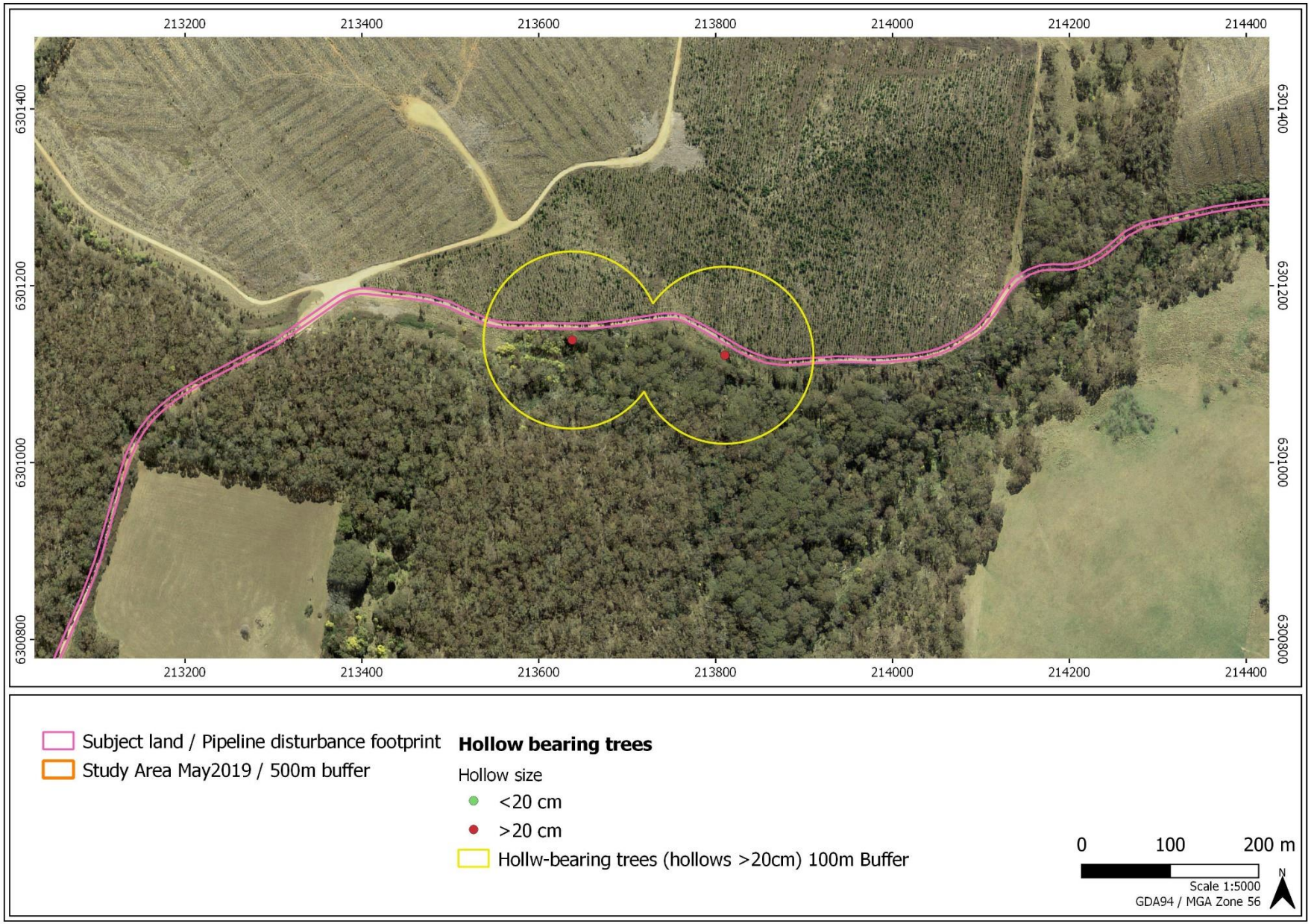
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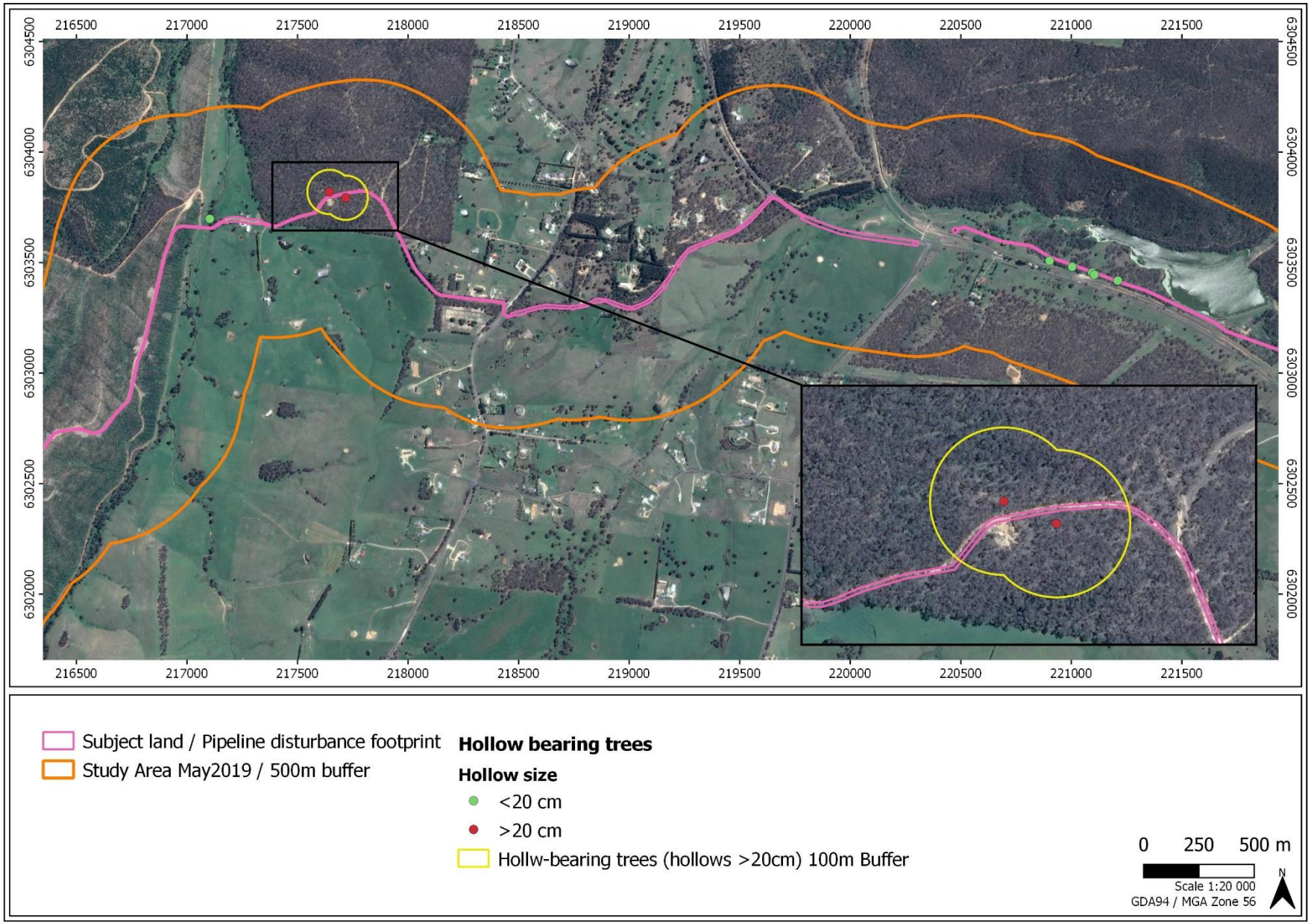
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Study Area May2019 / 500m buffer
Hollow bearing trees
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Hollw-bearing trees (hollows >20cm) 100m Buffer
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GDA94 / MGA Zone 56
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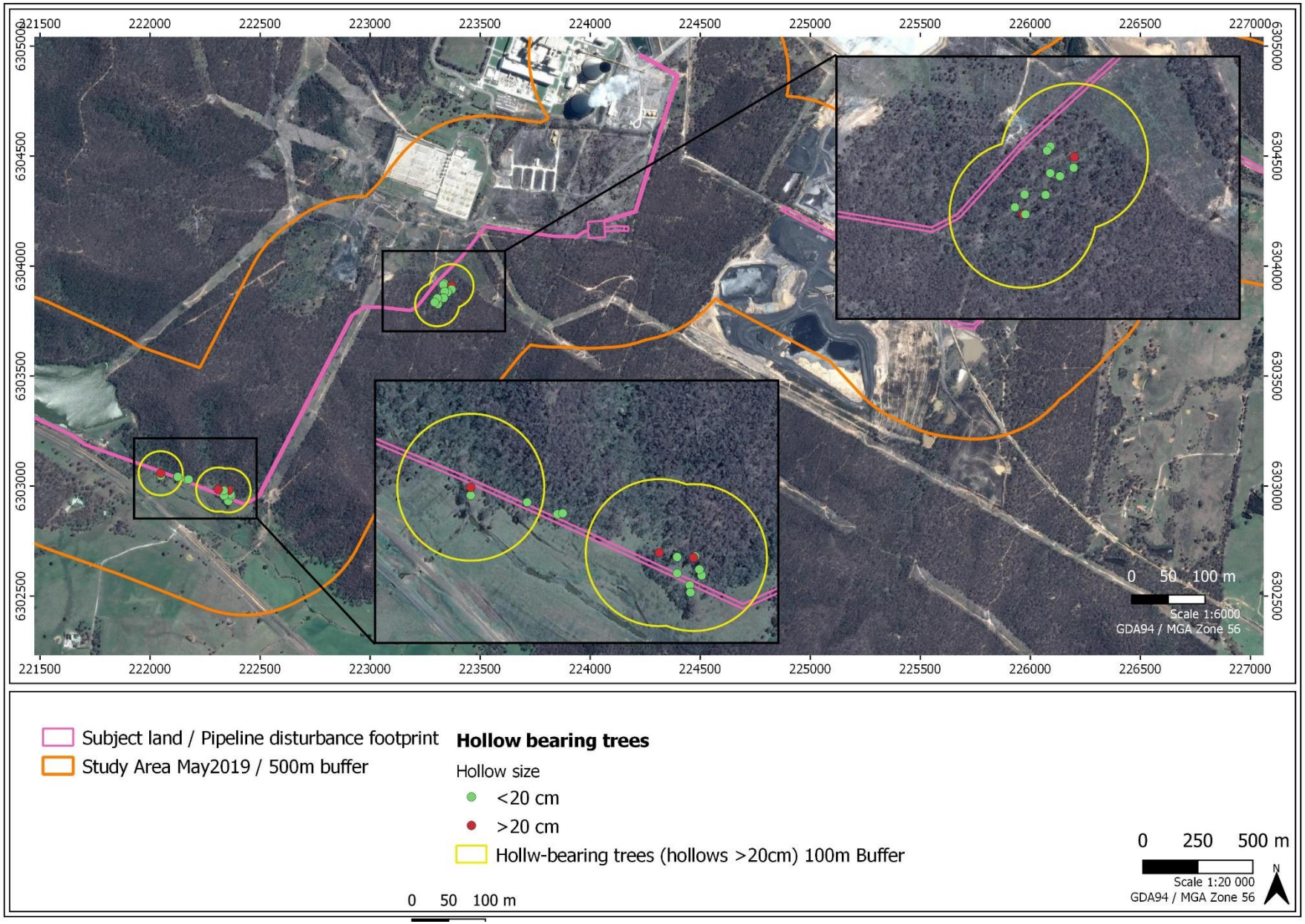
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GDA94 / MGA Zone 56
Subject land / Pipeline disturbance footprint
Study Area May2019 / 500m buffer
Hollow bearing trees
Hollow size
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>20 cm
Hollw-bearing trees (hollows >20cm) 100m Buffer
0 50 100 m
0 250 500 m
Scale 1:20 000
GDA94 / MGA Zone 56
N

# APPENDIX 7: CRITICAL KOALA HABITAT ASSESSMENT

**The following tables provide critical Koala habitat assessment for each PCT located within the pipeline development footprint. Note that as both Bathurst and Lithgow receive <800 mm annual rainfall, the inland context has been used.**

| **PCT 85 - River Oak forest and woodland wetland of the NSW South Western Slopes and South Eastern Highlands Bioregion.** | | | |
|---|---|---|---|
| Attribute | Score | Habitat appraisal | |
| Koala occurrence | 0 | Desktop | • EPBC PMST report identified the koala as 'known to occur' in the study area.<br>• NSW BioNet Atlas shows no records of Koalas within 2km of the edge of the Impact area |
| | | On-ground | • On-ground surveys were not carried out as there are no suitable feed trees within this PCT. |
| Vegetation structure and composition | 0 | Desktop | • PCT 85 lists *Eucalyptus viminalis* as a component of the canopy, although not dominant. |
| | | On-ground | • On-ground surveys revealed there is only a sparse canopy of River Oak (*Casuarins cunninghamii*). There are no species of Koala feed tree present. |
| Habitat connectivity | 0 | • The contiguous landscape patch was defined by the following barriers: > 2 km cleared rural land with few trees (north), 100 km/h, 4-lane road with median concrete barriers and no over/underpasses (east), > 2km cleared rural land (south and west).<br>• There are no forested riparian zones or other corridors of suitable width connecting the patch to other, larger patches.<br>• The size of the contiguous landscape defined by this polygon is 455 ha (see provided map and GIS shapefile). | |
| Key existing threats | 1 | Desktop | The area is accessible to the general public and is used for public recreation, including dog walking. This presents some risk of dog attack, although no evidence of this is apparent. |
| | | On-ground | |
| Recovery value | 0 | • As the area of this PCT does not contain suitable habitat (in the form of feed trees) and has no recent evidence of Koala within 2 km of the site, it is unlikely to be important for achieving any recovery objectives for inland Koala populations. | |
| **Total** | **1** | **Decision: Habitat not critical to the survival of the koala—assessment of significance not required.** | |

| **PCT 287 -** Long-leaved Box - Red Box - Red Stringybark mixed open forest on hills and hillslopes in the NSW South Western Slopes Bioregion. | | | |
|---|---|---|---|
| Attribute | Score | Habitat appraisal | |
| Koala | 1 | Desktop | • EPBC PMST report identified the koala as 'known to occur' in the study |

| **PCT 287 -** Long-leaved Box - Red Box - Red Stringybark mixed open forest on hills and hillslopes in the NSW South Western Slopes Bioregion. | | | |
|---|---|---|---|
| Attribute | Score | Habitat appraisal | |
| occurrence | | | area.<br>• NSW BioNet Atlas shows two records of Koalas within 2km of the edge of the Impact area in the last 10 years (2017), although there is no evidence of Koala within the impact area within the last 5 years |
| | | On-ground | • On-ground surveys did not detect any evidence of Koalas. |
| Vegetation structure and composition | 2 | Desktop | • PCT 287 lists several known feed trees as present within the canopy. |
| | | On-ground | • On-ground surveys revealed there are three species of emergent feed tree within an open forest community, *Eucalyptus goniocalyx, E. bridgesiana* and *E. macrorhyncha.*<br>• At sites surveyed, *E. goniocalyx* makes up at least 50% of the canopy layer. |
| Habitat connectivity | 2 | • The contiguous landscape patch was defined using the NSW BAM. i.e. areas of woody vegetation less than 100 m apart is considered a contiguous patch within the study area.<br>• Patch size for the relevant PCT above is >1000 ha. | |
| Key existing threats | 2 | Desktop | The area is private property and is not accessible to public vehicle traffic. There are no public roads that cross the property. There was no evidence of koala mortality resulting from dog attacks and vehicle strikes. |
| | | On-ground | |
| Recovery value | 2 | • Koala records occur both north and south of the impact area, within connected habitat patches. The area is important for maintaining the connectivity of Koala habitat. | |
| **Total** | **9** | **Decision: Habitat critical to the survival of the koala—assessment of significance required.** | |

| **PCT 654 - Apple Box - Yellow Box dry grassy woodland of the South Eastern Highlands Bioregion.** | | | |
|---|---|---|---|
| Attribute | Score | Habitat appraisal | |
| Koala occurrence | 1 | Desktop | • EPBC PMST report identified the koala as 'known to occur' in the study area.<br>• NSW BioNet Atlas shows only one record of a single Koala within 2km of the edge of the Impact area in the last 10 years (2017).<br>• There is no evidence of Koala within the impact area within the last 5 years |
| | | On-ground | • On-ground surveys did not detect any evidence of Koalas. |

| PCT 654 - Apple Box - Yellow Box dry grassy woodland of the South Eastern Highlands Bioregion. | | | |
|---|---|---|---|
| Attribute | Score | Habitat appraisal | |
| Vegetation structure and composition | 2 | Desktop | • PCT 654 lists two known feed trees as present within the canopy. |
| | | On-ground | • On-ground surveys revealed there are two species of emergent feed tree within areas confirmed as PCT 654 - *Eucalyptus bridgesiana* and *E. melliodora.*<br>• At sites surveyed, *E. goniocalyx* makes up at least 50% of the canopy layer. |
| Habitat connectivity | 2 | • The contiguous landscape patch was defined using the NSW BAM. i.e. areas of woody vegetation less than 100 m apart is considered a contiguous patch within the study area.<br>• Patch size for the relevant PCT above is >1000 ha. | |
| Key existing threats | 2 | Desktop<br>On-ground | The area is private property and is not accessible to public vehicle traffic. There are no public roads that cross the property. There was no evidence of koala mortality resulting from dog attacks and vehicle strikes. |
| Recovery value | 2 | • Koala records occur both north and south of the impact area, within connected habitat patches. The area is important for maintaining the connectivity of Koala habitat. | |
| **Total** | **9** | **Decision: Habitat critical to the survival of the koala—assessment of significance required.** | |

| PCT 679 - Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion | | | |
|---|---|---|---|
| Attribute | Score | Habitat appraisal | |
| Koala occurrence | 0 | Desktop | • EPBC PMST report identified the koala as 'known to occur' in the study area.<br>• NSW BioNet Atlas shows no records Koalas within 2km of the edge of the Impact area in the last 10 years.<br>• There is no evidence of Koala within the impact area within the last 5 years. |
| | | On-ground | • On-ground surveys did not detect any evidence of Koalas. |
| Vegetation structure and composition | 2 | Desktop | • *Eucalyptus pauciflora* is a known feed tree for Koala and is a dominant component PCT 679. |
| | | On-ground | • On-ground surveys confirmed a woodland community with feed trees *Eucalyptus pauciflora* and *E. rubida* present. |

| PCT 679 - Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion | | | |
|---|---|---|---|
| Attribute | Score | Habitat appraisal | |
| Habitat connectivity | 2 | • The contiguous landscape patch was defined using the NSW BAM. i.e. areas of woody vegetation less than 100 m apart is considered a contiguous patch within the study area.<br>• Patch size for the relevant PCT above is >1000 ha. | |
| Key existing threats | 2 | Desktop<br><br>On-ground | The area is private property (mining lease) and is not accessible to public vehicle traffic. There are no public roads that cross the property. There was no evidence of koala mortality resulting from dog attacks and vehicle strikes. |
| Recovery value | 1 | • The area may be important for maintaining the connectivity of Koala habitat, however as there are no records of Koala within 2 km of the impact area, it is uncertain as to whether the habitat is likely to be important for interim recovery objectives. | |
| **Total** | **7** | **Decision: Habitat critical to the survival of the koala—assessment of significance required.** | |

| PCT 727 - Broad-leaved Peppermint - Brittle Gum - Red Stringybark dry open forest on the South Eastern Highlands Bioregion | | | |
|---|---|---|---|
| Attribute | Score | Habitat appraisal | |
| Koala occurrence | 0 | Desktop<br><br>On-ground | • EPBC PMST report identified the koala as 'known to occur' in the study area.<br>• NSW BioNet Atlas shows no records Koalas within 2km of the edge of the Impact area in the last 10 years.<br>• There is no evidence of Koala within the impact area within the last 5 years.<br><br>• On-ground surveys did not detect any evidence of Koalas. |
| Vegetation structure and composition | 0 | Desktop | • PCT 727 is a forest community that contains feed tree species *Eucalyptus mannifera* in the canopy. |
| | | On-ground | • On-ground surveys confirmed PCT 727 in poor condition with no emergent tree layer present. |
| Habitat connectivity | 2 | • The contiguous landscape patch was defined using the NSW BAM. i.e. areas of woody vegetation less than 100 m apart is considered a contiguous patch within the study area.<br>• Patch size for the relevant PCT above is >1000 ha. | |
| Key existing threats | 1 | Desktop | The area is a state forest with a public access track used by logging trucks and private vehicles.<br><br>The area scored 0 for Koala occurrence, however there is likely to be some degree of vehicle threat present. |

| PCT 727 - Broad-leaved Peppermint - Brittle Gum - Red Stringybark dry open forest on the South Eastern Highlands Bioregion | | | |
|---|---|---|---|
| Attribute | Score | Habitat appraisal | |
| | | On-ground | There was no evidence of koala mortality resulting from dog attacks and vehicle strikes when the site was visited. |
| Recovery value | 1 | • The area may be important for maintaining the connectivity of Koala habitat, however as there are no records of Koala within 2 km of the impact area, it is uncertain as to whether the habitat is likely to be important for interim recovery objectives. | |
| **Total** | **4** | **Decision: Habitat not critical to the survival of the koala—assessment of significance not required.** | |

| PCT 731 - Broad-leaved Peppermint - Red Stringybark grassy open forest on undulating hills, South Eastern Highlands Bioregion | | | |
|---|---|---|---|
| Attribute | Score | Habitat appraisal | |
| Koala occurrence | 0 | Desktop | • EPBC PMST report identified the koala as 'known to occur' in the study area.<br>• NSW BioNet Atlas shows no records Koalas within 2km of the edge of the Impact area in the last 10 years.<br>• There is no evidence of Koala within the impact area within the last 5 years. |
| | | On-ground | • On-ground surveys did not detect any evidence of Koalas. |
| Vegetation structure and composition | 2 | Desktop | • PCT 731 is a forest community that contains feed tree species *Eucalyptus mannifera* in the canopy. |
| | | On-ground | • On-ground surveys confirmed areas of PCT 731 contain *E. mannifera* that makes up at least 50% of the canopy layer. |
| Habitat connectivity | 2 | • The contiguous landscape patch was defined using the NSW BAM. i.e. areas of woody vegetation less than 100 m apart is considered a contiguous patch within the study area.<br>• Patch size for the relevant PCT above is >1000 ha. | |
| Key existing threats | 1 | Desktop | The area is a private property (mining lease) with no public access.<br>The area scored 0 for Koala occurrence, however there is likely to be some degree of vehicle threat present. |
| | | On-ground | There was no evidence of koala mortality resulting from dog attacks and vehicle strikes when the site was visited. |
| Recovery value | 1 | • The area may be important for maintaining the connectivity of Koala habitat, however as there are no records of Koala within 2 km of the impact area, it is uncertain as to whether the habitat is likely to be important for interim recovery objectives. | |

| PCT 731 - Broad-leaved Peppermint - Red Stringybark grassy open forest on undulating hills, South Eastern Highlands Bioregion | | |
|---|---|---|
| Attribute | Score | Habitat appraisal |
| **Total** | **6** | **Decision: Habitat critical to the survival of the koala—assessment of significance required.** |

| PCT 732 - Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion | | | |
|---|---|---|---|
| Attribute | Score | Habitat appraisal | |
| Koala occurrence | 0 | Desktop | • EPBC PMST report identified the koala as 'known to occur' in the study area.<br>• NSW BioNet Atlas shows no records Koalas within 2km of the edge of the Impact area in the last 10 years.<br>• There is no evidence of Koala within the impact area within the last 5 years. |
| | | On-ground | • On-ground surveys did not detect any evidence of Koalas. |
| Vegetation structure and composition | 2 | Desktop | • PCT 732 is a forest community that contains feed tree species *Eucalyptus viminalis* and *E. mannifera* in the canopy. |
| | | On-ground | • On-ground surveys confirmed areas of PCT 732 contain *E. mannifera* that makes up at least 50% of the canopy layer. |
| Habitat connectivity | 2 | • The contiguous landscape patch was defined using the NSW BAM. i.e. areas of woody vegetation less than 100 m apart is considered a contiguous patch within the study area.<br>• Patch size for the relevant PCT above is >1000 ha. | |
| Key existing threats | 1 | Desktop | The area scored 0 for Koala occurrence, however there is likely to be some degree of vehicle threat present as the habitat is located adjacent a public access road. |
| | | On-ground | There was no evidence of koala mortality resulting from dog attacks and vehicle strikes when the site was visited. |
| Recovery value | 1 | • The area may be important for maintaining the connectivity of Koala habitat, however as there are no records of Koala within 2 km of the impact area, it is uncertain as to whether the habitat is likely to be important for interim recovery objectives. | |
| **Total** | **6** | **Decision: Habitat critical to the survival of the koala—assessment of significance required.** | |

| PCT 765 - Carex - Juncus sedgeland/wet grassland of the South Eastern Highlands Bioregion | | | |
|---|---|---|---|
| Attribute | Score | Habitat appraisal | |
| Koala occurrence | 0 | Desktop | • EPBC PMST report identified the koala as 'known to occur' in the study area.<br>• NSW BioNet Atlas shows no records Koalas within 2km of the edge of the Impact area in the last 10 years.<br>• There is no evidence of Koala within the impact area within the last 5 years. |
| | | On-ground | • On-ground surveys did not detect any evidence of Koalas. |
| Vegetation structure and composition | 0 | Desktop | • PCT 765 is not a forest or woodland community. |
| | | On-ground | • On-ground surveys confirmed areas of PCT 765 are a grassland community with no Koala feed trees present. |
| Habitat connectivity | 0 | • The contiguous landscape patch was defined using the NSW BAM. i.e. areas of woody vegetation less than 100 m apart is considered a contiguous patch within the study area.<br>• Patch size for the relevant PCT is <500 ha and is completely surrounded by *Pinus radiata* plantations. It is not part of a contiguous landscape | |
| Key existing threats | 1 | Desktop | The area scored 0 for Koala occurrence, however there is likely to be some degree of vehicle threat present as the habitat is located adjacent a public access road. |
| | | On-ground | There was no evidence of koala mortality resulting from dog attacks and vehicle strikes when the site was visited. |
| Recovery value | 0 | • The area is not important for maintaining the connectivity of Koala habitat, as it is not part of a connectivity corridor and contains no Koala feed trees. | |
| **Total** | **1** | **Decision: Habitat is not critical to the survival of the koala—assessment of significance not required.** | |

| PCT 1093 - Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion. | | | |
|---|---|---|---|
| Attribute | Score | Habitat appraisal | |
| Koala occurrence | 1 | Desktop | • EPBC PMST report identified the koala as 'known to occur' in the study area.<br>• NSW BioNet Atlas shows one record of a single Koala within 2km of the edge of the Impact area within this PCT in the last 10 years (2009).<br>• There is no evidence of Koala within the impact area within the last 5 years. |
| | | On-ground | • On-ground surveys did not detect any evidence of Koalas. |

| PCT 1093 - Red Stringybark - Brittle Gum - Inland Scribbly Gum dry open forest of the tablelands, South Eastern Highlands Bioregion. | | | |
|---|---|---|---|
| Attribute | Score | Habitat appraisal | |
| Vegetation structure and composition | 2 | Desktop | • PCT 1093 is an open forest community that is likely to contain feed trees *Eucalyptus mannifera, E. goniocalyx* and *E. macrorhyncha.* |
| | | On-ground | • On-ground surveys confirmed areas of PCT 765 contain the above three tree species |
| Habitat connectivity | 2 | • The contiguous landscape patch was defined using the NSW BAM. i.e. areas of woody vegetation less than 100 m apart is considered a contiguous patch within the study area.<br>• Patch size for the relevant PCT is >1000 ha. | |
| Key existing threats | 1 | Desktop | The single record within 2 km of the impact area was of an individual crossing the Western Highway. This is taken as evidence of at least infrequent or irregular Koala mortality as a result of vehicle strikes. |
| | | On-ground | There was no evidence of koala mortality resulting from dog attacks and vehicle strikes when the site was visited. |
| Recovery value | 2 | • As the area of this PCT is within proximity to recent Koala records and is part of a connectivity corridor, it is important for maintaining the connectivity of habitat and as such is likely to be important for recovery objectives. | |
| **Total** | **8** | **Decision: Habitat is critical to the survival of the koala—assessment of significance required.** | |

| PCT 1091 - Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion | | | |
|---|---|---|---|
| Attribute | Score | Habitat appraisal | |
| Koala occurrence | 0 | Desktop | • EPBC PMST report identified the koala as 'known to occur' in the study area.<br>• NSW BioNet Atlas shows no records Koalas within 2km of the edge of the Impact area in the last 10 years.<br>• There is no evidence of Koala within the impact area within the last 5 years. |
| | | On-ground | • On-ground surveys did not detect any evidence of Koalas. |
| Vegetation structure and composition | 2 | Desktop | • PCT 1091 is a woodland community that is likely to contain feed trees *Eucalyptus rubida, E. viminalis* and *E. pauciflora.* |
| | | On-ground | • On-ground surveys confirmed areas of PCT 1091 contain *E. viminalis* at >50% of the tree cover. |

| PCT 1091 - Snow Gum - Candle Bark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion | | | |
|---|---|---|---|
| Attribute | Score | Habitat appraisal | |
| Habitat connectivity | 0 | • The contiguous landscape patch was defined using the NSW BAM. i.e. areas of woody vegetation less than 100 m apart is considered a contiguous patch within the study area.<br>• Patch size for the relevant PCT is <500 ha and thus does not form part of a contiguous landscape. | |
| Key existing threats | 2 | Desktop | The area is located adjacent a public access road, although it is a minor, unsealed road only. The area is in an agricultural setting and is not surrounded by housing. There may be some irregular mortality of Koalas as a result of vehicle strikes, although no evidence of this is known. |
| | | On-ground | There was no evidence of koala mortality resulting from dog attacks and vehicle strikes when the site was visited. |
| Recovery value | 2 | • The impact area incorporates a water course and riparian vegetation (that will be diverted as part of the quarry works). This vegetation is likely to be important for refugia in dry conditions to Koala utilizing areas of PCT 1093 located nearby. | |
| **Total** | **6** | **Decision: Habitat is critical to the survival of the koala—assessment of significance required.** | |

| PCT 1197 - Snow Gum - Mountain Gum tussock grass-herb forest of the South Eastern Highlands Bioregion | | | |
|---|---|---|---|
| Attribute | Score | Habitat appraisal | |
| Koala occurrence | 0 | Desktop | • EPBC PMST report identified the koala as 'known to occur' in the study area.<br>• NSW BioNet Atlas shows no records Koalas within 2km of the edge of the Impact area in the last 10 years.<br>• There is no evidence of Koala within the impact area within the last 5 years. |
| | | On-ground | • On-ground surveys did not detect any evidence of Koalas. |
| Vegetation structure and composition | 2 | Desktop | • PCT 1197 is a forest community that is likely to contain feed trees *Eucalyptus dalrympleana* and *E. pauciflora.* |
| | | On-ground | • On-ground surveys confirmed areas of PCT 1197 contain both the above species. |
| Habitat connectivity | 1 | • The contiguous landscape patch was defined using the NSW BAM. i.e. areas of woody vegetation less than 100 m apart is considered a contiguous patch within the study area.<br>• Patch size for the relevant PCT is <1000 ha and >500 ha thus is part of a contiguous landscape. | |
| Key existing threats | 2 | Desktop | The area is located adjacent a public, 100km/h road. The area is in an agricultural setting and is not surrounded by housing. There may be some irregular mortality of Koalas resulting from vehicle strikes, although no evidence of this is known. |

| PCT 1197 - Snow Gum - Mountain Gum tussock grass-herb forest of the South Eastern Highlands Bioregion | | | |
|---|---|---|---|
| Attribute | Score | Habitat appraisal | |
| | | On-ground | There was no evidence of koala mortality resulting from dog attacks and vehicle strikes when the site was visited. |
| Recovery value | 2 | • The area is part of a contiguous landscape that provides connectivity for dispersing Koalas and thus is likely to be important to recovery objectives | |
| **Total** | **7** | **Decision: Habitat is critical to the survival of the koala—assessment of significance required.** | |

| PCT 1330 - Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion | | | |
|---|---|---|---|
| Attribute | Score | Habitat appraisal | |
| Koala occurrence | 1 | Desktop | • EPBC PMST report identified the koala as 'known to occur' in the study area.<br>• NSW BioNet Atlas shows two records Koalas within 2km of the edge of the Impact area in the last 10 years (2017).<br>• There is no evidence of Koala within the impact area within the last 5 years. |
| | | On-ground | • On-ground surveys did not detect any evidence of Koalas. |
| Vegetation structure and composition | 2 | Desktop | • PCT 1330 is a woodland community that is likely to contain feed trees *Eucalyptus melliodora* and *E. blakelyi.* |
| | | On-ground | • On-ground surveys confirmed areas of PCT 1330 contain both the above species. |
| Habitat connectivity | 2 | • The contiguous landscape patch was defined using the NSW BAM. i.e. areas of woody vegetation less than 100 m apart is considered a contiguous patch within the study area.<br>• Patch size for the relevant PCT is >1000 and thus is part of a contiguous landscape. | |
| Key existing threats | 2 | Desktop | The area is private property and is not accessible to public vehicle traffic. There are no public roads that cross the property. |
| | | On-ground | There was no evidence of koala mortality resulting from dog attacks and vehicle strikes when the site was visited. |
| Recovery value | 2 | • The area is part of a contiguous landscape that provides connectivity for dispersing Koalas and thus is likely to be important to recovery objectives | |
| **Total** | **9** | **Decision: Habitat is critical to the survival of the koala—assessment of significance required.** | |