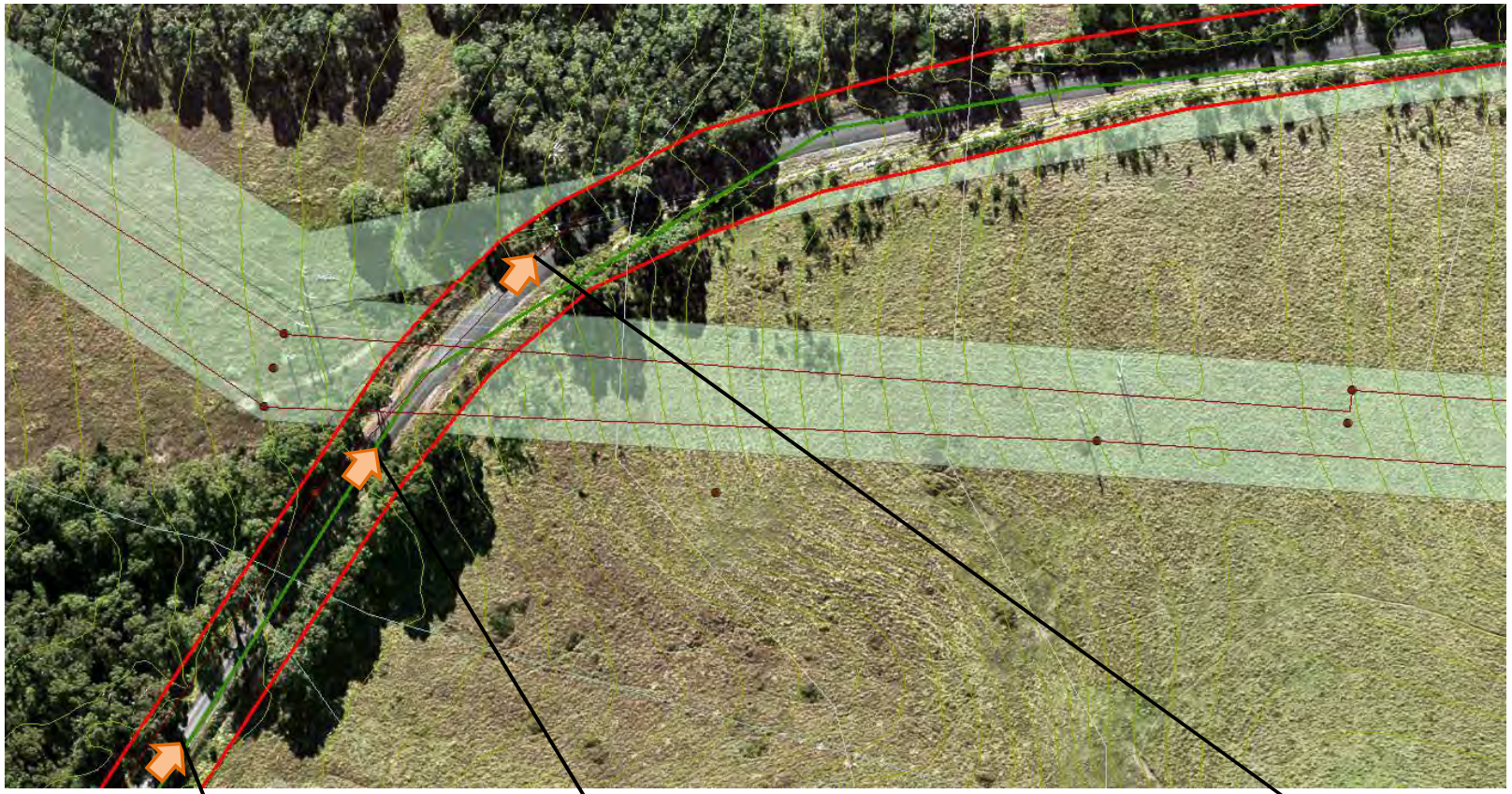
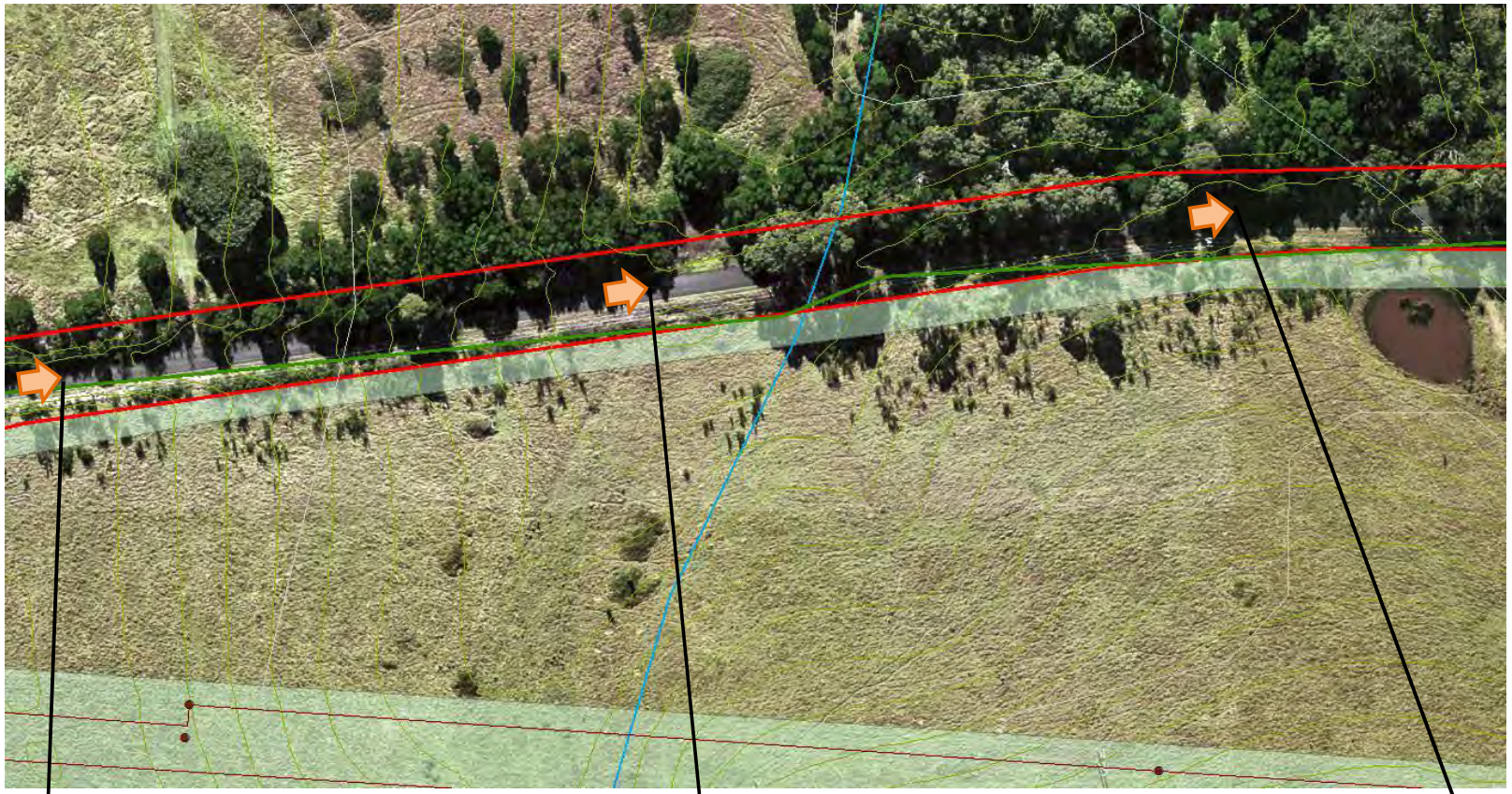
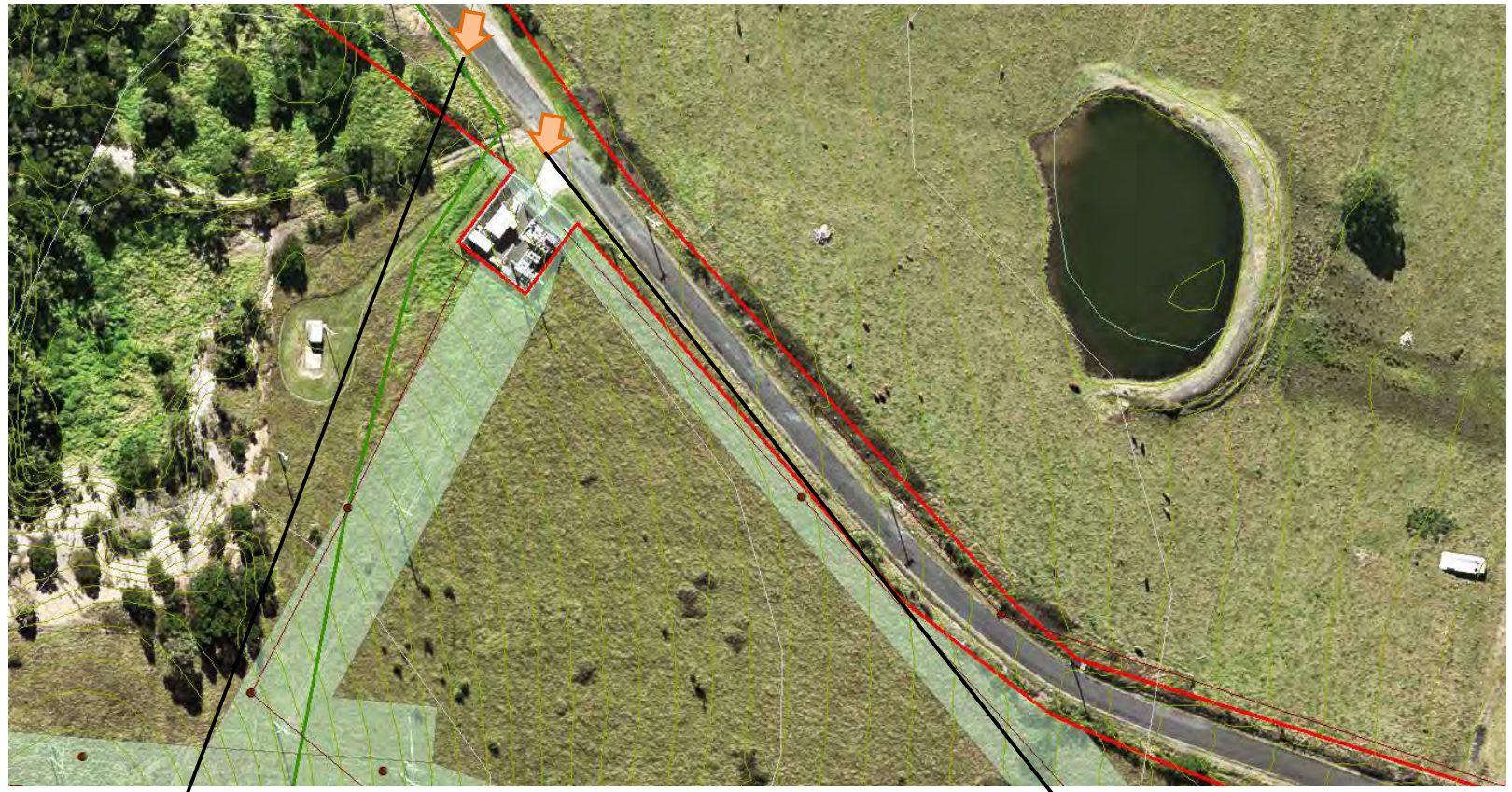
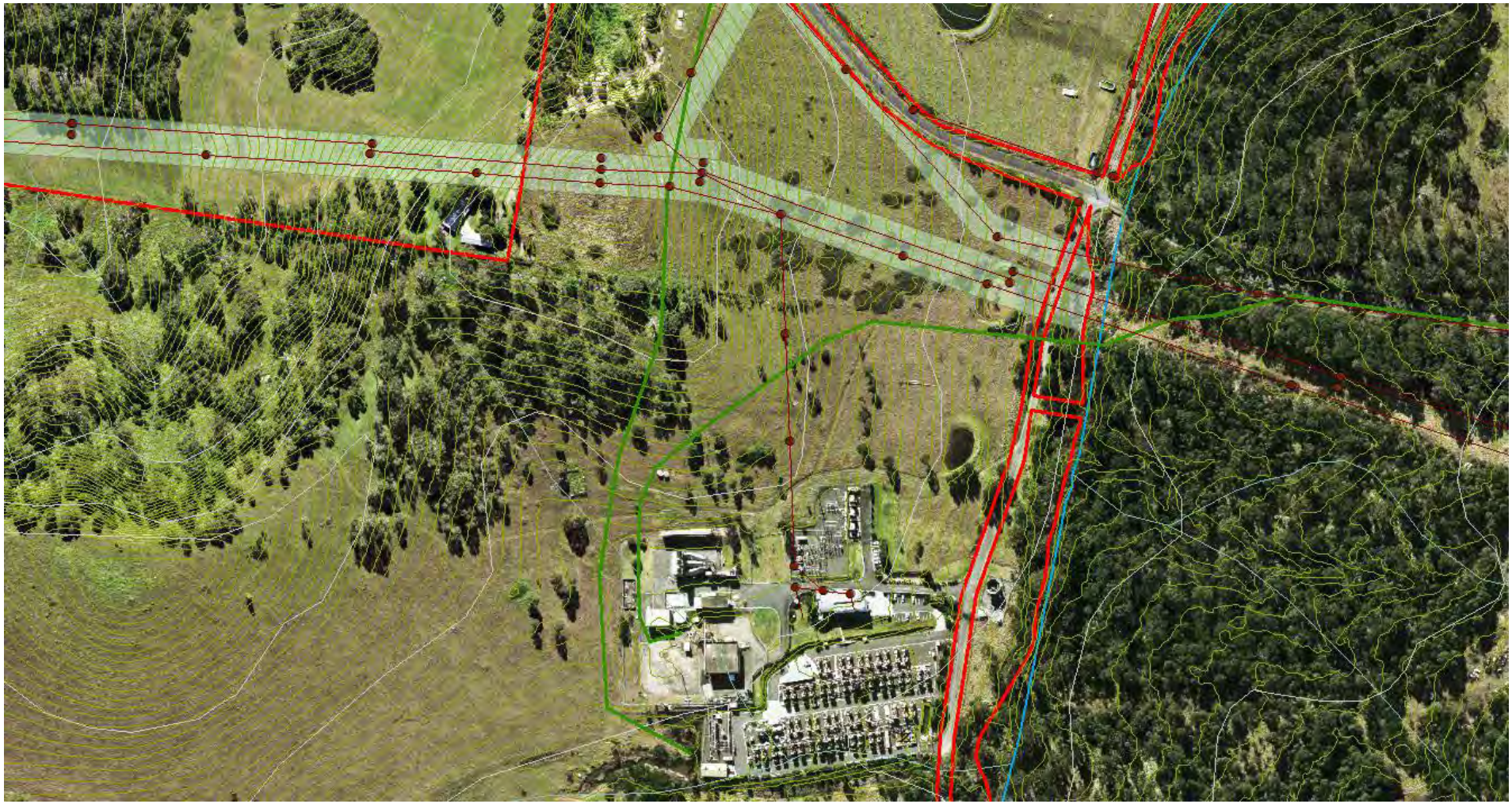








# Annex 3 Biodiversity Assessment

niche
Environment and Heritage

# Terrestrial Ecology Impact Assessment

## Bulli Seam Operations

## Mine Safety Gas Management Project

## Section 75W Modification

**Prepared for South32 Illawarra Coal**

**June 2016**

**Document control**

| | |
|---|---|
| Project no.: | 2522 |
| Project client: | South32 Illawarra Coal |
| Project office: | Sydney |
| Document description: | Terrestrial ecology assessment for Bulli Seam Operations Mine Safety Gas Management Project s75W Modification. |
| Project Director: | Luke Baker |
| Project Manager: | Chris McEvoy |
| Authors: | Luke Baker |
| Internal review: | Frank Lemckert |
| Document status: | Final - Rev 2 |
| Local Government Area: | Wollondilly |

**Document revision status**

| Author | Revision number | Internal review | Date issued |
|---|---|---|---|
| Luke Baker | D2 | Frank Lemckert | 11/04/2016 |
| Luke Baker | 0 | Frank Lemckert | 19/04/2016 |
| Luke Baker | 1 | Frank Lemckert | 20/04/2016 |
| Luke Baker | 2 | Frank Lemckert | 16/06/2016 |

**Niche Environment and Heritage**

A specialist environmental and heritage consultancy.

**Head Office**

Level 1, 19 Sorrell Street
Parramatta NSW 2150
All mail correspondence to:
PO Box 2443
North Parramatta NSW 1750
Email: info@niche-eh.com

**Sydney**
0488 224 888
**Central Coast**
0488 224 999
**Illawarra**
0488 224 777
**Armidale**
0488 224 094
**Newcastle**
0488 224 160
**Mudgee**
0488 224 025
**Port Macquarie**
0488 224 999
**Brisbane**
0488 224 036
**Cairns**
0488 284 743



*Cover photograph:* section of the study area which contains Cumberland Plain Woodland on both sides of road. Niche Environment and Heritage, 2016.

# Executive summary

Niche Environment and Heritage Pty Ltd (Niche) was commissioned by South32 Illawarra Coal (IC) to prepare a terrestrial ecology impact assessment for the proposed installation of gas drainage infrastructure within their Bulli Seam Operations – a continuation of the Appin and West Cliff mining operations – in the Southern Coalfield of New South Wales, approximately 25km northwest of Wollongong.

The primary objective of this report is to describe and assess ecological values within the study area and surrounds and to determine whether the proposal is likely to have a significant impact on threatened biodiversity protected by state and commonwealth legislation. A description of the likely impacts of the proposal and consideration of mitigation measures have also been included in this assessment.

Known impacts include the disturbance and modification of approximately 0.45 ha of native vegetation.

Potential indirect impacts include sedimentation or erosion in adjacent bushland and weed invasion. These indirect impacts would be ameliorated by a series of mitigation measures.

**Assessment of impacts to threatened biodiversity**

Vegetation mapping of the study area consisted of areas of cleared land/exotic pasture and areas of regenerating Cumberland Plain Woodland. Cumberland Plain Woodland is listed as a Threatened Ecological Community (TEC) both under the NSW *Threatened Species Conservation Act 1995* (TSC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Approximately 0.45 ha would be impacted by the proposal.

No threatened flora were recorded in the study area. Based on the results of the field survey, *Grevillea parviflora* subsp. *parviflora* and *Epacris purpurascens* var. *purpurascens* have a moderate likelihood of occurrence within the study area. However, both these species are relatively conspicuous, despite the survey not being carried out during their flowering times. It is therefore considered unlikely that these species occur within the study area.

No threatened fauna were detected during the field survey, however likelihood of occurrence assessments indicated potential habitat (limited) for nine threatened fauna within the study area.

Species include the following:

- Birds: Brown Treecreeper, Little Lorikeet and Varied Sittella.
- Invertebrates: Cumberland Plain Land Snail
- Mammals: Eastern False Pipistrelle, Yellow-bellied Sheathtail-bat, Large-footed Myotis, Eastern Freetail-bat and Little Bentwing–bat.

The birds and microbat species are considered to have potential foraging habitat within the study area. Up to three hollow-bearing trees may be removed. It is possible that the hollow-bearing trees may provide habitat for threatened microbats, and Little Lorikeet. Assessments of significance have been conducted for these species as a precautionary approach (Appendix 3), along with the implementation of a vegetation clearing protocol to minimise any potential harm to threatened fauna. The Assessment has concluded that the biodiversity is unlikely to be significantly impacted by the proposal.

The Cumberland Plain Land Snail, has the potential to occur within the area directly impacted by the proposal. Whilst not recorded during the field survey, as a precautionary approach, an Assessment of

Significance has been prepared for the species (Appendix 3). The Assessment has concluded that the Cumberland Plain Land Snail is unlikely to be significantly impacted by the proposal.

The proposal is not expected to have a significant impact on threatened biodiversity as listed under the EPBC Act and TSC Act.

An assessment of the project under SEPP 44 Koala Habitat has also been undertaken. This has found that Koala Habitat will not be impacted by the proposal.

**Recommendations**

To minimise impacts to flora, fauna and their habitats, the following actions are recommended:

1. Appropriate measures are to be employed to ensure that machinery working within the site does not bring materials (soils etc.) onto the site that may lead to the spread of Phytophthora cinnamomi. Refer http://www.environment.gov.au/biodiversity/invasive-species/publications/arrive-clean-leave-clean
2. Silt fencing should be used at all locations where erosion and sediment runoff may occur.
3. Any vegetation removal other than that detailed in this report should be subject to further assessment.
4. Implement a two-stage clearing protocol for the removal of the hollow-bearing tree at the pedestrian bridge site as per Section 5 of this report.

# Glossary and abbreviations

| | |
|---|---|
| **Flora and fauna of conservation significance** | Threatened species or populations listed on the schedules of the TSC Act and/or listed as MNES under the EPBC Act |
| **Local population** | The population of a particular threatened species that occurs in the locality |
| **Locality** | The area within 10 km of the study area |
| **Local occurrence** | Refers to the distribution of an ecological community within the study area and continuous with it |
| **MNES** | Matters of National Environmental Significance |
| **OEH** | Office of Environment and Heritage |
| **TEC** | Threatened Ecological Community as listed on the TSC Act and or EPBC Act. Collective term to describe vulnerable, endangered and critically endangered ecological communities |
| **Threatened biodiversity** | Threatened species, populations and ecological communities as listed on the TSC and or EPBC Acts |
| **TSC Act** | NSW *Threatened Species Conservation Act 1995* |
| **EPBC Act** | Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* |
| **EP&A Act** | NSW *Environmental Planning and Assessment Act 1979* |
| **OCVT** | Over Cleared Vegetation Type |
| **RBVT** | Revised Biometric Vegetation Type |
| **SEPP** | State Environment Planning Policy |

# Table of Contents

## List of Figures



## List of Photos



## List of Tables

# 1. Introduction

## 1.1 Background

Niche Environment and Heritage Pty Ltd (Niche) was commissioned by South32 Illawarra Coal (IC) to prepare a terrestrial ecology impact assessment for the proposed installation of gas drainage infrastructure within their Bulli Seam Operations – a continuation of the Appin and West Cliff mining operations – in the Southern Coalfield of New South Wales, approximately 25km northwest of Wollongong. The proposed works require a s75W modification to the existing Bulli Seam Operations Project (BSOP) Approval, which was granted by the Planning Assessment Commission on 22 December 2011 under Part 3A of the Environmental Planning and Assessment Act 1979 (EP&A Act). The construction and use of future gas drainage infrastructure was not included in the existing BSOP Approval. A s75W modification to the BSOP Approval is therefore proposed, to incorporate the construction and operation of the proposed gas management infrastructure, hereafter referred to as the Mine Safety Gas Management Project (MSGMP).

This report will be included within the s75W Environmental Assessment (Niche 2016).

## 1.2 Project description

The Bulli Seam Operations are located in the Southern Coalfield of New South Wales, approximately 25km northwest of Wollongong in the vicinity of the Appin, Wilton, Douglas Park, Picton and Menangle townships (Figure 1). The proposed MSGMP works are located between the townships of Appin and Douglas Park, in the vicinity of Brooks Point Road.

The project consists of several elements:

**Buried pipeline**

A trench nominally two metres wide and two metres deep would be constructed by large excavator. No blasting or rock picking would be required, however the shale/sandstone may need to be ripped or cut with a rock saw. HDPE pipe of ~1 m overall diameter will be laid on bedding sand in the trench then backfilled. The length of the buried pipeline is nominally 4000 m. Two work fronts would operate simultaneously from either end of the pipeline route and meet in the middle.

Each work front would require:

- Large excavator
- Two dump trucks to deliver bedding sand (estimated up to eight deliveries / day after the trench has been excavated)
- Two dump trucks to move excavated soil / rock to temporary stockpiles within a few km of the work front
- Front end loader for stock pile management / loading dump trucks
- Semi-trailer delivery of pipes (two / day)
- Truck mounted crane for pipe installation.

**Overland Steel Pipe**

A nominal one metre diameter overland steel pipeline would be constructed to bridge the NSW Water Upper Canal and adjacent creek / farm dam. Foundations would be excavated by small excavator, formwork installed and concrete poured. All steel elements would be fabricated off site and be

transported to site by semi-trailer loads. Two truck mounted cranes would install the fabricated steel pipeline elements

**Thrust bore**

A thrust bore would be required to install the buried pipeline below the existing Jemena / APA / Gorodok high pressure pipelines. This would require five metres by five metres by six metres deep portals to be constructed at both ends of the bore. This would require a large excavator, dump wide trucks, small crane to install shoring equipment. This element would take approximately two weeks.

Thrust boring would take approximately five days. The thrust boring equipment would be lowered into the portals with a small crane over one day. Once the thrust bore is completed, soil / rock filling the portals would be undertaken which is expected to take no more than four days.

**Rehabilitation**

Once the pipeline is installed and buried, surface disturbance of the road verge / driveways would be repaired and profiled using standard road maintenance equipment. The disturbed road verge would be configured to an open, safe and easy to maintain road side that would be suitable for the progressive encroachment of native vegetation regrowth from adjacent vegetated areas should the relevant road management agency consider this appropriate.

**Traffic Management**

During the proposed construction period, extensive traffic management will be required to ensure disruption to the traffic on Brooks Point Rd is kept to a minimum.

## 1.3 Study area

For this ecology assessment, the study area is defined as the disturbance footprint of the proposed gas management infrastructure, located between the Appin No. 3 Shaft and the existing gas infrastructure and power generation facilitated located at the Appin No. 2 Shaft site (Figure 2).

The Project will require approximately 0.45 ha of native regrowth vegetation clearing within an existing road corridor. A further 0.35 ha of introduced vegetation and cleared land would be disturbed. In total, the area of direct disturbance is approximately 0.8 ha (subject site). Indirect impacts would be mitigated as per the recommendations provided in Section 5 to avoid any further vegetation disturbance.

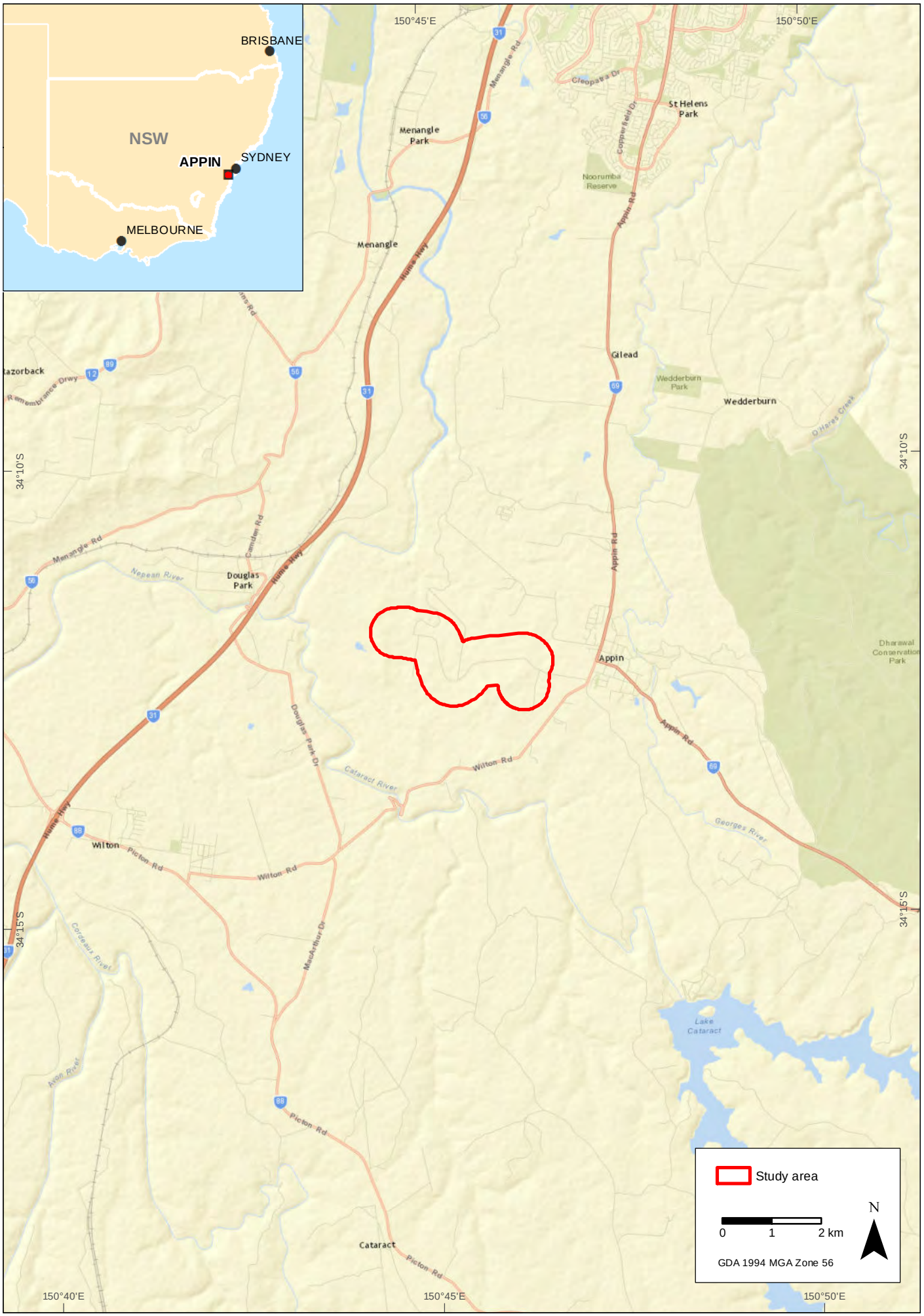
## 1.3 Purpose and objectives

The primary objective of this report is to describe and assess ecological values within the study area and to determine whether the proposal is likely to have a significant impact on threatened biodiversity. A description of likely impacts from the proposal and consideration of mitigation measures have also been provided.

The approach of this assessment includes:

1. Undertake a background review of relevant literature, mapping and databases
2. Conduct a field survey using recognised methods to assess the ecological values of the study area and address identified data gaps
3. Describe the ecological values of the study area in regards to flora, fauna and vegetation communities
4. Describe the potential ecological impacts of the proposal

5. Assess impacts on threatened biodiversity as listed on the NSW *Threatened Species Conservation Act 1995* (TSC Act) and the Commonwealth *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act)
6. Provide advice on measures to ameliorate impacts, including strategies to avoid or mitigate impacts.



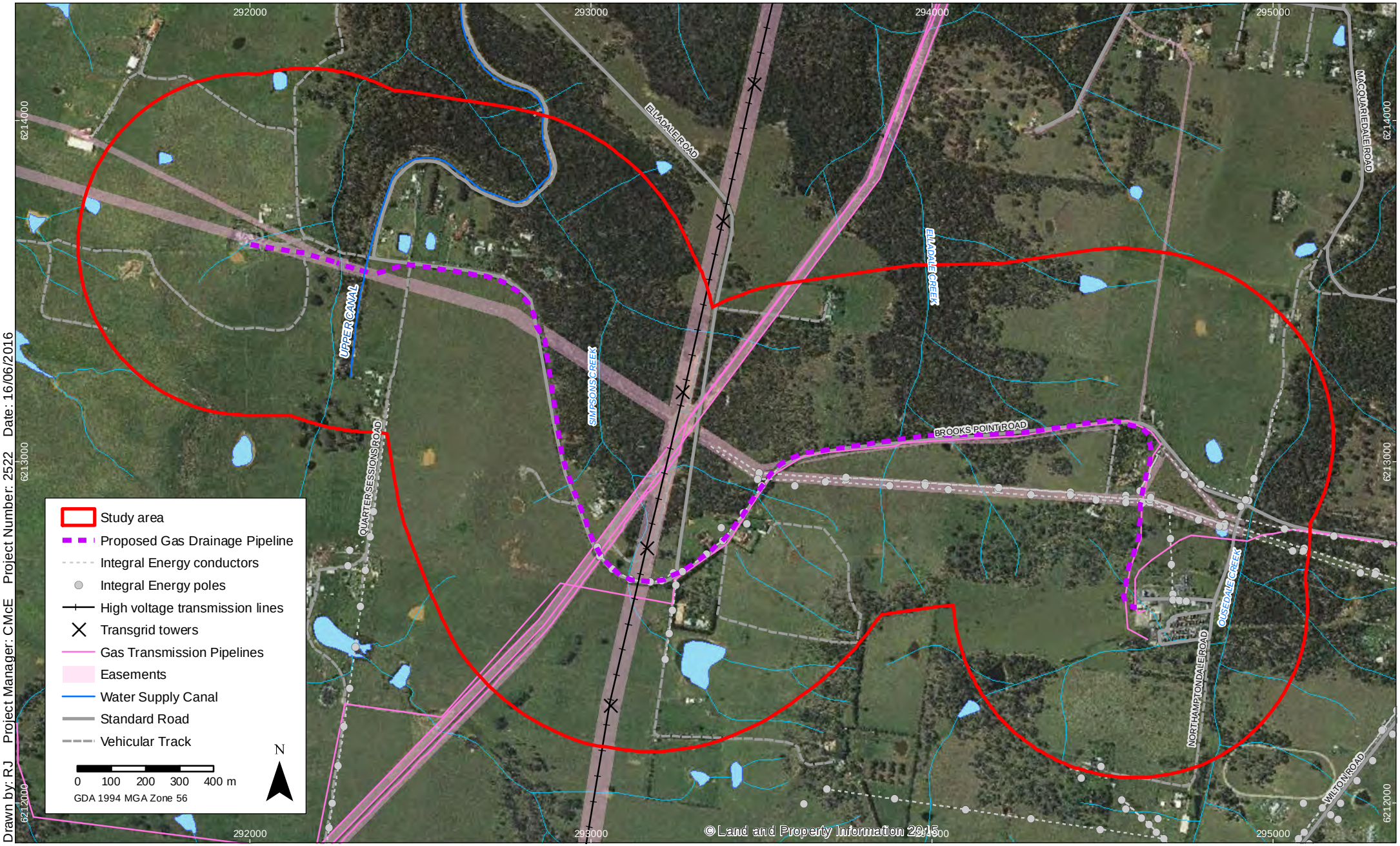

Drawn by: RJ Project Manager: CMcE Project Number: 2522 Date: 16/06/2016

Local context

Appin East Mine Safety Gas Management Project - s75 Modification

**FIGURE 1**

Path: T:\spatial\projects\a2500\a2522_AppinEastGas\Maps\report\Ecology\2522_Figure_1_Context.mxd




Drawn by: RJ Project Manager: CMcE Project Number: 2522 Date: 16/06/2016

Study area

Appin East Mine Safety Gas Management Project - s75 Modification

**FIGURE 2**

Path: T:\spatial\projects\a2500\a2522_AppinEastGas\Maps\report\Ecology\2522_Figure_2_StudyArea.mxd

Imagery: (c) LPI 2014-01-04

# 2. Methodology

## 2.1 Database and literature sources

Literature and data sources reviewed included:

- NPWS (2002) Native Vegetation of the Cumberland Plain
- OEH (2016) Threatened Species Profiles Database, NSW Department of Environment and Climate Change (now OEH)
- OEH Atlas of NSW Wildlife (accessed January 2016)
- The EPBC Act Protected Matters Search Tool (accessed January 2016).

## 2.2 Threatened flora and fauna likelihood

A list of subject threatened flora and fauna within the locality (10 kilometre radius) was determined from database searches (OEH Atlas of NSW Wildlife and EPBC Act Protected Matters Search Tool). The list of potentially impacted (affected) species is determined from consideration of this list. In order to adequately determine the relevant level of assessment to apply to subject species, further analysis of the likelihood of those species occurring within the study area was completed.

Five categories for 'likelihood of occurrence' (Table 1) were attributed to the species after consideration of criteria such as known records, presence or absence of important habitat features on the subject site, results of the field surveys and professional judgement. This process was completed on an individual species basis (Appendix 1).

Species considered further in formal assessments of significance pursuant to relevant legislation were those in the 'Known' to 'Moderate' categories and where impacts for the species could reasonably occur from the development.

**Table 1. Likelihood of occurrence criteria**

| Likelihood rating | Threatened flora criteria | Threatened and migratory fauna criteria |
|---|---|---|
| Known | The species was observed within the study area | The species was observed within the study area |
| High | It is likely that a species inhabits or utilises habitat within the study area | It is likely that a species inhabits or utilises habitat within the study area |
| Moderate | Potential habitat for a species occurs on the site. Adequate field survey would determine if there is a 'high' or 'low' likelihood of occurrence for the species within the study area | Potential habitat for a species occurs on the site and the species may occasionally utilise that habitat. Species unlikely to be wholly dependent on the habitat present within the study area |
| Low | It is unlikely that the species inhabits the study area | It is unlikely that the species inhabits the study area. If present at the site the species would likely be a transient visitor. The site contains only very common habitat for this species which the species would not rely on for its on-going local existence. |
| None | The habitat within the study area is unsuitable for the species. | The habitat within the study area is unsuitable for the species |

## 2.3 Field survey methodology

The study area was investigated by Luke Baker (Niche – Botanist) on 20 January 2016. This involved completing an entire traverse of the study area (Figure 3).

No Biometric plots were undertaken within the study area given the narrow width of the road corridor within public land. However, 34 Rapid Data Points (RDPs) were conducted within the study area. At each RDP, the dominant species, condition, structure and approximate cover abundance were recorded. A photograph was recorded at each RDP.

A random meander was also undertaken within the study area in order to look for present threatened species.

### 2.3.1 Vegetation and habitat condition

The natural vegetation within the study area was described based on the condition definitions detailed in Table 2.

**Table 2. Vegetation condition assessment**

| Type | Resilience rating | Description of vegetation condition |
|---|---|---|
| Resilient areas<br><br>*Soil profile intact. Natural regeneration pathways facilitated.* | High | Minor infestations of weeds or virtually weed free.<br>High species richness.<br>Low perimeter to core ratio and large adjacent patches.<br>All structural layers essentially intact or minor artificial modification has occurred but is not substantially impacting on ecological function.<br>Patch in benchmark condition or stable after disturbance.<br>Minimal management input required to facilitate regeneration |
| | Moderate | Minor infestations of weeds.<br>Moderate species richness.<br>Moderate perimeter to core ratio, large adjacent patches.<br>Structural absence or strong decline in condition of at least one vegetation layer due to previous artificial disturbance (e.g. regrowth from recent clearing event and subsequent loss of hollow-bearing trees).<br>Patch approaching benchmark condition.<br>Minimal management input required to facilitate regeneration. |
| | Low | Moderate to severe infestations of weeds.<br>Low species richness.<br>High perimeter to core ratio. Patches isolated or adjacent native vegetation fragmented.<br>Structural absence or strong decline in at least two vegetation layers (e.g. derived native pasture or grassland). Remaining native components under stress.<br>Original soil profile intact but patch well outside of benchmark condition.<br>Moderate levels of management required to facilitate regeneration. |
| Non-resilient areas<br><br>*Soil profile permanently altered. Natural regeneration pathways unlikely.* | Low (maintained rehabilitation area) | Moderate level of weed invasion.<br>Rehabilitation area – re-vegetation or previous soil translocation.<br>Soil profile may exhibit some regenerative potential though structure and composition unlikely to reach benchmark after treatment.<br>Limited natural regeneration capacity after treatment and high on-going inputs to achieve sustainable outcome. |

| Type | Resilience rating | Description of vegetation condition |
|---|---|---|
| | Very Low (unmanaged and degraded bushland) | Native vegetation almost totally replaced by weed species and, at best, a single structural layer intact (e.g. large trees in degraded riparian zone).<br>Soil profile disturbed and permanently altered resulting in loss of soil seed bank.<br>No regeneration capacity, natural regeneration pathways lost.<br>Management requires high input reconstruction and commitment to on-going maintenance. |
| | Not bushland | Potential regeneration suppressed by management practices (e.g. parkland, cropping or exotic pasture). |

### 2.3.2 Fauna survey

A habitat assessment was conducted within the study area. Habitat characteristics and parameters that were assessed included:

- physical aspects of the site such as climate (desktop), geology, soils, slope, elevation, drainage and aspect
- floristic composition, structure and age
- vegetation condition (Niche uses a measure of 'ecosystem resilience' as a function of disturbance, as described in Table 2 above)
- composition of ground layer (bare earth, litter etc.)
- presence and relative abundance of key habitat features (e.g. tree hollows, large logs, exfoliating rock, flowering resources, aquatic features).

Additional opportunistic observations (such as scats, scratchings etc.) were recorded whilst undertaking other surveys.

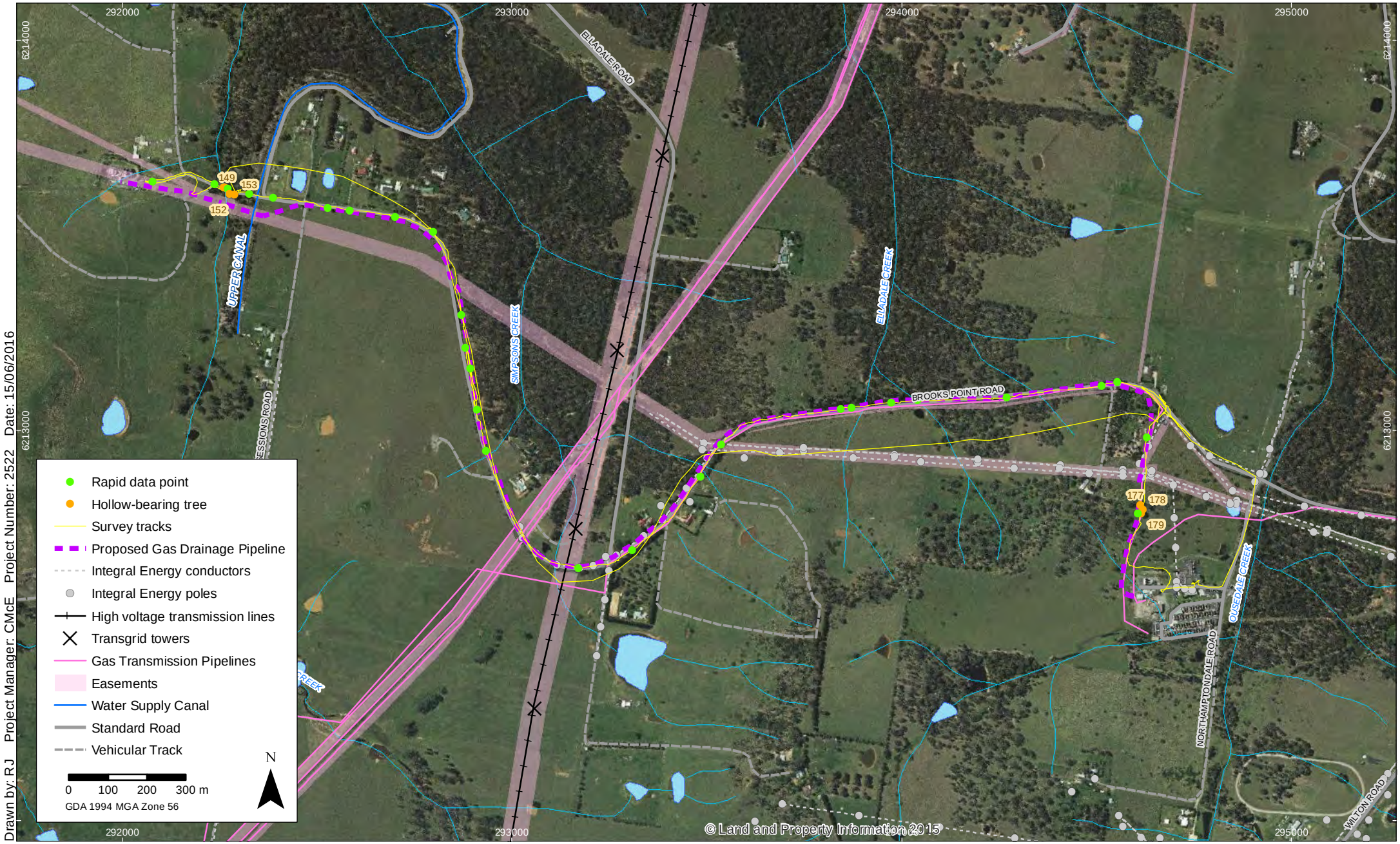
A search for hollow bearing trees was conducted within and adjacent to the areas of disturbance. The location of these were recorded using a hand-held GPS.

Targeted fauna survey, including trapping and ultrasonic bat surveys were not considered necessary given the site's condition, thus these were not undertaken.

## 2.4 Limitations

This study was designed as a habitat-based level of assessment, with the methodology developed for the purposes of conducting an assessment in accordance with Section 5A of the *Environment Planning and Assessment Act 1997* (EP&A Act). No surveys for terrestrial fauna such as trapping, spotlighting or call playback were employed. Habitat assessments are considered to be a more conservative method of assessment as species are assumed to be present if suitable habitat is present within the site and surrounding locality.

The GPS utilised in this assessment does have some accuracy limitations depending on satellite coverage at the time of the record. As such, there may be some very slight differences in the true location of records compared to that generated by the GPS.




Drawn by: RJ Project Manager: CMcE Project Number: 2522 Date: 15/06/2016

Survey effort

Appin East Mine Safety Gas Management Project - s75 Modification

**FIGURE 3**

Path: T:\spatial\projects\a2500\a2522_AppinEastGas\Maps\report\Ecology\2522_Figure_3_Survey.mxd

Imagery: (c) LPI 2014-01-04

# 3. Results

## 3.1 Flora

A total of 55 plant species were recorded across the study area. Flora recorded in the study area are provided in Appendix 2.

### 3.1.1 Vegetation community alignment and description

The study area is included in the Native Vegetation of the Cumberland Plain Mapping Project (NPWS 2002) (Figure 4). However not all vegetation within the study area is identified. According to NPWS (2002) mapping, vegetation identified as occurring within and adjacent to the study area consists predominantly of Shale Sandstone Transition Forest (Low and High sandstone influence), and Cumberland Plain Woodland (consisting of mapping units - Shale Plains Woodland, Shale Hills Woodland).

Field survey has addressed these discrepancies and provided a validation of the vegetation actually present. The validated vegetation mapping is provided in Figure 5, and is described in the sections below.

### 3.1.2 Validated vegetation mapping

The vegetation mapping units and relevant descriptions are provided in Table 3 and described below.

**Table 3. Vegetation validation mapping units and areas**

| Niche mapping unit | Corresponding Tozer unit | Corresponding Threatened Ecological Community (TEC) | Area within study area (ha) | Area mapped in Locality (NPWS 2000)[1] |
|---|---|---|---|---|
| Grey Box – Forest Red Gum grassy woodland (regenerating) | Shale Plains Woodland and Shale Hills Woodland | Cumberland Plain Woodland | 0.45 | 162.9 |
| Exotic grassland/disturbed land | Not listed | Not listed | 0.35 | - |
| | | **Total** | 0.8 | - |

**Grey Box – Forest Red Gum Grassy Woodland (regenerating)**

Grey Box – Forest Red Gum Grassy Woodland (regenerating) has been assigned to native vegetation within the study area that predominantly consists of regenerating shrubs, grasses and native forbs where the dominant canopy species were *Eucalyptus moluccana, E. tereticornis* and *E. crebra.* Common shrub species included: *Bursaria spinulosa, Acacia parramattensis*, *Kunzea ambigua* with occasional *Melaleuca decora* and *Allocasuarina littoralis.*

Native common ground cover included: *Themeda australis, Eragrostis brownii, Hardenbergia violacea, Glycine tabacina, Dichondra repens.*

[1] Area of Shale Plains Woodland and Shale Hills Woodland within locality (NPWS 2000)

The structure and condition of the vegetation community differed throughout the alignment, which is expected given it occurs within the existing road easement and has been subject to various management actions (slashing, mowing, trimming). As such, only one condition class has been assigned to this native vegetation type which encompasses areas of regenerating native grassland, and regenerating native shrubs/forbs/canopy trees.

Weeds were common throughout the ground layer within the native vegetation community. In particular the following introduced species were recorded*: Eragrostis curvula, Conyza bonariensis, Axonopus fissifolius, Paspalum dilatum, Pennisetum clandestinum, Chloris gayana, Verbena bonariensis* and *Bidens pilosa.*

**Photo 1. Example of CPW condition within road easement - Sporadic shrubs and native grasses amongst introduced Africa Love Grass (*Eragrostis curvula*)**

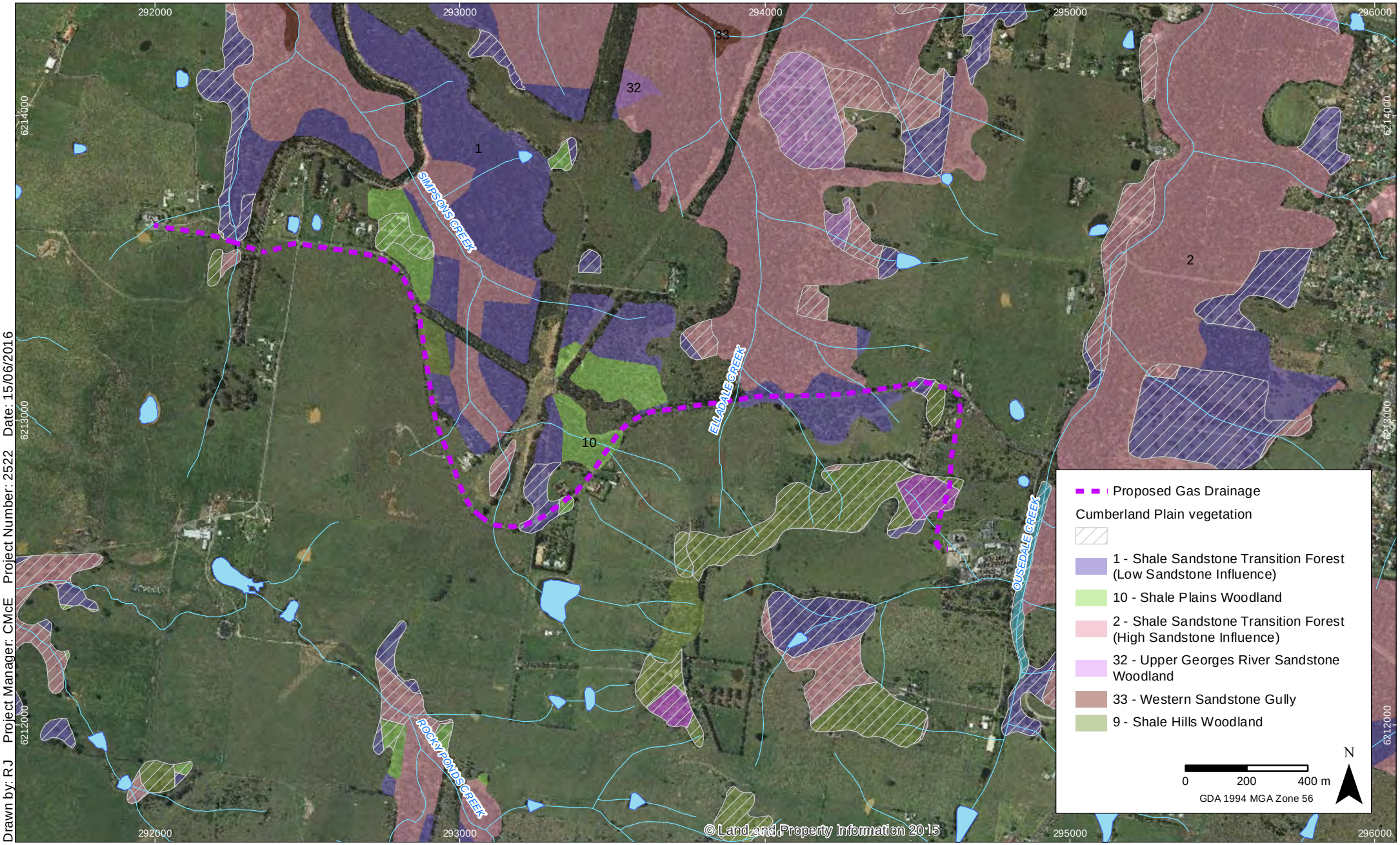
**Photo 2. CPW regeneration on both sides of road easement. Introduced Rhodes Grass (*Chloris gayana*) throughout.**

**Photo 3. CPW regeneration on both sides of road easement. Introduced Rhodes Grass (*Chloris gayana*) throughout.**

**Exotic grassland**

A large portion of the study area has been aligned to an exotic grassland vegetation unit. This area contains many introduced grass species with weeds, and occasional native species. Introduced species include: *Axonopus fissifolius, Paspalum dilatum, Pennisetum clandestinum, Chloris gayana, Verbena bonariensis* and *Bidens pilosa.* Native species include: *Themeda australis, Geranium solanderi* and *Sporobolus creber.* Given the highly degraded condition, less than 50 percent of the ground cover is native, this vegetation is therefore has been aligned to a non-native vegetation unit.

**Photo 4. Exotic grassland**




Drawn by: RJ Project Manager: CMcE Project Number: 2522 Date: 15/06/2016

Vegetation mapping (NPWS 2002)

Appin East Mine Safety Gas Management Project - s75 Modification

**FIGURE 4**

Path: T:\spatial\projects\a2500\a2522_AppinEastGas\Maps\report\Ecology\2522_Figure_4_Vegetation.mxd

Imagery: (c) LPI 2013-02-07


Validated vegetation mapping

Appin East Mine Safety Gas Management Project - s75 Modification

**FIGURE 5**

Path: T:\spatial\projects\a2500\a2522_AppinEastGas\Maps\report\Ecology\2522_Figure_5_ValidatedVegetation.mxd

Imagery: (c) LPI 2013-02-07

## 3.2 Threatened Ecological Communities

A list of Threatened Ecological Communities (TECs) occurring or potentially occurring within the locality was determined from database searches (NSW Bionet Database Search tool and EPBC Act Protected Matters Search Tool). Based on these database searches, six TECs have been identified as potentially occurring within the locality:

- Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion
- Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion
- Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest
- River-flat Eucalypt Forest
- Shale Sandstone Transition Forest of the Sydney Basin Bioregion
- Western Sydney Dry Rainforest and Moist Woodland on Shale.

Based on the results of the field survey (Section 3.1.1) parts of the study area likely align to Cumberland Plain Woodland TEC.

The impact to each of these TECs have been considered further in section 4.3.

## 3.3 Subject threatened flora

A total of 28 subject threatened flora, as listed on the TSC and/or EPBC Acts, were considered in this assessment (Appendix 1). This list was derived from the database searches outlined in Section 2.2.

Based on the results of the field survey, *Grevillea parviflora* subsp. *parviflora* and *Epacris purpurascens* var. *purpurascens* have a moderate likelihood of occurrence within the study area. However, both these species are relatively conspicuous despite the survey not carried out during flowering times. It is therefore unlikely that these species occur within the study area. All other threatened flora listed in Appendix 1 have a low to no potential habitat within the study area.

## 3.4 Fauna

Ten fauna species were observed or heard opportunistically during the field surveys (Table 4).

**Table 4. Observed fauna species**

| Scientific Name | Common Name | TSC Act | EPBC Act |
|---|---|---|---|
| *Acridotheres tristis* | Common Myna | - | - |
| *Cacatua galerita* | Sulphur-crested Cockatoo | - | - |
| *Calyptorhynchus funereus* | Yellow-tailed Black-Cockatoo | - | - |
| *Corvus coronoides* | Australian Raven | - | - |
| *Cormobates leucophaea* | White-throated Treecreeper | - | - |
| *Cracticus tibicen* | Australian Magpie | - | - |
| *Grallina cyanoleuca* | Magpie Lark | - | - |
| *Manorina melanocephala* | Noisy Minor | - | - |
| *Manorina melanophrys* | Bell Bird | - | - |
| *Rhipidura leucophrys* | Willie wagtail | - | - |

### 3.4.1 Habitat types

The habitat within the study area consisted of a woodland habitat, which typically consisted of scattered trees with a mix of degraded understorey. Much of the best condition habitat was located immediately

adjacent to the study area, outside of the road corridor. Trees from the family Myrtaceae (mostly *Eucalyptus* spp.) generally dominated the upper canopy in these areas and would supply direct (foliage, nectar, exudates) and indirect food (arthropods) for a range of vertebrates, particularly birds and arboreal mammals.

Tree hollows were limited due to the relatively young age of the trees within the study area. Six hollow-bearing trees were recorded during the field survey. Three of these hollow-bearing trees occur adjacent to the alignment (Trees 177, 178 and 179 - Figure 3. This assessment assumes the three hollow bearing trees would be removed for the project. A clearing protocol for the removal of the trees is provided in Section 5.

### 3.4.2 Subject threatened fauna

No threatened fauna species were recorded during the current survey.

A total of 67 subject threatened fauna have previously been recorded (Atlas of NSW Wildlife) or are predicted to have habitat (EPBC Act) within 10 km of the study area (Appendix 1). After considering the habitat present on the subject site and the results of the field survey, 9 of these threatened fauna were considered to have a moderate likelihood of occurrence within the study area:

- Birds: Brown Treecreeper, Little Lorikeet and Varied Sittella.
- Invertebrates : Cumberland Plain Land Snail
- Mammals: Eastern False Pipistrelle, Yellow-bellied Sheathtail-bat, Large-footed Myotis, Eastern Freetail-bat and Little Bentwing–bat.

The threatened microbats and Little Lorikeet have marginal habitat to be present within the hollow-bearing trees to be removed. An assessment of the potential impacts of the proposal on these threatened fauna species is provided in Section 4.

The Cumberland Plain Land Snail has a low-moderate chance of occurring within the study area given its ability to occur in a range of micro habitat types within the Cumberland Plain. Whilst the survey did not detect any under the larger trees, and under bark, it is possible the species does occur within the study area.

An assessment of the potential impacts of the proposal on these threatened fauna species is provided in Section 4.

# 4. Impact Assessment

## 4.1 Affected ecological communities

The proposal may result in the removal/modification of approximately 0.45 ha of native vegetation within the existing road easement, all of which is in a regenerating condition (based on the length of pipeline traversing regenerating Cumberland Plain Woodland (2108 m) being multiplied by a trench of 2 m width)

Table 3 details the breakdown of native vegetation disturbance that may occur as a result of the proposal.

Indirect impacts will be mitigated by the recommendations provided in Section 5.

## 4.2 Threatened ecological communities

As discussed in Section 3.2, the native vegetation has been aligned to Cumberland Plain Woodland TEC. The Project may result in impacts to approximately 0.45 ha of Cumberland Plain Woodland

Assessments of Significance have been conducted. These have been provided in Appendix 3.

Based on the results of the Assessments of Significance, it is considered unlikely that the Project will result in a significant impact to Cumberland Plain Woodland.

## 4.3 Affected threatened flora

*Grevillea parviflora* subsp. *parviflora* and *Epacris purpurascens* var. *purpurascens* have been given a moderate likelihood of occurrence. Both these species are relatively conspicuous and are unlikely to remain undetected during the field survey, regardless of their state of flowering. No threatened flora are therefore likely to occur within the study area. As such, the proposal is unlikely to result in a significant impact on threatened flora.

## 4.4 Affected threatened fauna

The analysis of subject threatened species (Appendix 1) resulted in nine threatened fauna being rated as having a moderate likelihood of occurrence within the study area (see Table 5).

Developments can impact upon fauna in a number of ways. The significance of an impact would be great if any of the following situations occur:

- Death or injury of individuals
- Loss or disturbance of limiting foraging resources
- Loss or disturbance of limiting sheltering resources
- Loss or disturbance of limiting breeding resources.

Limiting resources are those that are of particular importance for the survival of a species.

Habitat within the study area for the potentially affected bird and microbat species is considered to consist of marginal foraging habitat of low quality. The hollow-bearing tree to be removed has some marginal habitat for microbats and Little Lorikeet. Assessments of Significance have been conducted for the Eastern False Pipistrelle, Little Lorikeet, Cumberland Plain Land Snail, Little Bentwing-bat, Eastern Freetail-bat, Southern Myotis, and Yellow-bellied Sheathtail-bat. The Assessments concluded that the proposal is unlikely to have a significant impact on any of these species.

Cumberland Plain Land Snail has the potential to occur within the area directly impacted by the proposal. Whilst not recorded during the field survey, as a precautionary approach an Assessment of Significance has been completed for the species (Appendix 3). The Assessment has concluded that the proposal is unlikely to have a significant impact on the species.

**Table 5. Affected threatened fauna (NSW and Commonwealth)**

| Threatened species[2] | Conservation Status | Likelihood of occurrence within the study area | Likely to be impacted by proposal? |
|---|---|---|---|
| **Fauna** | | | |
| **Birds** | | | |
| Brown Treecreeper *Climacteris picumnus victoriae* | NSW: Vulnerable<br>Commonwealth: not listed | Low - moderate | Unlikely. Foraging habitat only would be disturbed. No limiting habitat to be removed. Not recorded during field survey. No previous records in study area. |
| Varied Sittella *Daphoenositta chrysoptera* | NSW: Vulnerable<br>Commonwealth: not listed | Low - moderate | Unlikely. Foraging habitat only would be disturbed. No limiting habitat to be removed. Not recorded during field survey. No previous records in study area. |
| Eastern False Pipistrelle *Falsistrellus tasmaniensis* | NSW: Vulnerable<br>Commonwealth: not listed | Low - moderate | Assessment of Significance conducted as a precautionary approach (Appendix 3) given three hollow-bearing trees may be removed. Based on result of assessment a significant impact is unlikely. |
| Little Lorikeet *Glossopsitta pusilla* | NSW: Vulnerable<br>Commonwealth: not listed | Low - moderate | Assessment of Significance conducted as a precautionary approach (Appendix 3) given three hollow-bearing trees may be removed. Based on result of assessment a significant impact is unlikely. |
| Cumberland Plain Land Snail *Meridolum corneovirens* | NSW: Vulnerable<br>Commonwealth: not listed | Low - moderate | Assessment of Significance conducted as a precautionary approach (Appendix 3). Based on result of assessment a significant impact is unlikely. |
| Little Bentwing-bat *Miniopterus australis* | NSW: Vulnerable<br>Commonwealth: not listed | Low - moderate | Assessment of Significance conducted as a precautionary approach (Appendix 3) given three hollow-bearing trees may be removed. Based on result of assessment a significant impact is unlikely. |
| Eastern Freetail-bat *Mormopterus norfolkensis* | NSW: Vulnerable<br>Commonwealth: not listed | Low - moderate | Assessment of Significance conducted as a precautionary approach (Appendix 3) given three hollow-bearing trees may be removed. Based on result of assessment a significant impact is unlikely. |
| Southern Myotis *Myotis macropus* | NSW: Vulnerable<br>Commonwealth: not listed | Low - moderate | Assessment of Significance conducted as a precautionary approach (Appendix 3) given three hollow-bearing trees may be removed. Based on result of assessment a significant impact is unlikely. |
| Yellow-bellied Sheathtail-bat | NSW: Vulnerable | Low - moderate | Assessment of Significance conducted as a precautionary approach (Appendix 3) given three hollow-bearing trees may be |

[2] Threatened species identified for inclusion in this assessment based on the EPBC Act Protected Matters Search Tool. Accessed April 2013.

| Threatened species[2] | Conservation Status | Likelihood of occurrence within the study area | Likely to be impacted by proposal? |
|---|---|---|---|
| **Fauna** | | | |
| *Saccolaimus flaviventris* | Commonwealth: not listed | | removed. Based on result of assessment a significant impact is unlikely. |

## 4.5 Migratory species (JAMBA, CAMBA, ROKAMBA)

Migratory species listed under the Japan-Australia Migratory Bird Agreement (JAMBA), the China-Australia Migratory Bird Agreement (CAMBA), and the Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA), which have been previously recorded, or have predicted habitat within the study area are detailed in Appendix 1. No migratory species are likely to be significantly impacted as a result of the proposal.

## 4.6 SEPP 44 Koala Habitat

State Environmental Planning Policy 44 (SEPP 44) aims to encourage the conservation and management of areas of natural vegetation that provide potential habitat for Koalas:

1. by requiring the preparation of plans of management before development consent can be granted in relation to areas of core Koala habitat
2. by encouraging the identification of areas of core Koala habitat
3. by encouraging the inclusion of areas of core Koala habitat in environment protection zones.

Whilst there would be some removal of small Koala feed trees (*Eucalyptus tereticornis*) as a result of the proposal, given the potential habitat surrounding the study area, the proposal is unlikely to result in any disruptions to core populations of the koala. As such, the proposal would not impact upon SEPP 44 Koala Habitat.

## 4.7 Key Threatening Processes

In NSW the Assessment of Significance requires that consideration be given as to whether the action proposed constitutes, or is part of, a Key Threatening Process (KTP) or is likely to result in the operation of, or increase the impact of, a KTP on threatened biodiversity as listed on the TSC Act. KTPs are also listed on the EPBC Act and are similar to those of the TSC Act. Those KTPs listed under the TSC Act and EPBC Act relevant to the proposal are provided in Table 6.

**Table 6. Key Threatening Processes**

| Key Threatening Process (TSC Act) | EPBC Act Equivalent (x) | Operating presently or historically | Increased by proposal |
|---|---|---|---|
| Alteration of habitat following subsidence due to longwall mining | x | No | No |
| Alteration to the natural flow regimes of rivers, streams, floodplains & wetlands | x | No | No |
| Bush rock removal | x | No | No |
| Clearing of native vegetation | | Yes | Yes |
| Ecological consequences of high frequency fires | x | No | No |

| Key Threatening Process (TSC Act) | EPBC Act Equivalent (x) | Operating presently or historically | Increased by proposal |
|---|---|---|---|
| Human-caused climate change | | No | No |
| Infection of frogs by amphibian chytrid fungus causing the disease chytridiomycosis | | Likely | No |
| Infection of native plants by *Phytophthora cinnamomi* | | Unsure | Potential though unlikely |
| Introduction and Establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae | x | No | No |
| Invasion and establishment of exotic vines and scramblers | x | Yes | Potential |
| Invasion of native plant communities by exotic perennial grasses | (only N. Aust) | NA | Potential |
| Loss of hollow-bearing trees | x | Yes | May result in removal of three hollow-bearing trees |
| Removal of dead wood and dead trees | x | No | No |

# 5. Recommendations

To minimise any impacts to flora, fauna and their habitat, the following are recommended:

- Appropriate measures are to be employed to ensure that machinery working within the site does not bring materials (soils etc.) onto the site that may lead to the spread of Phytophthora cinnamomi. Refer http://www.environment.gov.au/biodiversity/invasive-species/publications/arrive-clean-leave-clean
- Silt fencing should be used at all locations where erosion and sediment runoff may occur.
- Any vegetation removal other than that detailed in this report should be subject to further assessment.
- Implement a two-stage clearing protocol for the removal of the hollow-bearing tree at the pedestrian bridge site as per below.

### Hollow-bearing tree clearing removal procedure

Site Operator or Clearance Contractor

- Clear all vegetation but the hollow-bearing tree during the pre-clearance survey (stage1).
- Following a 24 hour grace period, clear the hollow bearing tree (stage 2).
- Mechanically shake or agitate the habitat tree prior to felling to encourage any remaining animals to either leave the tree or at least show themselves and possibly be removed, where possible.
- Following stage 2 clearing, hollow-bearing limbs from the tree which have been felled should be taken to predetermined locations. It is recommended that the hollow bearing limbs be placed in the vegetation directly opposite the impact area within native bushland.
- Keep on-site at all times the contact details of the project ecologist or site environmental representative, veterinary carer and local animal welfare groups (e.g. WIRES, the Native Animal Trust Fund).

<u>Should any fauna be found in the felled tree:</u>

- The ecologist or suitably trained site environmental representative will relocate all uninjured animals that are rescued to within adjoining bushland that provides suitable cover for that species. Captured animals will be released immediately or held for the shortest time possible if immediate release is not considered suitable (preferably less than 24 hours).
- Nocturnal animals captured in the clearing process will be released at dusk. If an animal is reluctant to move away, then it shouldn't be released and the ecologist or suitably trained site environmental representative shall take responsibility for contacting a fauna welfare group or veterinarian and will deliver the animals to that group.
- Any animals kept for any purpose should be secured in a cloth bag, stored with an appropriate material (woollen cloth) for warmth and placed in an appropriate non-sealed container until its release or for transport to an approved carer. Species such as reptiles known for their ability to escape poorly secured cloth bags, and possums and particularly Koalas, should be placed within double lined canvas bags. Frogs should be placed in plastic bags with moist leaf litter.
- The ecologist or suitably trained site environmental representative will prepare a record detailing the findings of the survey and relocation efforts. This should include details of any live animals that

are sighted, captured, released, injured, shocked, escape or killed as a result of clearing operations and fauna rescue.

- Fauna will be relocated within suitable habitats adjacent to the study area.

Injured Animals

The general practice of dealing with injured or captured fauna will be for the site operators to notify the ecologist or site environmental representative who will arrange for fauna rescue or veterinary treatment. If the ecologist or site environmental representative is not present when an injured or juvenile animal is found, the following steps will be implemented:

- Contact ecologist or site environmental representative who will advise how to best manage the injured or captured animal.
- Cover animal with a towel or blanket to minimise stress and place in an appropriate hessian or cloth bag.
- Contact the local animal welfare group or veterinarian immediately.

# 6. Conclusion

This report assesses the terrestrial ecology impacts associated with the proposal, in accordance with the requirements of the EP&A, TSC and EPBC Acts.

The proposal will result in the removal of approximately 0.45 ha of native vegetation.

One TEC was recorded in the study area (Cumberland Plain Woodland). Assessments of Significance have been completed for this TEC. Based on the tests, the TEC is not likely to be significantly impacted by the proposal.

No threatened flora were recorded within the study area. Given the degraded condition of much of the habitat to be impacted, the lack of flora records and the relatively conspicuous nature of the subject threatened flora, it is unlikely any of the subject threatened fauna are present. The proposal has therefore been deemed unlikely to have a significant impact on threatened flora listed on the TSC and/or EPBC Acts.

No threatened fauna were recorded during the current survey, however potential foraging habitat for nine threatened fauna are considered to occur within the study area. The assessment concluded that the proposal is unlikely to impact on any limiting habitat for the subject threatened fauna species. Assessments of Significance were prepared for the Cumberland Plain Land Snail given the species is relatively cryptic and if present may be directly impacted by the proposal, and hollow-bearing fauna including: Eastern False Pipistrelle, Little Lorikeet, Little Bentwing-bat, Eastern Freetail-bat, Southern Myotis, and Yellow-bellied Sheathtail-bat. The Assessments concluded that the proposal is not likely to result in a significant impact on threatened fauna listed on the TSC and/or EPBC Acts.

A number of recommendations have been made to minimise the potential impact of the proposal on native vegetation communities or flora and fauna species occurring in the study area.

A Species Impact Statement or Referral are not recommended.

# References

Churchill, S.K. (1998). Australian Bats. Sydney: Reed New Holland.

DEC (2005) Threatened Species Profiles Database, OEH. Also provides access to threatened species final determinations by the NSW Scientific Committee.

Harden, G.J. (ed.) (1991). Flora of New South Wales, Volume Two. University of NSW Press: Kensington, NSW.

OEH (2012). Atlas of NSW Wildlife (accessed January 2016). NSW Office of Environment and Heritage (OEH): Goulburn Street, Sydney.

DECC (2007). Threatened Species Assessment Guidelines: The Assessment of Significance. Department of Environment and Climate Change: Sydney.

New South Wales National Parks and Wildlife Service (2002). Interpretation Guidelines for the Native Vegetation Maps of the Cumberland Plain, Western Sydney, Final Edition. NSW NPWS: Hurstville.

SEWPaC (2012) SPRAT Database and Protected Matters Search Tool (accessed January 2016), http://www.environment.gov.au/, Commonwealth Department of Sustainability, Environment, Water, Population and Communities. Provides access to threatened species profiles, recovery plans and final determinations by the Commonwealth Scientific Committee.