PHOENIX
ENVIRONMENTAL SCIENCES

Flora and fauna assessment for the Calingiri to Wubin study areas – Report Addendum

Great Northern Highway, Muchea to Wubin Upgrade Stage 2 Project

Prepared for Muchea to Wubin Integrated Project Team (Main Roads WA, Jacobs and Arup)

December 2016

Final report

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Contents

List of Tables

List of Appendices

ABBREVIATIONS

CR – Critically Endangered

DBH – diameter at breast height

DoE - Department of the Environment

DSEWPaC – Department of Sustainability, Environment, Water, Population and Communities

EN – Endangered

EP Act – *Environmental Protection Act 1986*

EPA – Environmental Protection Authority

EPBC Act – *Environmental Protection and Biodiversity Act 1999*

EPP – Environmental Protection Policy

GNH – Great Northern Highway

GPS – Global Positioning System

IBRA – Interim Biogeographic Regionalisation of Australia

NES – national environmental significance

P – Priority

PDA – personal data assistant

SC – special conservation need

SLK – straight line kilometre

sp. – species (singular)

spp. – species (plural)

subsp. – subspecies (singular)

VU – Vulnerable

WA – Western Australia

WC Act – *Wildlife Conservation Act 1950*

EXECUTIVE SUMMARY

In 2014, Main Roads WA established the Muchea to Wubin Integrated Project Team with industry partners Jacobs and Arup (the ASJV) to conduct a comprehensive planning review of the entire Muchea to Wubin Upgrade Stage 2 (the Project). Phoenix Environmental Sciences Pty Ltd (Phoenix) was engaged by the ASJV to undertake a flora and fauna assessment for the Project.

The initial flora and fauna assessment for the Calingiri to Wubin study area, including Calingiri, Moore River, Midlands Road to Bindi Bindi, Pithara, Dalwallinu Bypass Improvements and Nugadong to Wubin work packages (collectively, the initial study area) was undertaken between October 2014 and April 2016 and is reported in Phoenix (2015, 2016). This report addendum is supplementary to Phoenix (2016) and documents the additional flora and fauna assessment conducted to include additions to the initial study area from Calingiri to Wubin (collectively, the gaps study area). In addition, this report documents vegetation extrapolation undertaken within a 500 m buffer outside the Calingiri to Wubin study area. The study area comprises six work packages – Calingiri, Moore River, Midlands Road to Bindi Bindi, Pithara, Dalwallinu Bypass Improvements and Nugadong to Wubin.

Specifically, the additional flora and fauna assessment comprised:

- Level 2 flora and vegetation survey in the gaps study area
- additional quadrat sampling (Dalwallinu Bypass Improvements only) and minor revisions to vegetation mapping in parts of the initial study area
- intensive transect searches for threatened orchids listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in suitable habitat in the initial study area and gaps study area.
- assessment of the distribution of the Eucalypt Woodlands of the Western Australian Wheatbelt Threatened Ecological Community (TEC) in the initial study area and gaps study area
- extrapolation of remnant native vegetation associations in the extrapolation study area
- Level 1 and where necessary targeted conservation significant fauna survey in the gaps study area
- survey of black cockatoo species including potential breeding trees, roosting and breeding sites, and mapping of breeding and foraging habitat in the gaps study area.

Field surveys were undertaken between October and November 2016 during the spring survey period. Where relevant, flora and fauna survey methodology was consistent with that employed in previous surveys of the initial study area.

A total of 290 plant taxa (including subspecies and varieties) representing 246 native species and 44 introduced species were recorded in the gaps study area. Of these, 139 species were not recorded in the previous surveys of the initial study area. Thirteen taxa could not be definitively identified to species level. Two additional taxa presented unusual features that did not key out to known species.

Thirteen conservation significant flora were recorded in the gaps study area:

- *Acacia drummondii* subsp. *affinis* (Priority 3)
- *Acacia isoneura* subsp. *nimia* (Priority 3)
- *Acacia scalena* (Priority 3)

- *Banksia benthamiana* (Priority 4)
- *Calothamnus pachystachyus* (Priority 4)
- *Conospermum densiflorum* subsp. *unicephalatum* (Endangered, EPBC Act and *Wildlife Conservation Act 1950* (WC Act))
- *Daviesia debilior* subsp. *sinuans* (Priority 3)
- *Eremophila pinnatifida* (Endangered EPBC Act, Critically Endangered WC Act)
- *Grevillea drummondii* (Priority 4)
- *Hibbertia miniata* (Priority 4)
- *Persoonia sulcata* (Priority 4)
- *Verticoidia insignis* subsp. *eomagis* (Priority 3)
- *Verticoidia lindleyi* subsp. *lindleyi* (Priority 4).

Five of these taxa were not collected during previous surveys of the initial study area; *Conospermum densiflorum* subsp. *unicephalatum*, *Eremophila pinnatifida*, *Grevillea drummondii*, *Verticordia insignis* subsp. *eomagis* and *Verticordia lindleyi* subsp. *lindleyi*. Specimens of two other taxa, a *Grevillea* and a *Synaphea* species, exhibited unusual features that did not key out to known species of the genera and they may represent undescribed/new species.

Targeted transect searches in potential habitat in the initial study area and gaps study area for two EPBC Act orchids, *Caladenia drakeoides* and *Theymitra stellata*, did not locate individuals of either species. Considering habitat suitability, survey intensity, seasonal conditions and expertise of the survey team, it is considered unlikely that these species occur in the study area.

One declared weed species was recorded in the gaps study area, **Rumex hypogaeus*. The species was recorded in previous surveys of the initial study area.

Remnant native vegetation was mapped in 222 ha (27%) of the gaps study area and comprised 15 vegetation associations. Broadly, the vegetation associations recorded represent medium woodlands (Marri, Jarrah, Wandoo, York Gum, Salmon Gum, *Banksia*), shrublands (*Acacia*, *Allocasuarina*, mallee, *Casuarina*, tea-tree) and low succulent steppe (*Tecticornia*, chenopods). All but two vegetation associations were previously recorded in the initial study area. The condition of native vegetation in the study area ranged from Degraded to Pristine, with Excellent and Pristine vegetation condition comprising 20.65% and 11.91% respectively.

The presence of the Eucalypt Woodlands of the Western Australian Wheatbelt TEC was confirmed in the initial study area and gaps study area. Based on the assessment, the TEC occupies 137.08 ha of the study areas and is present in all work packages.

Six fauna habitat types were mapped within remnant native vegetation of the gaps study area based on aggregations of the mapped vegetation associations. These were all previously mapped in the initial study area. Two conservation significant species were recorded within the gaps study area during the field surveys:

- Carnaby's Black Cockatoo *Calyptorhynchus latirostris* (Endangered EPBC Act and WC Act)
- Rainbow Bee-eater *Merops ornatus* (Migratory EPBC Act and WC Act).

A possible old inactive Malleefowl mound (Vulnerable EPBC Act and WC Act) was recorded in a large patch of remnant woodland north of Wubin; however, no evidence of any recent occurrence of the species was recorded during targeted searches.

Up to 13 conservation significant fauna species may occur in the gaps study area, although due to generally poor habitat condition, presence of introduced species and fragmentation, the fauna habitats in the gaps study area are unlikely to provide core habitat for species of conservation significance except for Carnaby's Black Cockatoo.

Carnaby's Black Cockatoo was recorded numerous times in the gaps study area from direct observation and secondary evidence, particularly in Calingiri. Nine confirmed (i.e. showing signs of use) nesting trees for Carnaby's Black Cockatoo were recorded in the gaps study area from 24 identified with hollows suitable for breeding and a total of 1,055 potential breeding trees recorded. Eight of the confirmed nesting trees were recorded in Calingiri and one was from Midlands Road to Bindi Bindi. Approximately 7 ha of quality foraging habitat was mapped, all within the Calingiri work package.

1 INTRODUCTION

Phoenix Environmental Sciences Pty Ltd (Phoenix) was commissioned by the Muchea to Wubin Integrated Project Team (Main Roads WA, Jacobs and Arup) to undertake flora and fauna assessments for the Muchea to Wubin Upgrade Stage 2 (the Project). The Project is supporting a significant program of works by Main Roads WA to improve safety and efficiency of the 218 km section of the Great Northern Highway (GNH) between Muchea and Wubin, north of Perth, to meet National Highway Standards.

The initial flora and fauna assessment relevant to this addendum report was conducted for the Calingiri to Wubin study area between October 2014 and April 2016 and is reported in Phoenix (2015, 2016).

This report addendum documents the additional flora and fauna assessment conducted for the Calingiri to Wubin study area in spring 2016 and is supplementary to Phoenix (2016).

1.1 STUDY AREA

The study area for the additional flora and fauna assessment of Calingiri to Wubin is shown in Appendix 1 and includes:

- **gaps study area** (668.83 ha), representing areas that were not previously surveyed in the initial flora and fauna assessment
- the phase 1 and phase 2 survey areas (referred to here as **initial study area**; 1,1494.3 ha) that were part of the initial flora and fauna assessment (Phoenix 2016)
- native vegetation within 500 m either side of the initial study area and gaps study area (**extrapolation study area**; 14,862.6 ha).

Survey work undertaken in each study area was highly variable and is explained in section 1.2.

The study area comprises six work packages (Appendix 1):

- Calingiri (SLK 80.6 – 112.4)
- Moore River (SLK 115.8 – 126.8)
- Midlands Road to Bindi Bindi (SLK 147 – 165.85)
- Pithara (SLK 207.72 – 231.77)
- Dalwallinu Bypass Improvements (SLK 231.77 – 234.85)
- Nugadong to Wubin (SLK 234.85 – 264.01).

Results of surveys conducted prior to spring 2016 are reported in Phoenix (2016) for all of the work packages except Moore River which was reported in Phoenix (2015).

1.2 SCOPE OF WORK

The scope of works for the additional flora and fauna assessment was as follows:

- Level 2 flora and vegetation survey in the **gaps study area**
- additional quadrat sampling (Dalwallinu Bypass Improvements only), and minor revisions to vegetation mapping in parts of the **initial study area**

- intensive transect searches for threatened orchids listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in areas identified as suitable habitat in the **initial study area and gaps study area**.
- detailed field assessment and mapping distribution of the Eucalypt Woodlands of the Western Australian Wheatbelt Threatened Ecological Community (TEC) in the **initial study area and gaps study area**
- extrapolation of remnant native vegetation associations in the **extrapolation study area**
- Level 1 and, where necessary, targeted conservation significant fauna survey in the **gaps study area**
- survey of black cockatoo species including potential breeding trees, roosting and breeding sites, and mapping of breeding and foraging habitat in the **gaps study area.**

2 METHODS

Field surveys were undertaken over several trips between 5 September and 24 November 2016.

Where applicable, survey methodology was consistent with that employed in previous surveys of the Calingiri to Wubin study area (Phoenix 2016).

The surveys were conducted in accordance with the relevant state and federal guidelines:

- Environmental Protection Authority (EPA) Guidance Statement No. 51: Terrestrial flora and vegetation surveys for environmental impact assessment in Western Australia (EPA 2004b)
- Position Statement No. 3: Terrestrial biological surveys as an element of biodiversity protection (EPA 2002)
- EPA Guidance Statement No. 56: Terrestrial fauna surveys for environmental impact assessment in Western Australia (EPA 2004a)
- EPA and DPaW Technical guide: Flora and vegetation surveys for environmental impact assessment (EPA & DPaW 2015)
- EPA and DPaW Technical guide: Terrestrial vertebrate fauna surveys for environmental impact assessment (EPA & DEC 2010)
- EPBC Act referral guidelines for threatened black cockatoo species (DSEWPaC 2012)
- EPBC Act survey guidelines for Australia's threatened orchids. Guidelines for detecting orchids listed as 'Threatened' under the Environmental Protection and Biodiversity Conservation Act 1999 (Department of the Environment 2014)
- National manual for the Malleefowl monitoring system (Natural Heritage Trust 2007).

Total field hours were 576 for flora and vegetation related tasks and 158 for fauna related tasks, inclusive of travel time.

2.1 LEVEL 2 FLORA SURVEY (GAPS STUDY AREA)

2.1.1 Quadrat and relevé selection

Twenty-six quadrats and seven relevés were sampled in the gaps study area (Appendix 1; Appendix 2). Quadrat locations were selected to ensure that an adequate representation of the major vegetation types and flora present was sampled, and considered existing quadrat locations in adjacent previously surveyed areas. Quadrat and relevé sampling was conducted in accordance with the methods outlined in Phoenix (2016).

2.1.2 Vegetation community and condition mapping

The vegetation descriptions from quadrats were grouped according to similarity of community structure (i.e. canopy levels) and species composition. These were then matched with vegetation associations of Shepherd *et al.* (2002) based on predominant overstorey species or combination of species and prevalent community structure, in accordance with methods outlined in Phoenix (2016). The vegetation boundaries were mapped utilising high quality colour aerial photography (supplied) and from vegetation boundaries recorded on a global positioning system (GPS) during the field survey. Vegetation mapping also considered mapped vegetation associations in adjacent previously surveyed areas, where relevant.

2.1.3 Targeted flora searches

Targeted searches for conservation significant flora focussed on species identified in the desktop review in Phoenix (2016). Prior to the field survey, a list of potential flora was prepared for each work package based on species that have been recorded in or near the work package (Table 2-1).

The status of conservation significant flora from the desktop review (Phoenix 2016) was also checked against the EPBC Act, the *Wildlife Conservation Act 1950* (WC Act), and the Department of Parks and Wildlife (DPaW) Priority flora list prior to the survey.

In the field, targeted searches and data collection were conducted in accordance with methods outlined in Phoenix (2016). The searches focussed on habitats considered likely to contain or support conservation significant flora, with most remnant vegetation patches traversed by foot. Searches were conducted at the locations of all known previous records of conservation significant flora in the gaps study area to re-locate these populations.

Table 2-1 Target conservation significant flora in each work package of the gaps study area

Species	EPBC Act[1]	WA Status[1]	Calingiri, Moore River	Midlands Road to Bindi Bindi	Pithara, Dalwallinu Bypass	Nugadong to Wubin
Acacia alata var. *platyptera*		P4	✓			
Acacia browniana var. *glaucescen*		P2	✓			
Acacia drummondii subsp. *affinis*		P3	✓			
Acacia isoneura subsp. *nimia*		P3			✓	✓
Acacia nigripilosa subsp. *latifolia*		P1				✓
Acacia pulchella var. *reflexa acuminate bracteole*		P3	✓			
Acacia ridleyana		P3	✓			
Acacia scalena		P3			✓	✓
Acacia vassalii	EN	CR		✓		
Adenanthos cygnorum subsp. *chamaephyton*		P3		✓		
Allocasuarina ramosissima		P3	✓			
Androcalva fragifolia		P1		✓		
Anigozanthos humilis subsp. *chrysanthus*		P4	✓			
Asterolasia nivea	VU	VU	✓			
Austrostipa blackii		P3			✓	✓
Baeckea sp. *Youndegin Hill* (A.S. George 15772)		P1	✓			
Banksia benthamiana		P4			✓	✓
Banksia serratuloides subsp. *serratuloides*	VU	VU	✓			
Beaufortia eriocephala		P3	✓			
Beyeria disciformis		P1				✓
Boronia adamsiana	VU	VU				✓
Boronia ericifolia		P2			✓	✓
Caladenia drakeoides	EN	CR			✓	✓

Species	EPBC Act[1]	WA Status[1]	Calingiri, Moore River	Midlands Road to Bindi Bindi	Pithara, Dalwallinu Bypass	Nugadong to Wubin
Caladenia x *ornata*		P1			✓	✓
Calothamnus accedens		P4		✓		
Calothamnus pachystachyus		P4	✓			
Calytrix plumulosa		P3				✓
Chorizema humile	EN	CR	✓			
Conospermum densiflorum subsp. *unicephalatum*	EN	EN	✓			
Cryptandra sp. Cowcowing (Wittwer W 1210)		P3				✓
Dampiera glabrescens		P1			✓	
Dasymalla axillaris	CR	CR			✓	✓
Daviesia debilior subsp. *sinuans*		P3		✓		✓
Daviesia dielsii	EN	CR			✓	✓
Dielsiodoxa leucantha subsp. *leucantha*		P3	✓			
Diuris recurva		P4	✓	✓		
Eremophila pinnatifida	EN	CR			✓	✓
Euryomyrtus recurva		P3				✓
Frankenia bracteata		P1	✓			
Gastrolobium rotundifolium		P3		✓		
Gnephosis setifera		P1				✓
Grevillea asparagoides		P3		✓		✓
Grevillea bracteosa subsp. *bracteosa*		EN	✓	✓		
Grevillea drummondii		P4	✓			
Grevillea dryandroides subsp. *dryandroides*	EN	CR			✓	✓
Grevillea florida		P3	✓			
Grevillea granulosa		P3				✓
Grevillea nana subsp. abbreviata		P2				✓
Grevillea pythara	EN	CR			✓	✓
Guichenotia tuberculata		P3	✓			
Haloragis platycarpa	CR	CR			✓	✓
Hemiandra gardneri	CR	CR				✓
Hibbertia miniata		P4	✓			
Lasiopetalum cenobium		P1	✓			
Lasiopetalum rotundifolium	EN	EN	✓			
Lechenaultia galactites		P3				✓
Melaleuca sciotostyla	EN	EN	✓			
Melaleuca sclerophylla		P3	✓			
Persoonia sulcata		P4	✓			
Petrophile biternata		P3	✓			
Petrophile plumosa		P3	✓			

Species	EPBC Act[1]	WA Status[1]	Calingiri, Moore River	Midlands Road to Bindi Bindi	Pithara, Dalwallinu Bypass	Nugadong to Wubin
Podotheca uniseta		P3			✓	✓
Scholtzia sp. *Gunyidi* (J.D. Briggs 1721)		P2			✓	✓
Stylidium periscelianthum		P3		✓		
Stylidium sacculatum		P3	✓			
Stylidium scabridum		P4	✓			
Synaphea grandis		P4	✓			
Synaphea rangiferops		P2	✓			
Thelymitra stellata	EN	EN	✓			
Thomasia sp. *Green Hill* (S. Paust 1322)	EN	CR	✓			
Thryptomene shirleyae		P2				✓
Urodon capitus		P3			✓	✓
Verticordia dasystylis subsp. *oestopoia*		P1		✓		
Verticordia insignis subsp. *eomagis*		P3	✓			
Verticordia lindleyi subsp. *lindleyi*		P4	✓			
Verticordia muelleriana subsp. *muelleriana*		P3			✓	✓
Verticordia rutilastra		P3	✓			
Verticordia serrata var. *linearis*		P3	✓			
Verticordia venusta		P3			✓	✓

[1] CR – Critical; EN – Endangered; VU – Vulnerable; P – Priority.

2.2 ADDITIONAL QUADRAT SAMPLING AND REVISIONS TO VEGETATION MAPPING (INITIAL STUDY AREA)

Four quadrats (DBY001, DBY002, DBY003, DBY005) in the Dalwallinu Bypass Improvements Phase 2 survey area that were previously ony sampled in March 2016 were re-sampled in October 2016 to capture the spring flowering period (Appendix 1; Appendix 2).

Other minor revisions were made to vegetation association and condition boundaries in the initial study area after review of the additional site data collected in the Eucalypt Woodlands of the Western Autralian Wheatbelt TEC assessment (see section 2.4).

2.3 TRANSECT SEARCHES FOR EPBC ACT ORCHIDS (INITIAL STUDY AREA AND GAPS STUDY AREA)

A detailed desktop assessment was conducted for four EPBC Act listed orchids that have previously been recorded within 20 km of the study area Table 2-2:

- *Drakaea elastica* Lindl. (glossy-leaved hammer-orchid; EN)
- *Diuris drummondii* Lindl. (tall donkey orchid; VU)

- *Thelymitra stellata* Lindl. (star sun-orchid; EN)
- *Caladenia drakeoides* Hopper & A.P.Br. (hinged dragon orchid; EN).

This included identification of suitable habitat for each species by an orchid specialist (Dr Andrew Batty), based on existing vegetation mapping, to define areas for intensive transect searches. Field reconnaissance was conducted to further refine suitable habitat extent for each species. Suitable habitat was identified in the study area for two of the species (Appendix 3):

- *Caladenia drakeoides* – suitable habitat was identified on the fringe of saline lakes in the northern part of the study area
- *Thelymitra stellata* – potential habitat was identified in the southern part of the study area.

No suitable habitat was identified for *Drakaea elastica* (*Banksia* and white sand) or *Diuris drummondii* (heavy soil/peat along seasonal creek lines), therefore these species were considered unlikely to occur in this study area and transect searches were not conducted for these species.

Prior to the commencement of field surveys, suitable timing for the survey was confirmed by visiting a local population known to DPaW (Appendix 3). Visiting the known population also enabled field botanists to familiarise themselves with the species specific habitat requirements prior to the transect searches.

At the commencement of the transect searches for *Caladenia drakeoides*, flowering was considered to be optimal with approximately 60% of individuals at the known location observed being in early to full flower.

A single plant of *Thelymitra stellata* located approximately 50 km south east of the study area was monitored to determine the optimal flowering time to undertake targeted transect searches for this species.

The field survey included:

- quadrat survey of flora and vegetation in areas of the previous known locations near the study area to characterise the local habitat of the target species and further refine potential habitat identified from the desktop study
- transect foot searches in suitable habitat for plants of the target species marking any evidence of presence, e.g on-ground markers of emergent leaves.

Table 2-2 Orchid detectability information (Department of the Environment 2014)

Species	EPBC Act status	Landscape-scale habitat	Peak detectability	Similar species	Nearest record
Drakaea elastica Lindl. (glossy-leaved hammer-orchid)	EN	In sandy soil adjacent to winter-wet depressions, swamps and water courses, growing in mixed woodlands, often under *Kunzea* species	Peak flowering period: late September to early November Dormant between December and late April *Drakaea elastica* likes open sites and is often found on old, disused tracks and firebreaks	Similar species: *Drakaea concolor* (Kneeling hammer orchid) T VU	Approx. 9 km west of GNH, north of Calingiri.
Diuris drummondii Lindl. (tall donkey	VU	Low-lying depressions in	Peak flowering period: late October to mid	Has often beenconfused	Approx. 20 km west of

Species	EPBC Act status	Landscape-scale habitat	Peak detectability	Similar species	Nearest record
orchid)		peaty and sandy, clay swamps	January. Note: flowers earlier in the north and later in the south Dormant between late January and late April Summer fires stimulate flowering in most populations	with *Diuris emarginata* Common (tall donkey orchid South of Perth) and *D. heberlei* P2 (Albany region)	Calingiri.
Thelymitra stellata Lindl. (star sun-orchid)	EN	Lateritic soil, growing amongst low heath and scrub in jarrah (*Eucalyptus marginata*) woodland, on ridges, slopes, and breakaways	Peak flowering period: late October in northern populations and early November near Perth. Flowers remain closed during cool overcast weather	Similar species: *Thelymitra magnifica*	Approx. 15.5 km south of Calingiri.
Caladenia drakeoides Hopper & A.P.Br. (hinged dragon orchid)	EN	Margins of salt lakes and flats beneath scrub	Peak flowering period: late August to early October Dormant between late October and late April	Similar species: *Caladenia barbarosiae*, *C. mesocera*, *C. barbarella* *Caladenia drakeoides* occasionally co-occurs with *C. mesocera*	Approx. 16 km north of Midlands Road to Bindi Bindi.

[1] EN – Endangered; VU – Vulnerable.

Habitat at known locations near the study area was assessed utilising survey methods consistent with previous quadrat sampling (Phoenix 2016). Transect foot searches were conducted at these locations (Appendix 3).

Parallel transect foot searches were undertaken at 5-10 m spacing in all suitable habitat for each species (Appendix 3), consistent with the methodology of the Survey Guidelines for Threatened Orchids (Department of the Environment 2014). The survey also took into account:

- appearance of species – recognition of species using photographs and/or herbarium specimens
- optimal timing for surveys, e.g. flowering times and review of climate data
- sampling in disturbed areas for *Caladenia drakeoides*
- the extent of known populations
- life history – occurrence of natural hybridisation and variation in floral morphology

- leaf morphology – although it is not possible to distinguish between *Thelymitra* species based on leaf morphology, leaves potentially matching *T. stellata* observed during vegetation assessments or other targeted searches were demarcated for follow-up determination during the flowering period
- to maximise the likelihood of detection, search efforts were targeted within habitat favoured by each species and in areas in better condition. As *Caladenia drakeoides* prefers moist habitats adjacent to salt lakes, all habitats associated with saline waterways/depressions were searched in detail. For *Thelymitra stellata*, lateritic soils and woodlands on ridges, slopes, and breakaways were targeted. Areas within target habitats that were found to be in less than good condition or that varied from habitat considered to be optimal justified reducing the intensity of the survey.

2.4 EUCALYPT WOODLANDS OF THE WESTERN AUSTRALIAN WHEATBELT ASSESSMENT (INITIAL STUDY AREA AND GAPS STUDY AREA)

Preliminary mapping of the extent of the Eucalypt Woodlands of the Western Australian Wheatbelt TEC in the initial study area (Phoenix 2016) was checked in the field using a key and customised data collection template derived from conservation advice for TEC (Threatened Species Scientific Committee 2015a). The TEC assessment was also extended to include the gaps study area.

A total of 131 TEC sites were assessed throughout the initial study area and gaps study area (Appendix 1). Many of these align with quadrat sites, but others were in additional woodland patches to increase the coverage of the assessment (Appendix 1).

In determining the presence of the TEC, features of the remnant woodland patch including vegetation condition, patch size (or in the case of roadside patches, patch width) and the density of mature trees (an average of 5 mature trees per 0.5 ha) were considered. This necessitated establishing the area of the patch in the field. Subsequently, prior to undertaking the field assessment, maps of the remnant woodland patches throughout the study area that potentially represented the TEC were uploaded to digital tablets.

During the field assessment, the area of each of the patches was identified by highlighting the patch on the tablet and reading the associated attributes table. Where required (i.e. where vegetation was in good or degraded condition) the area of the patch was reviewed. If found to be of suitable area, the patch was foot-searched and the number of mature trees counted to determine if density was sufficient for the patch to be considered representative of the TEC.

2.5 EXTRAPOLATION OF REMNANT NATIVE VEGETATION ASSOCIATIONS (EXTRAPOLATION STUDY AREA)

Remnant native vegetation was extrapolated in accordance with methodology outlined in the Technical Guide (EPA & DPaW 2015). Vegetation associations mapped in the survey areas previously (Phoenix 2016) and in current gap survey areas (based on the vegetation descriptions from quadrats/relevés and matching with vegetation associations of Shepherd *et al.* (2002)) were assigned to native vegetation present within 500 m on both sides of the survey corridor. This was done by matching similar features visible on high quality colour aerial photography (supplied), native vegetation extent shapefile and contour lines utilising ArcGIS software.

2.6 LEVEL 1 AND TARGETED CONSERVATION SIGNIFICANT FAUNA SURVEY (GAPS STUDY AREA)

The level 1 and targeted level 2 fauna assessment entailed:

- habitat assessment and mapping
- assessment of the likelihood of occurrence for conservation significant fauna within the study area
- targeted searches for conservation significant species.

Survey methods were consistent with those in Phoenix (2016).

Targeted searches for conservation significant fauna focussed on species identified in the desktop review in Phoenix (2016). The current status of Threatened and Priority fauna was checked prior to the survey. Searches were conducted in areas containing suitable habitat or adjacent to areas of suitable habitat occurring outside of the gaps study area considered suitable to support conservation significant fauna.

One area in Wubin identified as suitable habitat for Malleefowl was transect searched for active, inactive or dis-used malleefowl mounds in accordance with the National Manual for The Malleefowl Monitoring System (Natural Heritage Trust 2007). Targeted transects were walked across the entire area of potential habitat occurring within the study area. Transects were walked approximately 20–30 m apart depending on density of vegetation and visibility. Where patches of dense vegetation were encountered, transect distance was reduced to approximately 6–10 m to accommodate reduced visibility.

2.7 SURVEY OF BLACK COCKATOO SPECIES (GAPS STUDY AREA)

The following assessment was conducted for black cockatoo species in the gaps study area:

- survey of potential breeding trees, roosting sites and feeding sites for black cockatoo species, particularly Carnaby's Black Cockatoo
- mapping of breeding and foraging habitat for Carnaby's Black Cockatoo
- mapping of foraging habitat for Forest Red-tailed Black Cockatoo.

Survey methods were consistent with those in Phoenix (2016).

2.8 TAXONOMY AND NOMENCLATURE

Species that were well known to the survey botanists were identified in the field, while unknown and unconfirmed species were collected and assigned a unique number to facilitate tracking. All plant voucher specimens collected during the field program were preserved in accordance with the requirements of the WA Herbarium. Plant species were identified using local and regional flora taxonomic keys, and comparisons with named species held at the WA Herbarium.

The conservation status of all recorded flora was compared against the current lists available on FloraBase (DPaW 2016a), the Protected Matters Database (Department of the Environment and Energy 2016) and recent changes introduced in WA Government Gazette number 166 (Western Australian Government 2015). Nomenclature for flora and vegetation used in this report follows that used by FloraBase (DPaW 2016a) and the WA Herbarium.

2.9 SURVEY PERSONNEL

The personnel involved in the survey are presented below (Table 2-3).

Table 2-3 Project team

Name	Qualifications	Role/s
Mrs Karen Crews	BSc (Env. Biol.) (Hons)	Project manager and report review
Dr Grace Wells	PhD (Plant Conservation)	Coordinator of field program, GIS, vegetation mapping, data management and report writing
Dr Grant Wells	PhD (Botany)	Field surveys, taxonomy, data analysis, report writing
Dr Andrew Batty	PhD (Botany)	Field surveys, vegetation mapping, data analysis, report writing
Mr Jarrad Clark	BSc (Env. Mgt.)	Field surveys, data management
Mr Ryan Ellis	Dipl (Cons. Land Mgt)	Field surveys, report writing
Ms Anna Leung	BSc (Env Science) (hons)	Data analysis
Ms Catherine Krens	BSc (Env Science)	Field surveys
Ms Gabriela Martinez	BSc (Env Science)	Field surveys
Mr Conrad Slee	BSc (Env. Mgmt.) (Hons)	Field surveys
Mr Ben Eckermann	BSc (Env. Science), Grad. Cert. Sci. (Land and Water Mgmt.)	Field surveys
Mr Mike Brown	BSc (Env Science)	Field surveys
Ms Linette Umbrello	BSc Wildlife Mgmt. (Hons)	Field surveys
Mr Tony Kirkby		Field surveys (black cockatoo assessment)
Mr Frank Obbens	BSc (Biology) (Hons)	Taxonomy
Ms Kathryn Wyatt	B. Information Technology	GIS, data analysis

3 RESULTS

3.1 SURVEY LIMITATIONS

The limitations of the surveys have been considered in accordance with the potential survey limitations listed in Guidance Statement 51 (EPA 2004b) and Guidance Statement 56 (EPA 2004a) (Table 3-1).

Table 3-1 Limitations and constraints associated with the field survey

Variable	Impact on survey outcomes
Availability of contextual information	**Slight constraint.** Existing information on the vegetation and land systems of the study area has been mapped by Shepherd *et al*. (2002). Access to online floristic records and information including previous studies undertaken on or near the study area provided adequate information on the vegetation of the study area. Few existing systematic fauna surveys have been undertaken within or in the vicinity of the gaps study area. The conservation significant fauna assessment relied primarily on the proximity of database records to the study area, current known distribution of the species, species habitat preferences and the field habitat assessment.
Access problems	**Not a constraint.** No access problems were encountered during the field survey and most of the study area (open paddocks excepted) was traversed by foot. Where required, surveys were staggered to accommodate access permission to provate property.
Experience levels	**Not a constraint.** Suitably qualified and experienced botanists and zoologists undertook the surveys and reporting for the project.
Timing, weather, season	**Not a constraint.** Flora and fauna surveys were undertaken in the study area during the appropriate seasons according the relevant EPA guidelines. Weather leading up to the survey was optimal with sufficient rainfall and normal temperatures in the preceding winter. Dalwallinu weather station recorded above average rainfall and cooler temperatures in the six months preceding the survey and the Gingin weather station recording variable rainfall month to month equalling slightly below average rainfall in the six months preceding the survey and generally lower temperatures (BoM 2016). Two rounds of transect searches were conducted for Thelymitra stellata, first at an onset of optimum flowering times (established from the desktop review and checks of known populations) and for the second time towards the end of the flowering season to detect late flowering individuals. Known populations were visited at each stage to assess the reproductive stage of the individual plants.
Disturbances	**Slight constraint**. Large sections of the study area were in degraded to completely degraded condition from multiple historical disturbances, particularly clearing and weed infestation, making it difficult to discern changes in vegetation association in some areas**.** Historic disturbance within and in the vicinity of the gaps study area is likely to have influenced the occurrence of some conservation significant species identified in the desktop review.
Survey intensity	**Slight constraint.** The Level 2 flora and vegetation assessment of the gaps study area represents the first seasonal survey for this area. However, as the gaps areas are small patches adjacent to the initial study areas that have been surveyed over two sampling events, this constraint is considered minor. The field program conducted in spring 2016 is supplementary to previous surveys conducted for the Calingiri to Wubin study areas and adds to the overall survey intensity for the program. Most patches of remnant and planted vegetation were traversed by foot in search of conservation significant flora and fauna. Some areas were surveyed more than once to

Variable	Impact on survey outcomes
	account for different flowering times that aid in flora identification. The Level 1 and as necessary targeted fauna surveys were conducted across all areas of the gaps study area. The black cockatoo breeding tree, roosting site and breeding/ foraging/ roosting habitat assessment was conducted in all previously unsurveyed parts of the gaps study area.
Completeness	**Slight constraint.** During the field assessment of the extent of the Eucalypt woodlands of the Western Australian wheatbelt TEC, in the woodland communities within the survey area, some ambiguities in the information provided in the conservation advice for the community were identified. Clear detailed data was collected and is presented in this report but may require further consideration following feedback from regulators. The fauna survey was focussed on identifying the potential for presence of conservation significant species. Systematic censusing of the fauna assemblage was not undertaken but this is consistent with other surveys for similar linear infrastructure projects in the region. All areas were adequately surveyed during the Level 1 and targeted conservation significant surveys.
Determination	**Slight constraint.** At the time of preparing this report the identity of two flora specimens that may represent undescribed species is yet to be determined. Further collections of these taxa are required to establish whether they represent unusual forms of described species or are new, undescribed species. In addition, the identity of two priority taxa, *Verticordia lindleyi* subsp. *lindleyi* and *Daviesia debilior* subsp. *sinuans* is awaiting confirmation from the state herbarium. Determinations regarding taxonomy and conservation status of flora and fauna were made on the basis of current classifications and no limitations were encountered in this regard.

3.2 FLORA AND VEGETATION

A total of 290 plant taxa (including subspecies and varieties) representing 161 genera and 58 families were recorded in the gaps study area (Table 3-2). This total is comprised of 246 (85%) native species and 44 (15%) introduced (weed) species, and included 83 annual and 207 perennial species (Appendix 4). The most prominent families were Asteraceae (35), Myrtaceae (32), Proteaceae (26), Poaceae (24) and Fabaceae (23) (Appendix 4).

Of a total of 814 species recorded for the Calingiri to Wubin study area up to the current time, 139 of the species are new collections (spring 2016) from previously unsurveyed area (gaps study area). Three species were added to the four quadrat sites re-sampled in Dalwallinu Bypass Improvements initial study area, increasing the overall species assemblage for this work package (Appendix 2).

The number of new flora species recorded in each work package within the gaps study area varied from 3 to 68 (Table 3-2). The most species were recorded in Calingiri followed by Nugadong to Wubin, two of the largest work packages in the study area.

Table 3-2 Summary of flora species recorded in gaps study area

Work package	No. flora species recorded	No. genera	No. families	No. native species	No. introduced species	No. new records for the work package[1]
Calingiri	126	89	39	103	23	68
Moore River	25	26	15	17	8	7
Midlands Road to Bindi Bindi	31	26	15	16	15	11
Pithara	69	50	21	54	15	14
Dalwallinu Bypass Improvements	3	3	3	3	0	3
Nugadong to Wubin	141	94	38	122	19	59
Total number of species in the gaps study area	**290**	**161**	**58**	**246**	**44**	**139**

[1] Additional to flora species collected during surveys reported in Phoenix (2016) for the work package.

Thirteen taxa could not be definitively identified to species level as the specimens were either seedlings or sterile (i.e. lacked reproductive structures) at the time of collection and/or reproductive structures present were incomplete, dry and the material was inadequate for full identification (Table 3-3).

An additional two taxa presented unusual features that did not key out to known species (Table 3-3):

- *Grevillea* sp. GNH – recorded at 467584 E, 6659753 S (WGS84)
- Synaphea sp. GNH – recorded at 424115 E, 6561738 S (WGS84).

These specimens potentially represent undescribed species but further specimens are required to determine this.

Table 3-3 Details of taxa not identified definitively to species level

Taxon	Work package	Comments
Freesia sp.	Calingiri	Sterile
Banksia sp.	Calingiri	Seedling
Cassytha ? *glabella*	Midland Road to Bindi Bindi	Sterile
Cassytha sp.	Nudagong to Wubin	Sterile
Drosera sp.	Calingiri	Sterile
Eucalyptus sp.	Nudagong to Wubin	Sterile
Grevillea ? *biternata*	Moore River	Flowers dry, shrivelled
Grevillea ? *obliquistigma*	Nudagong to Wubin	Sterile
Grevillea sp. GNH	Nudagong to Wubin	Unusual specimen does not key out to known species potential new species requires further specimens for clarification
Haemodorum ? *discolor*	Calingiri	Sterile

Taxon	Work package	Comments
Haemodorum sp.	Calingiri	Sterile
Hydrocotyle ? *callicarpa*	Calingiri	Fruits not fully formed
Pterostylis ? *spathulata*	Moore River	Sterile
Rytidosperma ? *setaceum*	Dallwallinu Bypass Improvements	Sterile
Synaphea sp. GNH	Calingiri	Unusual specimen does not key out to known species potential new species requires further specimens for clarification

3.2.1 Conservation significant flora

Twelve conservation significant flora species were recorded in the spring 2016 surveys, including two threatened flora, *Conospermum densiflorum* subsp*. unicephalatum* and *Eremophila pinnatifida* and 10 priority species. Records were collected from Calingiri, Dalwallinu Bypass Improvements and Nugadong to Wubin (Appendix 5).

All the taxa were identified in the desktop review; however, *Conospermum densiflorum* subsp*. unicephalatum*, *Eremophila pinnatifida*, *Grevillea drummondii* and *Verticordia lindleyi* subsp. *lindleyi* were not collected in the previous surveys of the initial study area (Phoenix 2016).

Verification of the identity of *Verticordia lindleyi* subsp. *lindleyi* and *Daviesoa debilior* subsp. *sinuans* is still to be confirmed with the WA Herbarium. The identity of all remaining conservation significant flora has been confirmed.

Potential habitat for two EPBC Act orchid species, *Caladenia drakeoides* and *Thelymitra stellata*, was found to be present in the study area. Habitat for *Caladenia drakeoides* was confined to the northern part of the study area and was associated with saline depressions or drainage lines (Appendix 3). Transect searches of the mapped habitat did not locate any individuals. Eight potential locations for *Caledenia drakeoides* were inspected with habitat generally being in Good to Degraded condition (Keighery 1994). Searches were also conducted near a DPaW record located within 1 km of the study area near Miling and in nearby suitable habitat (Appendix 3).

Habitat for *Thelymitra stellata* was confined to the southern part of the study area (Appendix 3). Approximately 48 ha of potential habitat for *T. stellata* was searched (Appendix 3). It was confined to roadside vegetation and was generally linear in nature in degraded to excellent condition in the following proportions:

- 16.17 ha in excellent condition
- 14.92 ha in very good condition
- 13.78 ha in good condition
- 3.22 ha in degraded condition.

Table 3-4 Details of conservation significant flora recorded

Species	Conservation status	Work package	No. popn's / work package	Total no. plants / work package	Comment
Acacia drummondii subsp. *affinis*	P3	Calingiri	4 (ranging from 1 – 102 plants)	172	All are new populations
Acacia isoneura subsp. *nimia*	P3	Nugadong to Wubin	3	Many plants (one large pop.)	Two are new populations
Acacia scalena	P3	Nugadong to Wubin	4 (ranging from 1 – 47 plants)	108	Two are new populations
Banksia benthamiana	P4	Nugadong to Wubin	2 (ranging from 2 – 45 plants)	47	Both are new populations
Calothamnus pachystachyus	P4	Calingiri	1	129	New population
Conospermum densiflorum subsp. *unicephalatum*	EN (EPBC Act, WC Act)	Calingiri	2 (ranging from 1 – 38 plants)	39	All new populations
Daviesia debilior subsp. *sinuans*	P3	Nugadong to Wubin	2 (ranging from 1 - -2 plants)	3	Both new populations
Eremophila pinnatifida	CR (WC Act), EN (EPBC Act)	Dalwallinu Bypass Improvements	1	8	New population
Grevillea drummondii	P4	Calingiri	1	37	New population
Hibbertia miniata	P4	Calingiri	1	40	New population
Persoonia sulcata	P4	Calingiri	2	2	Both new populations
Verticordia lindleyi subsp. *lindleyi*	P4	Calingiri	2 (ranging from 5 – 113 plants)	118	Both new populations

[1] CR – Critical; EN – Endangered; P – Priority.

3.2.2 Introduced flora

A total of 44 introduced flora species were recorded in the gaps study area (Appendix 4; Appendix 5). All species recorded have wide distributions in WA. Twenty of the species were not previously recorded in the surveys of the initial study area (Phoenix 2016).

One declared pest, **Rumex hypogaeus*, was recorded at two locations in Nugadong to Wubin. Two individual plants were recorded, adding to the previous single record of this species in Nugadong to Wubin (Phoenix 2016).

3.2.3 Range extensions

A range extension for the threatened species *Conospermum densiflorum* subsp. *unicephalatum* and an introduced species **Stellaria pallida* were recorded in the study area.

A solitary plant of *Conospermum densiflorum* subsp. *unicephalatum* was recorded approximately 11 km south of the southern-most record of the species on Florabase (DPaW 2016a) and NaureMap (DPaW 2016b) in the Calingiri work-package.

The introduced species **Stellaria pallida* was recorded in a quadrat survey in the Moore River work-package representing an approximate 140 km north-east range extension. The identity of the species was determined post-field and subsequently the number of individuals and extent of the population was not determined. A cover value of 0.1% was recorded for the species indicating presence in low numbers.

3.2.4 Vegetation associations

A total of 15 vegetation associations were mapped within the gaps study area (Table 3-5; Appendix 5). Two of these represent new vegetation associations to those recorded in (Phoenix 2016):

- Medium woodland; Jarrah and Marri (association 965) was recorded in Calingiri
- Shrublands; thicket, *Acacia-Casuarina* alliance species (association 36) was recorded in Nugadong to Wubin.

Broadly, the vegetation associations recorded represent low to mid woodlands and shrublands, and low succulent steppe/samphire; these collectively covered 27% of the gaps study area. Areas described as the road (GNH), cleared (e.g. townships, driveways, side roads), cleared and planted (re-vegetated), pasture (agricultural areas), pasture and cleared (mosaic of agricultural areas and cleared areas for other agricultural purposes) accounted for the remainder of the gaps study area.

The re-sampling of the four quadrats in Dalwallinu Bypass Improvements (DBY001, DBY002, DBY003, DBY005) did not result in any changes to vegetation associations in this area (Table 3-5; Appendix 6).

Minor changes to the vegetation mapped previously in the Calingiri to Wubin (Phoenix 2016) resulted from more quadrat/relevé surveys conducted in the work packages, for example vegetation associations were updated in relevés recorded for TEC, The Eucalypt Woodlands of the Western Australian Wheatbelt assessments.

The number of vegetation associations recorded in each work package in the gaps study area varied from five to 13 (Table 3-6).

Table 3-5 Vegetation associations recorded in sampled quadrats

Code	Vegetation description as per Shepherd *et al.* 2002	Quadrat	Work package[1]	Vegetation description (current survey)
4	Medium woodland; Marri & Wandoo	Extrapolated from S3A29	CAL	Mid *Corymbia calophylla* and *Eucalyptus wandoo* woodland over tall sparse *Banksia sessilis* and *Casuarina obesa* shrubland over low sparse *Xanthorrhoea preissii*, *Melaleuca trichophylla* and *Bossiaea eriocarpa* shrubland over isolated mid *Neurachne alopecuroidea, *Avena barbata* and **Bromus diandrus* tussock grasses.
7	Medium woodland; York Gum (*Eucalyptus loxophleba*) & Wandoo	Gap20	CAL	Mid open *Eucalyptus loxophleba* subsp. *loxophleba*, *E. rudis* and *E. wandoo* woodland over low **Avena barbata*, **Ehrharta longiflora* and **Lolium rigidum* tussock grassland and low closed **Oxalis purpurea* forbland.
8	Medium woodland; Salmon Gum &	Extrapolated from W6.19	NW	Mid open *Eucalyptus salmonophloia* and *E. salubris* forest over low open *Enchylaena tomentosa*, *Rhagodia drummondii* and *Acacia merrallii* shrubland over isolated

Code	Vegetation description as per Shepherd *et al.* 2002	Quadrat	Work package[1]	Vegetation description (current survey)
	Gimlet			low **Ehrharta longiflora*, *Austrostipa elegantissima* and **Avena barbata* tussock grasses
36	Shrublands; thicket, *Acacia-Casuarina* alliance species	Gap05	NW	Tall open *Acacia acuminata* and *Hakea recurva* subsp. *recorva* shrubland over low *Aristida contorta* and *Austrstipa trichophylla* tussock grassland and low **Ursinia anthemoides* subsp. *anthemoides*, **Arctotheca calendula* and *Cephalipterum drummondii* forbland.
142	Medium woodland; York Gum & Salmon Gum	Extrapolated from S3D11	MR	Mid *Eucalyptus loxophleba* and *E. salmonophloia* woodland over sparse low *Maireana* sp. chenopod shrubland over isolated low **Avena barbata*, **Bromus diandrus* and **Eragrostis curvula* tussock grassland.
352	Medium woodland; York Gum	DBY001	DBY	Mid *Eucalyptus loxophleba* open forest over open tall *Acacia acuminata* and *Santalum acuminatum* shrubland over sparse mid *Acacia hemiteles*, *Eremophila decipiens* and *Dodonaea inaequifolia* shrubland over sparse low *Enchylaena tomentosa* var. *tomentosa*, *Maireana brevifolia* and *Rhagodia drummondii* chenopod shrubland over low **Avena barbata* tussock grassland and isolated clumps of low *Ptilotus polystachyus* forbs.
		Gap06	NW	Low *Eucalyptus loxophleba* subsp. *loxophleba* woodland over tall open *Acacia microbotrya* and *Hakea preissii* shrubland over low open *Aristida contorta*, *Austrostipa trichophylla* and *Rytidosperma caespitosum* tussock grassland.
		Gap11	NW	Low open *Eucalyptus kochii* subsp. *plenissima* woodland over low **Avena barbata* tussock grassland and low open *Sclerolaena diacantha* forbland.
		Gap12	PIT	Low *Eucalyptus loxophleba* subsp. *loxophleba* and *E. salubris* woodland over mid sparse *Melaleuca adnata* shrubland over low open *Enchylaena tomentosa*, *Maireana marginata* and *Rhagodia preissii* subsp. *preissii*chenopod shrubland.
		Gap13	DBY	Low *Eucalyptus loxophleba* subsp. *loxophleba* woodland over tall open *Acacia acuminata*, *Melaleuca acuminata* subsp. *websteri* and *Hakea recurva* subsp. *recurva* shrubland over low sparse **Gorteria personata*, *Trachymene cyanopetala* and *Velleia cycnopotamica* forbland.
		Gap14	DBY	Low *Eucalyptus loxophleba* subsp. *loxophleba* woodland over low **Gorteria personata* forbland.
		Gap16	MR	Mid *Eucalyptus loxophleba* subsp. *loxophleba* woodland over low open **Avena barbata* tussock grassland and low open **Arctotheca calendula* forbland.
		Gap18	MOR	Mid open *Eucalyptus loxophleba* subsp. *loxophleba* woodland over tall sparse *Acacia acuminata* shrubland over low **Arctotheca calendula*, **Romulea rosea* var. *australis* and *Hyalosperma glutinosum* subsp. *venustum* forbland.
551	Shrublands; *Allocasuarina*	Gap03	NW	Low *Allocasuarina acutivalvis* subsp. *acutivalvis* woodland over tall *Allocasuarina campestris*, *Acacia neurophylla*

Code	Vegetation description as per Shepherd *et al.* 2002	Quadrat	Work package[1]	Vegetation description (current survey)
	campestris thicket			subsp. *erugata* and *Melaleuca cordata* shrubland over mid sparse *Grevillea paradoxa* and *Enekbatus sessilis* shrubland.
		Gap07	NW	Tall *Allocasuarina acutivalvis* subsp. *acutivalvis* and *A. campestris* shrubland over mid sparse *Grevillea petrophiloides* subsp. *petrophiloides*, *Grevillea*? *obliquistigma* and *Petrophile shuttleworthiana* shrubland over isolated mid *Ecdeiocolea monostachya* sedges.
		Gap08	NW	Tall *Allocasuarina acutivalvis* subsp. *acutivalvis* and *A. campestris* shrubland over mid sparse *Acacia assimilis* and *Hibbertia drummondii* shrubland over isolated low *Goodenia berardiana*, *Velleia cycnopotamica* and *Waitzia acuminata* var. *acuminata* forbs.
		Gap10	DBY	Isolated *Eucalyptus* sp. mallee over tall open *Allocasuarina acutivalvis* subsp. *acutivalvis* and *A. campestris* shrubland over mid open *Ecdeiocolia monostachya* sedgeland.
676	Succulent steppe; samphire	Extrapolated from S3D09	MR	Sparse low *Tecticornia pergranulata* and *Atriplex spp*. chenopod shrubland over isolated low **Avena barbata* and *Eragrosis spp*. tussock grasses.
946	Medium woodland; Wandoo	Gap17	MR	Mid open *Eucalyptus wandoo* subsp. *wandoo* woodland over isolated low **Ehrharta longiflora*, *Lolium rigidum* and **Bromus* spp. tussock grasses and isolated low **Arctotheca calendula*, **Hypochaeris glabra* and **Sonchus oleraceus* forbs.
		Gap21	CAL	Mid *Eucalyptus wandoo* subsp. *wandoo* woodland over low open *Acacia lasiocarpa* var. *sedifolia* and *Gastrolobium spathulatum* shrubland.
		Gap22	CAL	Mid *Eucalyptus wandoo* subsp. *wandoo* woodland over low open *Acacia lasiocarpa* var. *sedifolia* and *Gastrolobium spathulatum* shrubland.
		Gap23	CAL	Mid *Eucalyptus wandoo* subsp. *wandoo* woodland over low open *Acacia lasiocarpa* var. *sedifolia* and *Gastrolobium spathulatum* shrubland.
		Gap24	CAL	Mid *Eucalyptus wandoo* subsp. *wandoo* woodland over mid *Banksia* spp., *Macrozamia riedlei* and *Xanthorrhoea preissii* shrubland over low sparse *Hibbertia hypericoides*, *Phyllanthus calycinus* and *Bossiaea eriocarpa* shrubland.
950	Medium woodland, *Casuarina obesa*	Gap19	MOR	Mid open *Casuarina obesa* and *Eucalyptus loxophleba* woodland over low closed **Arctotheca calendula*, **Oxalis pes-caprae* and **Romulea rosea* forbland
965	Medium woodland; Jarrah and Marri	Gap31	CAL	Mid *Corymbia calophylla* and *Eucalyptus marginata* woodland over tall isolated *Banksia sessilis* shrubs over low open *Daviesia divaricata* shrubland over isolated low *Neurachne alopercuroidea* tussock grasses.
1024	Shrublands; mallee & *Casuarina* thicket	DBY003	DBY	Low *Eucalyptus loxophleba*, *Acacia coolgardiensis* and *A. acuminata* woodland over sparse low *Maireana brevifolia* chenopod shrubland over low closed **Avena barbata* and **Ehrharta calycina* tussock grassland and low open **Mesembryanthemum nodiflorum* and *Waitzia acuminata* forbland.

Code	Vegetation description as per Shepherd *et al.* 2002	Quadrat	Work package[1]	Vegetation description (current survey)
		DBY005	DBY	Low open *Eucalyptus loxophleba*, *E. kochii* and *Acacia coolgardiensis* forest over mid sparse *Grevillea paniculata* and *G. petrophiloides* shrubland over low closed **Avena barbata*, **Ehrharta calycina* and *Monachather paradoxus* tussock grassland.
1034	Medium woodland; Marri, Wandoo & Powderbark	Gap25	CAL	Mid *Corymbia calophylla*, *Eucalyptus accedens* and *E. wandoo* subsp. *wandoo* woodland over sparse mid *Xanthorrhoea preissii* shrubland over low *Bossiaea eriocarpa*, *Hibbertia hypericoides* and *Gastrolobium bilobum* shrubland.
		Gap27	CAL	Mid *Corymbia calophylla*, *Eucalyptus accedens* and *E. wandoo* subsp. *wandoo* woodland over tall sparse *Allocasuarina helmsii* shrubland over mid open *Xanthorrhoea preisii* shrubland.
		Gap28	CAL	Mid open *Corymbia calophylla*, *Eucalyptus accedens* and *E. wandoo* subsp. *wandoo* woodland over low *Hibbertia hypericoides* shrubland.
		Gap29	CAL	Mid *Corymbia calophylla*, *Eucalyptus accedens* and *E. wandoo* subsp. *wandoo* woodland over tall sparse *Allocasuarina helmsii* shrubland over mid open *Xanthorrhoea preisii* shrubland.
1182	Medium woodland; *Eucalyptus rudis* and *Melaleuca rhaphiophylla*	Gap26	CAL	Mid *Eucalyptus rudis* woodland over tall *Melaleuca viminea* subsp. *viminea* shrubland over mid open*Juncus kraussii* subsp. *australiensis* sedgeland.
1413	Shrublands, *Acacia, Casuarina* and *Melaleuca* thicket	DBY002	DBY	Tall open *Acacia yorkrakinensis* subsp. *acrita* and *Baeckea elderiana* shrubland over mid open *Grevillea petrophiloides*, *Acacia multispicata* and *A. acuminata* shrubland over low open *Baeckea muricata*, *Comesperma integerrimum* and *Grevillea paniculata* shrubland over isolated low *Amphipogon caricinus* tussock grasses and *Cassytha nodiflora* vines.
		Gap01	NW	Low *Acacia resinimarginea* woodland over low open *Eucalyptus leptopoda* subsp. *arctata* mallee woodland over tall sparse *Baeckia* sp. Wubin shrubland over mid sparse *Phebalium tunerculosum*, *Melaleuca conothamnoides* and *Westringia cephalantha* shrubland.
		Gap02	NW	Tall *Acacia isoneura* subsp. *nimia*, *A. assimilis* and *Melaleuca atroviridis* shrubland over mid sparse *Melaleuca cordata* and *Phebalium tuberculosum* shrubland over low sparse *Drosera macrantha* subsp. *macrantha* forbland.

[1] CAL – Calingiri; DBY – Dalwallinu Bypass Improvements; MOR – Moore River; MR – Midlands Road to Bindi Bindi; NW – Nugadong to Wubin; PIT – Pithara.

Table 3-6 Distribution of vegetation in each work package within the gaps study area

Code	Vegetation association description as per Shepherd *et al.* (2002)	Area by work package[1] (ha)						
		CAL	MOR	MR	PIT	DBY	NW	Total
4	Medium woodland; Marri and Wandoo	1.31						**1.31**
7	Medium woodland; York Gum (*Eucalyptus loxophleba*) and Wandoo	0.63	3.90	1.29				**5.82**
8	Medium woodland; Salmon Gum and Gimlet						0.16	**0.16**
36	Shrublands; thicket, *Acacia-Casuarina* alliance species				0.12		14.26	**14.38**
142	Medium woodland; York Gum and Salmon Gum			0.40				**0.40**
352	Medium woodland; York Gum		1.73	8.34	15.60	1.25	0.36	**27.28**
495	Shrublands; thicket, Jam and *Allocasuarina acutivalvis* on ironstone						37.12	**37.12**
551	Shrublands; *Allocasuarina campestris* thicket						35.23	**35.23**
676	Succulent steppe; samphire		4.30	<0.05				**4.30**
936	Medium woodland; Salmon Gum			0.14				**0.14**
946	Medium woodland; Wandoo	9.55		1.91				**11.46**
950	Medium woodland; *Casuarina obesa*	4.15	3.52					**7.67**
965	Medium woodland; Jarrah and Marri	0.77						**0.77**
968	Medium woodland; Jarrah, Marri and Wandoo	4.40						**4.40**
991	Medium woodland; small Wandoo patches surrounded by other eucalypts	10.68						**10.68**
1024	Shrublands; mallee and *Casuarina* thicket				13.71		16.73	**30.44**
1034	Medium woodland; Marri, Wandoo and Powderbark	5.81						**5.81**
1048	Mosaic: Shrublands; *Melaleuca* patchy scrub / succulent steppe; samphire				4.49			**4.49**
1182	Medium woodland; *Eucalyptus rudis* and *Melaleuca rhaphiophylla*	1.53						**1.53**
1413	Shrublands; *Acacia*, *Casuarina* and *Melaleuca* thicket					0.35	18.55	**18.90**
Cleared	Mostly cleared. Townships, driveways, side roads. Small pockets of vegetation maybe present	2.85	1.33	0.56	1.53	0.50	7.19	**13.96**
Cleared and Planted	Historically cleared. Maybe replanted with non-native vegetation	0.49	1.80	2.85	3.39	1.01	2.29	**11.83**
GNH	Bitumen and road shoulders. No vegetation		0.33				9.08	**9.41**
Pasture	Agricultural areas. Small pockets of vegetation maybe present	64.52	54.02	69.62	84.25	4.95	110.72	**388.08**
Pasture and Cleared	Agricultural areas. Small pockets of vegetation maybe present, includes infrastructure eg. sheds, houses	2.44			16.14		4.67	**23.25**
Total		**109.13**	**70.94**	**85.13**	**139.22**	**8.05**	**256.36**	**688.83**

[1] CAL – Calingiri; DBY – Dalwallinu Bypass Improvements; MOR – Moore River; MR – Midlands Road to Bindi Bindi; NW – Nugadong to Wubin; PIT – Pithara.

3.2.5 Vegetation condition

The condition of remnant native vegetation across the gaps study area ranged from Completely Degraded to Pristine (Table 3-7; Appendix 6). Approximately 25.9% of the study area consisted vegetation in Good to Pristine condition (Table 3-7).

The areas mapped as Completely Degraded represented areas devoid of native vegetation, i.e. agricultural areas, roads, townships, driveways and other cleared areas.

Table 3-7 Vegetation condition in the gaps study area (ha/%)

Condition rating	Area of condition rating by work package (ha/%)						
	Calingiri	**Moore River**	**Midlands Road to Bindi Bindi**	**Pithara**	**Dalwallinu Bypass**	**Nugadong to Wubin**	**Total**
Completely Degraded	70.30 (64.4%)	57.49 (81.0%)	73.04 (85.8%)	105.30 (75.6%)	6.46 (80.2%)	133.96 (52.3%)	**446.55 (66.8%)**
Degraded	6.06 (5.6%)	13.35 (18.8%)	11.70 (13.7%)	5.17 (3.7%)		12.44 (4.9%)	**48.72 (7.3%)**
Good	4.93 (4.5%)	0.10 (0.1%)	0.40 (0.5%)	6.48 (4.7%)	1.60 (19.8%)	9.96 (3.9%)	**23.47 (3.5%)**
Very Good	16.20 (14.8%)			20.65 (14.8%)		80.67 (31.5%)	**117.5 (27.6%)**
Excellent	7.86 (7.2%)			1.61 (1.2%)		11.18 (4.4%)	**20.65 (3.1%)**
Pristine	3.77 (3.5%)					8.14 (3.2%)	**11.91 (1.8%)**
Total	**109.13**	**70.94**	**85.13**	**139.22**	**8.05**	**256.36**	**668.83**

3.2.6 Eucalypt Woodlands of the Western Australian Wheatbelt TEC

Presence of the Eucalypt Woodlands of the Western Australian Wheatbelt TEC was confirmed in the initial study area and gaps study area. Of 263 site assessments throughout the study area, 105 sites were determined to represent the TEC (Appendix 8). Based on the assessment, the TEC occupies 137.08 ha of the study areas and is present in all work packages (Table 3-8; Appendix 7).

Some patches of vegetation determined not to represent the TEC occur adjacent to a patch of the same woodland community that was determined to be TEC. This occurred for vegetation that was in a degraded condition, where insufficient mature trees were present to be representative of the TEC, while the adjacent patch contained sufficient mature trees, and between the patches was an area devoid of trees for 50 m or more.

Table 3-8 Summary of Eucalypt woodlands of the Western Australian wheatbelt TEC in initial study area and gaps study area

Work package	Area of TEC (ha)	Vegetation associations	Sites
Calingiri	36.38	1034, 1182, 352, 4, 7, 946, 991	TEC062, TEC063, TEC064, TEC068, TEC068A, TEC070, TEC071, TEC072, TEC073, TEC074, TEC075, TEC076, TEC077, TEC078, TEC079, TEC080, TEC081, TEC082, TEC087, TEC088, TEC092, TEC093, TEC096, TEC096A, TEC102, TEC107, TEC108, TEC109, TEC110, TEC111, TEC112, TEC113, TEC117, TEC118, TEC119, TEC121
Moore River	13.33	352, 7	TEC050, TEC051, TEC052, TEC053, TEC054, TEC056, TEC058, TEC059, TEC060, TEC061
Midlands Road to Bindi Bindi	64.30	1040, 142, 352, 7, 936, 946	TEC026, TEC027, TEC028, TEC029, TEC030, TEC032, TEC033, TEC034, TEC035, TEC037, TEC038, TEC039, TEC040, TEC041, TEC042, TEC043, TEC044, TEC045, TEC047, TEC048, TEC049, TEC117a, TEC122, TEC123
Pithara	16.04	141, 352	TEC021, TEC022, TEC024A
Dalwallinu Bypass Improvements	2.82	142, 352	TECW014, TECW015, TECW016
Nugadong to Wubin	4.21	352, 8	TECW001, TECW002, TECW003, TECW004, TECW007, TECW009, TECW012
Total study area	**137.08**		

3.2.7 Local and regional significance of vegetation

Local context

Sixteen of the vegetation associations defined in the gaps study area may be considered locally significant as they represent habitat for Threatened, Protected or Priority Flora, contain one or more quadrats that align with a TEC, were recorded to be in excellent or pristine condition and therefore are considered to represent patches of comparatively high native species diversity surrounded by highly impacted vegetation (Table 3-9).

Table 3-9 Vegetation associations in the gaps study area considered locally conservation significant

Vegetation code	Work package	Reason for local significance
4	Calingiri	Provides habitat for *Verticordia lindleyi* subsp. *lindleyi* (P4) Contains vegetation in excellent condition Contains the Eucalypt Woodlands of the Western Australian Wheatbelt TEC
7	Calingiri	Contains the Eucalypt Woodlands of the Western Australian Wheatbelt TEC
	Midlands Road to Bindi Bindi	Contains the Eucalypt Woodlands of the Western Australian Wheatbelt TEC
8	Nugadong to Wubin	Contains the Eucalypt Woodlands of the Western Australian Wheatbelt TEC

Vegetation code	Work package	Reason for local significance
36	Nugadong to Wubin	Provides habitat for *Acacia scalena* (P3)
142	Midlands Road to Bindi Bindi	Contains the Eucalypt Woodlands of the Western Australian Wheatbelt TEC
	Pithara	Contains the Eucalypt Woodlands of the Western Australian Wheatbelt TEC
352	Calingiri	Contains vegetation in excellent condition Contains the Eucalypt Woodlands of the Western Australian Wheatbelt TEC
	Dalwallinu Bypass Improvements	Provides habitat for *Eremophila pinnatifida* (CR, WC Act) Contains vegetation in excellent condition Contains the Eucalypt Woodlands of the Western Australian Wheatbelt TEC
	Moore River	Contains the Eucalypt Woodlands of the Western Australian Wheatbelt TEC
	Midlands Road to Bindi Bindi	Contains the Eucalypt Woodlands of the Western Australian Wheatbelt TEC
	Pithara	Contains the Eucalypt Woodlands of the Western Australian Wheatbelt TEC
	Nugadong to Wubin	Contains the Eucalypt Woodlands of the Western Australian Wheatbelt TEC
551	Nugadong to Wubin	Provides habitat for *Acacia scalena* (P3) Contains vegetation in excellent and pristine condition
936	Midlands Road to Bindi Bindi	Contains the Eucalypt Woodlands of the Western Australian Wheatbelt TEC
946	Calingiri	Provides habitat for *Acacia drummondii* subsp. *affinis* (P3) and *Grevillea drummondii* (P4) Contains vegetation in excellent and pristine condition Contains the Eucalypt Woodlands of the Western Australian Wheatbelt TEC
	Midlands Road to Bindi Bindi	Contains the Eucalypt Woodlands of the Western Australian Wheatbelt TEC
968	Calingiri	Provides habitat for *Conospermum densiflorum* subsp. *unicephalatum* (EN EPBC, WC Act) Contains vegetation in excellent condition
991	Calingiri	Provides habitat for *Acacia drummondii* subsp. *affinis* (P3), *Calothamnus pachystachyus, Conospermum densiflorum* subsp. *unicephalatum* (EN EPBC, WC Act)*, Persoonia sulcata* (P4) and *Verticordia lindleyi* subsp. *lindleyi* (P4) Contains vegetation in excellent condition Contains the Eucalypt Woodlands of the Western Australian Wheatbelt TEC
1024	Nugadong to Wubin	Provides habitat for *Acacia scalena* (P3) and *Banksia benthamiana* (P4) and *Daviesia debilior* subsp*. sinuans*(P3) Contains vegetation in excellent condition
1034	Calingiri	Provides habitat for *Acacia drummondii* subsp. *affinis* (P3), *Conospermum densiflorum* subsp. *unicephalatum* (EN EPBC, WC Act)*, Grevillea drummondii* (P4) *Hibbertia miniata* (P4) and *Verticordia lindleyi* subsp. *lindleyi* (P4) Contains vegetation in excellent and pristine condition Contains the Eucalypt Woodlands of the Western Australian Wheatbelt TEC
1040	Midlands Road to Bindi Bindi	Contains the Eucalypt Woodlands of the Western Australian Wheatbelt TEC
1182	Calingiri	Contains the Eucalypt Woodlands of the Western Australian Wheatbelt TEC
1413	Nugadong to Wubin	Provides habitat for *Acacia isoneura* subsp. *nimia* (P3), *Acacia scalene* (P3) and *Banksia benthamiana* (P4) Contains vegetation in excellent condition

Regional context

Regional significance of the vegetation associations is addressed for most recorded associations in Phoenix (2016), although the additional mapping in the gaps study area adds marginally to the percentage of each association that is represented within the Calingiri to Wubin study areas. For the newly recorded associations:

- Medium woodland; Jarrah and Marri (association 965), recorded in Calingiri is currently rated as least concern at state scale (55.39% remaining) and at the Interim Biogeographic Regionalisation of Australia (IBRA) scale, this association is not mapping in the Avon Wheatbelt bioregion by (DPaW 2014).
- Shrublands; thicket, *Acacia-Casuarina* alliance species (association 36), recorded in Nugadong to Wubin is currently rated as least concern at state scale (45.67% remaining) and at the IBRA scale and Vulnerable at IBRA scale (24.18% remaining in the Avon Wheatbelt bioregion; (DPaW 2014).

3.2.8 Extrapolation of remnant native vegetation

Extrapolation of the vegetation mapping identified 25 vegetation associations covering an area of 2,262.81 ha. Extrapolated remnant native vegetation was dominated by vegetation associations 4, 7, 352, 551, 946, 991, 1024, and 1143, all covering an area greater than 140 ha and covering approximately 81.5% of remnant vegetation in the extrapolation study area (Table 3-10; Appendix 9). The remaining 18.5% of remnant vegetation in the extrapolation study area was made up of the remaining 17 vegetation associations, all covering less than 65 ha each (Table 3-10; Appendix 9).

Five vegetation associations not occurring within the gaps or initial study area (141, 354, 973, 999 and 1132) were identified in the extrapolation study area based on other vegetation mapping conducted for the project, outside the Calingiri to Wubin study area.

Table 3-10 Distribution of extrapolated remnant vegetation (ha), by work package

Code	Vegetation association description as per Shepherd *et al.* (2002)	Area by work package[1] (ha)						
		CAL	MOR	MR	PIT	DBY	NW	Total
4	Medium woodland; Marri and Wandoo	142.42						**142.42**
7	Medium woodland; York Gum (*Eucalyptus loxophleba*) and Wandoo	51.11	186.55	17.44				**255.1**
8	Medium woodland; Salmon Gum and Gimlet						13.67	**13.67**
36	Shrublands; thicket, *Acacia-Casuarina* alliance species	7.06			9.62		16.09	**32.77**
141	Medium woodland; York Gum, Salmon Gum and Gimlet				24.41			**24.41**
142	Medium woodland; York Gum and Salmon Gum			24.18				**24.18**
352	Medium woodland; York Gum	39.44	31.77	117.32	74.96	17.00	5.84	**286.33**
354	Shrublands; jam and *Acacia rostellifera* (+hakea) scrub with scattered York gum				2.91			**2.91**
495	Shrublands; thicket, Jam & *Allocasuarina acutivalvis* on ironstone						43.47	**43.47**
551	Shrublands; *Allocasuarina campestris* thicket						268.10	**268.1**
676	Succulent steppe; samphire		9.09	9.26				**18.35**
936	Medium woodland; Salmon Gum			17.41				**17.41**
946	Medium woodland; Wandoo	160.58		89.62				**250.2**
950	Medium woodland; *Casuarina obesa*	14.22	13.90	8.01				**36.13**
965	Medium woodland; Jarrah and Marri	11.40						**11.4**
968	Medium woodland; Jarrah, Marri and Wandoo	63.87						**63.87**
973	Low forest; paperbark (*Melaleuca rhaphiophylla*)	11.51						**11.51**
991	Medium woodland; small Wandoo patches surrounded by other eucalypts	203.39						**203.39**
999	Medium woodland; Marri	23.38						**23.38**
1024	Shrublands; mallee and *Casuarina* thicket			5.97	153.23		104.61	**263.81**
1034	Medium woodland; Marri, Wandoo and Powderbark	42.02						**42.02**
1048	Mosaic: Shrublands; *Melaleuca* patchy scrub / succulent steppe; samphire	3.70			3.53			**7.23**
1132	Medium forest; Marri	1.55						**1.55**
1182	Medium woodland; *Eucalyptus rudis* and *Melaleuca rhaphiophylla*	43.25						**43.25**
1413	Shrublands; *Acacia*, *Casuarina* and *Melaleuca* thicket					47.47	128.48	**175.95**
Total		**818.90**	**241.31**	**289.21**	**268.66**	**64.47**	**580.26**	**2262.81**

[1] CAL – Calingiri; DBY – Dalwallinu Bypass Improvements; MOR – Moore River; MR – Midlands Road to Bindi Bindi; NW – Nugadong to Wubin; PIT – Pithara.

3.3 FAUNA AND FAUNA HABITAT

3.3.1 Fauna habitats

Eight fauna habitat types were defined in the gaps study area, including six habitats comprising remnant native vegetation (Appendix 10):

- cleared (agriculture, road, infrastructure) (434.69 ha, 64.99%)
- shrubland (thicket) (136.06 ha, 20.34%)
- woodland (Jarrah, Marri, Wandoo and/or Banksia) (34.42 ha, 5.15%)
- woodland (York Gum, Wandoo, Salmon Gum, and/or Gimlet) (33.82 ha, 5.06%)
- cleared and revegetated non-native woodland mosaic (11.83 ha, 1.77%)
- woodland (paperbark or sheoak) (9.20 ha, 1.38%)
- succulent steppe/samphire with woodland or shrubland (4.49 ha, 0.67%)
- succulent steppe/samphire (4.30 ha, 0.64%)

All of the habitat types were previously documented in the Calingiri to Wubin study area in Phoenix (2016). Most of the gaps study area (~67%) comprised cleared areas, represented by agriculture, roads and other infrastructure, and cleared and revegetated woodlands. These were present and dominant throughout all work packages. The remaining 33% of the gaps study area comprised of habitat consisting of native remnant vegetation. Habitats present were variable between work packages (Table 3-11) but generally consistent with habitats mapped previously in Phoenix (2016). Habitat consisting of native remnant vegetation tended to be dominated by taller woodland habitats in the south with shrubland thicket habitat becoming more dominant in the northern part of the gaps study area (Table 3-11).

The habitats present within the work packages varied in quality and suitability for species of conservation significence. The cleared areas, pasture, and non-native revegetation woodlands that are widespread within the gaps study area offer little habitat value to fauna due to their lack of suitable coverage and food sources. The native vegetation habitats (e.g. woodland, shrubland, and samphires) offer higher habitat value for fauna where quality was good; however, these were not common.

Most of the native vegetation remnants within the gaps study area are of low value as fauna habitat due to a poor or absent native understory, presence of weeds, presence of feral animals, narrowness of the existing habitat, fragmentation from other areas of native vegetation by cleared or highly degraded areas and the lack of native vegetation in the surrounding agricultural landscape. The habitats that may be of value are those in good condition that are adjacent to existing areas of remnant native vegetation outside of the study area. These habitats also have a higher value as linkages for native fauna.

Table 3-11 Area (ha) of fauna habitat type recorded in the gaps study area, by work package

Habitat type	Area by work package[1] (ha)						
	CAL	MOR	MR	PIT	DBY	NW	Total
Cleared (agriculture, road, infrastructure)	69.81	55.68	70.18	101.91	5.45	131.66	**434.69**
Shrubland (thicket)				13.83	0.35	121.88	**136.06**
Woodland (Jarrah, Marri, Wandoo, and/or Banksia)	32.51		1.91				**34.42**
Woodland (York Gum, Wandoo, Salmon Gum, and/or Gimlet)	0.63	5.64	10.18	15.60	1.25	0.52	**33.82**
Cleared and revegetated non-native woodland mosaic	0.49	1.80	2.85	3.39	1.01	2.29	**11.83**
Woodland (paperbark or sheoak)	5.68	3.52					**9.20**
Succulent steppe/samphire with woodland or shubland				4.49			**4.49**
Succulent steppe/ samphire		4.30					**4.30**
Total gaps study area	**109.13**	**70.94**	**85.13**	**139.22**	**8.05**	**256.36**	**668.83**

[1] CAL – Calingiri; DBY – Dalwallinu Bypass Improvements; MOR – Moore River; MR – Midlands Road to Bindi Bindi; NW – Nugadong to Wubin; PIT – Pithara.

3.3.2 Conservation significant fauna

Two conservation significant species were recorded within the study area during the surveys, Carnaby's Black Cockatoo and Rainbow Bee-eater (Table 3-12; Appendix 10). A possible old inactive Malleefowl mound was recorded in a large patch of remnant woodland north of Wubin; however, no evidence of any recent occurrence of the species was recorded within the gaps study area (Table 3-12; Appendix 10).

Table 3-12 Conservation significant fauna recorded in the gaps study area

Species	Number of individuals	Section	Latitude	Longitude	Record type
Calyptorhynchus latirostris (Carnaby's Black Cockatoo) Endangered (EPBC and WC Act)	1	Calingiri	-31.0803	116.2039	Forage evidence
	5	Calingiri	-31.0792	116.2038	Direct sighting
	16	Calingiri	-31.2117	116.1763	Direct sighting
	6	Calingiri	-31.2190	116.1775	Direct sighting
	1	Calingiri	-31.2083	116.1767	Direct sighting
	1	Calingiri	-31.1969	116.1762	Direct sighting
	1	Midlands Road to Bindi Bindi	-30.6776	116.2411	Direct sighting
Leipoa ocellata (Malleefowl) Vulnerable (EPBC and WC Act)	1	Nugadong to Wubin	-30.0588	116.6914	Possible mound
Merops ornatus (Rainbow Bee-eater) Migratory (EPBC and WC Act)	1	Calingiri	-31.0769	116.2044	Direct sighting
	1	Pithara	-30.4038	116.6639	Direct sighting
	1	Nugadong to Wubin	-30.0567	116.6928	Direct sighting
	1	Nugadong to Wubin	-30.0644	116.6811	Calls
	1	Nugadong to Wubin	-30.0566	116.6931	Calls
	1	Nugadong to Wubin	-30.0643	116.6812	Direct sighting

An assessment of the likelihood of occurrence of all potential conservation significant species identified in the desktop review as part of earlier surveys by Phoenix (2016) was undertaken based on current known distribution, habitat preferences, proximity of previous records to the study area identified in the desktop review and habitats present. Distribution and habitat preferences for each of these species are provided in Table 5-19 of Phoenix (2016).

Up to 13 conservation significant species are known to, or may occur, within the gaps study area based on habitats present and known species distributions, as indicated by NatureMap records (Table 3-13; DPaW 2016b). Some species may occur in the larger areas of remnant vegetation adjacent to the gaps study area where suitable habitat is present, particularly where connectivity to larger areas of native vegetation is available, or where species have ability to migrate across larger areas of sub-optimal habitat.

Table 3-13 Conservation significant fauna likelihood of occurrence assessment in gaps study area

Species	Likelihood of occurrence *
Invertebrates	
Idiosoma nigrum (Shield-back Trapdoor Spider) Vulnerable (EPBC and WC Act)	Unlikely – most of study area outside of known distribution. Previous records of *I. nigrum* from Buntine Nature Reserve, approximately 12 km north of Wubin (DPaW 2016b), represent an undescribed species.
Throscodectes xederoides (Mogumber Bush Cricket) (Priority 3 DPaW)	Possible – may occur in areas where suitable substrate present (white sands) in the far south of the gaps study area.
Reptiles	
Egernia stokesii badia (Western Spiny-tailed Skink) Endangered (EPBC), Vulnerable (WC Act)	Possible – may occur in remnant woodland habitat; however, habitat largely degraded and fragmented. Most recent desktop record in vicinity is dated 2009 (DPaW 2016b); however, record is likely to represent an isolated or relict population. Searches conducted in areas of potential habitat did not record any evidence of presence.
Aspidites ramsayi (Woma Python) Priority 1 (DPaW)	Unlikely – suitable habitat not present; desktop records in vicinity of the gaps study area are very old, the most recent from 1981 (DPaW 2016b).
Birds	
Leipoa ocellata (Malleefowl) Vulnerable (EPBC and WC Act)	Possible – suitable habitat not present within most of the gaps study area. A possible old inactive mound recorded in a patch of remnant woodland to the north of Wubin (Table 3-12; Appendix 10); however, no evidence of recent occurrence was recorded. May possibly occur in woodland and shrubland habitats where suitable vegetation cover and material for mound construction (loose substrates and leaf litter) is present, particularly the remnant patches of woodland and shrubland habitat adjacent to larger blocks of remnant vegetation in the northern portion of the gaps study area, south of Dalwallinu and north of Wubin. However, habitats considered too degraded and fragmented to be optimal habitat. Transect searches in areas of suitable habitat north of Wubin did not record any evidence fo the species' however, evidence of feral animal presence was frequently recorded. The most recent record of the species is dated 2010 from the Wubin area (DPaW 2016b).
Apus pacificus (Fork-tailed Swift) Migratory (EPBC and WC Act)	Likely – may frequent the area on occasion above most habitats throughout the gaps study area to forage, unlikely to land or nest within the gaps study area.
Ardea modesta (Eastern Great Egret) Migratory (EPBC and WC Act)	Unlikely – suitable habitat not present (streams and waterbodies).
Ardea ibis (Cattle Egret) Migratory (EPBC and WC Act)	Possible – may occur in low lying areas following suitable rainfall.
Pandion cristatus (Eastern Osprey) Migratory (EPBC and WC Act)	Unlikely – suitable habitat not present (large wetlands).
Falco peregrinus (Peregrine Falcon) Specially protected (WC Act)	Likely – may forage in all habitats and nest in woodland habitats where suitable large eucalypts present throughout the gaps study area.

Species	Likelihood of occurrence *
Thinornis rubricollis (Hooded Plover) Priority 4 (DPaW)	Possible – may occur in samphire habitat
Rostratula australis (Australian Painted Snipe) Endangered (EPBC and WC Act)	Unlikely – no habitat present (shallow wetlands)
Tringa hypoleucos (Common Sandpiper) Migratory (EPBC and WC Act)	Unlikely – no habitat present (shallow wetlands)
Gelochelidon nilotica (Gull-billed Tern) Migratory (EPBC and WC Act)	Unlikely – no habitat present (coastal or wetlands)
Calyptorhynchus banksii naso (Forest Red-tailed Black Cockatoo) Vulnerable (EPBC and WC Act)	Possible – may forage and roost in trees and shrubs in areas across most of the gaps study area but unlikely to breed. Northern portion of the gaps study area outside of the species modelled distributiuon (DSEWPaC 2012); however, may still occasionally occur to forage.
Calyptorhynchus latirostris (Carnaby's Black Cockatoo) Endangered (EPBC and WC Act)	Recorded – recorded from multiple direct observations and secondary evidence records within the gaps study area (Table 3-12; Appendix 10) and in adjacent areas during previous surveys. Likely to occur throughout most of the gaps study area to forage and/or roost where suitable hollow bearing trees and foraging species present.
Calyptorhynchus baudinii (Baudin's Black Cockatoo) Vulnerable (EPBC) and Endangered (WC Act)	Possible – study area north of modelled distribution (DSEWPaC 2012); however, a few (potentially unreliable) NatureMap records occur as far north as New Norcia (DPaW 2016b). May occasionally forage but unlikely to breed or roost in the southern portion of the gaps study area, unlikely to occur in the northern portion.
Ninox connivens connivens (Barking Owl) Priority 2 (DPaW)	Possible – may occur in woodland habitat throught the gaps study area to forage and may nest in habitat where suitable hollows present.
Merops ornatus (Rainbow Bee-eater) Migratory (EPBC and WC Act)	Recorded – Recorded multiple times within the gaps study area (Table 3-12; Appendix 10). Likely to occur in most habitats, including shrubland and woodland habitats as well as disturbed areas throughout the study area to forage and may nest where suitable sandy substrates present.
Mammals	
Dasyurus geoffroii (Western Quoll) Vulnerable (EPBC and WC Act)	Possible – southern portion of the gaps study area within known distribution and patchy areas of suitable woodland habitat present; however, it is often heavily degraded and/or fragmented in most areas. There is one old NatureMap record within Calingiri study area from 1967 and more recent (2000–02) records exist approximately 9 km south (DPaW 2016b).; however, most of the gaps study area located outside of species current known distribution and suitabler habitat not present. Study area unlikely to provide core habitat for species.

* See Phoenix (2016) Table 5-19 for full description of species distribution and habitat preferences.

3.3.3 Introduced species

Cats, Foxes, Dogs and Rabbits were present in various parts of the study area. Direct sightings and evidence (tracks, scats, dead individuals, burrows and warrens) of these introduced species were recorded within most parts of the study area, particularly in larger areas of remnant vegetation or areas adjacent to blocks of remnant vegetation. Many of the species have previously been recorded within and in the vicinity fo the gaps study area during previous surveys (Phoenix 2016).

3.3.4 Survey of black cockatoo species

A total of 1,055 potential Carnaby's Black Cockatoo breeding trees were recorded in the gaps study area (Table 3-14; Appendix 10; Appendix 11). Most of the trees were recorded in Calingiri, Midlands Road to Bindi Bindi and Moore River (Table 3-14).

Table 3-14 Summary of potential Carnaby's Black Cockatoo breeding trees recorded in gaps study area, by work package

Species	Number of potential breeding trees present						
	Calingiri	Moore River	Midlands Road to Bindi Bindi	Pithara	Dalwallinu Bypass	Nugadong to Wubin	Total
Corymbia calophylla	84						**84**
Eucalyptus accedens	20						**20**
Eucalyptus camaldulensis	3	15		2			**20**
Eucalyptus loxophleba	9	31	44	6		29	**119**
Eucalyptus marginata	24						**24**
Eucalyptus rudis	10						**10**
Eucalyptus salmonophloia	3		6	3	3	2	**17**
Eucalyptus wandoo	578	39	116		1		**734**
Eucalyptus sp. (dead, introduced or unknown)	20	6	1				**27**
Total	**751**	**91**	**167**	**11**	**4**	**31**	**1055**

Of the potential breeding trees recorded, 143 had visible hollows, and 24 of these were confirmed by Tony Kirkby as having hollows suitable for current breeding by Carnaby's Black Cockatoo, including nine which showed signed of use by the species (Table 3-14; Appendix 11). Eight of the trees that had signs of use were in Calingiri, with the other one from Midlands Road to Bindi Bindi:

- HT08984 (-31.184579, 116.176098), Calingiri, *Eucalyptus wandoo*, hollows at 7 m and 12 m, hollow with chewed entrance
- HT13905 (-31.219616, 116.177606), Calingiri *Corymbia calophylla*, hollow at 9 m, chewed hollow.
- HT03629 (-30.66209, 116.27418), Midlands Road to Bindi Bindi, *Eucalyptus salmonophloia*, hollow at 5 m, artificial nest box shows heavy signs of use by Carnaby's Black Cockatoo.
- HT12912 (-31.02234, 116.209405), Calingiri, *Eucalyptus wandoo*, hollow at 6 m, worn hollow entrances suitable.

- HT13274 (-31.071726, 116.204474), Calingiri, *Eucalyptus wandoo*, hollow at 6 m, well chewed hollow.
- HT13250 (-31.072418, 116.204659), Calingiri, *Eucalyptus wandoo*, hollow at 5 m, dead, well chewed hollow.
- HT13978 (-31.074659, 116.20446), Calingiri, *Eucalyptus wandoo*, hollow with chewed entrance.
- HT13367 (-31.076045, 116.204383), Calingiri, *Eucalyptus wandoo*, hollow at 7 m, chewed hollow.
- HT13728 (-31.219017, 116.176709), Calingiri, *Eucalyptus wandoo*, hollow at 8 m, chewed hollow.

Breeding and roosting tree species were recorded in some of the sampled vegetation quadrats in the gaps study area, particularly in Calingiri (Table 3-15).

Approximately 104 ha of breeding habitat for Carnaby's Black Cockatoo was mapped within remnant native vegetation of the gaps study area. Potental breeding habitat was present in all work packages. In total, 852 (80.7%) of the 1,055 potential breeding trees were present within the mapped areas with the remainder recorded in cleared pastures and revegetated areas.

Foraging habitat for Carnaby's Black Cockatoo varied between and within the study areas. Known food species were recorded in many of sampled vegetation quadrats, particularly towards the southern work packages (Table 3-15). Extensive foraging evidence from Marri, *Banksia squarrosa*, *B. sessilis* and *Hakea undulata*, and a high abundance of foraging species were recorded in Calingiri. No foraging evidence and fewer forage species were recorded in the gaps study area of the remaining four work packages. This finding was supported by the spatial analysis of foraging habitat which classified 7.2 ha as quality foraging habitat, all within the Calingiri work package.

Forest Red-tailed Black Cockatoos are seldom recorded near the gaps study area, particularly the northern work packages. However, as there are some desktop records from the area, potential foraging habitat was identified, mainly in Calingiri where their main food preference (Jarrah and Marri seed) was present in the existing remnant vegetation, and Nugadong to Wubin where potential food sources of *Casuarina* and *Allocasuarina* were present in native woodlands and shrublands. Smaller areas of potential foraging habitat were also recorded in the other three work packages (Moore River, Midlands Road to Bindi Bindi and Pithara). Spatial analysis identified 124.9 ha of foraging habitat for Forest Red-tailed Black Cockatoo, almost all of which was in Calingiri (16.43 ha) and Nugadong to Wubin (102.73 ha).

Table 3-15 Plant species of relevance to Carnaby's Black Cockatoo recorded in quadrats in the gaps study area (based on DEC 2011)

Species	Food plant	Nesting	Roosting	Calingiri							Moore River	Midlands Road to Bindi Bindi		Pithara			Nugadong to Wubin								
				GAP020	GAP021	GAP022	GAP024	GAP025	GAP026	GAP027	GAP018	GAP016	GAP017	GAP012	GAP013	GAP014	GAP001	GAP002	GAP003	GAP004	GAP005	GAP006	GAP007	GAP008	GAP010
Banksia bipinnafida subsp. *multifida*	•							✓ 0.5%																	
Banksia polycephala	•						✓ 10%																		
Banksia squarrosa subsp. *squarrosa*	•						✓ 1%																		
Corymbia calophylla	•	•	•					✓ 1%		✓ 5%															
Eucalyptus accedens	•	•	•					✓ 1%		✓ 1%															
Eucalyptus loxophleba subsp. *lissophloia*		•																	✓ 5%						
Eucalyptus loxophleba subsp. *loxophleba*		•	•	✓ 12%							✓ 50%	✓ 25%		✓ 30%	✓ 35%	✓ 35%						✓ 25%			
Eucalyptus rudis	•	•	•	✓ 1%					✓ 25%																
Eucalyptus salubris		•												✓ 10%											
Eucalyptus wandoo	•	•	•	✓ 25%	✓ 35%	✓ 3%	✓ 25%	✓ 15%		✓ 1%			✓ 60%												
Eremophila glabra	•														✓ 10%										
Grevillea paradoxa	•																		✓ 3%					✓ 0.1%	
Grevillea petrophiloides subsp. *petrophiloides*	•																						✓ 2%		
Hakea incrassata	•									✓ 5															

Species	Food plant	Nesting	Roosting	Calingiri							Moore River	Midlands Road to Bindi Bindi		Pithara			Nugadong to Wubin								
				GAP020	GAP021	GAP022	GAP024	GAP025	GAP026	GAP027	GAP018	GAP016	GAP017	GAP012	GAP013	GAP014	GAP001	GAP002	GAP003	GAP004	GAP005	GAP006	GAP007	GAP008	GAP010
Hakea lissocarpha	•							✓ 0.1%																	
Hakea preissii	•																					✓ 5%			
Hakea undulata	•							✓ 0.1%																	
*Raphanus raphanistrum**	•											0.1%													
Xanthorrhoea preissii	•						✓ 5%	✓ 5%		✓ 15%															

4 DISCUSSION

4.1 FLORA AND VEGETATION

Records of conservation significant flora in the spring 2016 surveys were recorded in the Calingiri, Nudagong to Wubin and Dalwallinu Bypass Improvements work packages. The population of the Threatened species *Eremophila pinnatifida* from near Dalwallinu town (Dalwallinu Bypass Improvements) represents a new record for the species. DPaW have advised that this population represents the only known extant population in the Dalwallinu area (pers. comm. Andrew Brown, DPaW, December 2016). All previous *E. pinnatifida* records within the Dalwallinu town area were recently determined to have died out, following searches for the known populations by DPaW personnel in 2014 and 2015 (pers. comm. Andrew Brown, DPaW, December 2016). This finding is supported by the surveys conducted for this Project, which failed to located any plants at any of the known Dalwallinu populations within the study area.

The largest population (38 individuals) of the Threatened species *Conospermum densiflorum* subsp. *unicephalatum* recorded in Calingiri work package was located within 900 m of a 1974 record from the DPaW database (DPaW 2016c), which had not been relocated since that time (Threatened Species Scientific Committee 2015b). It is considered that the population located during the current survey is likely to be the population recorded in 1974. The second population of a single plant recorded adjacent to Udumung Nature Reserve represents a new record and a southern extension of the previously mapped range for the species.

Populations of the six priority flora recorded in the Calingiri work package – *Acacia drummondii* subsp*. affinis*, *Persoonia sulcata*, *Verticordia lindleyi* subsp*. lindleyi*, *Calothamnus polystachyus*, *Grevillea drummondii* and *Hibbertia miniata* – mostly represent new records; however, populations of the latter three were located in the vicinity of previous records.

New populations of four priority flora – *Acacia isoneura* subsp. *nimia*, *Acacia scalena*, *Banksia benthamiana* and *Daviesia debilior* subsp. *sinuans* – were recorded in the Nudagong to Wubin work package. The records for *Daviesia debilior* subsp. *sinuans* are the first populations recorded for this work package; the remaining three species were previously recorded in the work package in the initial surveys.

Targeted transect searches carried out in accordance with EPBC guidelines (Department of the Environment 2014) for *Caladenia drakeoides* and *Theymitra stellata* in potential habitat within the study area did not locate individuals of either species. It is considered unlikely that these species occur in the study area. In reaching this conclusion, the following points were considered:

- survey intensity was comprehensive (as directed by guidelines) being conducted at transect spacings of generally 5–10 m, with exceptions to this being in areas that were considered too degraded to support target species
- surveys were completed at optimal times based on monitoring of extant known populations located within approximately 50 km of the study area
- surveys were directed by Dr Andrew Batty (orchid specialist) who has over 20 years' experience researching and working with native orchids including the target species. Dr Batty was involved in all targeted orchid transect searches, initial team familarisation with each target species and inspection of orchids observed during searches
- weather conditions at the time of the surveys, particularly for *Thelymitra stellata*, were optimal being completed during warm sunny conditions required for the flowers of *Thelymitra* species to be fully open.

- seasonal rainfall conditions were above average across the study area resulting in one of the best spring flowering events for orchids for several years, based on anecdotal observations.
- potential habitat for both species was generally considered marginal when considered in the broader context of suitable habitat for the target species across their known distributions.

Specimens of two taxa, a *Grevillea* and a *Synaphea* species, which exhibited unusual features that did not key out to known species of the genera, may represent undescribed/new species. Further specimens are required to determine if this is so or if they are simply unusual variants of described species. The *Grevillea* specimen was collected from the Nudagong to Wubin work package and resembles the Priority 2 species *Grevillea nana* subsp. *abbreviata* but hairs on reproductive features and striations on the stems are not consistent for this species. The *Synaphea* specimen was collected from the Calingiri work package and exhibited reproductive features that did not key out to described species.

The mapped extent of the Eucalypt Woodlands of the Western Australian Wheatbelt TEC in the initial study area and gaps study area (137.08 ha combined) is considered the maximum extent of the TEC in the study areas. As no minimum length of roadside patches is provided in the conservation advice (Threatened Species Scientific Committee 2015a), some very small areas of roadside woodland assessed to be TEC were included based on width, species composition, vegetation condition and the presence of satisfactory density of mature trees.

In addition, as the conservation advice for the TEC indicates that native vegetation understorey may be 'bare or sparse', areas in degraded condition with no native understorey but with mature tree density exceeding 5 per 0.5 ha were assessed to be TEC. In addition, several vegetation associations not identified in the conservation advice as representative of the TEC for a given IBRA region, were assessed to be TEC as a suitable *Eucalyptus* sp. was dominant and other criteria (e.g. vegetation condition etc.) were also satisfied. Further review of the above considerations in the assessment methodology by DoEE may result in reduction in the total extent of the TEC in the study areas.

The extrapolated remnant vegetation to 500 m either side of the study area indicates that many of the environmental values recorded in the study area are also likely to be present in the extrapolation study area, including habitat for the recorded conservation significant flora, nesting and foraging habitat for Carnaby's Black Cockatoo and the Eucalypt Woodlands of the Western Australian Wheatbelt TEC. However, the extrapolated vegetation mapping should be treated as a broad indication of vegetation extent and patterning only. Field survey would be required to confirm the accuracy of the extralopated vegetation mapping.

4.1 FAUNA AND FAUNA HABITAT

No new fauna values were identified in the gaps study area to those already recorded in previous surveys of the initial study area.

The additional survey extended the extent of breeding (including eight confirmed breeding trees) and foraging habitat for Carnaby's Black Cockatoo in the Calingiri work package, reinforcing the importance of this area for the species.

The possible Malleefowl mound recorded in the large native vegetation remnant north of Wubin is most likely from past occurrence of the species in this area. The absence of any evidence being recorded of recent activity by Malleefowl, and the high number of introduced predators recorded (mainly fox and some cat), suggests the species is not currently inhabiting this remnant vegetation. The remnant is isolated with poor connectivity to other remnant bushland in the broader area.

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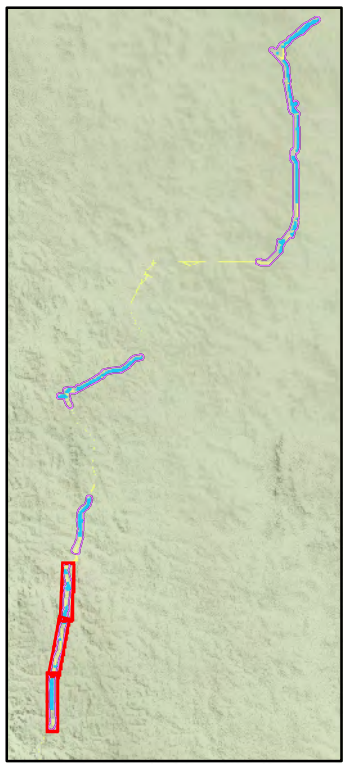
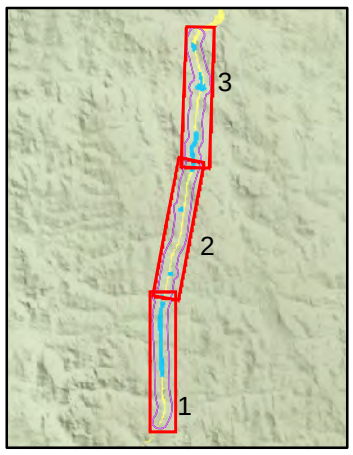
Appendix 1
Study area and survey sites (Calingiri)

- TEC assessment sites
- Quadrats
- Relevés
- Work package start/end SLKs
- Initial study area
- Gaps study area
- Extrapolation study area





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Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 02-Dec-16

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Datum: GDA 1994

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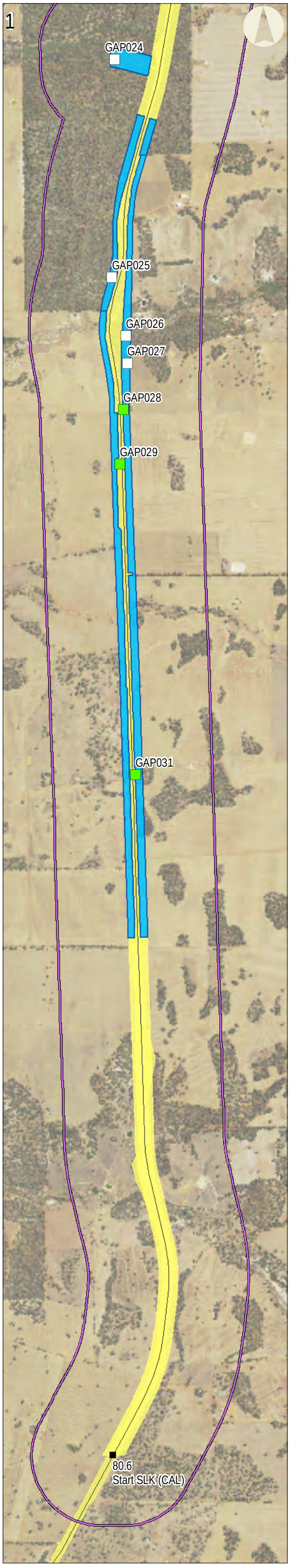
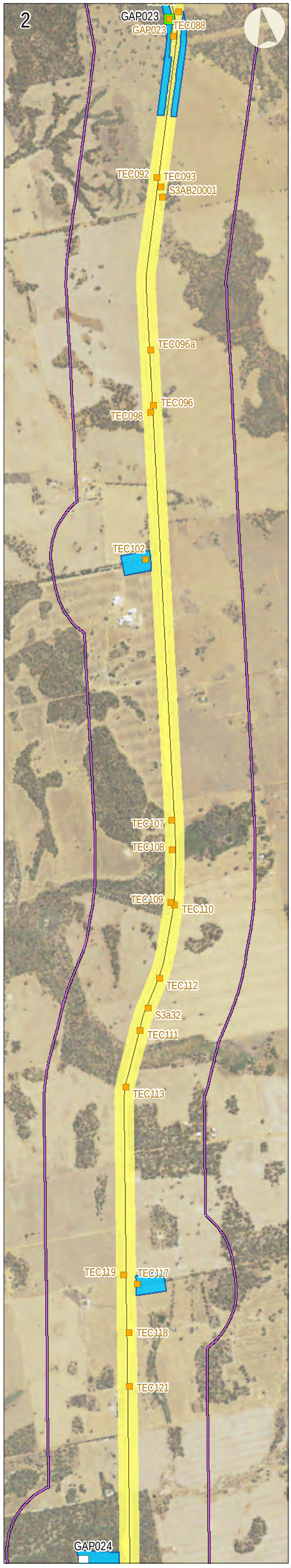
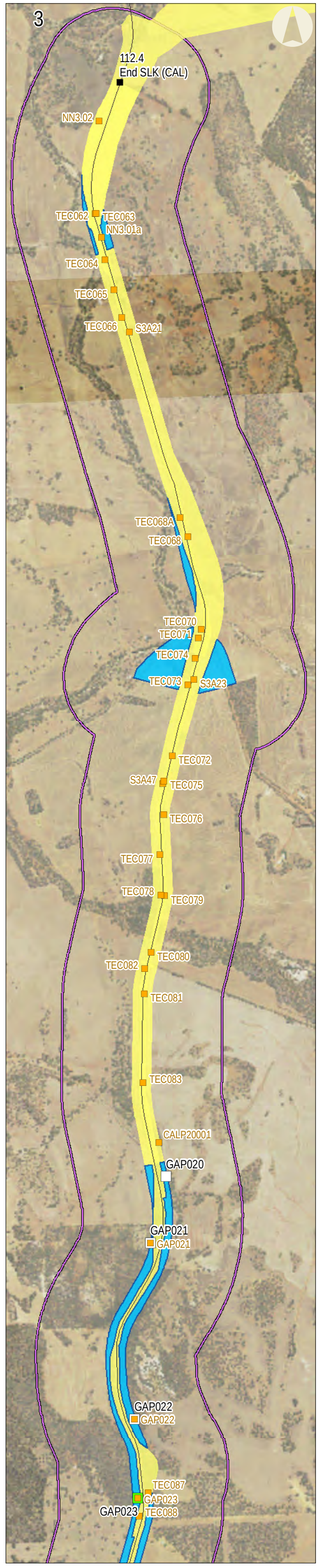
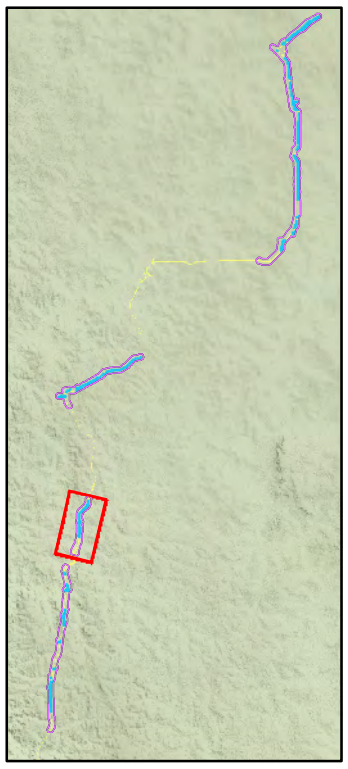


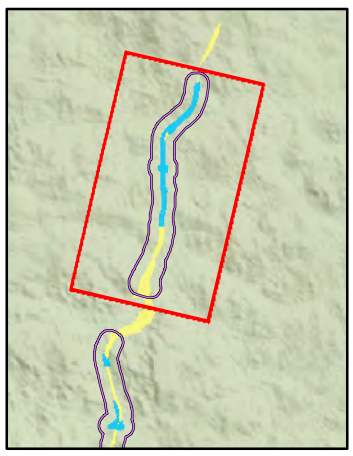




Appendix 1
Study area and survey sites (Moore River)

- TEC assessment sites
- Quadrats
- Relevés
- Work package start/end SLKs
- Initial study area
- Gaps study area
- Extrapolation study area





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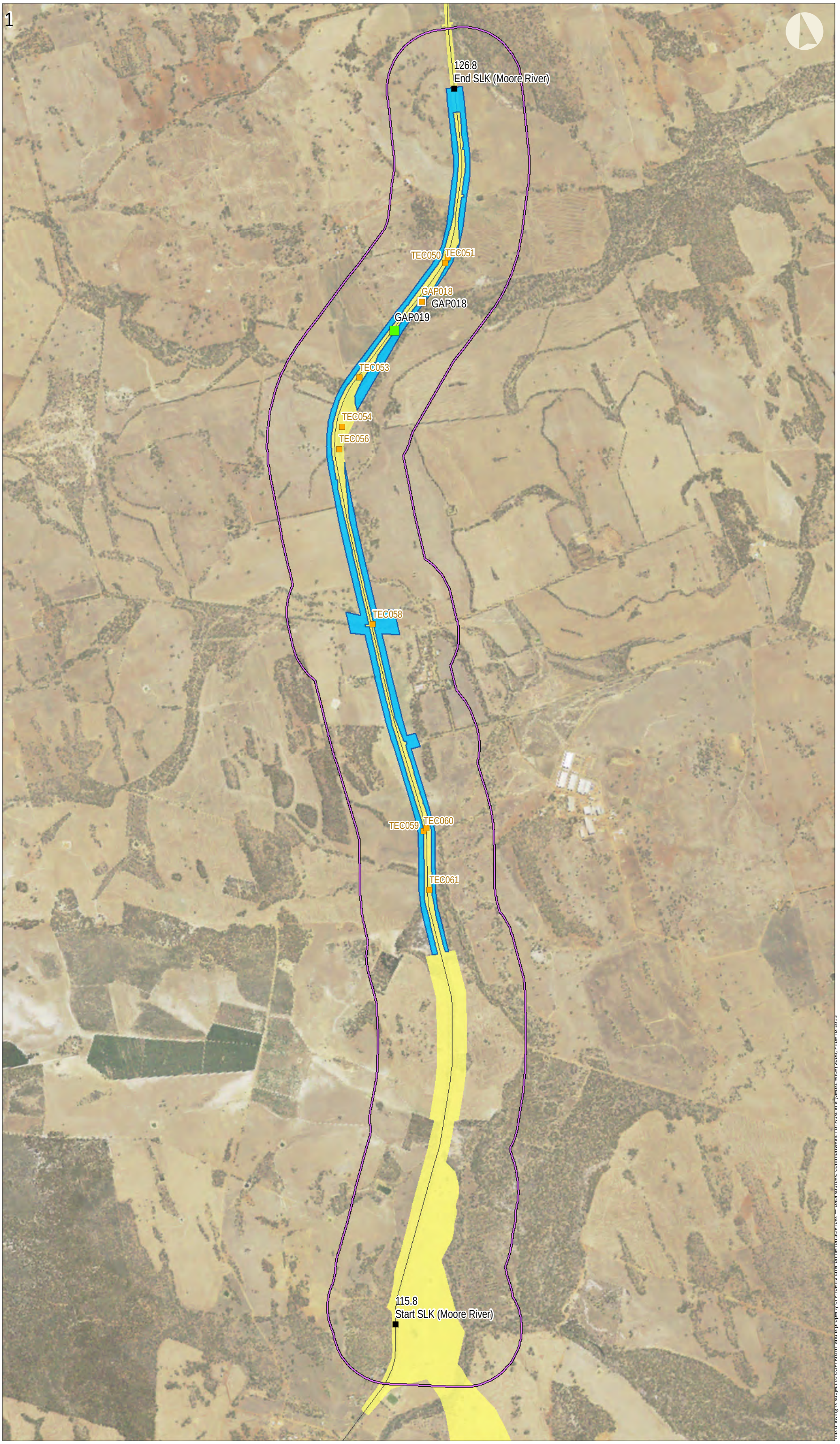

Appendix 1
Study area and survey sites (Midlands Road to Bindi Bindi)

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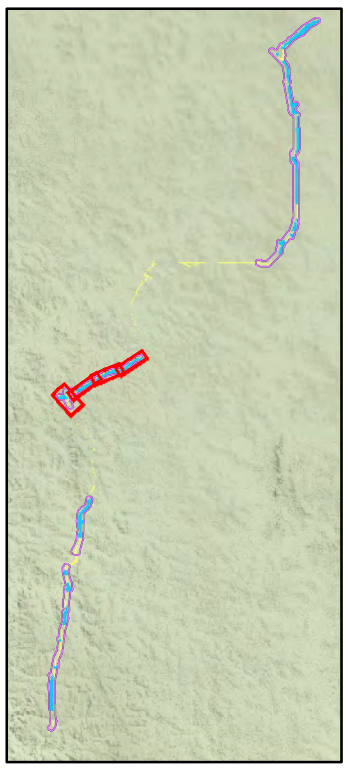
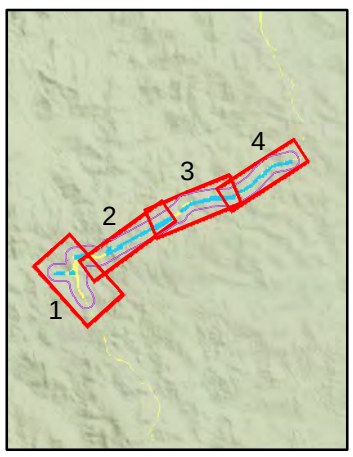
- Quadrats
- Relevés
- Work package start/end SLKs
- Initial study area
- Gaps study area
- Extrapolation study area





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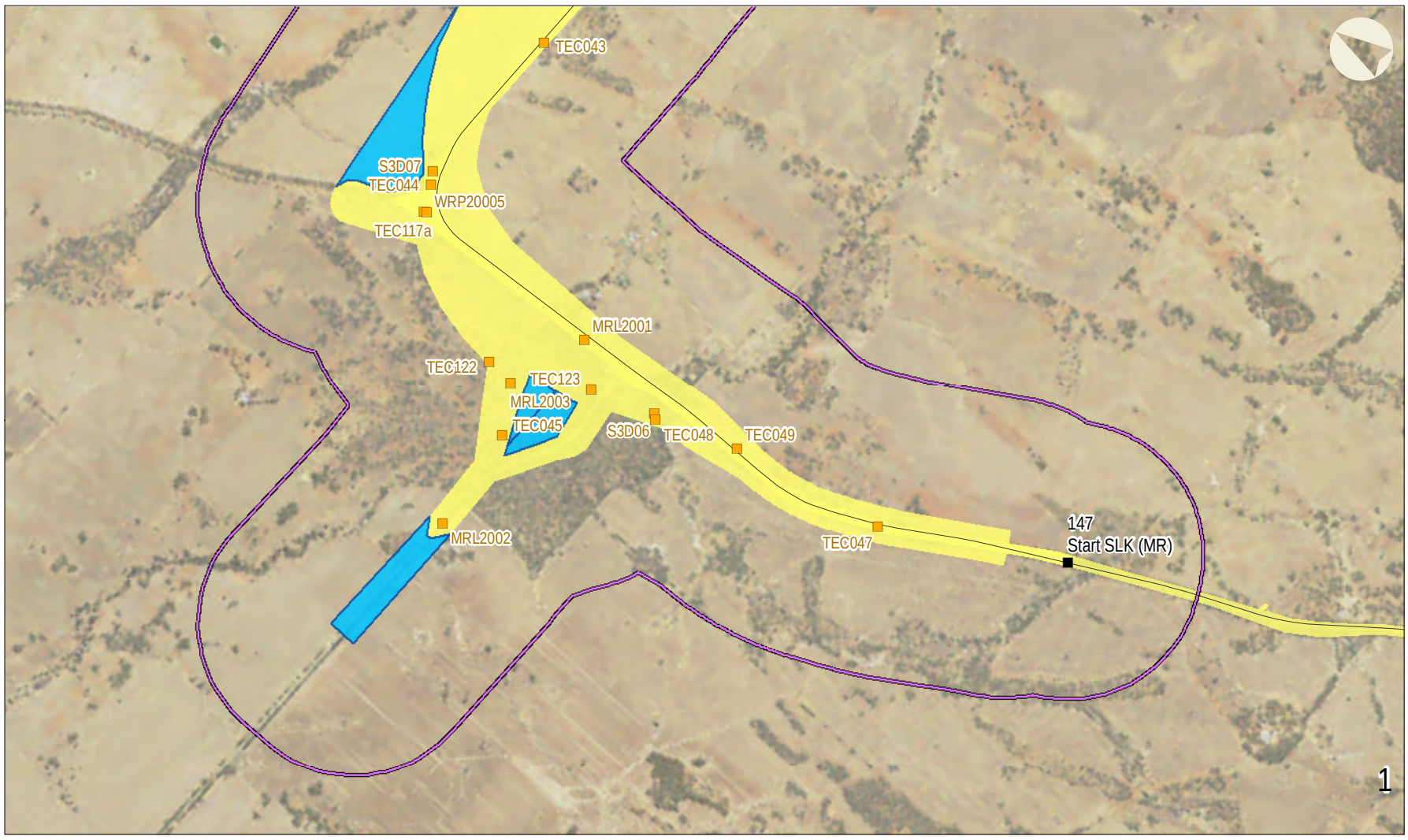
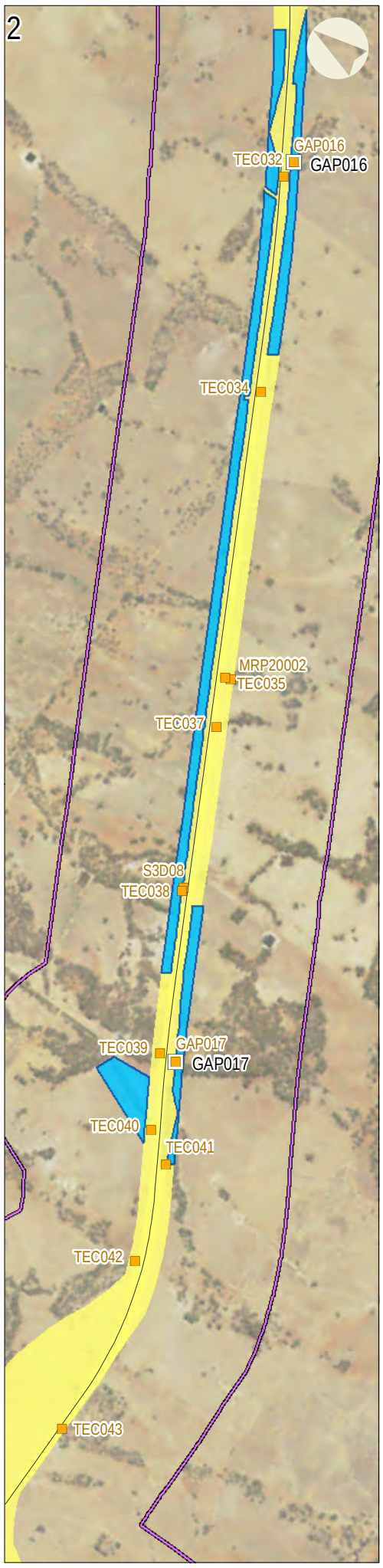
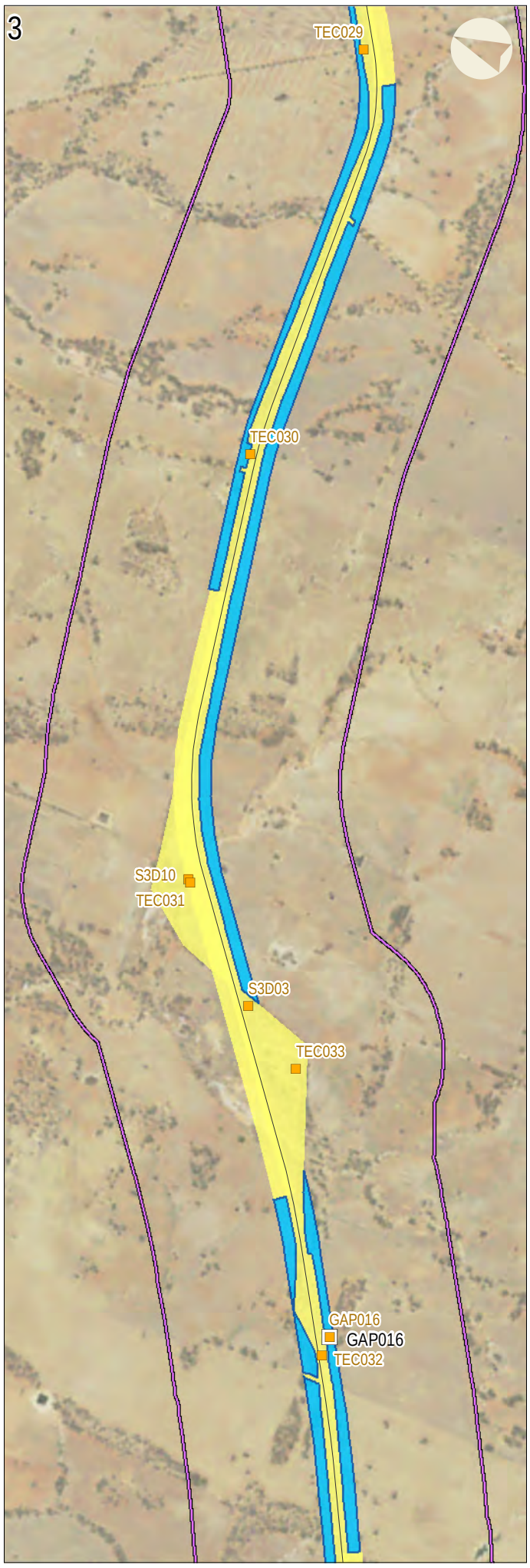
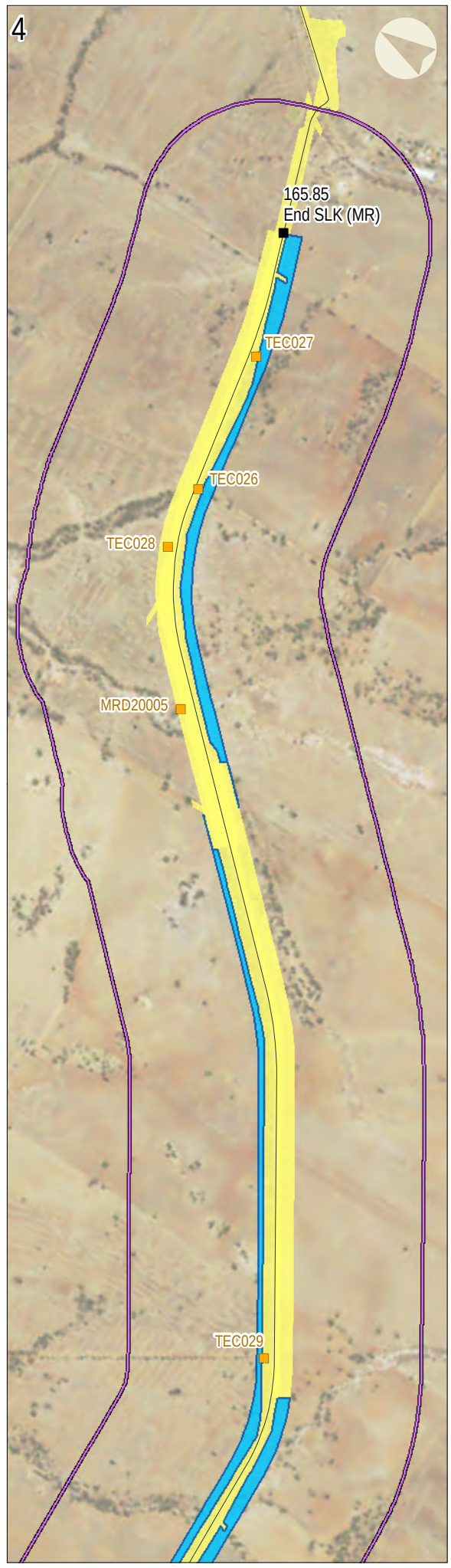


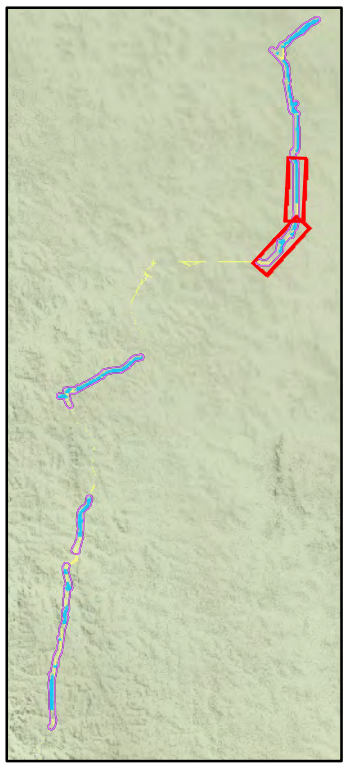


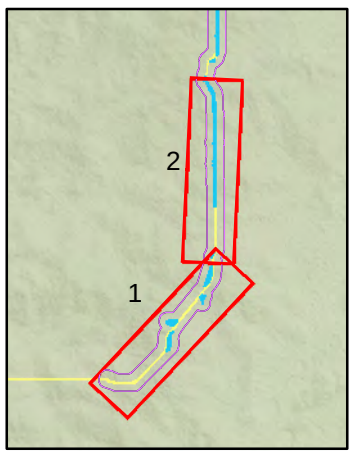




Appendix 1
Study area and survey sites (Pithara)

- TEC assessment sites
- Quadrats
- Relevés
- Work package start/end SLKs
- Initial study area
- Gaps study area
- Extrapolation study area





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Projection: Transverse Mercator
Datum: GDA 1994

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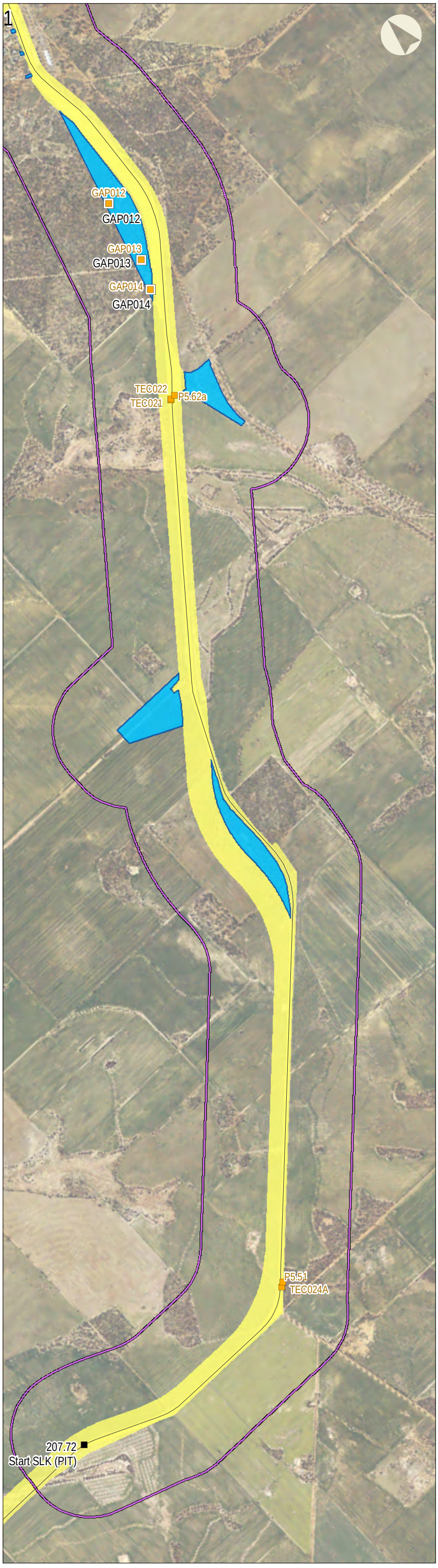
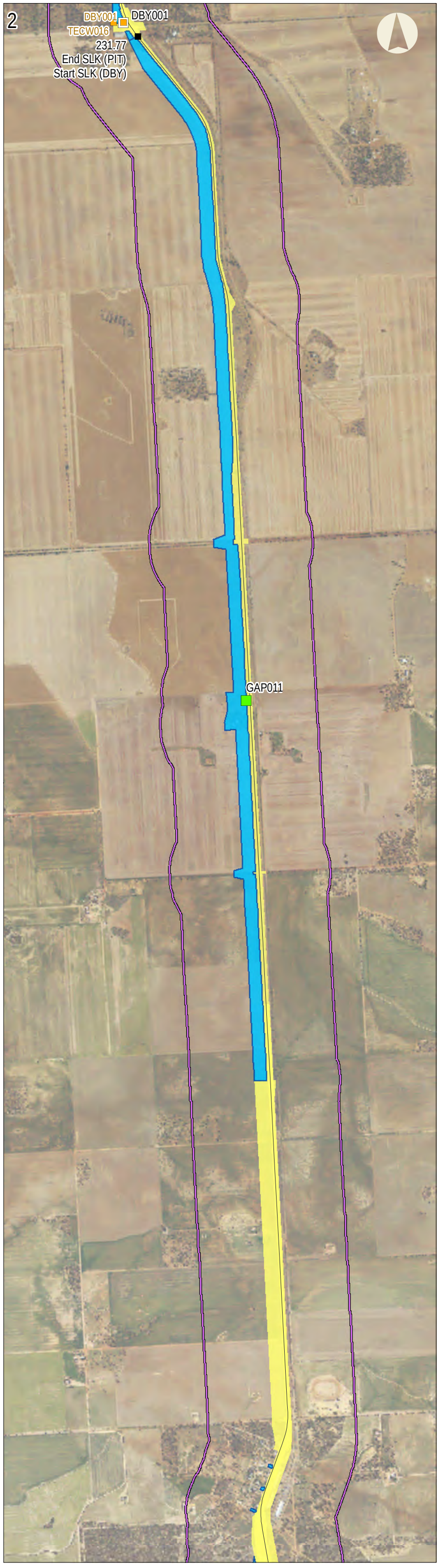
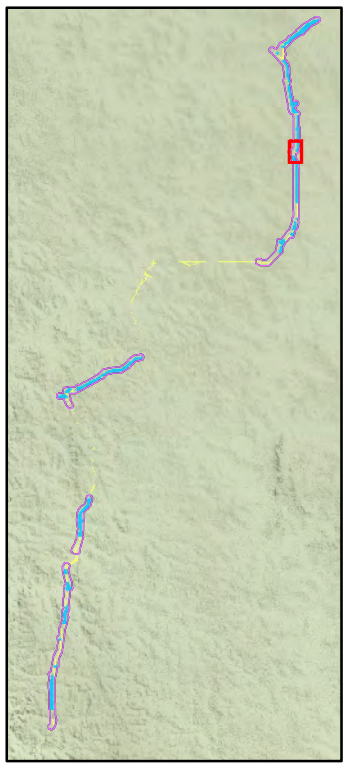
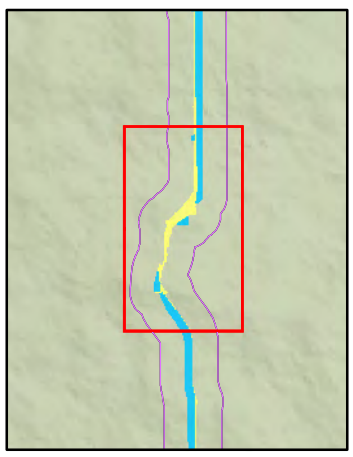




Appendix 1
Study area and survey sites (Dalwalinu Bypass Improvements)

- TEC assessment sites
- Quadrats
- Relevés
- Work package start/end SLKs
- Initial study area
- Gaps study area
- Extrapolation study area





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Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 02-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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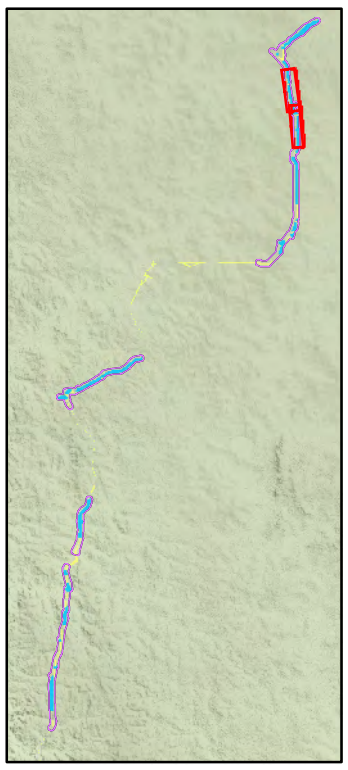
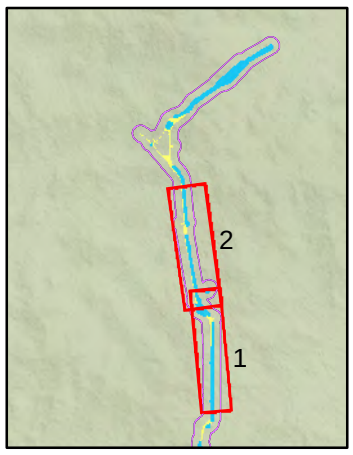
234.85
End SLK (DBY)
Start SLK (NW)
DBY005
TECW014
DBY003
DBY002
TECW015
DBY001
DBY001
TECW016
231.77
Start SLK (DBY)
End SLK (PIT)

Appendix 1
Study area and survey sites (Nugadong to Wubin - southern section)

- TEC assessment sites
- Quadrats
- Relevés
- Work package start/end SLKs
- Initial study area
- Gaps study area
- Extrapolation study area





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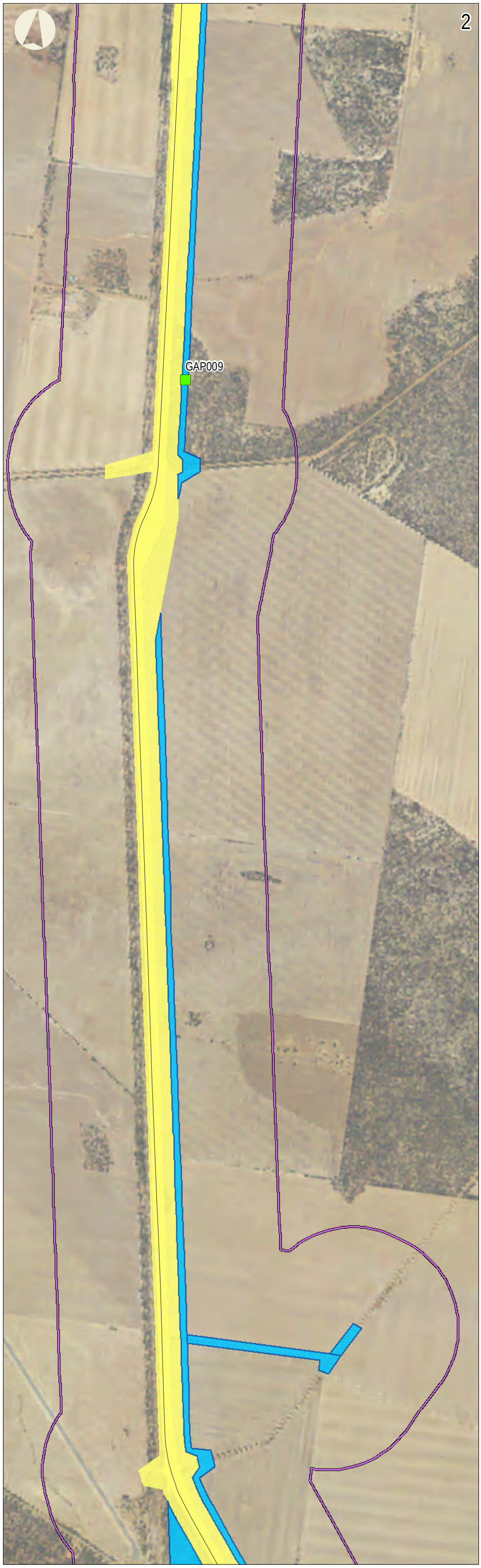
Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 02-Dec-16

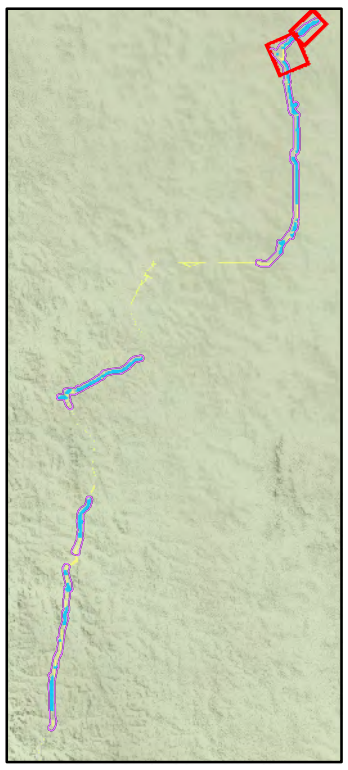
Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

PHOENIX ENVIRONMENTAL SCIENCES



Appendix 1
Study area and survey sites (Nugadong to Wubin - northern section)

- TEC assessment sites
- Quadrats
- Relevés
- Work package start/end SLKs
- Initial study area
- Gaps study area
- Extrapolation study area



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Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 02-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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Appendix 2 Quadrat data

Site:	DBY001	**Type:**	Quadrat (10 m x 10 m)
Date(s):	23/03/2016, 01/10/2015	**Position:**	-30.286328, 116.662584
Total vegetation cover (%):	70	**Topography:**	hill slope
Tree/shrub cover >2 m (%):	40	**Soil colour:**	red-brown
Shrub cover <2 m (%):	15	**Soil:**	clay loam
Grass cover (%):	55	**Rock type:**	none
Herb cover (%):	10	**Fire age:**	not evident
Disturbance details:	evidence of feral animals, firebreak, grazing – low, historic clearing, litter, vehicle tracks, weed infestation		
Vegetation condition:	good, Keighery (1994)		
Vegetation description:	Mid *Eucalyptus loxophleba* open forest over tall open *Acacia acuminata* and *Santalum acuminatum* shrubland over mid sparse *Acacia hemiteles*, *Eremophila decipiens* and *Dodonaea inaequifolia* shrubland over low sparse *Enchylaena tomentosa* var. *tomentosa*, *Maireana brevifolia* and *Rhagodia drummondii* chenopod shrubland.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Avena barbata	55.0	00.50	*	
Eucalyptus loxophleba subsp. *loxophleba*	35.0	15.00		
Santalum acuminatum	10.0	02.50		
Carrichtera annua	10.0	00.40	*	
Acacia hemiteles	05.0	01.80		
Bromus rubens	05.0	00.15	*	
Eremophila decipiens	02.0	01.10		
Maireana brevifolia	02.0	01.00		
Rhagodia preissii subsp. *preissii*	02.0	01.00		
Rhagodia drummondii	02.0	00.50		
Enchylaena tomentosa var. *tomentosa*	02.0	00.20		
Waitzia acuminata	02.0	00.20		
Acacia acuminata	01.0	03.00		
Dianella revoluta	01.0	00.80		
Rytidosperma acerosum	01.0	00.15		
Acacia acuaria	00.5	01.00		
Austrostipa elegantissima	00.5	00.60		

Dodonaea inaequifolia	00.1	01.50	
Templetonia ceracea	00.1	01.10	
Grevillea paniculata	00.1	01.00	
Ptilotus polystachyus	00.1	00.50	
Brassica tournefortii	00.1	00.30	*
Austrostipa nitida	00.1	00.15	

Site:	DBY002	**Type:**	Quadrat (10 m x 10 m)
Date(s):	23/03/2016, 01/10/2015	**Position:**	-30.281721, 116.662811
Total vegetation cover (%):	45	**Topography:**	plain
Tree/shrub cover >2 m (%):	10	**Soil colour:**	red-orange
Shrub cover <2 m (%):	35	**Soil:**	clay loam
Grass cover (%):	2	**Rock type:**	none
Herb cover (%):	0.1	**Fire age:**	not evident
Disturbance details:	historic clearing, large-scale clearing, revegetation		
Vegetation condition:	very Good, Keighery (1994)		
Vegetation description:	Tall open *Acacia yorkrakinensis* subsp. *acrita* and *Baeckea elderiana* shrubland over mid open *Grevillea petrophiloides*, *Acacia multispicata* and *A. acuminata* shrubland over low open *Baeckea muricata*, *Comesperma integerrimum* and *Grevillea paniculata* shrubland.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Grevillea petrophiloides	20.0	01.60		
Baeckea muricata	10.0	00.40		
Acacia yorkrakinensis subsp. *acrita*	07.0	04.00		
Baeckea elderiana	05.0	02.20		
Cassytha nodiflora	05.0	00.60		
Comesperma integerrimum	04.0	00.60		
Amphipogon caricinus	02.0	00.20		
Acacia multispicata	01.0	01.20		
Grevillea paniculata	00.5	00.70		
Acacia acuminata	00.1	01.50		
Gahnia drummondii	00.1	00.70		
Glischrocaryon flavescens	00.1	00.50		
Cryptandra nutans	00.1	00.40		
Dampiera lavandulacea	00.1	00.30		

Site:	DBY003	**Type:**	Quadrat (10 m x 10 m)
Date(s):	22/03/2016, 01/10/2015	**Position:**	-30.272411, 116.66816
Total vegetation cover (%):	90	**Topography:**	plain
Tree/shrub cover >2 m (%):	35	**Soil colour:**	brown
Shrub cover <2 m (%):	8	**Soil:**	clay loam
Grass cover (%):	65	**Rock type:**	none
Herb cover (%):	10	**Fire age:**	not evident
Disturbance details:	erosion channels, excavation, grazing – low, historic clearing, historic operations, large-scale clearing, litter, vehicle tracks, weed infestation		
Vegetation condition:	degraded, Keighery (1994)		
Vegetation description:	Low *Eucalyptus loxophleba* , *Acacia coolgardiensis* and *A. acuminata* woodland over low sparse *Maireana bevifolia* chenopod shrubland over low closed **Avena barbata* and **Ehrharta calycina* tussock grassland and low open **Mesembryanthemum nodiflorum* and *Waitzia acuminata* forbland.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Avena barbata	40.0	00.30	*	
Ehrharta calycina	35.0	00.30	*	
Acacia coolgardiensis	20.0	06.00		
Eucalyptus loxophleba	10.0	07.00		
Maireana brevifolia	06.0	01.00		
Acacia acuminata	05.0	06.00		
Waitzia acuminata	05.0	00.20		
Mesembryanthemum nodiflorum	05.0	00.20	*	
Austrostipa elegantissima	02.0	00.90		
Enchylaena tomentosa	02.0	00.20		

Site:	DBY005	**Type:**	Quadrat (10 m x 10 m)
Date(s):	22/03/2016, 01/10/2015	**Position:**	-30.267579, 116.669692
Total vegetation cover (%):	90	**Topography:**	plain
Tree/shrub cover >2 m (%):	40	**Soil colour:**	brown
Shrub cover <2 m (%):	5	**Soil:**	sandy loam
Grass cover (%):	60	**Rock type:**	none
Herb cover (%):	2	**Fire age:**	not evident
Disturbance details:	erosion channels, excavation, firebreak, grazing – medium, historic clearing, litter, weed infestation		
Vegetation condition:	degraded, Keighery (1994)		
Vegetation description:	Low open *Eucalyptus loxophleba*, *E. kochii* and *Acacia coolgardiensis* forest over mid sparse *Grevillea paniculata* and *G. petrophiloides* shrubland over low closed **Avena barbata, *Ehrharta calycina* and *Monachather paradoxus* tussock grassland.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Avena barbata	40.0	00.30	*	
Acacia coolgardiensis	30.0	06.00		
Ehrharta calycina	15.0	00.30	*	
Eucalyptus loxophleba	05.0	07.00		
Eucalyptus kochii	05.0	06.00		
Monachather paradoxus	05.0	00.20		
Grevillea paniculata	03.0	02.00		
Grevillea petrophiloides	02.0	01.50		
Austrostipa elegantissima	02.0	00.60		
Waitzia acuminata	02.0	00.20		
Amphipogon caricinus var. *caricinus*	01.5	00.15		
Grevillea petrophiloides	00.5	01.20		
Dianella revoluta	00.5	01.10		
Enchylaena tomentosa	00.5	00.20		
Ecdeiocolea monostachya	00.1	00.70		
Gahnia drummondii	00.1	00.60		
Comesperma integerrimum	00.1	00.50		

Site:	GAP001	**Type:**	Quadrat (10 m x 10 m)
Date(s):	05/09/2016	**Position:**	-30.048786, 116.708685
Total vegetation cover (%):	70	**Topography:**	undulating plain
Tree/shrub cover >2 m (%):	70	**Soil colour:**	brown,
Shrub cover <2 m (%):	5	**Soil:**	sandy loam,
Grass cover (%):	1	**Rock type:**	
Herb cover (%):	1	**Fire age:**	not evident
Disturbance details:	firebreak, historic clearing, litter, weed infestation,		
Vegetation condition:	very Good, Keighery (1994)		
Vegetation description:	Low *Acacia resinimarginea* woodland over low open *Eucalyptus leptopoda* subsp. *arctata* mallee woodland over tall sparse *Baeckia* sp. Wubin shrubland over mid sparse *Phebalium tunerculosum*, *Melaleuca conothamnoides* and *Westringia cephalantha* shrubland.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Acacia resinimarginea	70.0	07.00		
Eucalyptus leptopoda subsp. *arctata*	05.0	03.00		
Baeckea sp. Wubin (M.E. Trudgen 5404)	03.0	03.00		
Phebalium tuberculosum	02.0	01.20		
Melaleuca conothamnoides	01.0	01.20		
Westringia cephalantha	01.0	01.00		
Austrostipa elegantissima	01.0	00.60		
Velleia discophora	00.1	00.40		
Thysanotus manglesianus	00.1	00.30		
Hypochaeris glabra	00.1	00.20	*	
Waitzia acuminata	00.1	00.20		
Cheilanthes sieberi	00.1	00.15		
Trachymene pilosa	00.1	00.10		
Trachymene ornata	00.1	00.10		
Sisymbrium orientale	00.1	00.10	*	
Crassula colorata var. *colorata*	00.1	00.05		
Pterostylis sp. inland (A.C. Beauglehole 11880)	00.1	00.01		

Site:	GAP002	**Type:**	Quadrat (10 m x 10 m)
Date(s):	05/09/2016	**Position:**	-30.056873, 116.69339
Total vegetation cover (%):	55	**Topography:**	undulating plain
Tree/shrub cover >2 m (%):	45	**Soil colour:**	brown, yellow,
Shrub cover <2 m (%):	5	**Soil:**	sandy loam,
Grass cover (%):	0.1	**Rock type:**	
Herb cover (%):	1	**Fire age:**	not evident
Disturbance details:			
Vegetation condition:	excellent, Keighery (1994)		
Vegetation description:	Tall *Acacia isoneura* subsp. *nimia*, *A. assimilis* and *Melaleuca atroviridis* shrubland over mid sparse *Melaleuca cordata* and *Phebalium tuberculosum* shrubland over low sparse *Drosera macrantha* subsp. *macrantha* forbland.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Melaleuca atroviridis	30.0	03.50		
Acacia isoneura subsp. *nimia*	10.0	04.00		P3 (WC Act)
Eucalyptus leptopoda subsp. *arctata*	05.0	04.00		
Phebalium tuberculosum	05.0	01.50		
Acacia assimilis	03.0	02.00		
Phebalium tuberculosum	02.0	01.50		
Allocasuarina campestris	01.0	03.00		
Melaleuca cordata	01.0	01.20		
Melaleuca conothamnoides	00.5	00.50		
Waitzia acuminata	00.5	00.20		
Malleostemon roseus	00.1	02.00		
Baeckea sp. Dudawa (M.E. Trudgen MET 5369)	00.1	00.50		
Drosera macrantha subsp. *macrantha*	00.1	00.30		
Stenanthemum pomaderroides	00.1	00.20		
Rumex hypogaeus	00.1	00.20	*	
Thysanotus manglesianus	00.1	00.20		
Enchylaena tomentosa	00.1	00.15		
Borya sphaerocephala	00.1	00.10		
Trachymene pilosa	00.1	00.10		

Schoenus hexandrus	00.1	00.10	
Hypochaeris glabra	00.1	00.10	*
Ehrharta longiflora	00.1	00.10	*
Cyanicula amplexans	00.1	00.10	
Cheilanthes adiantoides	00.1	00.05	

Site:	GAP003	**Type:**	Quadrat (10 m x 10 m)
Date(s):	06/09/2016	**Position:**	-30.059495, 116.691027
Total vegetation cover (%):	80	**Topography:**	undulating plain
Tree/shrub cover >2 m (%):	45	**Soil colour:**	red-orange, brown,
Shrub cover <2 m (%):	35	**Soil:**	gravel / alluvial, sandy clay, sandy loam,
Grass cover (%):	1	**Rock type:**	Laterite gravel, no gravel
Herb cover (%):	2	**Fire age:**	not evident
Disturbance details:			
Vegetation condition:	pristine, Keighery (1994)		
Vegetation description:	Low *Allocasuarina acutivalvis* subsp. *acutivalvis* woodland over tall *Allocasuarina campestris*, *Acacia neurophylla* subsp. *erugata* and *Melaleuca cordata* shrubland over mid sparse *Grevillea paradoxa* and *Enekbatus sessilis* shrubland.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Allocasuarina campestris	35.0	02.50		
Allocasuarina acutivalvis subsp. *acutivalvis*	30.0	05.00		
Melaleuca cordata	15.0	02.20		
Acacia neurophylla subsp. *erugata*	05.0	03.50		
Grevillea paradoxa	05.0	01.50		
Enekbatus sessilis	03.0	00.40		
Melaleuca cordata	01.0	01.50		
Thysanotus manglesianus	01.0	01.50		
Austrostipa elegantissima	01.0	00.50		
Monoculus monstrosus	01.0	00.30	*	
Trachymene ornata	01.0	00.15		
Cheilanthes sieberi	01.0	00.15		
Dianella revoluta var. *divaricata*	00.1	00.50		
Austrostipa elegantissima	00.1	00.50		
Cassytha sp.	00.1	00.30		
Amphipogon caricinus	00.1	00.30		
Thysanotus manglesianus	00.1	00.30		
Drosera macrantha subsp. *macrantha*	00.1	00.20		

Hypochaeris glabra	00.1	00.20	*
Lawrencella rosea	00.1	00.15	
Waitzia acuminata	00.1	00.15	
Arctotheca calendula	00.1	00.15	*
Trachymene pilosa	00.1	00.10	
Waitzia acuminata	00.1	00.10	
Cheilanthes sieberi	00.1	00.10	
Velleia cycnopotamica	00.1	00.05	

Site:	GAP004	**Type:**	Quadrat (10 m x 10 m)
Date(s):	06/09/2016	**Position:**	-30.062375, 116.688155
Total vegetation cover (%):	55	**Topography:**	drainage line
Tree/shrub cover >2 m (%):	35	**Soil colour:**	red-orange,
Shrub cover <2 m (%):	15	**Soil:**	sandy clay, clay loam,
Grass cover (%):	0.2	**Rock type:**	Laterite slabs on surface/slab outcropping
Herb cover (%):	10	**Fire age:**	not evident
Disturbance details:	historic clearing, vehicle tracks,		
Vegetation condition:	very Good, Keighery (1994)		
Vegetation description:	Low *Acacia acuminata, Allocasuarina acutivalvis* subsp*. acutivalvis* and *Eucalyptus loxophleba* subsp. *lissophloia* woodland over tall sparse *Acacia assimilis*, *Dodonaea inaequifolia* and *Melaleuca* spp. shrubland over low sparse *Podotheca gnaphaloides* and *Lawrencella rosea* forbland.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Acacia acuminata	15.0	05.00		
Allocasuarina acutivalvis subsp. *acutivalvis*	15.0	04.00		
Dodonaea inaequifolia	15.0	02.50		
Eucalyptus loxophleba subsp. *lissophloia*	05.0	05.00		
Lawrencella rosea	05.0	00.20		
Melaleuca acuminata subsp. *websteri*	04.0	04.00		
Melaleuca hamulosa	02.0	03.00		
Acacia assimilis subsp. *assimilis*	02.0	03.00		
Melaleuca radula	02.0	01.50		
Goodenia berardiana	02.0	00.20		
Hyalosperma glutinosum subsp. *venustum*	02.0	00.20		
Grevillea levis	01.0	01.20		
Pimelea avonensis	01.0	01.00		
Hyalosperma glutinosum subsp. *glutinosum*	01.0	00.10		
Podolepis aristata subsp. *aristata*	00.1	00.40		
Thysanotus manglesianus	00.1	00.30		
Rytidosperma ? *setaceum*	00.1	00.30		
Senecio pinnatifolius	00.1	00.30		

Podotheca gnaphalioides	00.1	00.20	
Austrostipa elegantissima	00.1	00.20	
Prasophyllum gracile	00.1	00.20	
Caladenia dimidia	00.1	00.10	
Pentameris airoides	00.1	00.10	*
Arthropodium curvipes	00.1	00.10	
Levenhookia dubia	00.1	00.10	
Plantago hispida	00.1	00.10	
Rhodanthe pygmaea	00.1	00.10	
Crassula colorata var. *acuminata*	00.1	00.05	
Pauridia glabella var. *leptantha*	00.1	00.05	
Aira cupaniana	00.1	00.05	*
Rhodanthe laevis	00.1	00.05	
Siloxerus multiflorus	00.1	00.02	
Blennospora drummondii	00.1	00.01	
Calandrinia eremaea	00.1	00.01	
Podolepis lessonii			

Site:	GAP005	**Type:**	Quadrat (10 m x 10 m)
Date(s):	06/09/2016	**Position:**	-30.065135, 116.683789
Total vegetation cover (%):	90	**Topography:**	plateau
Tree/shrub cover >2 m (%):	20	**Soil colour:**	red-brown,
Shrub cover <2 m (%):	5	**Soil:**	sandy loam,
Grass cover (%):	50	**Rock type:**	Granite slab outcrops, flat, low hill cres
Herb cover (%):	25	**Fire age:**	>5 years
Disturbance details:	grazing – low, weed infestation,		
Vegetation condition:	degraded, Keighery (1994)		
Vegetation description:	Tall open *Acacia acuminata* and *Hakea recurva* subsp. *recurva* shrubland over low *Aristida contorta* and *Austrostipa trichophylla* tussock grassland and low **Ursinia anthemoides* subsp. *anthemoides*, **Arctotheca calendula* and *Cephalipterum drummondii* forbland.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Hakea recurva subsp. *recurva*	15.0	03.50		
Avena barbata	15.0	00.40	*	
Austrostipa trichophylla	15.0	00.40		
Aristida contorta	15.0	00.20		
Acacia acuminata	10.0	04.50		
Arctotheca calendula	10.0	00.30	*	
Cephalipterum drummondii	05.0	00.40		
Ehrharta longiflora	05.0	00.20	*	
Monoculus monstrosus	03.0	00.30	*	
Hypochaeris glabra	03.0	00.20	*	
Crassula colorata var. *acuminata*	03.0	00.05		
Calandrinia eremaea	02.0	00.02		
Enchylaena tomentosa var. *tomentosa*	01.0	00.30		
Podolepis aristata subsp. *aristata*	01.0	00.25		
Ursinia anthemoides subsp. *anthemoides*	01.0	00.25	*	
Bromus rubens	01.0	00.20	*	
Cephalipterum drummondii	01.0	00.20		
Petrorhagia dubia	01.0	00.15	*	

Ptilotus polystachyus	00.1	00.50
Hyalosperma glutinosum subsp. *glutinosum*	00.1	00.10
Brachyscome iberidifolia	00.1	00.05

Site:	GAP006	**Type:**	Quadrat (10 m x 10 m)
Date(s):	06/09/2016	**Position:**	-30.069207, 116.680777
Total vegetation cover (%):	60	**Topography:**	
Tree/shrub cover >2 m (%):	35	**Soil colour:**	red-brown,
Shrub cover <2 m (%):	20	**Soil:**	sandy clay,
Grass cover (%):	15	**Rock type:**	
Herb cover (%):	10	**Fire age:**	not evident
Disturbance details:			
Vegetation condition:	very Good, Keighery (1994)		
Vegetation description:	Low *Eucalyptus loxophleba* subsp. *loxophleba* woodland over tall open *Acacia microbotrya* and *Hakea preissii* shrubland over low open *Aristida contorta*, *Austrostipa trichophylla* and *Rytidosperma caespitosum* tussock grassland.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Eucalyptus loxophleba subsp. *loxophleba*	25.0	10.00		
Acacia microbotrya	15.0	04.00		
Austrostipa trichophylla	10.0	00.30		
Hakea preissii	05.0	03.00		
Rytidosperma caespitosum	05.0	00.40		
Sclerolaena eurotioides	05.0	00.20		
Rhagodia drummondii	02.0	00.40		
Ptilotus obovatus	01.0	00.50		
Avena barbata	01.0	00.40	*	
Enchylaena tomentosa var. *tomentosa*	01.0	00.30		
Monoculus monstrosus	01.0	00.30	*	
Sclerolaena diacantha	01.0	00.20		
Aristida contorta	01.0	00.20		
Oxalis corniculata	01.0	00.05	*	
Crassula colorata var. *acuminata*	01.0	00.03		
Sonchus oleraceus	00.1	00.30	*	
Acacia acuaria	00.1	00.30		
Ptilotus nobilis subsp. *nobilis*	00.1	00.30		

Thysanotus manglesianus	00.1	00.30	
Hypochaeris glabra	00.1	00.20	*
Lepidium rotundum	00.1	00.15	
Hyalosperma glutinosum subsp. *glutinosum*	00.1	00.15	
Waitzia acuminata	00.1	00.15	
Medicago minima	00.1	00.15	*
Trifolium hirtum	00.1	00.15	*
Senecio glossanthus	00.1	00.10	
Calotis hispidula	00.1	00.10	
Podolepis lessonii	00.1	00.10	
Pentameris airoides	00.1	00.10	*
Lamarckia aurea	00.1	00.10	*
Calandrinia calyptrata	00.1	00.05	
Calandrinia eremaea	00.1	00.05	
Calandrinia eremaea	00.1	00.05	
Cotula bipinnata	00.1	00.05	*
Pogonolepis stricta	00.1	00.05	
Goodenia pusilliflora	00.1	00.05	
Calandrinia granulifera	00.1	00.01	

Site:	GAP007	**Type:**	Quadrat (10 m x 10 m)
Date(s):	06/09/2016	**Position:**	-30.070364, 116.6745
Total vegetation cover (%):	55	**Topography:**	undulating plain
Tree/shrub cover >2 m (%):	40	**Soil colour:**	red-brown, red-orange,
Shrub cover <2 m (%):	15	**Soil:**	sandy clay, clay loam,
Grass cover (%):	4	**Rock type:**	Laterite gravel but no rocks/outcropping
Herb cover (%):	2	**Fire age:**	not evident
Disturbance details:	weeds		
Vegetation condition:	excellent, Keighery (1994)		
Vegetation description:	Tall *Allocasuarina acutivalvis* subsp. *acutivalvis* and *A. campestris* shrubland over mid sparse *Grevillea petrophiloides* subsp. *petrophiloides* , *Grevillea* ? *obliquistigma* and *Petrophile shuttleworthiana* shrubland over isolated mid *Ecdeiocolea monostachya* sedges.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Allocasuarina acutivalvis subsp. *acutivalvis*	30.0	04.00		
Allocasuarina campestris	15.0	03.00		
Grevillea ? *obliquistigma*	05.0	02.00		
Grevillea petrophiloides subsp. *petrophiloides*	02.0	02.00		
Ecdeiocolea monostachya	02.0	00.90		
Petrophile shuttleworthiana	01.0	02.50		
Persoonia rufiflora	01.0	01.50		
Melaleuca conothamnoides	01.0	00.90		
Austrostipa elegantissima	01.0	00.50		
Ehrharta longiflora	01.0	00.25	*	
Goodenia berardiana	01.0	00.10		
Cyathostemon heterantherus	00.1	00.50		
Platysace maxwellii	00.1	00.40		
Austrostipa elegantissima	00.1	00.30		
Iphigenia indica	00.1	00.30		
Drosera macrantha subsp. *macrantha*	00.1	00.30		
Arctotheca calendula	00.1	00.20	*	
Neurachne alopecuroidea	00.1	00.15		

Lawrencella rosea	00.1	00.15	
Waitzia acuminata var. *acuminata*	00.1	00.15	
Trachymene ornata	00.1	00.15	
Cheilanthes sieberi	00.1	00.15	
Velleia cycnopotamica	00.1	00.05	
Parentucellia latifolia			*

Site:	GAP008	**Type:**	Quadrat (10 m x 10 m)
Date(s):	07/09/2016	**Position:**	-30.079432, 116.659493
Total vegetation cover (%):	35	**Topography:**	undulating plain
Tree/shrub cover >2 m (%):	35	**Soil colour:**	yellow, grey, whitish,
Shrub cover <2 m (%):	2	**Soil:**	sandy clay, clay loam,
Grass cover (%):	0.2	**Rock type:**	Sparse lateritic gravel
Herb cover (%):	0.5	**Fire age:**	not evident
Disturbance details:	historic clearing		
Vegetation condition:	excellent, Keighery (1994)		
Vegetation description:	Tall *Allocasuarina acutivalvis* subsp. *acutivalvis* and *A. campestris* shrubland over mid sparse *Acacia assimilis* and *Hibbertia drummondii* shrubland over isolated low *Goodenia berardiana*, *Velleia cycnopotamica* and *Waitzia acuminata* var. *acuminata* forbs.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Allocasuarina campestris	25.0	02.50		
Allocasuarina acutivalvis subsp. *acutivalvis*	10.0	03.50		
Petrophile incurvata	01.0	01.80		
Acacia assimilis	01.0	01.80		
Grevillea paradoxa	00.1	01.80		
Hibbertia drummondii	00.1	00.40		
Thysanotus manglesianus	00.1	00.30		
Schoenus hexandrus	00.1	00.20		
Velleia cycnopotamica	00.1	00.20		
Drosera macrantha subsp. *macrantha*	00.1	00.20		
Amphipogon caricinus	00.1	00.15		
Caladenia roei	00.1	00.15		
Neurachne alopecuroidea	00.1	00.15		
Waitzia acuminata var. *acuminata*	00.1	00.15		
Trachymene cyanopetala	00.1	00.05		
Goodenia berardiana	00.1	00.02		

Site:	GAP010	**Type:**	Quadrat (10 m x 10 m)
Date(s):	07/09/2016	**Position:**	-30.205383, 116.662396
Total vegetation cover (%):	30	**Topography:**	plain
Tree/shrub cover >2 m (%):	10	**Soil colour:**	yellow,
Shrub cover <2 m (%):	13	**Soil:**	sandy clay,
Grass cover (%):	20	**Rock type:**	none
Herb cover (%):	0.5	**Fire age:**	not evident
Disturbance details:	none		
Vegetation condition:	pristine, Keighery (1994)		
Vegetation description:	Isolated *Eucalyptus* sp. mallee over tall open *Allocasuarina acutivalvis* subsp. *acutivalvis* and *A. campestris* shrubland over mid open *Ecdeiocolia monostachya* sedgeland.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Ecdeiocolea monostachya	20.0	00.60		
Allocasuarina campestris	15.0	02.50		
Melaleuca atroviridis	05.0	01.80		
Allocasuarina acutivalvis subsp. *acutivalvis*	02.0	03.00		
Eucalyptus sp.	01.0	04.50		
Platysace maxwellii	01.0	00.40		
Drosera macrantha subsp. *macrantha*	00.1	00.40		
Chrysitrix distigmatosa	00.1	00.30		
Gahnia drummondii	00.1	00.20		
Waitzia acuminata var. *acuminata*	00.1	00.15		
Schoenus hexandrus	00.1	00.15		
Borya sphaerocephala	00.1	00.05		
Velleia cycnopotamica	00.1	00.05		
Hyalosperma demissum	00.1	00.01		
Actinobole uliginosum	00.1	00.01		

Site:	GAP011	**Type:**	Relevé (unbounded)
Date(s):	07/09/2016	**Position:**	-30.334438, 116.669569
Total vegetation cover (%):	70	**Topography:**	undulating plain
Tree/shrub cover >2 m (%):	5	**Soil colour:**	red-brown,
Shrub cover <2 m (%):	0	**Soil:**	sandy loam, clay,
Grass cover (%):	60	**Rock type:**	none
Herb cover (%):	10	**Fire age:**	not evident
Disturbance details:	exstensive clearing, weed infestation		
Vegetation condition:	good, Keighery (1994)		
Vegetation description:	Low open *Eucalyptus kochii* subsp. *plenissima* woodland over low**Avena barbata* tussock grassland and low open *Sclerolaena diacantha* forbland.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Avena barbata	60.0	00.40	*	
Sclerolaena diacantha	10.0	00.20		
Eucalyptus kochii subsp. *plenissim*a	05.0	10.00		

Site:	GAP012	**Type:**	Quadrat (10 m x 10 m)
Date(s):	08/09/2016	**Position:**	-30.401708, 116.664252
Total vegetation cover (%):	60	**Topography:**	plain
Tree/shrub cover >2 m (%):	45	**Soil colour:**	brown, yellow,
Shrub cover <2 m (%):	10	**Soil:**	sandy clay,
Grass cover (%):	1	**Rock type:**	Nil rock
Herb cover (%):	15	**Fire age:**	not evident
Disturbance details:	vehicle tracks, weed infestation		
Vegetation condition:	very Good, Keighery (1994)		
Vegetation description:	Low *Eucalyptus loxophleba* subsp. *loxophleba* and *E. salubris* woodland over mid sparse *Melaleuca adnata* shrubland over low open *Enchylaena tomentosa*, *Maireana marginata* and *Rhagodia preissii* subsp. *preissii* chenopod shrubland.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Eucalyptus loxophleba subsp. *loxophleba*	30.0	06.00		
Eucalyptus salubris	10.0	09.00		
Melaleuca adnata	05.0	02.20		
Monoculus monstrosus	05.0	00.25	*	
Enchylaena tomentosa	05.0	00.25		
Sclerolaena diacantha	05.0	00.20		
Rhagodia preissii subsp. *preissii*	02.0	01.00		
Hyalosperma glutinosum subsp. *glutinosum*	02.0	00.05		
Maireana marginata	02.0	00.05		
Podolepis aristata subsp. *aristata*	01.0	00.20		
Romulea rosea	01.0	00.20	*	
Cephalipterum drummondii	01.0	00.15		
Bromus rubens	01.0	00.15	*	
Dianella revoluta var. *divaricata*	00.1	01.00		
Acacia acuaria	00.1	01.00		
Ptilotus obovatus	00.1	00.50		
Rhagodia drummondii	00.1	00.40		
Maireana georgei	00.1	00.40		

Austrostipa elegantissima	00.1	00.30	
Austrostipa nitida	00.1	00.30	
Brassica tournefortii	00.1	00.20	*
Ehrharta longiflora	00.1	00.20	*
Avena barbata	00.1	00.20	*
Pentameris airoides	00.1	00.15	*
Austrostipa scabra	00.1	00.15	
Lomandra effusa	00.1	00.15	
Hyalosperma glutinosum subsp. *glutinosum*	00.1	00.15	
Cuscuta planiflora	00.1	00.10	*
Waitzia acuminata var. *acuminata*	00.1	00.10	
Erymophyllum tenellum	00.1	00.06	
Calotis hispidula	00.1	00.05	
Crassula colorata var. *acuminata*	00.1	00.05	
Mesembryanthemum nodiflorum	00.1	00.02	*

Site:	GAP013	**Type:**	Quadrat (10 m x 10 m)
Date(s):	08/09/2016	**Position:**	-30.406162, 116.663066
Total vegetation cover (%):	60	**Topography:**	undulating plain
Tree/shrub cover >2 m (%):	45	**Soil colour:**	red-orange, brown,
Shrub cover <2 m (%):	12	**Soil:**	sandy clay,
Grass cover (%):	3	**Rock type:**	Scattered quartz gravel and stones
Herb cover (%):	10	**Fire age:**	not evident
Disturbance details:	weed infestation		
Vegetation condition:	excellent, Keighery (1994)		
Vegetation description:	Low *Eucalyptus loxophleba* subsp. *loxophleba* woodland over tall open *Acacia acuminata*, *Melaleuca acuminata* subsp. *websteri* and *Hakea recurva* subsp. *recurva* shrubland over low sparse **Gorteria personata*, *Trachymene cyanopetala* and *Velleia cycnopotamica* forbland.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Eucalyptus loxophleba subsp. *loxophleba*	35.0	07.00		
Acacia acuminata	15.0	03.00		
Eremophila drummondii	05.0	00.60		
Gorteria personata	05.0	00.10	*	
Melaleuca acuminata subsp. *websteri*	02.0	02.50		
Austrostipa elegantissima	02.0	00.40		
Waitzia acuminata	02.0	00.25		
Velleia cycnopotamica	02.0	00.05		
Hakea recurva subsp. *recurva*	01.0	02.50		
Acacia hemiteles	01.0	00.90		
Rhagodia drummondii	01.0	00.30		
Enchylaena tomentosa	01.0	00.30		
Dampiera lavandulacea	01.0	00.25		
Sclerolaena diacantha	01.0	00.15		
Austrostipa trichophylla	01.0	00.15		
Calandrinia baccata	01.0	00.05		
Trachymene cyanopetala	01.0	00.05		
Melaleuca stereophloia	00.1	01.50		

Dianella revoluta var. *divaricata*	00.1	00.60	
Hyalosperma glutinosum subsp. *glutinosum*	00.1	00.40	
Eremophila glabra	00.1	00.30	
Calotis hispidula	00.1	00.25	
Monoculus monstrosus	00.1	00.20	*
Arctotheca calendula	00.1	00.20	*
Lawrencella rosea	00.1	00.15	
Podolepis lessonii	00.1	00.15	
Solanum lasiophyllum	00.1	00.15	
Gilberta tenuifolia	00.1	00.10	
Pentameris airoides	00.1	00.10	*
Hyalosperma glutinosum subsp. *glutinosum*	00.1	00.10	
Trachymene ornata	00.1	00.06	
Rhodanthe manglesii	00.1	00.05	
Goodenia berardiana	00.1	00.05	
Erodium cygnorum	00.1	00.05	
Calandrinia eremaea	00.1	00.02	

Site:	GAP014	**Type:**	Quadrat (10 m x 10 m)
Date(s):	08/09/2016	**Position:**	-30.408118, 116.661971
Total vegetation cover (%):	90	**Topography:**	plain
Tree/shrub cover >2 m (%):	35	**Soil colour:**	brown, yellow,
Shrub cover <2 m (%):	5	**Soil:**	sandy clay,
Grass cover (%):	1	**Rock type:**	Limited quartz gravel
Herb cover (%):	70	**Fire age:**	not evident
Disturbance details:	historic clearing, weed infestation		
Vegetation condition:	good, Keighery (1994)		
Vegetation description:	Low *Eucalyptus loxophleba* subsp. *loxophleba* woodland over isolated tall *Acacia acuminata* and *Melaleuca atroviridis* shrubs over low **Gorteria personata* forbland.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Gorteria personata	70.0	00.15	*	
Eucalyptus loxophleba subsp. *loxophleba*	35.0	07.00		
Acacia acuminata	02.0	04.00		
Ptilotus polystachyus	02.0	00.70		
Dampiera lavandulacea	02.0	00.20		
Melaleuca atroviridis	01.0	03.00		
Rhagodia drummondii	01.0	00.50		
Solanum lasiophyllum	01.0	00.50		
Ehrharta longiflora	01.0	00.40	*	
Hyalosperma glutinosum subsp. *venustum*	01.0	00.15		
Calandrinia granulifera	01.0	00.10		
Acacia acuaria	00.1	01.00		
Rhagodia preissii subsp. *preissii*	00.1	00.60		
Austrostipa nitida	00.1	00.40		
Enchylaena tomentosa	00.1	00.40		
Avena barbata	00.1	00.40	*	
Lomandra effusa	00.1	00.40		
Thysanotus manglesianus	00.1	00.30		
Austrostipa trichophylla	00.1	00.20		

Brassica tournefortii	00.1	00.20	*
Sonchus oleraceus	00.1	00.20	*
Bromus rubens	00.1	00.20	*
Mesembryanthemum nodiflorum	00.1	00.20	*
Monoculus monstrosus	00.1	00.20	*
Hypochaeris glabra	00.1	00.15	*
Ursinia anthemoides	00.1	00.15	*
Waitzia acuminata var. *acuminata*	00.1	00.15	
Aristida contorta	00.1	00.15	
Corchorus lasiocarpus	00.1	00.10	
Pentameris airoides	00.1	00.10	*
Gilberta tenuifolia	00.1	00.10	
Ptilotus gaudichaudii subsp. *eremita*	00.1	00.10	
Leontodon rhagadioloides	00.1	00.10	*
Velleia cycnopotamica	00.1	00.05	
Rhodanthe manglesii	00.1	00.05	
Actinobole uliginosum	00.1	00.01	

Site:	GAP015	**Type:**	Quadrat (10 m x 10 m)
Date(s):	02/09/2016	**Position:**	-30.531113, 116.339338
Total vegetation cover (%):	95	**Topography:**	drainage line
Tree/shrub cover >2 m (%):	0	**Soil colour:**	red-brown
Shrub cover <2 m (%):	80	**Soil:**	sandy clay
Grass cover (%):	40	**Rock type:**	none
Herb cover (%):	15	**Fire age:**	not evident

Disturbance details: Current operations, evidence of f.eral animals, grazing low, historic clearing, weed infestation

Vegetation condition: good, Keighery (1994)

Vegetation description: Mid sparse *Rhagodia drummondii* shrubland over low closed *Tecticornia indica* subsp. *bidens* and *T. pergranulata* subsp. *pergranulata* chenopod shrubland over low **Lolium rigidum* grassland.

Species	Cover (%)	Height (m)	Weeds	Conservation status
Tecticornia indica subsp. *bidens*	65.0	00.50		
Lolium rigidum	40.0	00.50	*	
Tecticornia pergranulata subsp. *pergranulata*	10.0	00.30		
Cotula bipinnata	10.0	00.20	*	
Sonchus oleraceus	05.0	01.00	*	
Rhagodia drummondii	04.0	00.60		
Austrostipa nitida	02.0	00.20		
Atriplex amnicola	01.0	00.60		
Mesembryanthemum nodiflorum	01.0	00.10	*	
Monoculus monstrosus	00.1	00.40	*	
Medicago polymorpha	00.1	00.30	*	

Site:	GAP016	**Type:**	Quadrat (10 m x 10 m)
Date(s):	08/09/2016	**Position:**	-30.664258, 116.27178
Total vegetation cover (%):	60	**Topography:**	hill slope
Tree/shrub cover >2 m (%):	25	**Soil colour:**	red-brown,
Shrub cover <2 m (%):	2	**Soil:**	gravel / alluvial, clay loam,
Grass cover (%):	25	**Rock type:**	granite bolders
Herb cover (%):	15	**Fire age:**	not evident
Disturbance details:	historic clearing, weed infestation		
Vegetation condition:	degraded, Keighery (1994)		
Vegetation description:	Mid *Eucalyptus loxophleba* subsp. *loxophleba* woodland over low open **Avena barbata* tussock grassland and low open **Arctotheca calendula* forbland.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Eucalyptus loxophleba subsp. *loxophleba*	25.0	11.00		
Avena barbata	25.0	00.40	*	
Arctotheca calendula	15.0	00.15	*	
Acacia acuminata	01.0	02.50		
Austrostipa elegantissima	01.0	00.50		
Maireana brevifolia	01.0	00.50		
Romulea rosea var. *australis*	01.0	00.40	*	
Austrostipa platychaeta	01.0	00.30		
Monoculus monstrosus	00.1	00.40	*	
Lepidosperma costale	00.1	00.40		
Eragrostis curvula	00.1	00.30	*	
Ehrharta longiflora	00.1	00.25	*	
Comesperma integerrimum	00.1	00.25		
Raphanus raphanistrum	00.1	00.20	*	
Neurachne alopecuroidea	00.1	00.20		
Acacia microbotrya	00.1	00.10		
Atriplex semibaccata	00.1	00.10		
Cassytha ? *glabella*	00.1	00.10		
Trifolium subterraneum	00.1	00.05	*	

Ptilotus spathulatus	00.1	00.02

Site:	GAP017	**Type:**	Quadrat (10 m x 10 m)
Date(s):	09/09/2016	**Position:**	-30.680903, 116.235717
Total vegetation cover (%):	60	**Topography:**	hill slope
Tree/shrub cover >2 m (%):	60	**Soil colour:**	brown,
Shrub cover <2 m (%):	0	**Soil:**	sand, sandy loam,
Grass cover (%):	2	**Rock type:**	Sandy laterite with quartz stones, weathered
Herb cover (%):	2	**Fire age:**	not evident
Disturbance details:	grazing – high, weed infestation,		
Vegetation condition:	degraded, Keighery (1994)		
Vegetation description:	Mid open *Eucalyptus wandoo* subsp. *wandoo* woodland over isolated low **Ehrharta longiflora*, *Lolium rigidum* and **Bromus* spp. tussock grasses and isolated low ** Arctotheca calendula*, **Hypochaeris glabra* and **Sonchus oleraceus* forbs.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Eucalyptus wandoo subsp. *wandoo*	60.0	11.00		
Ehrharta longiflora	01.0	00.35	*	
Lolium rigidum	01.0	00.20	*	
Arctotheca calendula	01.0	00.15	*	
Sonchus oleraceus	00.1	00.30	*	
Hypochaeris glabra	00.1	00.20	*	
Bromus diandrus	00.1	00.15	*	
Bromus rubens	00.1	00.15	*	
Cotula bipinnata	00.1	00.08	*	
Trachymene pilosa	00.1	00.05		
Stellaria pallida	00.1	00.05	*	
Triglochin sp. A Flora of Australia (G.J. Keighery	00.1	00.03		
Calandrinia calyptrata	00.1	00.02		

Site:	GAP018	**Type:**	Quadrat (10 m x 10 m)
Date(s):	09/09/2016	**Position:**	-30.885224, 116.247166
Total vegetation cover (%):	80	**Topography:**	hill top
Tree/shrub cover >2 m (%):	55	**Soil colour:**	brown,
Shrub cover <2 m (%):	1	**Soil:**	sandy loam,
Grass cover (%):	5	**Rock type:**	Lateritic gravel
Herb cover (%):	45	**Fire age:**	not evident
Disturbance details:	historic clearing, litter, revegetation, weed infestation,		
Vegetation condition:	degraded, Keighery (1994)		
Vegetation description:	Mid open *Eucalyptus loxophleba* subsp. *loxophleba* woodland over tall sparse *Acacia acuminata* shrubland over low **Arctotheca calendula*, **Romulea rosea* var. *australis* and *Hyalosperma glutinosum* subsp. *venustum* forbland.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Eucalyptus loxophleba subsp. *loxophleba*	50.0	11.00		
Arctotheca calendula	30.0	00.15	*	
Romulea rosea var. *australis*	10.0	00.20	*	
Acacia acuminata	05.0	05.00		
Hyalosperma glutinosum subsp. *venustum*	05.0	00.15		
Avena barbata	02.0	00.50	*	
Austrostipa platychaeta	02.0	00.30		
Grevillea ? *biternata*	01.0	01.00		
Lolium rigidum	01.0	00.30	*	
Arthropodium dyeri	01.0	00.20		
Monoculus monstrosus	01.0	00.20	*	
Hakea preissii	00.1	03.00		
Comesperma integerrimum	00.1	00.40		
Ehrharta longiflora	00.1	00.40	*	
Dianella revoluta var. *divaricata*	00.1	00.40		
Enchylaena tomentosa	00.1	00.30		
Sonchus oleraceus	00.1	00.20	*	
Dampiera lavandulacea	00.1	00.20		

Rhodanthe manglesii	00.1	00.15	
Daucus glochidiatus	00.1	00.10	
Pterostylis ? spathulata	00.1	00.10	
Trachymene ornata	00.1	00.10	
Crassula colorata var. *colorata*	00.1	00.08	
Blennospora drummondii	00.1	00.05	
Oxalis corniculata	00.1	00.02	*
Maireana brevifolia	00.1		

Site:	GAP019	**Type:**	Relevé (unbounded)
Date(s):	09/09/2016	**Position:**	-30.886897, 116.244234
Total vegetation cover (%):	100	**Topography:**	creek
Tree/shrub cover >2 m (%):	65	**Soil colour:**	red-brown,
Shrub cover <2 m (%):	0	**Soil:**	sandy clay, clay loam,
Grass cover (%):	0	**Rock type:**	Nil rock
Herb cover (%):	70	**Fire age:**	not evident
Disturbance details:	historic clearing, weed infestation		
Vegetation condition:	degraded, Keighery (1994)		
Vegetation description:	Mid open *Casuarina obesa* and *Eucalyptus loxophleba* woodland over low closed **Arctotheca calendula*, **Oxalis pes-caprae* and **Romulea rosea* forbland		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Casuarina obesa	65.0	15.00		
Oxalis pes-caprae	30.0	00.25	*	
Romulea rosea	20.0	00.25	*	
Arctotheca calendula	20.0	00.20	*	
Eucalyptus loxophleba	04.0	12.00		
Acacia acuminata	00.1	02.50		
Acacia saligna	00.1	02.50		

Site:	GAP020	**Type:**	Quadrat (10 m x 10 m)
Date(s):	09/09/2016	**Position:**	-31.056309, 116.207778
Total vegetation cover (%):	100	**Topography:**	drainage line
Tree/shrub cover >2 m (%):	45	**Soil colour:**	brown,
Shrub cover <2 m (%):	0	**Soil:**	clay loam,
Grass cover (%):	55	**Rock type:**	Nil rock
Herb cover (%):	50	**Fire age:**	not evident
Disturbance details:	grazing – high, weed infestation,		
Vegetation condition:	degraded, Keighery (1994)		
Vegetation description:	Mid open *Eucalyptus loxophleba* subsp. *loxophleba*, *E. rudis* and *E. wandoo* woodland over low **Avena barbata*, **Ehrharta longiflora* and **Lolium rigidum* tussock grassland and low closed **Oxalis purpurea* forbland.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Oxalis purpurea	50.0	00.05	*	
Ehrharta longiflora	40.0	00.40	*	
Eucalyptus wandoo	25.0	12.00		
Eucalyptus loxophleba subsp. *loxophleba*	12.0	15.00		
Eucalyptus rudis	10.0	12.00		
Avena barbata	05.0	00.35	*	
Lolium rigidum	05.0	00.25	*	
Romulea rosea var. *communis*	01.0	00.25	*	
Triticum aestivum	00.1	00.40	*	
Monoculus monstrosus	00.1	00.40	*	
Raphanus raphanistrum	00.1	00.25	*	
Hypochaeris glabra	00.1	00.20	*	
Trifolium hirtum	00.1	00.20	*	
Lysimachia arvensis	00.1	00.15	*	
Arctotheca calendula	00.1	00.15	*	
Sonchus oleraceus	00.1	00.10	*	

Site:	GAP021	**Type:**	Quadrat (10 m x 10 m)
Date(s):	13/09/2016	**Position:**	-31.060541, 116.20638
Total vegetation cover (%):	60	**Topography:**	hill slope
Tree/shrub cover >2 m (%):	35	**Soil colour:**	red-brown,
Shrub cover <2 m (%):	40	**Soil:**	gravel / alluvial, clay loam,
Grass cover (%):	2	**Rock type:**	laterite
Herb cover (%):	0.2	**Fire age:**	not evident
Disturbance details:	historic operations, weed infestation,		
Vegetation condition:	excellent, Keighery (1994)		
Vegetation description:	Low *Eucalyptus wandoo* subsp. *wandoo* woodland over low *Acacia lasiocarpa* var. *sedifolia* and *Gastrolobium spathulatum* shrubland.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Eucalyptus wandoo subsp. *wandoo*	35.0	08.00		
Gastrolobium spathulatum	20.0	00.40		
Acacia lasiocarpa var. *sedifolia*	15.0	00.40		
Hibbertia hypericoides	02.0	00.30		
Desmocladus asper	01.5	00.15		
Bossiaea spinescens	01.0	00.60		
Austrostipa elegantissima	01.0	00.50		
Bossiaea spinescens	01.0	00.50		
Comesperma volubile	01.0	00.50		
Orthrosanthus laxus var. *gramineus*	00.1	00.30		
Melaleuca radula	00.1	00.30		
Ursinia anthemoides	00.1	00.25	*	
Hovea pungens	00.1	00.20		
Lomandra micrantha subsp. *micrantha*	00.1	00.20		
Eriochilus dilatatus subsp. *multiflorus*	00.1	00.20		
Freesia sp.	00.1	00.15	*	
Cheilanthes austrotenuifolia	00.1	00.15		
Ericksonella saccharata	00.1	00.10		
Lysimachia arvensis	00.1	00.08	*	
Lagenophora huegelii	00.1	00.01		

Site:	GAP022	**Type:**	Quadrat (10 m x 10 m)
Date(s):	13/09/2016	**Position:**	-31.071853, 116.204567
Total vegetation cover (%):	40	**Topography:**	hill top
Tree/shrub cover >2 m (%):	30	**Soil colour:**	red-brown,
Shrub cover <2 m (%):	15	**Soil:**	clay loam,
Grass cover (%):	0.1	**Rock type:**	laterite
Herb cover (%):	1	**Fire age:**	not evident
Disturbance details:	weed infestation		
Vegetation condition:	excellent, Keighery (1994)		
Vegetation description:	Mid *Eucalyptus wandoo* subsp. *wandoo* woodland over low open *Acacia lasiocarpa* var. *sedifolia* and *Gastrolobium spathulatum* shrubland.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Eucalyptus wandoo subsp. *wandoo*	30.0	12.00		
Acacia lasiocarpa var. *sedifolia*	10.0	00.50		
Gastrolobium spathulatum	04.0	00.25		
Loxocarya cinerea	00.1	02.00		
Acacia microbotrya	00.1	01.00		
Comesperma volubile	00.1	00.70		
Austrostipa elegantissima	00.1	00.40		
Freesia sp.	00.1	00.20	*	
Ursinia anthemoides	00.1	00.20	*	
Comesperma integerrimum	00.1	00.20		
Romulea rosea	00.1	00.20	*	
Oxalis pes-caprae	00.1	00.20	*	
Olearia rudis	00.1	00.20		
Bossiaea spinescens	00.1	00.20		
Pauridia glabella var. *leptantha*	00.1	00.15		
Daucus glochidiatus	00.1	00.10		
Lysimachia arvensis	00.1	00.10	*	
Hydrocotyle ? *callicarpa*	00.1	00.10		
Petrorhagia dubia	00.1	00.10	*	
Lagenophora huegelii	00.1	00.01		

Site:	GAP024	**Type:**	Quadrat (10 m x 10 m)
Date(s):	13/09/2016	**Position:**	-31.173459, 116.176163
Total vegetation cover (%):	65	**Topography:**	hill slope
Tree/shrub cover >2 m (%):	25	**Soil colour:**	red-orange,
Shrub cover <2 m (%):	35	**Soil:**	gravel / alluvial, sandy clay, sandy loam,
Grass cover (%):	4	**Rock type:**	laterite
Herb cover (%):	3	**Fire age:**	not evident
Disturbance details:	weed infestation,		
Vegetation condition:	excellent, Keighery (1994)		
Vegetation description:	Mid *Eucalyptus wandoo* subsp. *wandoo* woodland over mid *Banksia* spp., *Macrozamia riedlei* and *Xanthorrhoea preissii* shrubland over low sparse *Hibbertia hypericoides*, *Phyllanthus calycinus* and *Bossiaea eriocarpa* shrubland.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Eucalyptus wandoo subsp. *wandoo*	25.0	20.00		
Banksia squarrosa subsp. *squarrosa*	10.0	01.50		
Banksia polycephala	10.0	01.40		
Xanthorrhoea preissii	05.0	01.80		
Hibbertia hypericoides	05.0	00.40		
Macrozamia riedlei	04.0	01.80		
Loxocarya cinerea	03.0	00.15		
Bossiaea eriocarpa	01.0	00.40		
Phyllanthus calycinus	01.0	00.25		
Neurachne alopecuroidea	01.0	00.15		
Romulea rosea	01.0	00.15	*	
Rhodanthe manglesii	01.0	00.15		
Ursinia anthemoides	01.0	00.15	*	
Comesperma integerrimum	00.2	00.15		
Acacia lasiocarpa var. *sedifolia*	00.1	00.40		
Lepidosperma asperatum	00.1	00.25		
Haemodorum sp.	00.1	00.20		
Opercularia echinocephala	00.1	00.20		

Dianella revoluta	00.1	00.20	
Chamaescilla corymbosa	00.1	00.15	
Goodenia berardiana	00.1	00.15	
Conostylis tomentosa	00.1	00.10	
Olearia rudis	00.1	00.10	
Ptilotus manglesii	00.1	00.10	
Lysimachia arvensis	00.1	00.08	*
Schoenus nanus	00.1	00.05	
Levenhookia pusilla	00.1	00.05	
Drosera bulbosa subsp. *bulbosa*	00.1	00.01	
Hypochaeris glabra	00.1	00.01	*

Site:	GAP025	**Type:**	Quadrat (10 m x 10 m)
Date(s):	14/09/2016	**Position:**	-31.187523, 116.175831
Total vegetation cover (%):	60	**Topography:**	hill slope
Tree/shrub cover >2 m (%):	25	**Soil colour:**	brown, grey, whitish,
Shrub cover <2 m (%):	35	**Soil:**	sandy clay, clay loam,
Grass cover (%):	2	**Rock type:**	granite rocks
Herb cover (%):	1	**Fire age:**	not evident
Disturbance details:	none		
Vegetation condition:	pristine, Keighery (1994)		
Vegetation description:	Mid *Corymbia calophylla*, *Eucalyptus accedens* and *E. wandoo* subsp. *wandoo* woodland over sparse mid *Xanthorrhoea preissii* shrubland over low *Bossiaea eriocarpa*, *Hibbertia hypericoides* and *Gastrolobium bilobum* shrubland.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Eucalyptus wandoo subsp. *wandoo*	15.0	15.00		
Hibbertia hypericoides	15.0	00.25		
Eucalyptus accedens	10.0	12.00		
Bossiaea eriocarpa	10.0	00.40		
Xanthorrhoea preissii	05.0	01.40		
Gastrolobium bilobum	05.0	00.40		
Neurachne alopecuroidea	02.0	00.20		
Corymbia calophylla	01.0	17.00		
Dampiera lindleyi	01.0	00.30		
Astroloma serratifolium	01.0	00.20		
Borya sphaerocephala	01.0	00.15		
Hakea undulata	00.1	00.70		
Macrozamia riedlei	00.1	00.50		
Dianella revoluta	00.1	00.50		
Sowerbaea laxiflora	00.1	00.40		
Austrostipa elegantissima	00.1	00.40		
Drosera macrantha subsp. *macrantha*	00.1	00.30		
Haemodorum ? *discolor*	00.1	00.30		

Banksia sp.	00.1	00.30
Haemodorum sp.	00.1	00.30
Drosera sp.	00.1	00.30
Pterostylis recurva	00.1	00.25
Chamaescilla corymbosa	00.1	00.20
Diuris corymbosa	00.1	00.20
Lepidosperma asperatum	00.1	00.20
Dampiera lavandulacea	00.1	00.15
Hakea lissocarpha	00.1	00.15
Banksia bipinnatifida subsp. *multifida*	00.1	00.10
Lomandra caespitosa	00.1	00.10
Opercularia vaginata	00.1	00.10
Stylidium sp. Bindoon (K.F. Kenneally 11405)	00.1	00.10
Pterostylis vittata	00.1	00.10
Hydrocotyle ? *callicarpa*	00.1	00.05
Levenhookia pusilla	00.1	00.03
Schoenus nanus	00.1	00.03
Rhodanthe citrina	00.1	00.02
Drosera erythrorhiza subsp. *collina*	00.1	00.01

Site:	GAP026	**Type:**	Quadrat (10 m x 10 m)
Date(s):	14/09/2016	**Position:**	-31.191292, 116.176869
Total vegetation cover (%):	95	**Topography:**	drainage line
Tree/shrub cover >2 m (%):	65	**Soil colour:**	brown,
Shrub cover <2 m (%):	1	**Soil:**	clay loam,
Grass cover (%):	40	**Rock type:**	none
Herb cover (%):	11	**Fire age:**	not evident
Disturbance details:	litter, weed infestation,		
Vegetation condition:	very Good, Keighery (1994)		
Vegetation description:	Mid *Eucalyptus rudis* woodland over tall *Melaleuca viminea* subsp. *viminea* shrubland over mid open *Juncus kraussii* subsp. *australiensis* sedgeland.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Melaleuca viminea subsp. *viminea*	40.0	05.00		
Eucalyptus rudis	25.0	15.00		
Juncus kraussii subsp. *australiensis*	25.0	00.50		
Cynodon dactylon	15.0	00.15	*	
Hypochaeris glabra	10.0	00.01	*	
Juncus acutus	02.0	01.30	*	
Typha orientalis	01.0	01.60	*	
Vulpia muralis	01.0	00.15	*	
Astartea scoparia	00.1	02.00		
Cyperus polystachyos	00.1	00.50	*	
Dianella revoluta	00.1	00.30		
Ursinia anthemoides	00.1	00.15	*	
Lysimachia arvensis	00.1	00.10	*	
Arctotheca calendula	00.1	00.10	*	

Site:	GAP027	**Type:**	Quadrat (10 m x 10 m)
Date(s):	14/09/2016	**Position:**	-31.193058, 116.176942
Total vegetation cover (%):	80	**Topography:**	hill slope
Tree/shrub cover >2 m (%):	30	**Soil colour:**	red-orange,
Shrub cover <2 m (%):	50	**Soil:**	gravel / alluvial, clay loam,
Grass cover (%):	10	**Rock type:**	laterite
Herb cover (%):	2	**Fire age:**	not evident
Disturbance details:	historic clearing, litter, revegetation, weed infestation,		
Vegetation condition:	excellent, Keighery (1994)		
Vegetation description:	Mid *Corymbia calophylla*, *Eucalyptus accedens* and *E. wandoo* subsp. *wandoo* woodland over tall sparse *Allocasuarina helmsii* shrubland over mid open *Xanthorrhoea preisii* shrubland.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Bossiaea spinescens	20.0	01.20		
Opercularia vaginata	20.0	00.15		
Xanthorrhoea preissii	15.0	01.20		
Eucalyptus wandoo subsp. *wandoo*	10.0	15.00		
Eucalyptus accedens	10.0	12.00		
Bossiaea eriocarpa	10.0	00.40		
Neurachne alopecuroidea	10.0	00.15		
Corymbia calophylla	05.0	17.00		
Allocasuarina helmsii	05.0	05.00		
Hakea incrassata	05.0	01.00		
Astroloma serratifolium	02.0	00.30		
Daviesia podophylla	01.0	00.60		
Cryptandra nutans	01.0	00.40		
Hibbertia hypericoides	01.0	00.30		
Ursinia anthemoides	01.0	00.20	*	
Romulea rosea	01.0	00.20	*	
Chamaescilla corymbosa	01.0	00.15		
Stylidium repens	00.5	00.07		
Dianella revoluta	00.1	00.80		

Acacia drummondii subsp. *affinis*	00.1	00.50		P3 (WC Act)
Leucopogon pulchellus	00.1	00.50		
Orthrosanthus laxus var. *gramineus*	00.1	00.30		
Lechenaultia biloba	00.1	00.30		
Hibbertia rupicola	00.1	00.20		
Ptilotus manglesii	00.1	00.10		
Lysimachia arvensis	00.1	00.10	*	
Conostylis teretifolia subsp. *planescens*	00.1	00.10		
Levenhookia pusilla	00.1	00.03		

Site:	GAP028	**Type:**	Relevé (unbounded)
Date(s):	14/09/2016	**Position:**	-31.196055, 116.176622
Total vegetation cover (%):	75	**Topography:**	undulating plain
Tree/shrub cover >2 m (%):	45	**Soil colour:**	brown,
Shrub cover <2 m (%):	30	**Soil:**	sandy loam, clay loam,
Grass cover (%):	1	**Rock type:**	none
Herb cover (%):	0.1	**Fire age:**	not evident
Disturbance details:	firebreak		
Vegetation condition:	excellent, Keighery (1994)		
Vegetation description:	Mid open *Corymbia calophylla*, *Eucalyptus accedens* and *E. wandoo* subsp. *wandoo* woodland over low *Hibbertia hypericoides* shrubland and low isolated *Lepidosperma asperatum* sedges.		

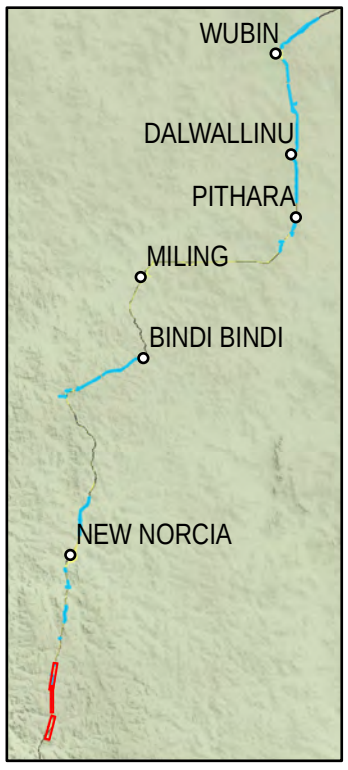
Species	Cover (%)	Height (m)	Weeds	Conservation status
Hibbertia hypericoides	30.0	00.30		
Eucalyptus accedens	20.0	18.00		
Eucalyptus wandoo subsp. *wandoo*	20.0	15.00		
Corymbia calophylla	05.0	15.00		
Lepidosperma asperatum	01.0	00.40		
Thomasia foliosa	00.1	00.50		
Burchardia congesta	00.1	00.40		
Tetratheca confertifolia	00.1	00.30		

Site:	GAP031	**Type:**	Relevé (unbounded)
Date(s):	14/09/2016	**Position:**	-31.21959, 116.177317
Total vegetation cover (%):	70	**Topography:**	undulating plain
Tree/shrub cover >2 m (%):	50	**Soil colour:**	grey,
Shrub cover <2 m (%):	20	**Soil:**	gravel / alluvial, sandy loam,
Grass cover (%):	5	**Rock type:**	laterite
Herb cover (%):	10	**Fire age:**	not evident
Disturbance details:	historic clearing, litter,		
Vegetation condition:	very Good, Keighery (1994)		
Vegetation description:	Mid *Corymbia calophylla* and *Eucalyptus marginata* woodland over low open *Daviesia divaricata* shrubland over isolated low *Neurachne alopercuroidea* tussock grasses.		

Species	Cover (%)	Height (m)	Weeds	Conservation status
Corymbia calophylla	25	20		
Eucalyptus marginata	25	20		
Neurachne alopecuroidea	2	0.2		
Daviesia divaricata	15	0.8		

Appendix 3
EPBC Act orchid survey
Thelymitra stellata

Town
Transect tracks for *Thelymitra stellata*
Suitable habitat for *Thelymitra stellata*
Gaps study area
Initial study area



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Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 12/16/2016

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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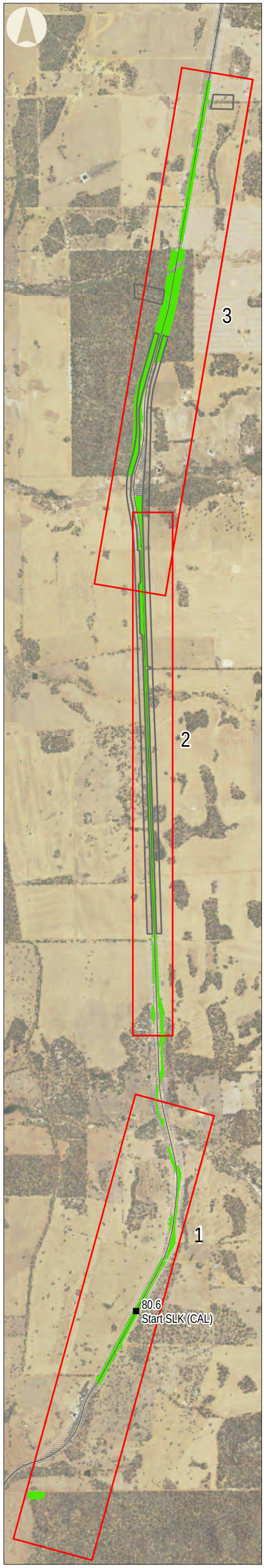
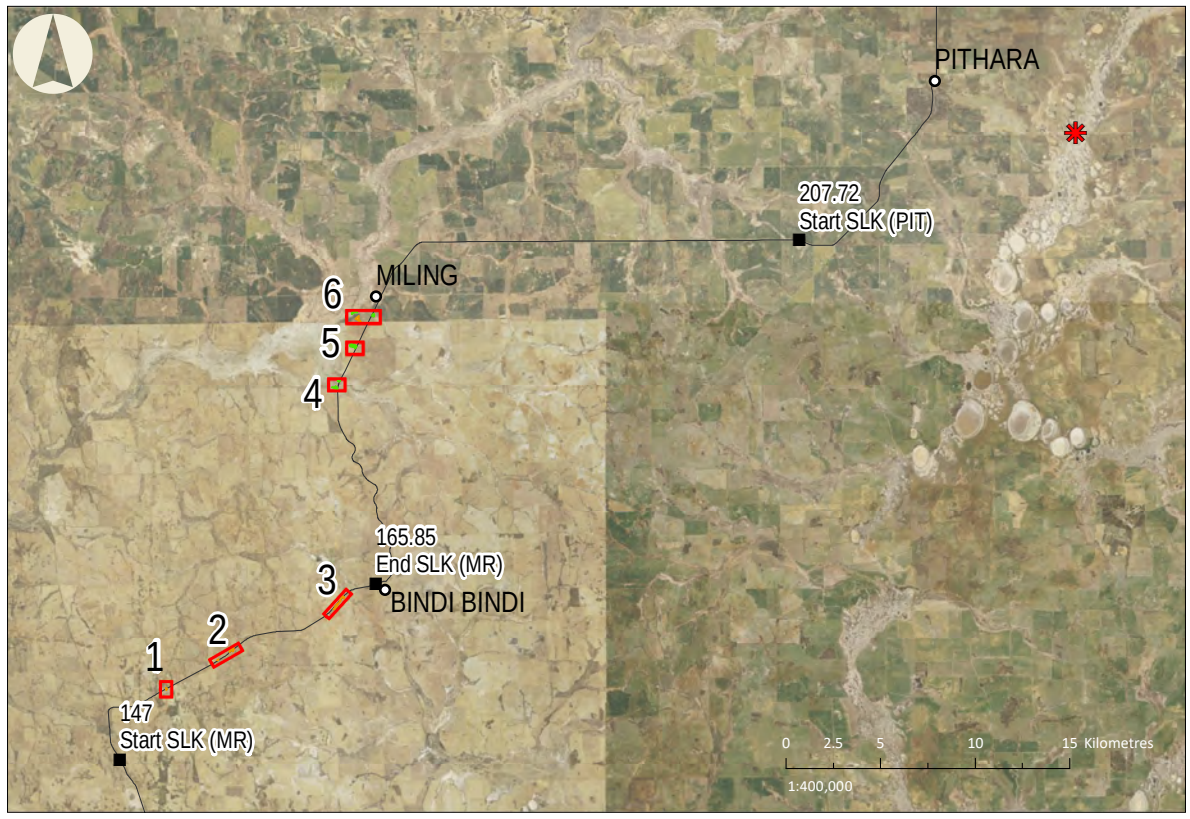
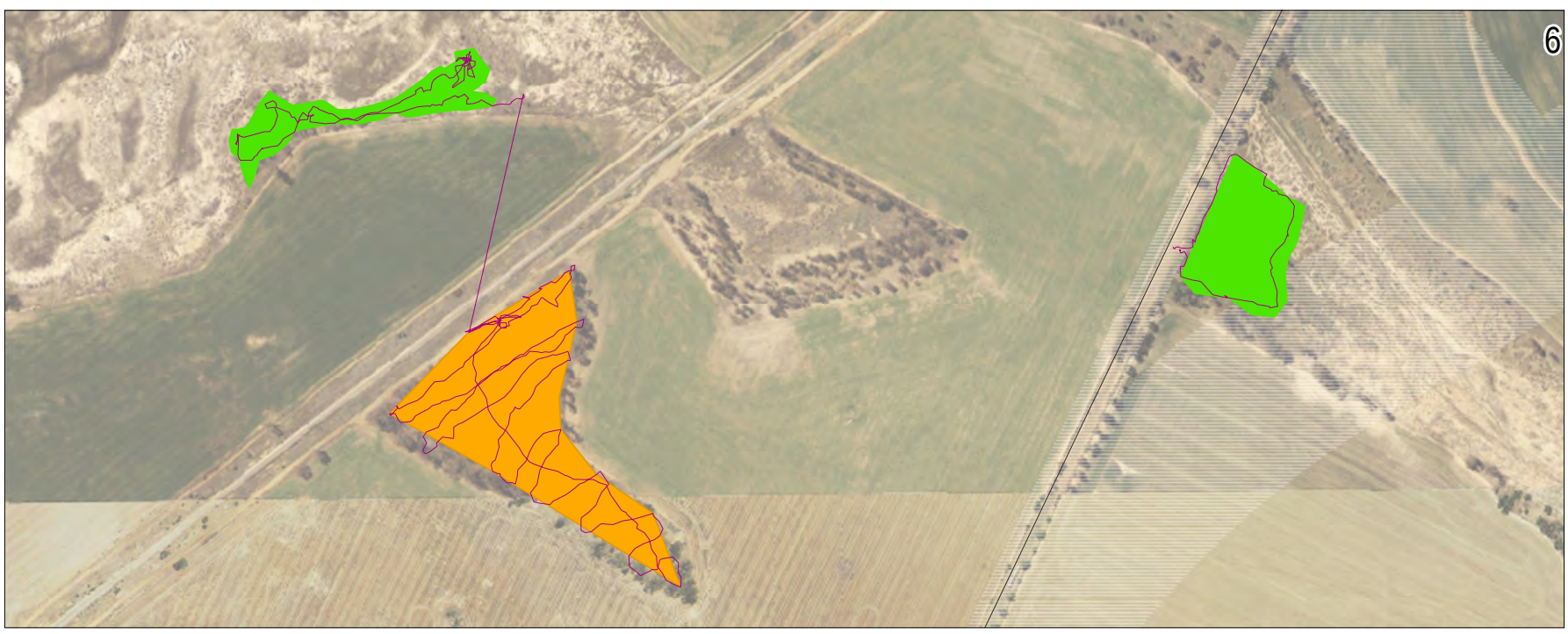
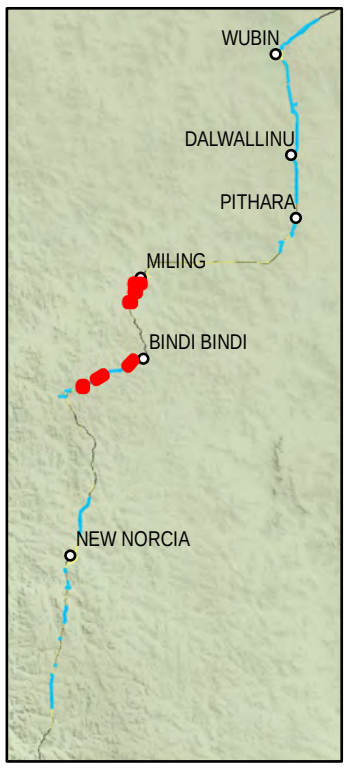


Appendix 3
EPBC Act orchid survey
Caladenia drakeoides

- *Caladenia drakeoides* local population
- Transect tracks for *Caladenia drakeoides*
- Suitable habitat for *Caladenia drakeoides*
- Unsuitable habitat for *Caladenia drakeoides*
- Gaps study area
- Initial study area







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Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 16/12/2016

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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Appendix 4 Flora species inventory

Family	Taxon	Calingiri (SLK 80.6 - 112.4)	Dalwallinu Bypass (SLK 231.77 - 234.85)	Moore River (SLK 115.8 - 126.8)	Midlands Road to Bindi Bindi (SLK 147 - 165.85)	Nugadong to Wubin (SLK 234.85 - 264.01)	Pithara (SLK 207.72 - 231.77)
Aizoaceae	**Mesembryanthemum nodiflorum*						+
Amaranthaceae	*Ptilotus gaudichaudii subsp. eremita*						+
Amaranthaceae	*Ptilotus manglesii*	+					
Amaranthaceae	*Ptilotus nobilis subsp. nobilis*					+	
Amaranthaceae	*Ptilotus obovatus*					+	+
Amaranthaceae	*Ptilotus polystachyus*					+	+
Amaranthaceae	*Ptilotus spathulatus*				+		
Apiaceae	*Daucus glochidiatus*	+		+			
Apiaceae	*Platysace maxwellii*					+	
Araliaceae	*Hydrocotyle ? callicarpa*	+					
Araliaceae	*Trachymene cyanopetala*					+	+
Araliaceae	*Trachymene ornata*			+		+	+
Araliaceae	*Trachymene pilosa*				+	+	
Asparagaceae	*Arthropodium curvipes*					+	
Asparagaceae	*Arthropodium dyeri*			+			
Asparagaceae	*Chamaescilla corymbosa*	+					
Asparagaceae	*Lomandra caespitosa*	+					
Asparagaceae	*Lomandra effusa*						+
Asparagaceae	*Lomandra micrantha subsp. micrantha*	+					
Asparagaceae	*Sowerbaea laxiflora*	+					
Asparagaceae	*Thysanotus manglesianus*					+	+
Asteraceae	**Arctotheca calendula*	+		+	+	+	+
Asteraceae	**Cotula bipinnata*				+	+	
Asteraceae	**Gorteria personata*						+
Asteraceae	**Hypochaeris glabra*	+			+	+	+
Asteraceae	**Leontodon rhagadioloides*						+
Asteraceae	**Monoculus monstrosus*	+		+	+	+	+
Asteraceae	**Sonchus oleraceus*	+		+	+	+	+
Asteraceae	**Ursinia anthemoides*	+					+
Asteraceae	**Ursinia anthemoides subsp. anthemoides*					+	
Asteraceae	*Actinobole uliginosum*					+	+
Asteraceae	*Blennospora drummondii*			+		+	
Asteraceae	*Brachyscome iberidifolia*					+	
Asteraceae	*Calotis hispidula*					+	+

Family	Taxon	Calingiri (SLK 80.6 - 112.4)	Dalwallinu Bypass (SLK 231.77 - 234.85)	Moore River (SLK 115.8 - 126.8)	Midlands Road to Bindi Bindi (SLK 147 - 165.85)	Nugadong to Wubin (SLK 234.85 - 264.01)	Pithara (SLK 207.72 - 231.77)
Asteraceae	*Cephalipterum drummondii*					+	+
Asteraceae	*Erymophyllum tenellum*						+
Asteraceae	*Gilberta tenuifolia*						+
Asteraceae	*Hyalosperma demissum*					+	
Asteraceae	*Hyalosperma glutinosum subsp. glutinosum*					+	+
Asteraceae	*Hyalosperma glutinosum subsp. venustum*			+		+	+
Asteraceae	*Lagenophora huegelii*	+					
Asteraceae	*Lawrencella rosea*					+	+
Asteraceae	*Olearia rudis*	+					
Asteraceae	*Podolepis aristata subsp. aristata*					+	+
Asteraceae	*Podolepis lessonii*					+	+
Asteraceae	*Podotheca gnaphalioides*					+	
Asteraceae	*Pogonolepis stricta*					+	
Asteraceae	*Rhodanthe citrina*	+					
Asteraceae	*Rhodanthe laevis*					+	
Asteraceae	*Rhodanthe manglesii*	+		+			+
Asteraceae	*Rhodanthe pygmaea*					+	
Asteraceae	*Senecio glossanthus*					+	
Asteraceae	*Senecio pinnatifolius*					+	
Asteraceae	*Siloxerus multiflorus*					+	
Asteraceae	*Waitzia acuminata*					+	+
Asteraceae	*Waitzia acuminata var. acuminata*					+	+
Boryaceae	*Borya sphaerocephala*	+				+	
Brassicaceae	**Brassica tournefortii*						+
Brassicaceae	**Raphanus raphanistrum*	+			+		
Brassicaceae	**Sisymbrium orientale*					+	
Brassicaceae	*Lepidium rotundum*					+	
Caryophyllaceae	**Petrorhagia dubia*	+				+	
Caryophyllaceae	**Stellaria pallida*				+		
Casuarinaceae	*Allocasuarina acutivalvis subsp. acutivalvis*					+	
Casuarinaceae	*Allocasuarina campestris*					+	
Casuarinaceae	*Allocasuarina helmsii*	+					
Casuarinaceae	*Allocasuarina humilis*	+					
Casuarinaceae	*Allocasuarina thuyoides*	+					
Chenopodiaceae	*Atriplex semibaccata*				+		

Family	Taxon	Calingiri (SLK 80.6 - 112.4)	Dalwallinu Bypass (SLK 231.77 - 234.85)	Moore River (SLK 115.8 - 126.8)	Midlands Road to Bindi Bindi (SLK 147 - 165.85)	Nugadong to Wubin (SLK 234.85 - 264.01)	Pithara (SLK 207.72 - 231.77)
Chenopodiaceae	*Enchylaena tomentosa*			+		+	+
Chenopodiaceae	*Enchylaena tomentosa var. tomentosa*					+	
Chenopodiaceae	*Maireana brevifolia*			+	+		
Chenopodiaceae	*Maireana georgei*						+
Chenopodiaceae	*Maireana marginata*						+
Chenopodiaceae	*Rhagodia drummondii*					+	+
Chenopodiaceae	*Rhagodia preissii subsp. preissii*						+
Chenopodiaceae	*Sclerolaena diacantha*					+	+
Chenopodiaceae	*Sclerolaena eurotioides*					+	
Colchicaceae	*Burchardia congesta*	+					
Colchicaceae	*Iphigenia indica*					+	
Convolvulaceae	**Cuscuta planiflora*						+
Crassulaceae	*Crassula colorata var. acuminata*					+	+
Crassulaceae	*Crassula colorata var. colorata*					+	
Cyperaceae	**Cyperus polystachyos*	+					
Cyperaceae	*Chrysitrix distigmatosa*					+	
Cyperaceae	*Gahnia drummondii*					+	
Cyperaceae	*Lepidosperma asperatum*	+					
Cyperaceae	*Lepidosperma costale*				+		
Cyperaceae	*Schoenus hexandrus*					+	
Cyperaceae	*Schoenus nanus*	+					
Dilleniaceae	*Hibbertia drummondii*					+	
Dilleniaceae	*Hibbertia hypericoides*	+					
Dilleniaceae	*Hibbertia rupicola*	+					
Droseraceae	*Drosera bulbosa subsp. bulbosa*	+					
Droseraceae	*Drosera callistos*	+					
Droseraceae	*Drosera erythrorhiza subsp. collina*	+					
Droseraceae	*Drosera macrantha subsp. macrantha*	+				+	
Droseraceae	*Drosera sp.*	+					
Ecdeiocoleaceae	*Ecdeiocolea monostachya*					+	
Elaeocarpaceae	*Tetratheca confertifolia*	+					
Ericaceae	*Astroloma serratifolium*	+					
Ericaceae	*Leucopogon pulchellus*	+					
Euphorbiaceae	*Ricinocarpos velutinus*					+	
Fabaceae	**Medicago minima*					+	
Fabaceae	**Trifolium hirtum*	+				+	

Family	Taxon	Calingiri (SLK 80.6 - 112.4)	Dalwallinu Bypass (SLK 231.77 - 234.85)	Moore River (SLK 115.8 - 126.8)	Midlands Road to Bindi Bindi (SLK 147 - 165.85)	Nugadong to Wubin (SLK 234.85 - 264.01)	Pithara (SLK 207.72 - 231.77)
Fabaceae	**Trifolium subterraneum*				+		
Fabaceae	*Acacia acuaria*					+	+
Fabaceae	*Acacia acuminata*			+	+	+	+
Fabaceae	*Acacia assimilis*					+	
Fabaceae	*Acacia assimilis subsp. assimilis*					+	
Fabaceae	*Acacia drummondii subsp. affinis P3*	+					
Fabaceae	*Acacia hemiteles*						+
Fabaceae	*Acacia isoneura subsp. nimia P3*					+	
Fabaceae	*Acacia lasiocarpa var. sedifolia*	+					
Fabaceae	*Acacia microbotrya*	+			+	+	
Fabaceae	*Acacia neurophylla subsp. erugata*					+	
Fabaceae	*Acacia resinimarginea*					+	
Fabaceae	*Acacia scalena P3*					+	
Fabaceae	*Bossiaea eriocarpa*	+					
Fabaceae	*Bossiaea spinescens*	+					
Fabaceae	*Daviesia debilior subsp. sinuans P3*					+	
Fabaceae	*Daviesia divaricata*	+					
Fabaceae	*Daviesia podophylla*	+					
Fabaceae	*Gastrolobium bilobum*	+					
Fabaceae	*Gastrolobium spathulatum*	+					
Fabaceae	*Hovea pungens*	+					
Geraniaceae	*Erodium cygnorum*						+
Goodeniaceae	*Dampiera lavandulacea*	+		+		+	+
Goodeniaceae	*Dampiera lindleyi*	+					
Goodeniaceae	*Dampiera oligophylla*					+	
Goodeniaceae	*Goodenia berardiana*	+				+	+
Goodeniaceae	*Goodenia pusilliflora*					+	
Goodeniaceae	*Lechenaultia biloba*	+					
Goodeniaceae	*Velleia cycnopotamica*					+	+
Goodeniaceae	*Velleia discophora*					+	
Haemodoraceae	*Conostylis setosa*	+					
Haemodoraceae	*Conostylis teretifolia subsp. planescens*	+					
Haemodoraceae	*Conostylis tomentosa*	+					
Haemodoraceae	*Haemodorum ? discolor*	+					
Haemodoraceae	*Haemodorum sp.*	+					
Haemodoraceae	*Haemodorum spicatum*	+					

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Hemerocallidaceae	*Dianella revoluta*	+					
Hemerocallidaceae	*Dianella revoluta var. divaricata*			+		+	+
Hypoxidaceae	*Pauridia glabella var. leptantha*	+				+	
Iridaceae	**Freesia sp.*	+					
Iridaceae	**Romulea rosea*	+					+
Iridaceae	**Romulea rosea var. australis*			+	+		
Iridaceae	**Romulea rosea var. communis*	+					
Iridaceae	*Orthrosanthus laxus var. gramineus*	+					
Juncaceae	**Juncus acutus*	+					
Juncaceae	*Juncus kraussii subsp. australiensis*	+					
Juncaginaceae	*Triglochin sp. A Flora of Australia (G.J. Keighery 2477)*				+		
Lamiaceae	*Westringia cephalantha*					+	
Lauraceae	*Cassytha ? Glabella*				+		
Lauraceae	*Cassytha nodiflora*		+				
Lauraceae	*Cassytha sp.*					+	
Malvaceae	*Corchorus lasiocarpus*						+
Malvaceae	*Thomasia foliosa*	+					
Malvaceae	*Thomasia grandiflora*	+					
Myrtaceae	*Astartea scoparia*	+					
Myrtaceae	*Baeckea sp. Dudawa (M.E. Trudgen MET 5369)*					+	
Myrtaceae	*Baeckea sp. Wubin (M.E. Trudgen 5404)*					+	
Myrtaceae	*Calothamnus pachystachyus P4*	+					
Myrtaceae	*Calytrix gracilis*					+	
Myrtaceae	*Chamelaucium brevifolium*					+	
Myrtaceae	*Chamelaucium drummondii*					+	
Myrtaceae	*Corymbia calophylla*	+					
Myrtaceae	*Cyathostemon heterantherus*					+	
Myrtaceae	*Darwinia sp. Bindoon (S. Patrick 281)*		+				
Myrtaceae	*Enekbatus sessilis*					+	
Myrtaceae	*Ericomyrtus tenuior*	+					
Myrtaceae	*Eucalyptus accedens*	+					

Family	Taxon	Calingiri (SLK 80.6 - 112.4)	Dalwallinu Bypass (SLK 231.77 - 234.85)	Moore River (SLK 115.8 - 126.8)	Midlands Road to Bindi Bindi (SLK 147 - 165.85)	Nugadong to Wubin (SLK 234.85 - 264.01)	Pithara (SLK 207.72 - 231.77)
Myrtaceae	*Eucalyptus leptopoda subsp. arctata*					+	
Myrtaceae	*Eucalyptus loxophleba subsp. lissophloia*					+	
Myrtaceae	*Eucalyptus loxophleba subsp. loxophleba*	+		+	+	+	+
Myrtaceae	*Eucalyptus rudis*	+					
Myrtaceae	*Eucalyptus salubris*						+
Myrtaceae	*Eucalyptus sp.*					+	
Myrtaceae	*Eucalyptus wandoo*	+					
Myrtaceae	*Eucalyptus wandoo subsp. wandoo*	+			+		
Myrtaceae	*Malleostemon roseus*					+	
Myrtaceae	*Melaleuca acuminata subsp. websteri*					+	+
Myrtaceae	*Melaleuca adnata*						+
Myrtaceae	*Melaleuca atroviridis*					+	+
Myrtaceae	*Melaleuca conothamnoides*					+	
Myrtaceae	*Melaleuca cordata*					+	
Myrtaceae	*Melaleuca hamulosa*					+	
Myrtaceae	*Melaleuca radula*	+				+	
Myrtaceae	*Melaleuca stereophloia*						+
Myrtaceae	*Melaleuca viminea subsp. viminea*	+					
Myrtaceae	*Verticordia lindleyi subsp. lindleyi P4*	+					
Orchidaceae	*Caladenia dimidia*					+	
Orchidaceae	*Caladenia roei*					+	
Orchidaceae	*Cyanicula amplexans*					+	
Orchidaceae	*Diuris corymbosa*	+					
Orchidaceae	*Ericksonella saccharata*	+					
Orchidaceae	*Eriochilus dilatatus subsp. multiflorus*	+					
Orchidaceae	*Prasophyllum gracile*					+	
Orchidaceae	*Pterostylis ? spathulata*			+			
Orchidaceae	*Pterostylis recurva*	+					
Orchidaceae	*Pterostylis sp. inland (A.C. Beauglehole 11880)*					+	
Orchidaceae	*Pterostylis vittata*	+					
Orobanchaceae	**Parentucellia latifolia*					+	
Oxalidaceae	**Oxalis corniculata*			+		+	
Oxalidaceae	**Oxalis pes-caprae*	+					
Oxalidaceae	**Oxalis purpurea*	+					

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Phyllanthaceae	*Phyllanthus calycinus*	+					
Plantaginaceae	*Plantago hispida*					+	
Poaceae	**Aira cupaniana*					+	
Poaceae	**Avena barbata*	+		+	+	+	+
Poaceae	**Bromus diandrus*				+		
Poaceae	**Bromus rubens*				+	+	+
Poaceae	**Cynodon dactylon*	+					
Poaceae	**Ehrharta longiflora*	+		+	+	+	+
Poaceae	**Eragrostis curvula*				+		
Poaceae	**Lamarckia aurea*					+	
Poaceae	**Lolium rigidum*	+		+	+		
Poaceae	**Pentameris airoides*					+	+
Poaceae	**Triticum aestivum*	+					
Poaceae	**Vulpia muralis*	+					
Poaceae	*Amphipogon caricinus*					+	
Poaceae	*Amphipogon turbinatus*	+					
Poaceae	*Aristida contorta*					+	+
Poaceae	*Austrostipa elegantissima*	+			+	+	+
Poaceae	*Austrostipa nitida*						+
Poaceae	*Austrostipa platychaeta*			+	+		
Poaceae	*Austrostipa scabra*						+
Poaceae	*Austrostipa trichophylla*					+	+
Poaceae	*Neurachne alopecuroidea*	+			+	+	
Poaceae	*Rytidosperma ? setaceum*					+	
Poaceae	*Rytidosperma acerosum*		+				
Poaceae	*Rytidosperma caespitosum*					+	
Polygalaceae	*Comesperma integerrimum*	+		+	+		
Polygalaceae	*Comesperma volubile*	+					
Polygonaceae	**Rumex hypogaeus*					+	
Portulacaceae	*Calandrinia baccata*						+
Portulacaceae	*Calandrinia calyptrata*				+	+	
Portulacaceae	*Calandrinia eremaea*					+	+
Portulacaceae	*Calandrinia granulifera*					+	+
Primulaceae	**Lysimachia arvensis*	+					
Proteaceae	*Adenanthos cygnorum*	+					
Proteaceae	*Banksia benthamiana P4*					+	
Proteaceae	*Banksia bipinnatifida subsp. multifida*	+					

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Proteaceae	*Banksia lindleyana*	+					
Proteaceae	*Banksia polycephala*	+					
Proteaceae	*Banksia sp.*	+					
Proteaceae	*Banksia squarrosa subsp. squarrosa*	+					
Proteaceae	*Conospermum densiflorum subsp. unicephalatum EN*	+					
Proteaceae	*Grevillea ? biternata*			+			
Proteaceae	*Grevillea ? obliquistigma*					+	
Proteaceae	*Grevillea drummondii P4*	+					
Proteaceae	*Grevillea levis*					+	
Proteaceae	*Grevillea paradoxa*					+	
Proteaceae	*Grevillea petrophiloides subsp. petrophiloides*					+	
Proteaceae	*Grevillea sp. GNH*					+	
Proteaceae	*Hakea incrassata*	+					
Proteaceae	*Hakea lissocarpha*	+					
Proteaceae	*Hakea preissii*			+		+	
Proteaceae	*Hakea recurva subsp. recurva*					+	+
Proteaceae	*Hakea undulata*	+					
Proteaceae	*Persoonia rufiflora*					+	
Proteaceae	*Persoonia sulcata P4*	+					
Proteaceae	*Petrophile incurvata*					+	
Proteaceae	*Petrophile shuttleworthiana*					+	
Proteaceae	*Petrophile striata*	+					
Proteaceae	*Synaphea sp. GNH*	+					
Pteridaceae	*Cheilanthes adiantoides*					+	
Pteridaceae	*Cheilanthes austrotenuifolia*	+					
Pteridaceae	*Cheilanthes sieberi*					+	
Restionaceae	*Desmocladus asper*	+					
Restionaceae	*Loxocarya cinerea*	+					
Rhamnaceae	*Cryptandra apetala var. apetala*					+	
Rhamnaceae	*Cryptandra nutans*	+					
Rhamnaceae	*Stenanthemum pomaderroides*					+	
Rubiaceae	*Opercularia echinocephala*	+					
Rubiaceae	*Opercularia vaginata*	+					
Rutaceae	*Phebalium lepidotum*					+	

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Rutaceae	*Phebalium tuberculosum*					+	
Sapindaceae	*Dodonaea inaequifolia*					+	
Scrophulariaceae	*Eremophila drummondii*						+
Scrophulariaceae	*Eremophila glabra*						+
Solanaceae	*Solanum lasiophyllum*						+
Stylidiaceae	*Levenhookia dubia*					+	
Stylidiaceae	*Levenhookia pusilla*	+					
Stylidiaceae	*Stylidium repens*	+					
Stylidiaceae	*Stylidium sp. Bindoon (K.F. Kenneally 11405)*	+					
Thymelaeaceae	*Pimelea avonensis*					+	
Typhaceae	**Typha orientalis*	+					
Xanthorrhoeaceae	*Xanthorrhoea preissii*	+					
Zamiaceae	*Macrozamia riedlei*	+					

Appendix 5
Vegetation association, conservation significant flora, and declared pests (Calingiri)

Conservation significant flora

- EN (EPBC; WC Act), *Conospermum densiflorum* subsp. *unicephalatum*
- P3, *Acacia drummondii* subsp. *affinis*
- P4, *Calothamnus pachystachyus*
- P4, *Grevillea drummondii*
- P4, *Hibbertia miniata*
- P4, *Persoonia sulcata*
- P4, *Verticordia lindleyi* subsp. *lindleyi*
- Gaps study area
- Initial study area

Vegetation Association

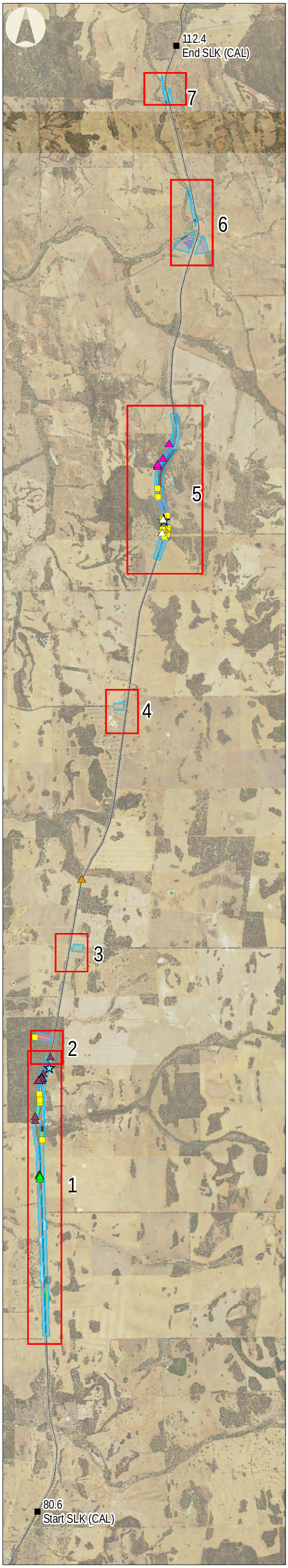
- 4 - Medium woodland; Marri and Wandoo
- 7 - Medium woodland; York Gum *(Eucalyptus loxophleba)* and Wandoo
- 946 - Medium woodland; Wandoo
- 950 - Medium woodland; *Casuarina obesa*
- 965 - Medium woodland; Jarrah and Marri
- 968 - Medium woodland; Jarrah, Marri and Wandoo
- 991 - Medium woodland; small Wandoo patches surrounded by other Eucalypts
- 1034 - Medium woodland; Marri, Wandoo and Powderbark
- 1182 - Medium woodland; *Eucalyptus rudis* and *Melaleuca rhaphiophylla*
- Cleared
- Cleared and Planted
- Pasture
- Pasture and Cleared

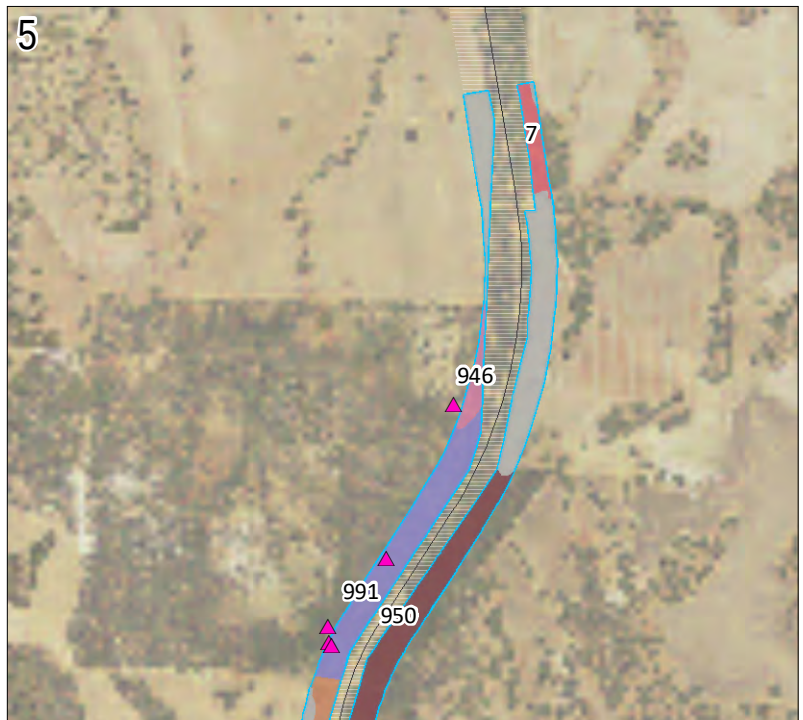
0 0.5 1 2 3 Kilometres
1:80,000

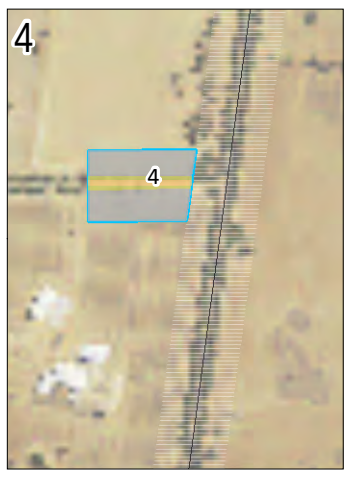
Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 21-Dec-16

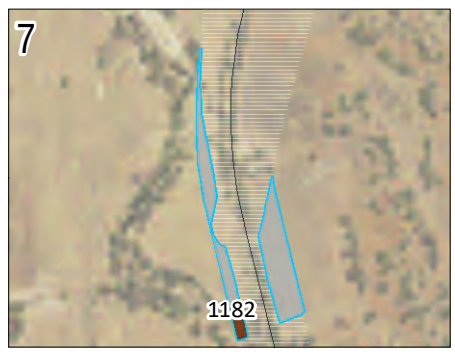
Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

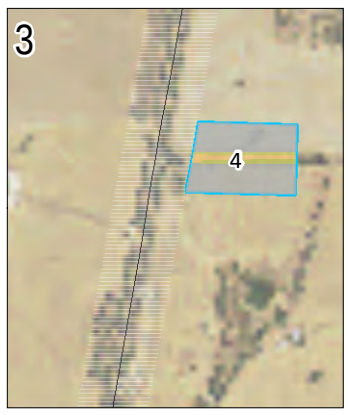
PHOENIX ENVIRONMENTAL SCIENCES

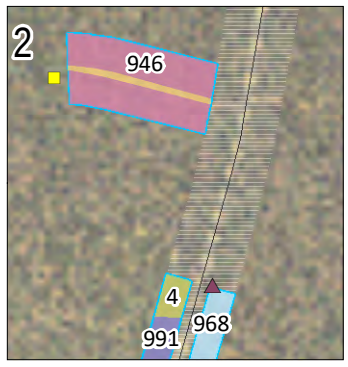


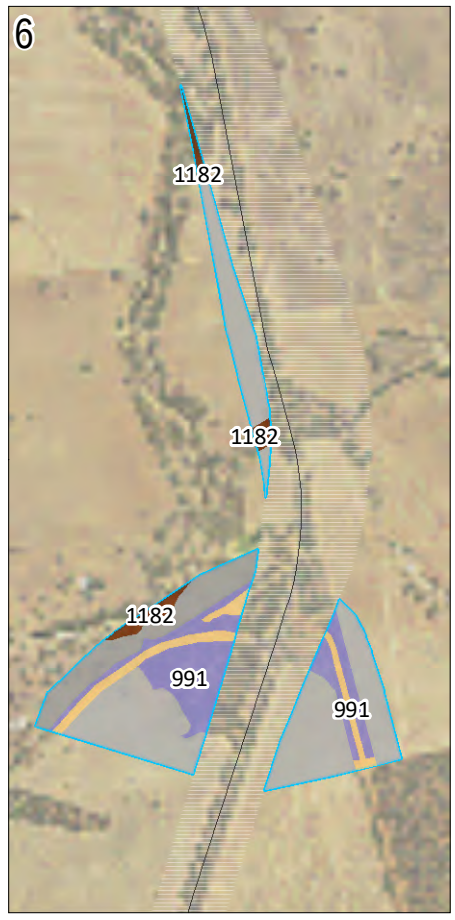












Appendix 5
Vegetation association, conservation significant flora, and declared pests (Moore River)

Gaps study area
Initial study area

Vegetation Association

- 7 - Medium woodland; York Gum *(Eucalyptus loxophleba)* and Wandoo
- 352 - Medium woodland; York Gum
- 676 - Succulent steppe; samphire
- 950 - Medium woodland; *Casuarina obesa*
- Cleared
- Cleared and Planted
- GNH
- Pasture

0 0.5 1 Kilometres
1:50,000

Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 02-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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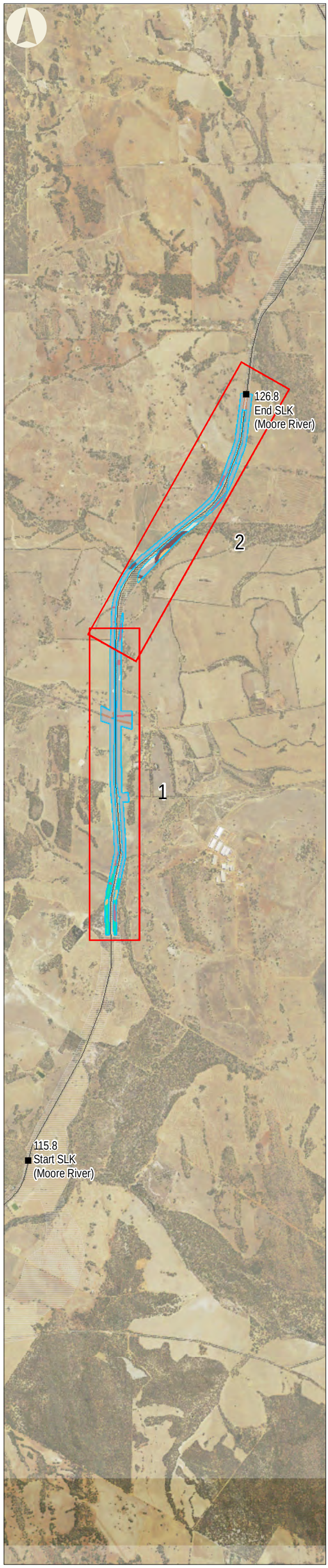
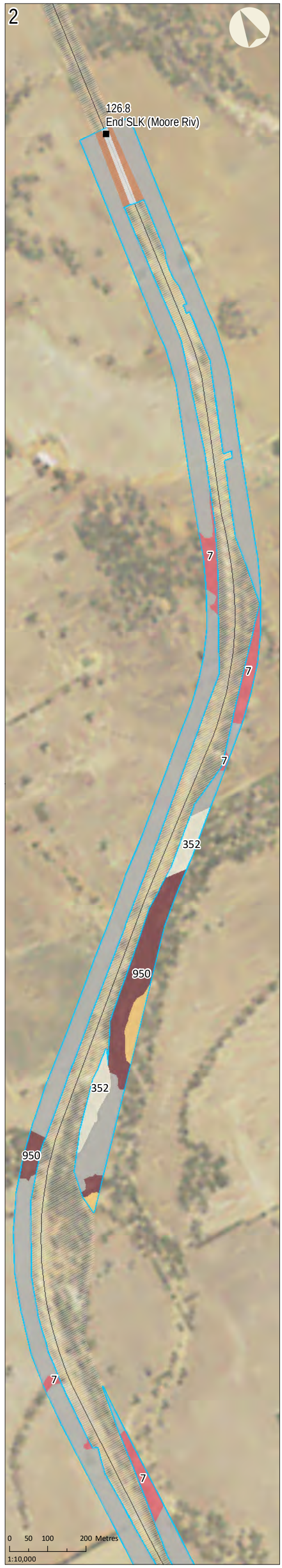


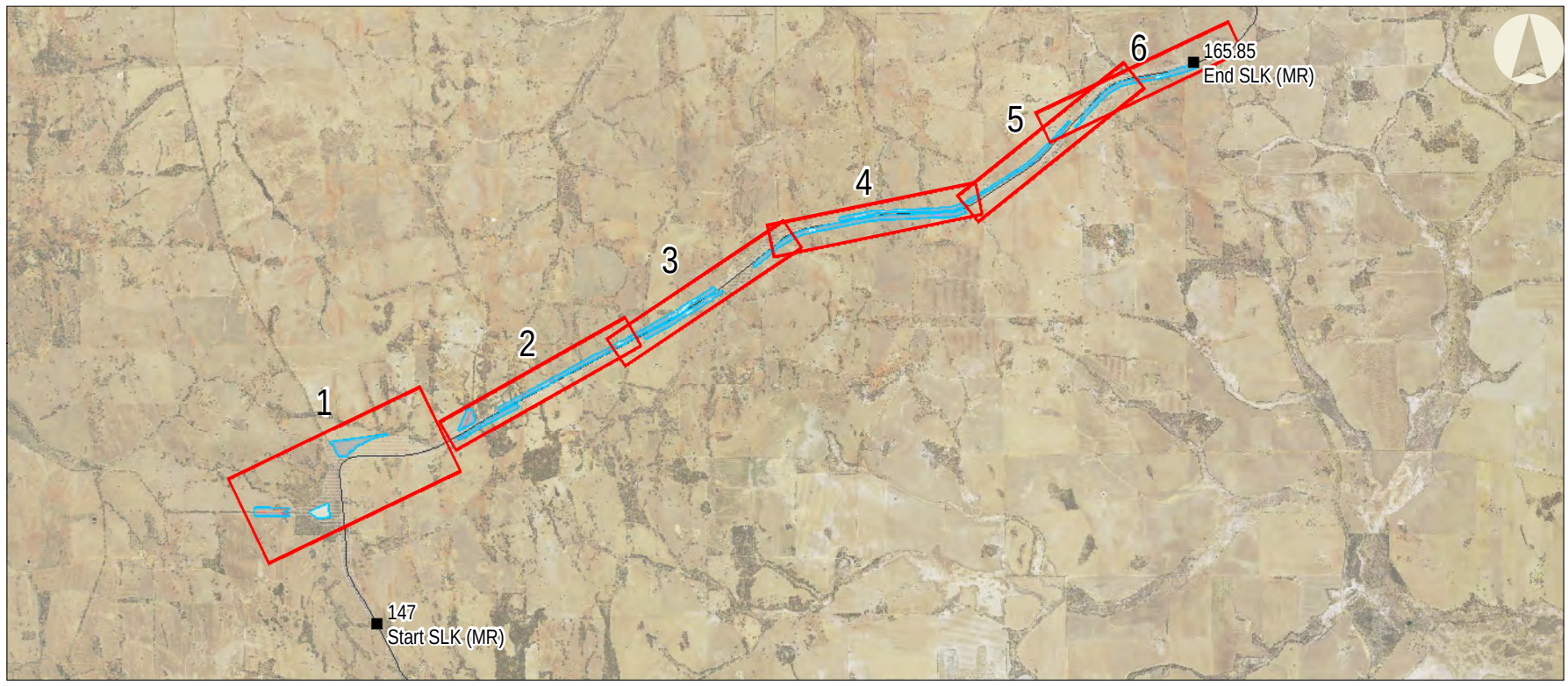


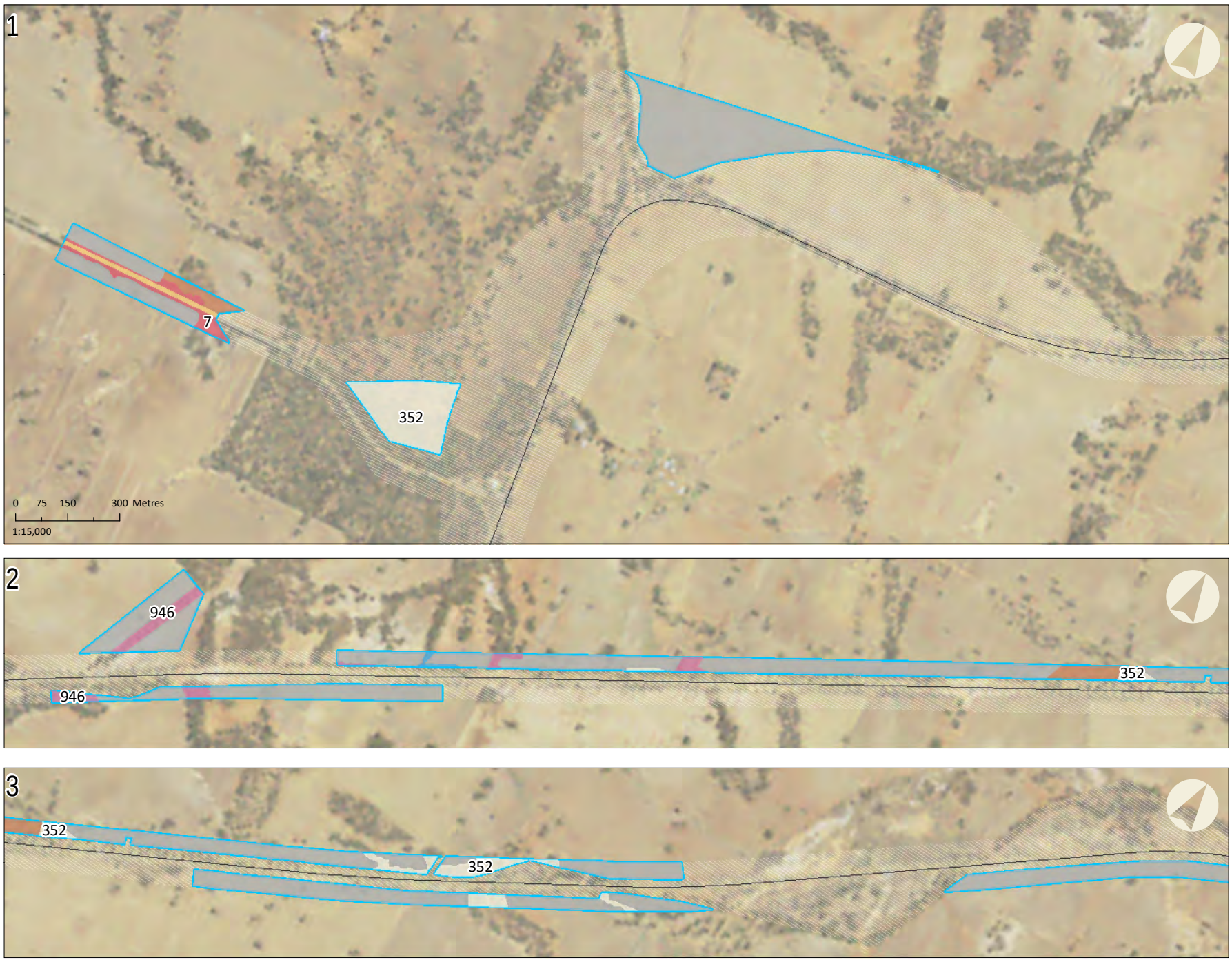
Appendix 5
Vegetation association, conservation significant flora, and declared pests (Midlands Road to Bindi Bindi)

Gaps study area
Initial study area

Vegetation Association

- 7 - Medium woodland; York Gum *(Eucalyptus loxophleba)* and Wandoo
- 142 - Medium woodland; York Gum and Salmon Gum
- 352 - Medium woodland; York Gum
- 676 - Succulent steppe; samphire
- 936 - Medium woodland; Salmon Gum
- 946 - Medium woodland; Wandoo
- Cleared
- Cleared and Planted
- Pasture





0 0.5 1 2 3 Kilometres
1:110,000

Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 02-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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Appendix 5
Vegetation association, conservation significant flora, and declared pests (Pithara)

Gaps study area
Initial study area

Vegetation Association

- 36 - Shrublands; thicket, *Acacia-Casuarina* alliance species
- 352 - Medium woodland; York Gum
- 1024 - Shrublands; Mallee and *Casuarina* thicket
- 1048 - Mosaic: Shrublands; *Melaleuca* patchy scrub/succulent steppe; samphire
- 1413 - Shrublands; *Acacia, Casuarina* and *Melaleuca* thicket
- Cleared
- Cleared and Planted
- Pasture
- Pasture and Cleared

0 0.5 1 2 3 Kilometres
1:100,000

Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 02-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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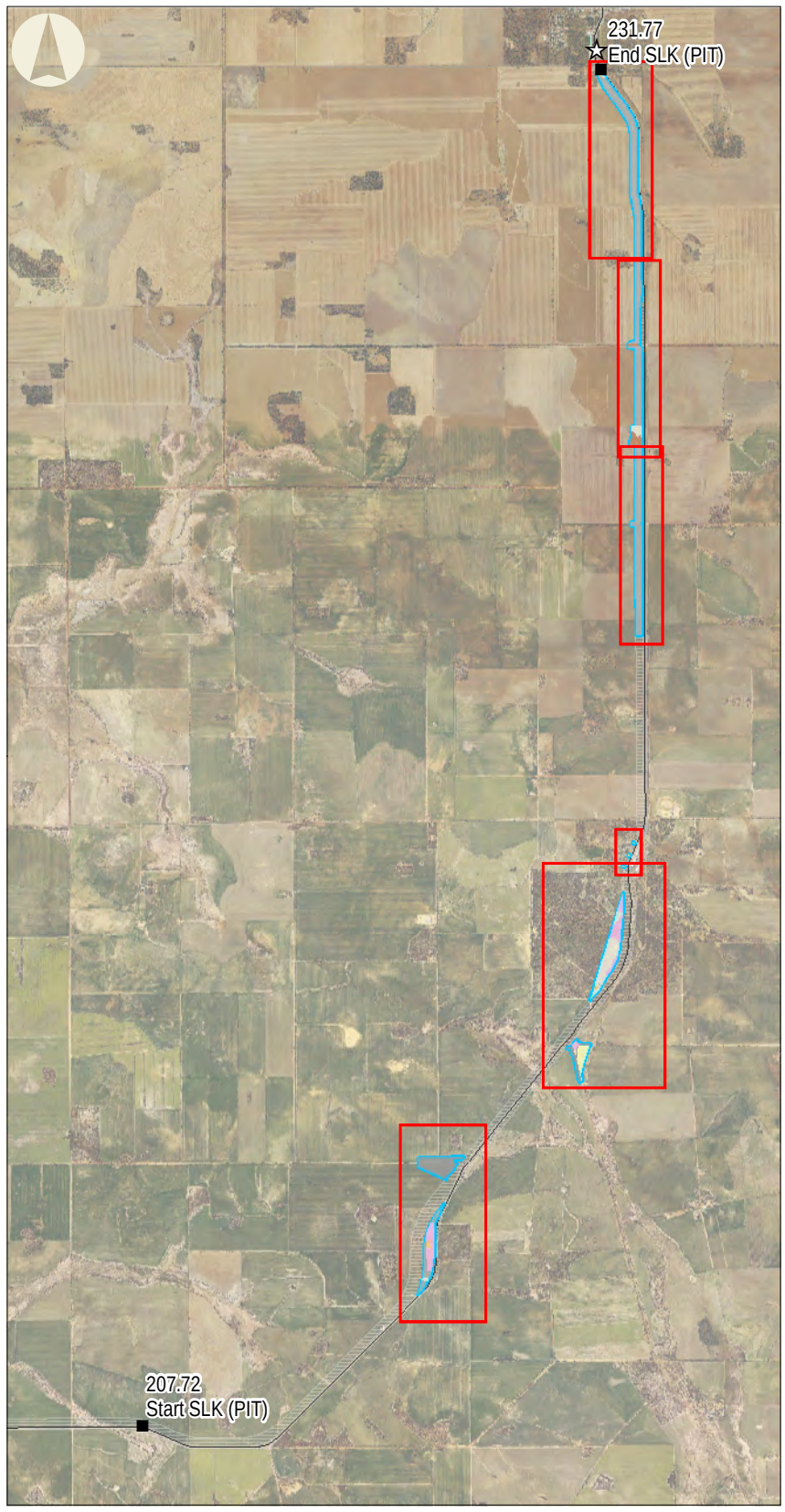

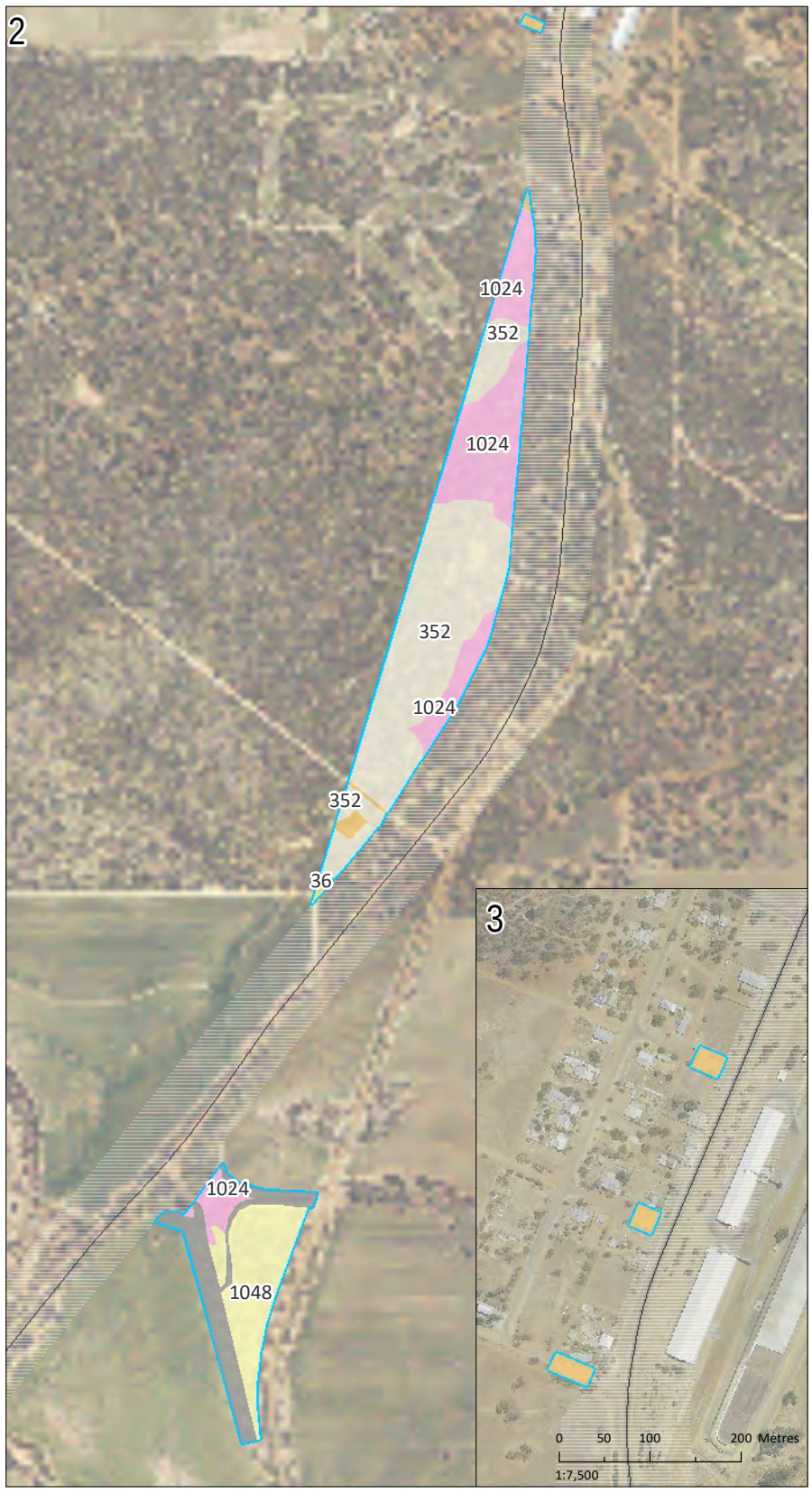

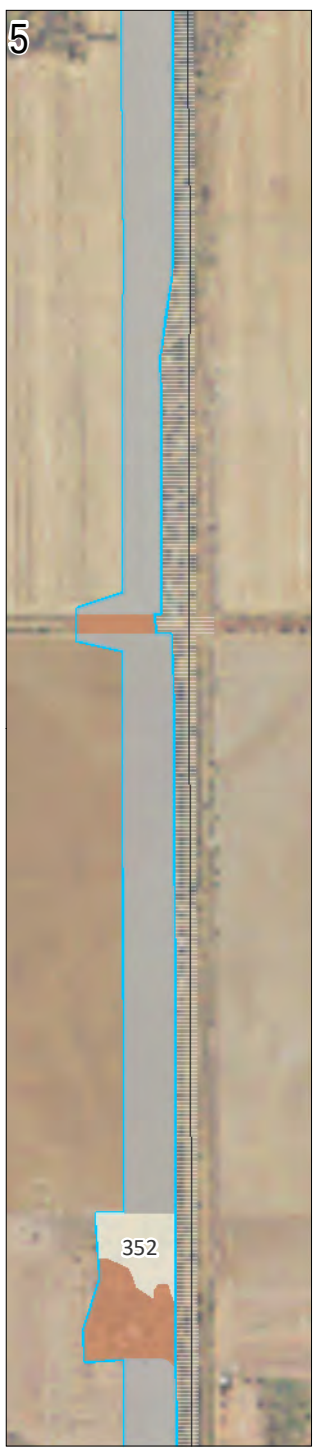

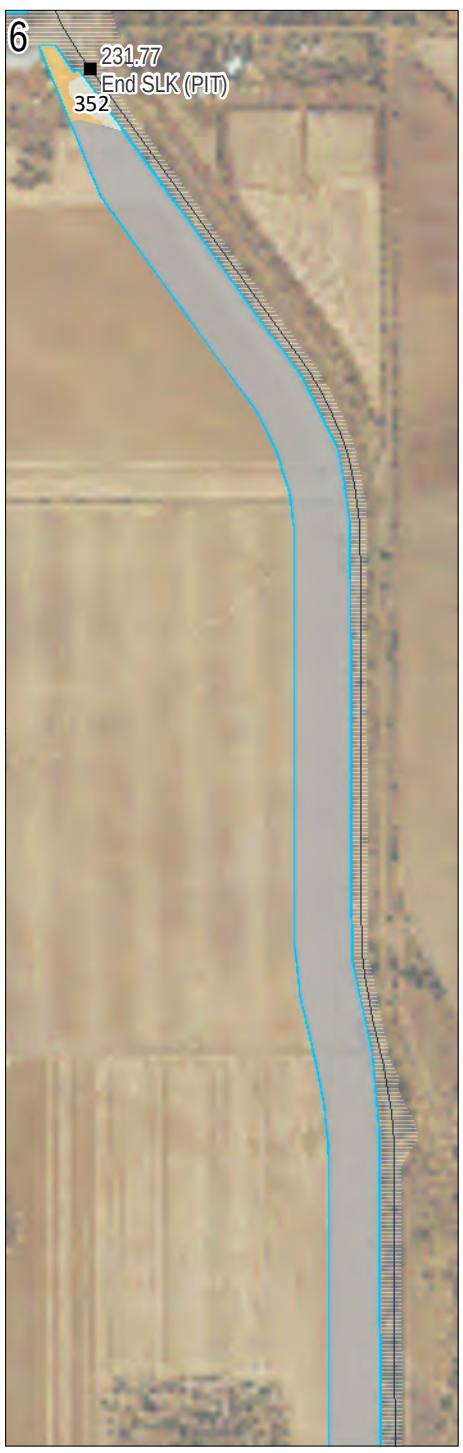

Appendix 5
Vegetation association, conservation significant flora, and declared pests (Dalwallinu Bypass Improvements)

Conservation significant flora

☆ CR (WC Act), *Eremophila pinnatifida*

Gaps study area (DBY shown only)

Initial study area

Vegetation Association

352 - Medium woodland; York Gum

1413 - Shrublands; *Acacia, Casuarina* and *Melaleuca* thicket

Cleared

Cleared and Planted

Pasture

234.85
End SLK (DBY)
Start SLK (NW)

1413

352

231.77
Start SLK (DBY)
End SLK (PIT)

352

0 0.125 0.25 Kilometres
1:7,500

Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 02-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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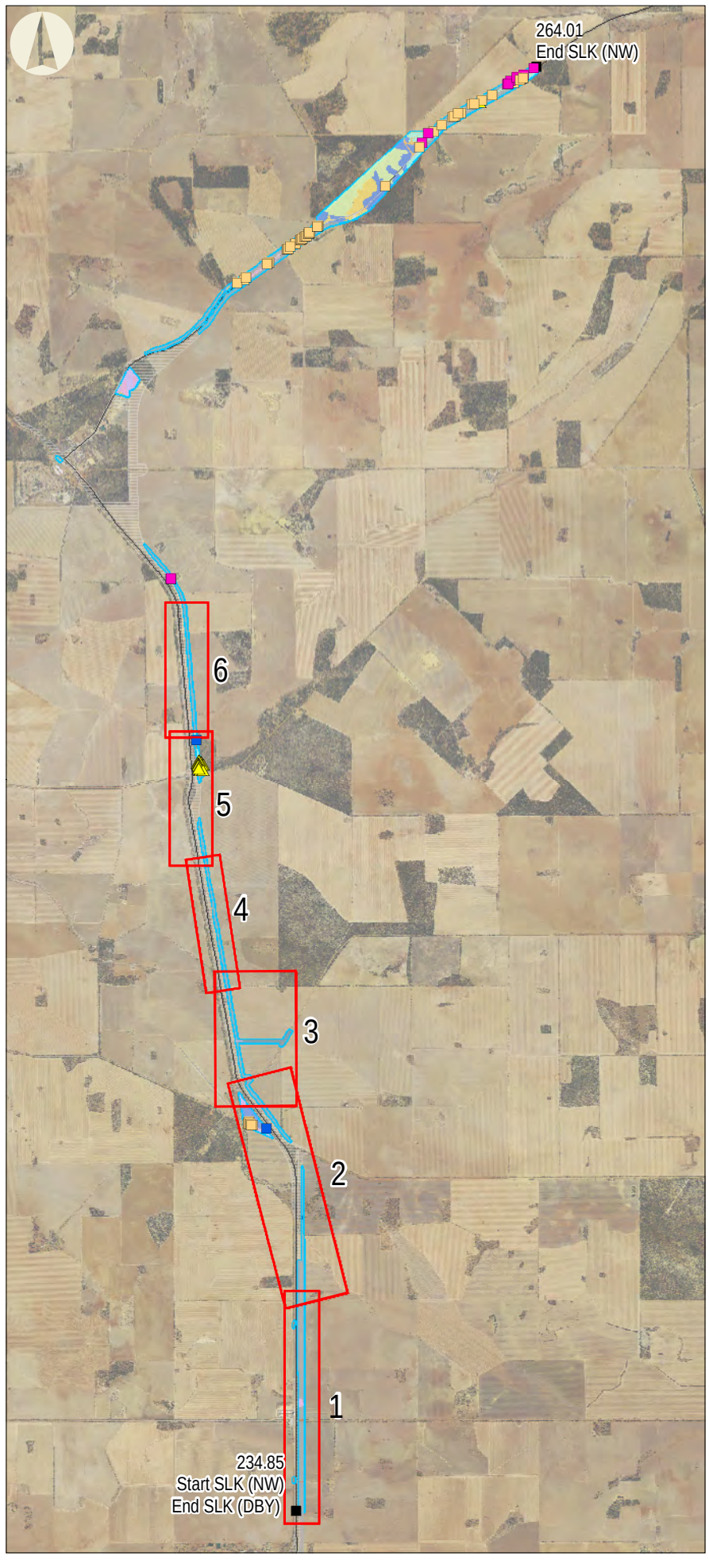
Appendix 5
Vegetation association, conservation significant flora, and declared pests (Nugadong to Wubin - southern section)

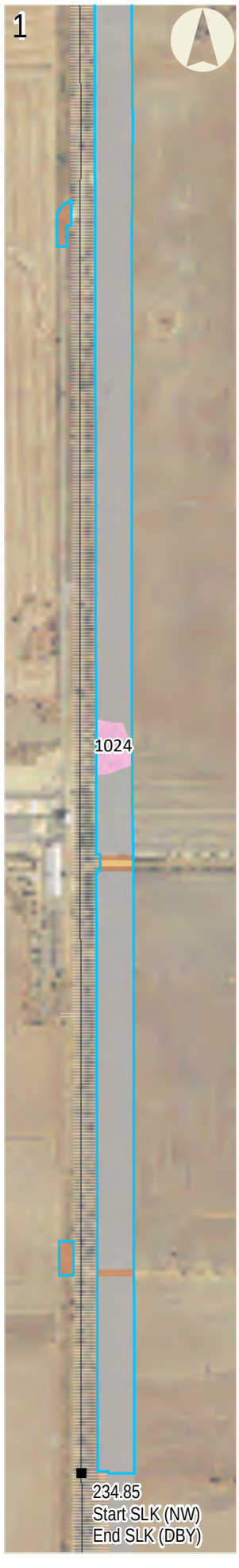
Conservation significant flora

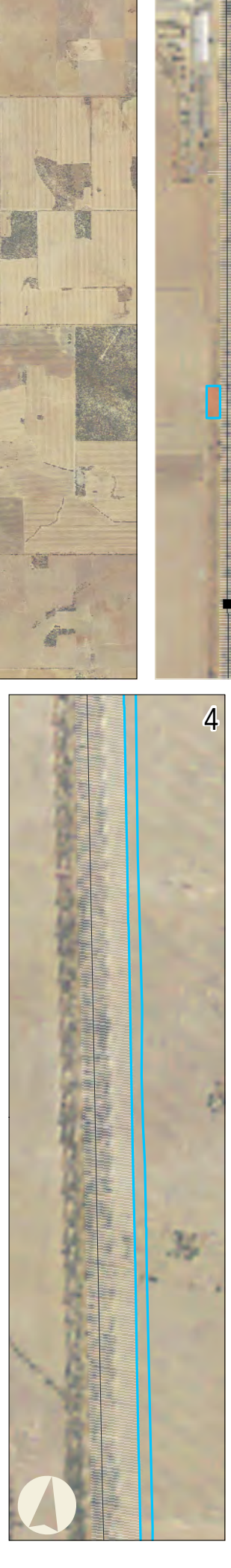
- P3, *Acacia isoneura* subsp. *nimia*
- P3, *Acacia scalena*
- P3, *Daviesia debilior* subsp. *sinuans*
- P4, *Banksia benthamiana*
- Gaps study area (NW shown only)
- Initial study area

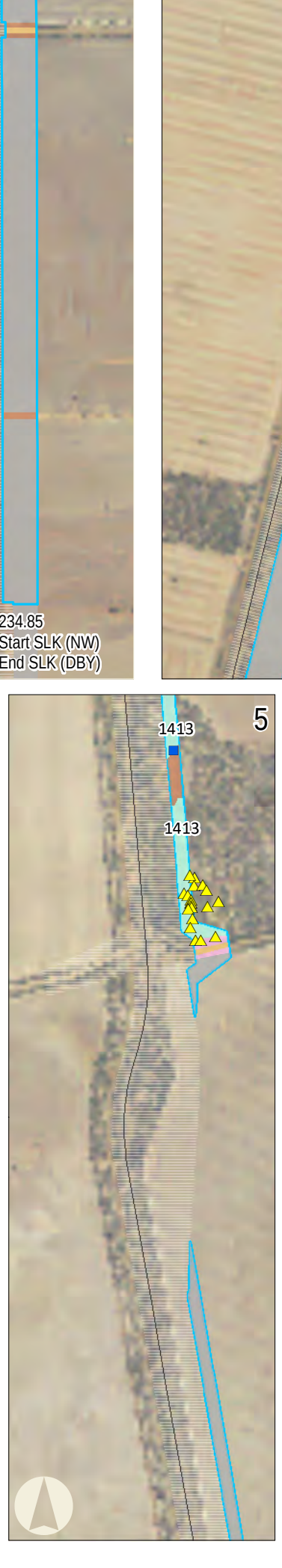
Vegetation Association

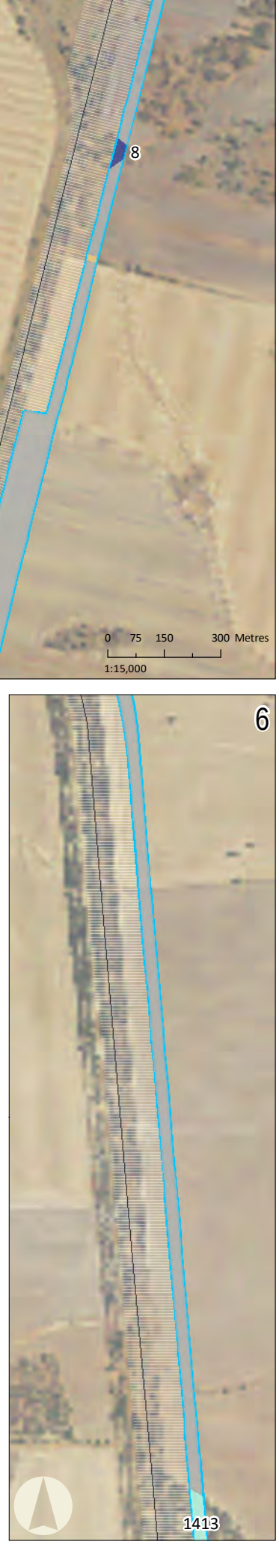
- 8 - Medium woodland; Salmon Gum and Gimlet
- 36 - Shrublands; thicket, *Acacia-Casuarina* alliance species
- 352 - Medium woodland; York Gum
- 495 - Shrublands; thicket, Jam and *Allocasuarina acutivalvis* on ironstone
- 551 - Shrublands; *Allocasuarina campestris* thicket
- 1024 - Shrublands; Mallee and *Casuarina* thicket
- 1413 - Shrublands; *Acacia, Casuarina* and *Melaleuca* thicket
- Cleared
- Cleared and Planted
- GNH
- Pasture
- Pasture and Cleared











0 0.5 1 2 3 Kilometres
1:100,000

Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 02-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

PHOENIX ENVIRONMENTAL SCIENCES

Appendix 5
Vegetation association, conservation significant flora, and declared pests (Nugadong to Wubin - northern section)

Conservation significant flora

- P3, *Acacia isoneura* subsp. *nimia*
- P3, *Acacia scalena*
- P3, *Daviesia debilior* subsp. *sinuans*
- P4, *Banksia benthamiana*

Declared pests

- **Echium plantagineum*
- **Rumex hypogaeus*

Gaps study area (NW shown only)

Initial study area

Vegetation Association

- 8 - Medium woodland; Salmon Gum and Gimlet
- 36 - Shrublands; thicket, *Acacia-Casuarina* alliance species
- 352 - Medium woodland; York Gum
- 495 - Shrublands; thicket, Jam and *Allocasuarina acutivalvis* on ironstone
- 551 - Shrublands; *Allocasuarina campestris* thicket
- 1024 - Shrublands; Mallee and *Casuarina* thicket
- 1413 - Shrublands; *Acacia, Casuarina* and *Melaleuca* thicket
- Cleared
- Cleared and Planted
- GNH
- Pasture
- Pasture and Cleared

0 0.5 1 2 3 Kilometres
1:100,000

Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 02-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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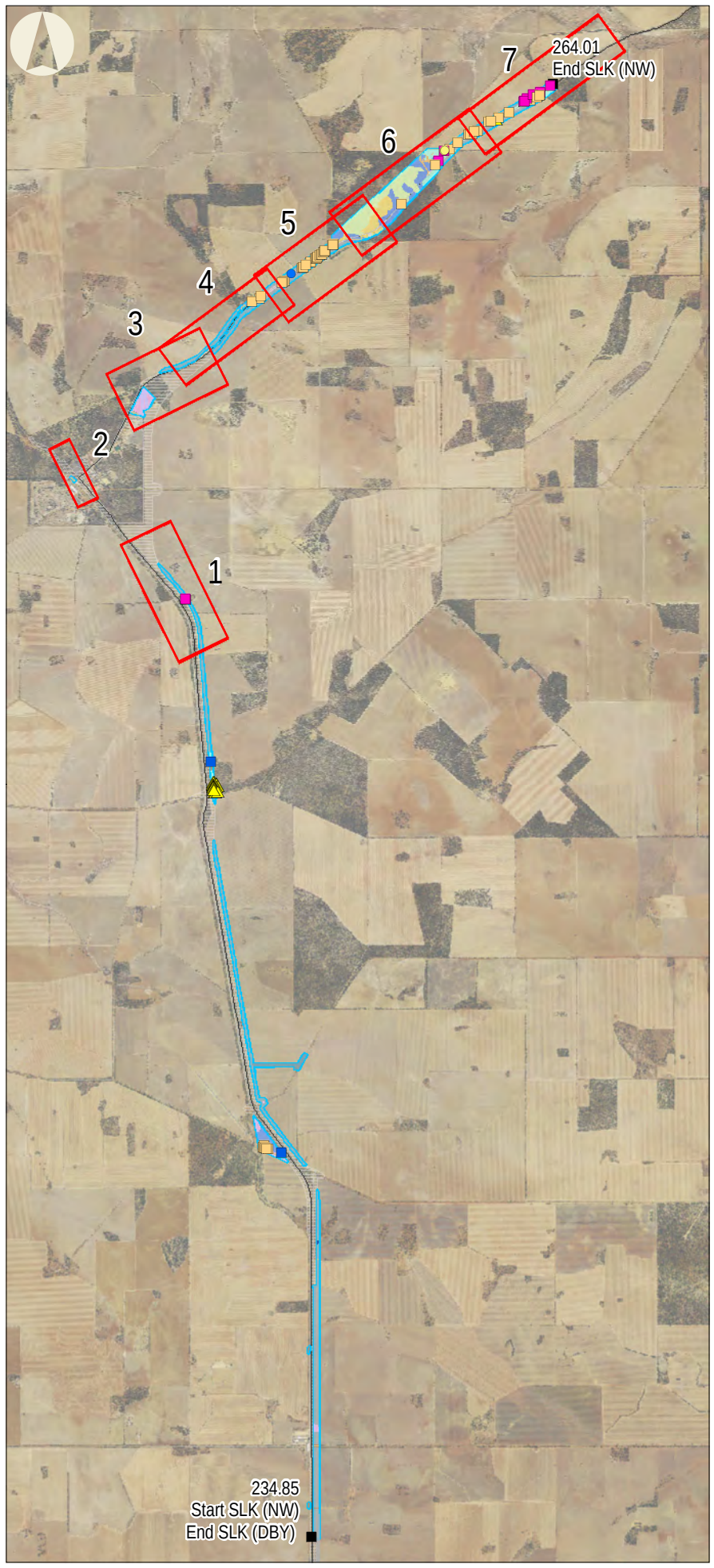

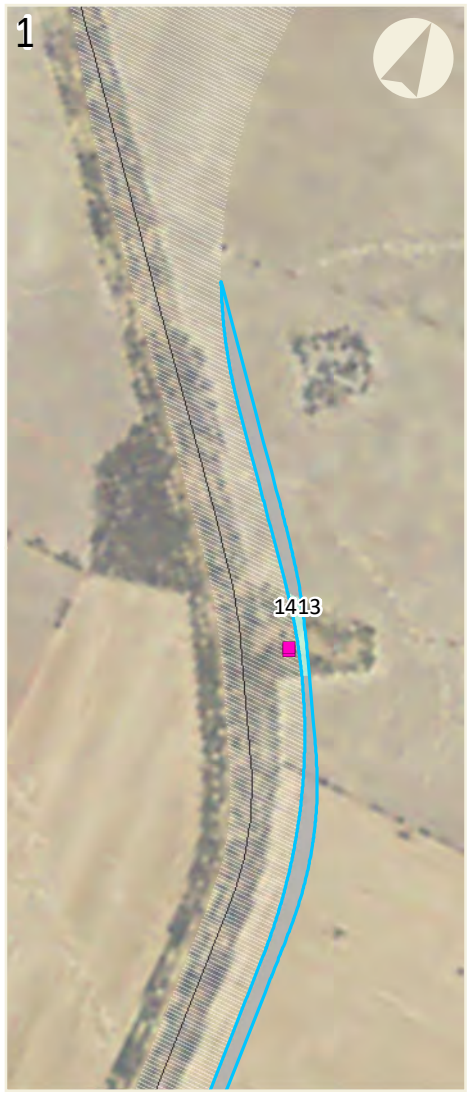

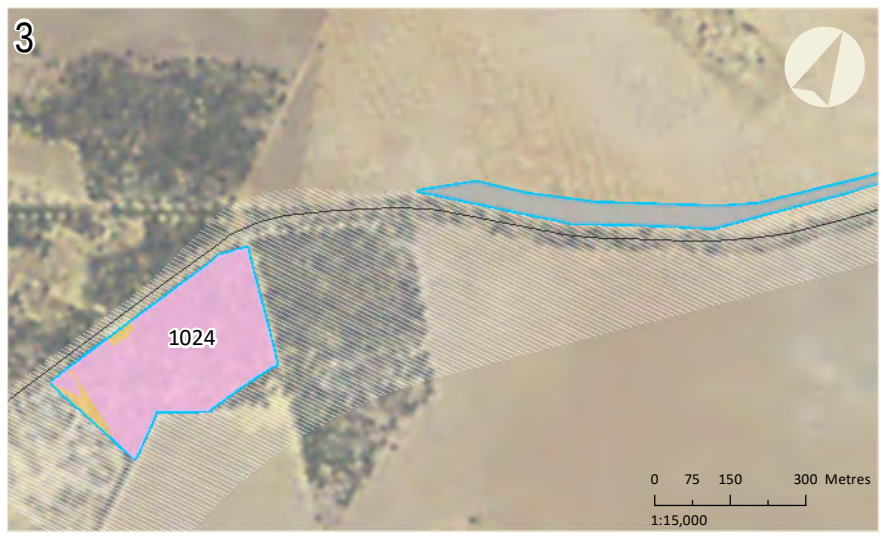

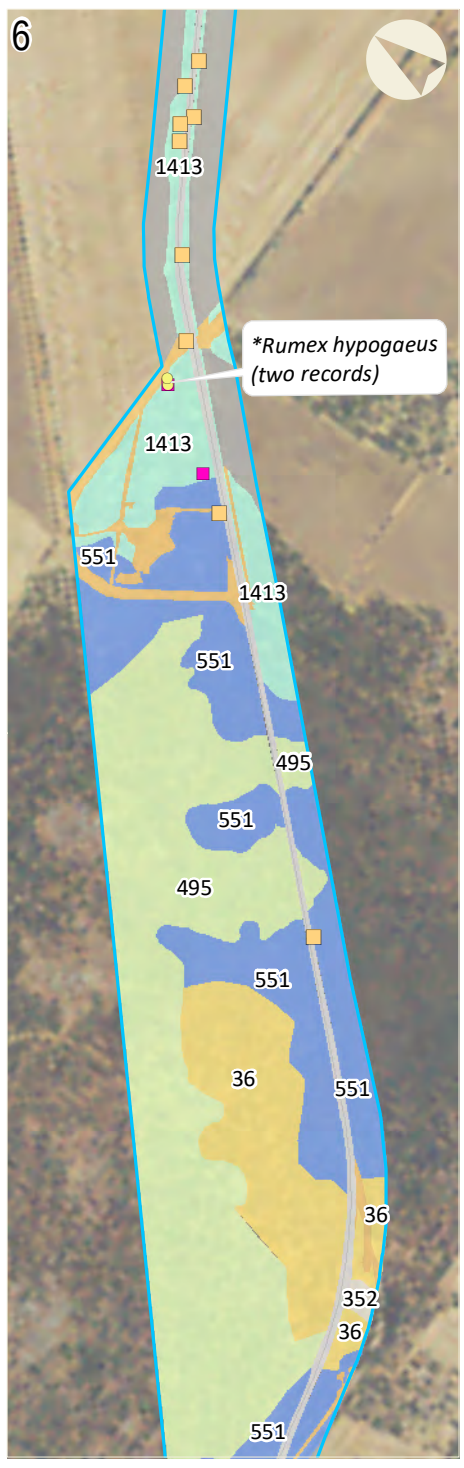

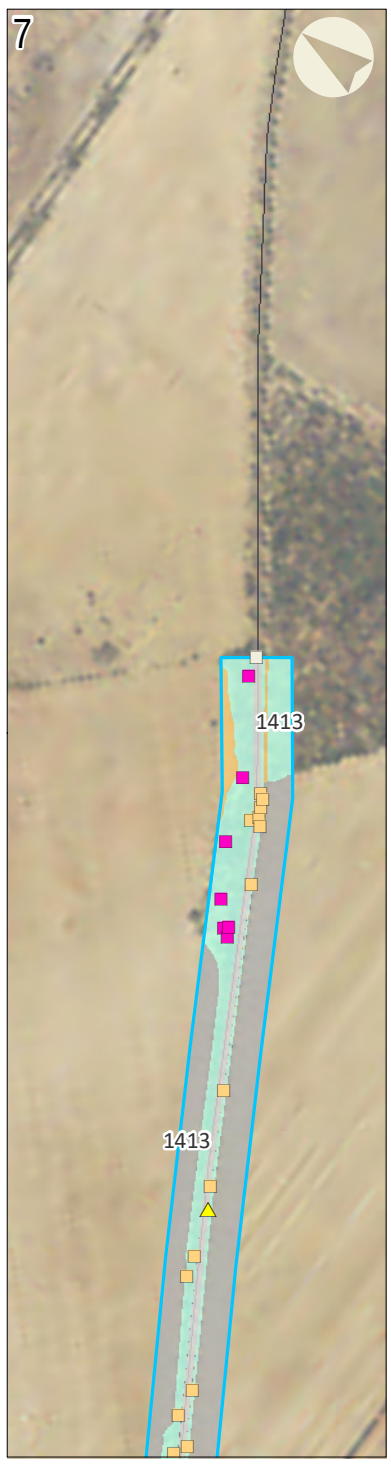

Appendix 6
Vegetation condition (Calingiri)

Gaps study area
Initial study area

Vegetation condition
- Pristine
- Excellent
- Very Good
- Good
- Degraded
- Completely Degraded

0 0.5 1 2 3 Kilometres
1:80,000

Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 30-Nov-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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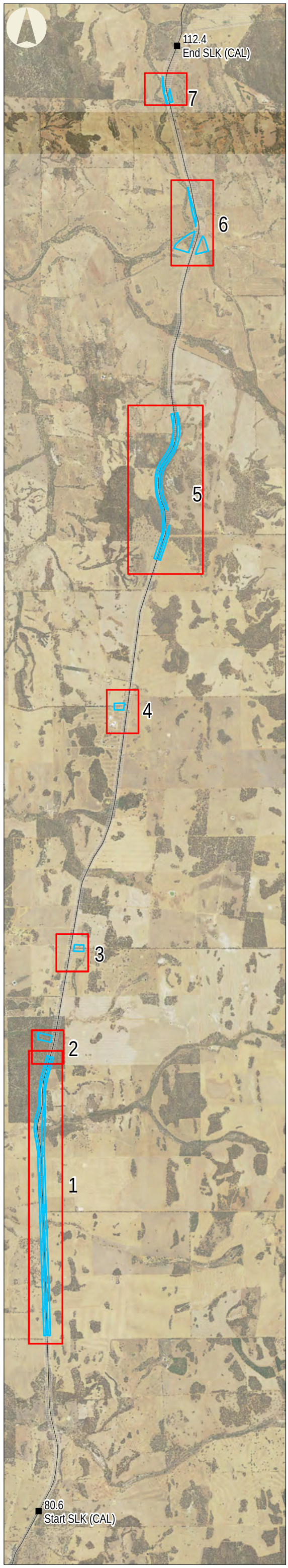
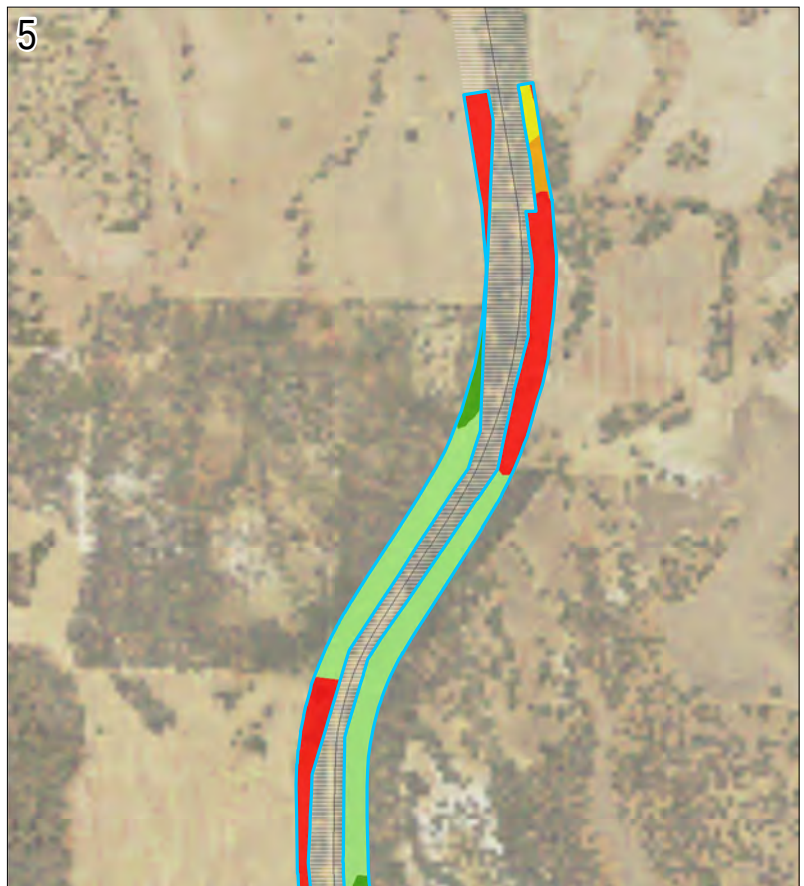
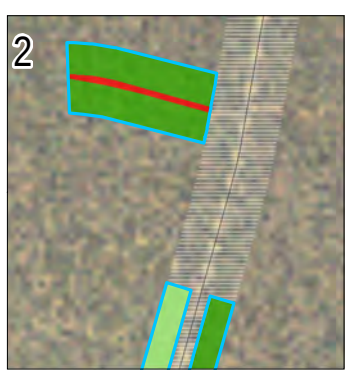
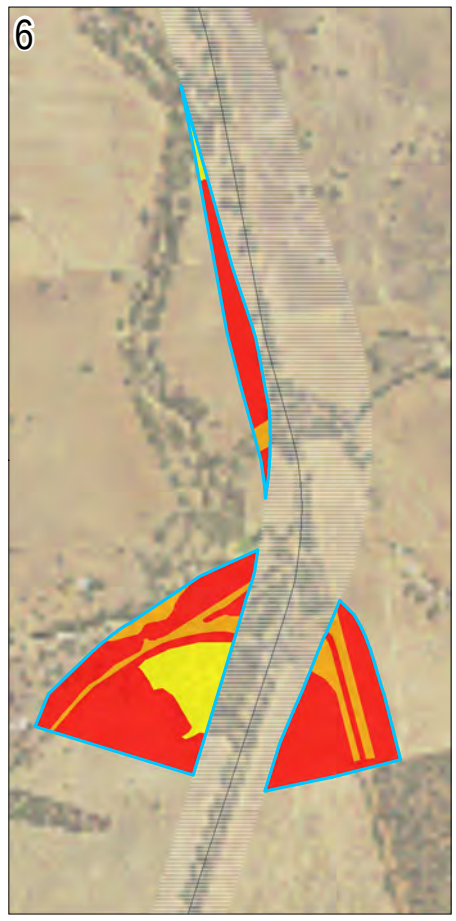






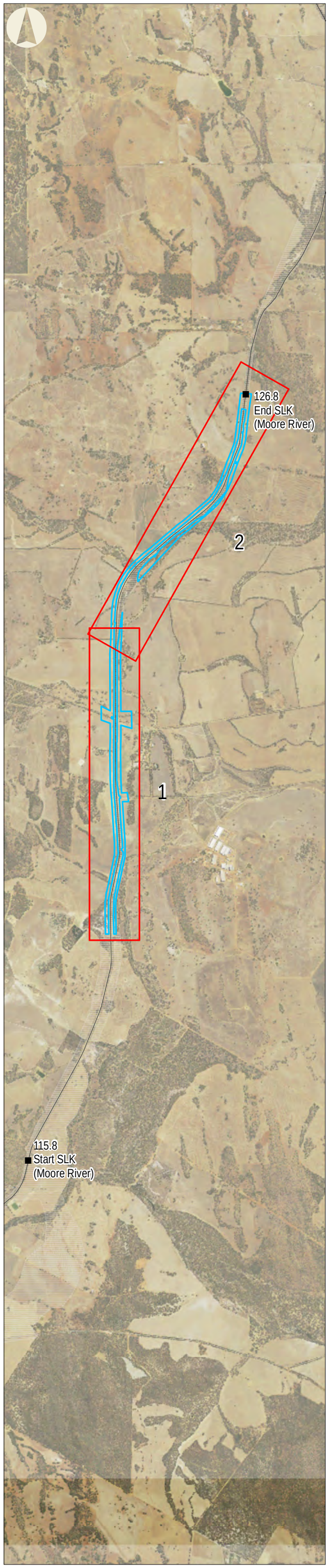


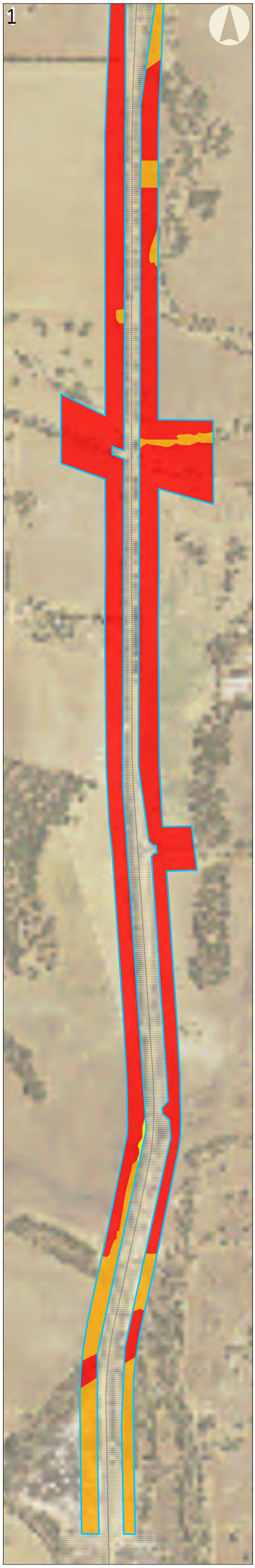
Appendix 6
Vegetation condition
(Moore River)

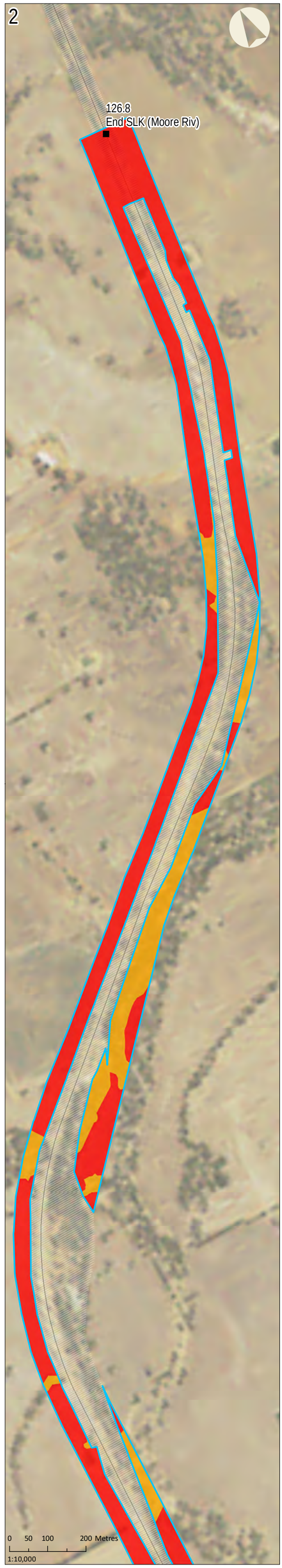
Gaps study area
Initial study area

Vegetation condition

Pristine
Excellent
Very Good
Good
Degraded
Completely Degraded







0 0.5 1 Kilometres
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Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 30-Nov-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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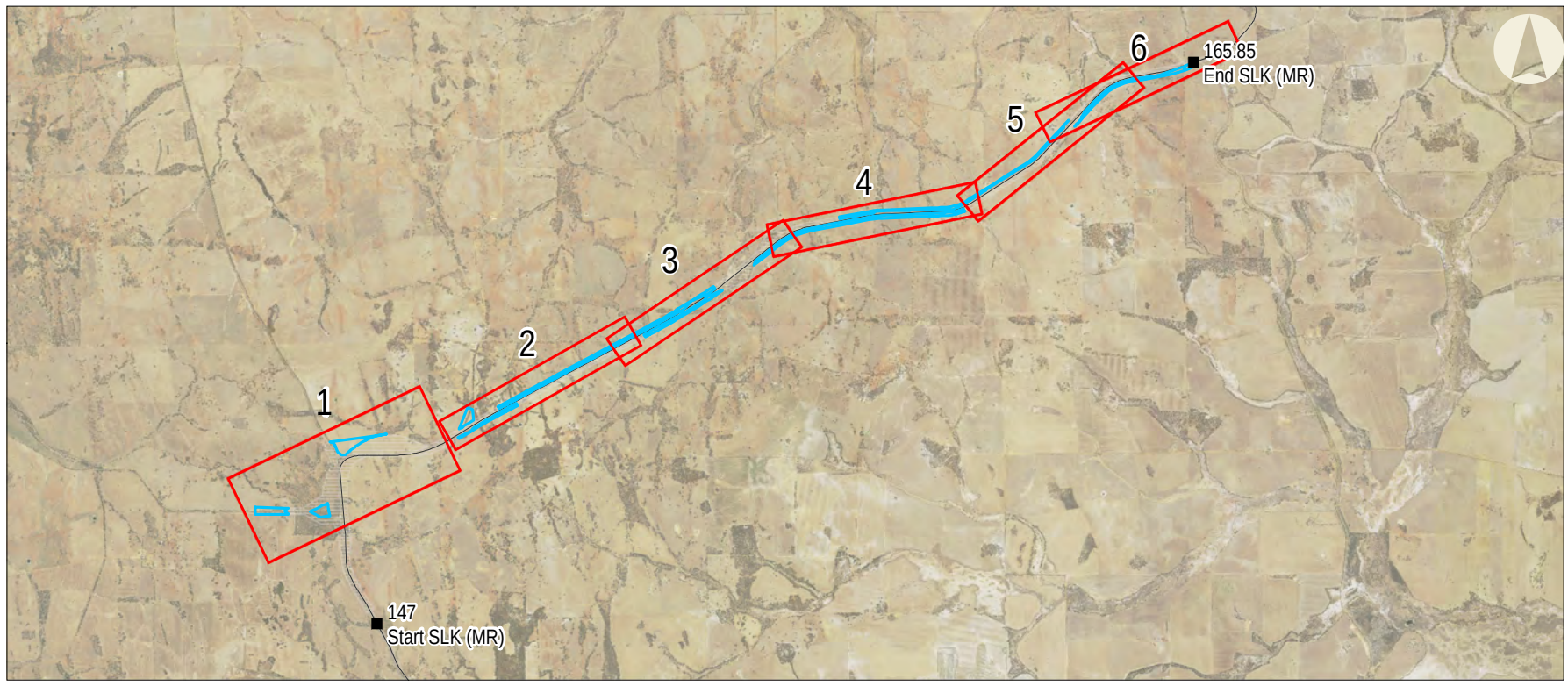
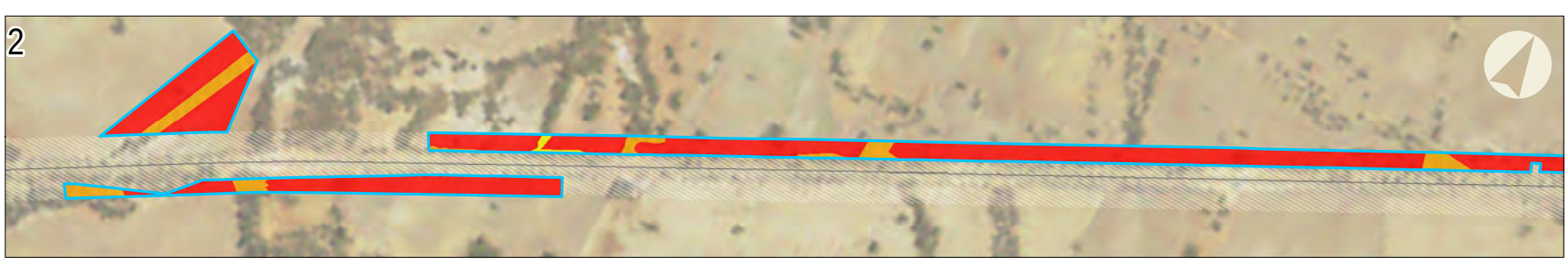
ENVIRONMENTAL SCIENCES

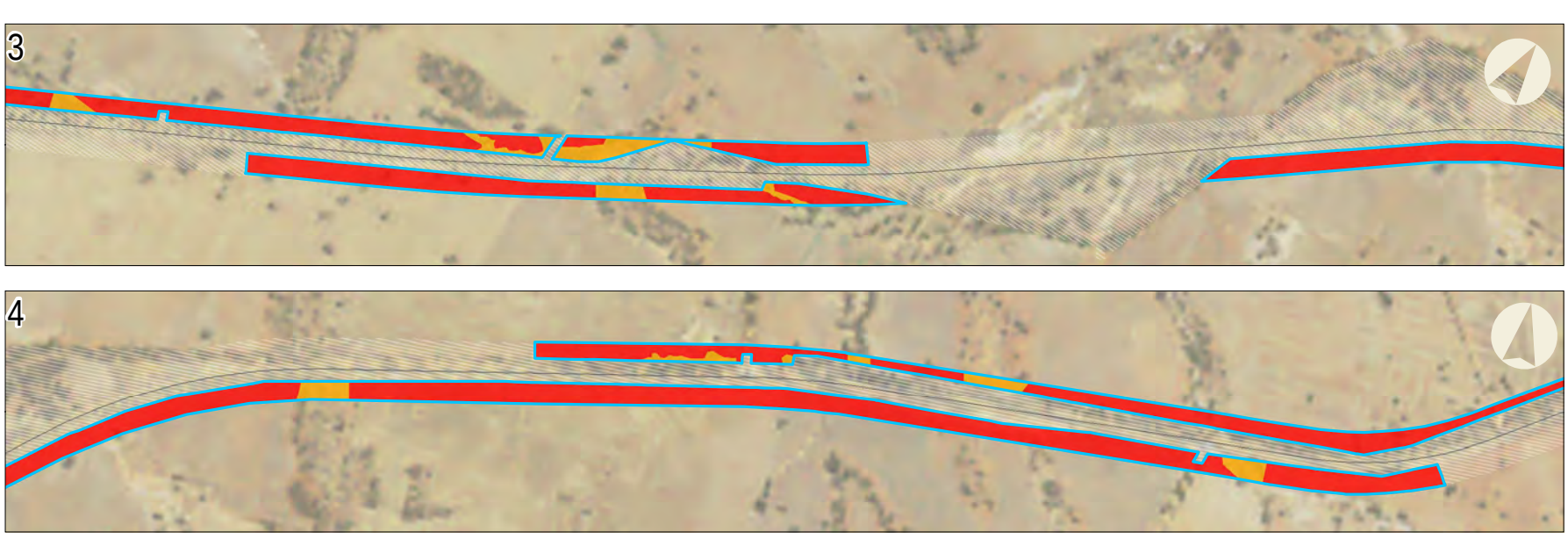
Appendix 6
Vegetation condition
(Midlands Road to Bindi Bindi)

Gaps study area
Initial study area

Vegetation condition
- Pristine
- Excellent
- Very Good
- Good
- Degraded
- Completely Degraded







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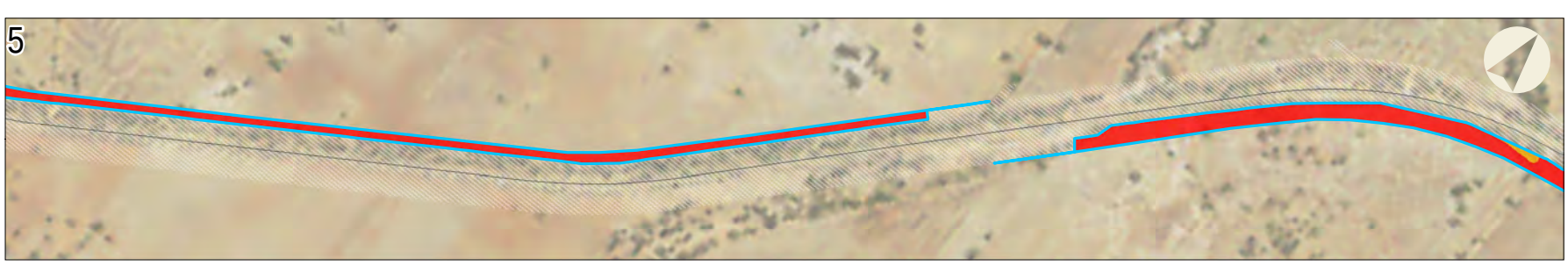
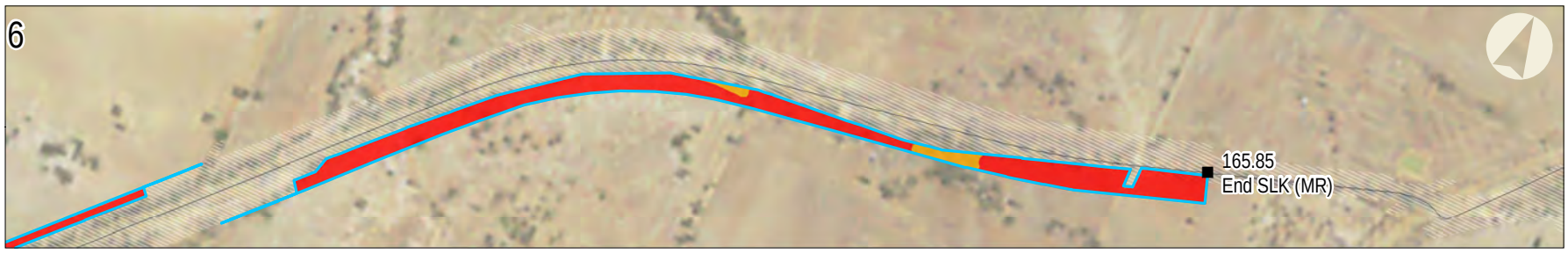
1:110,000

Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 30-Nov-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994





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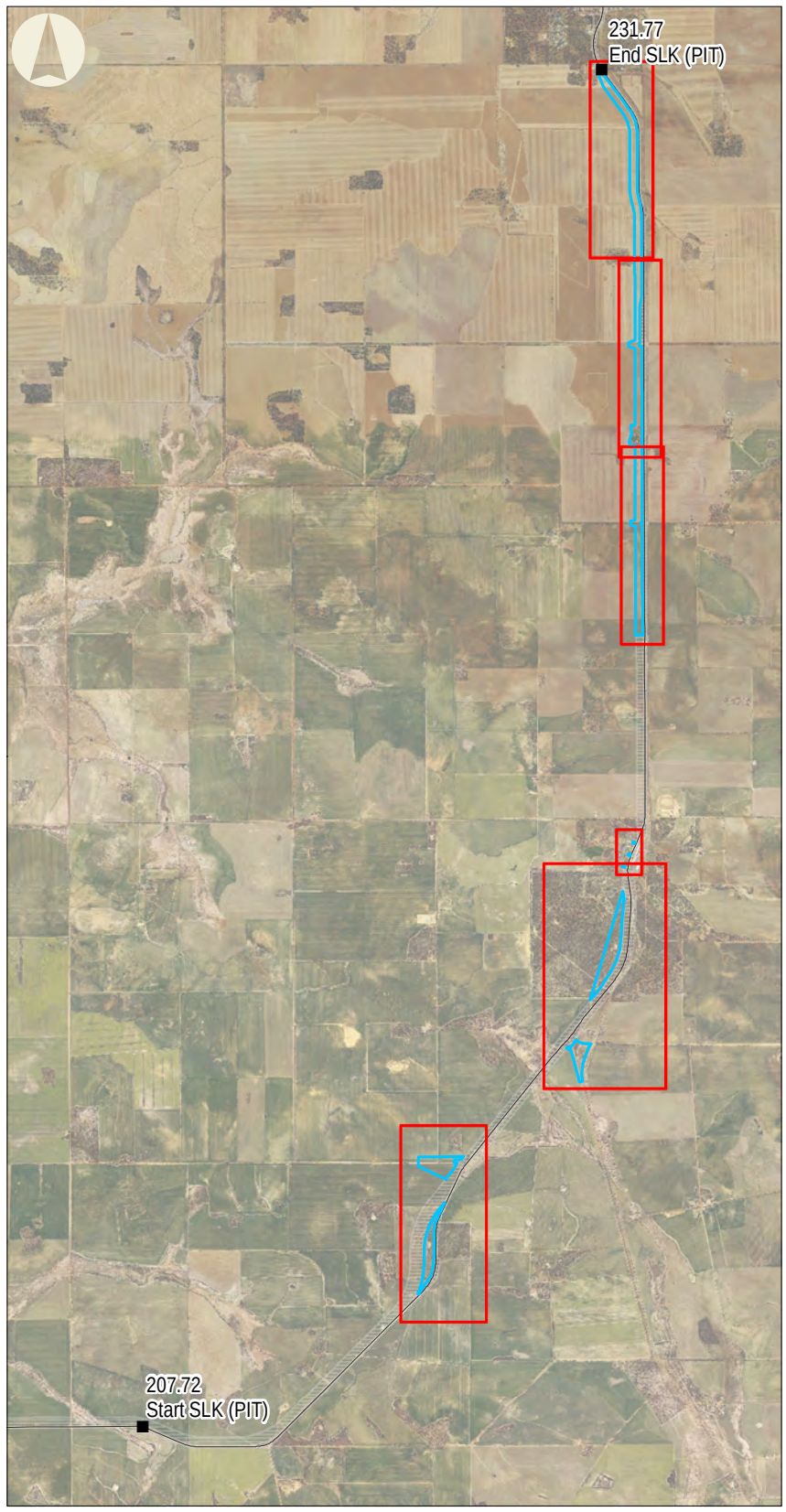
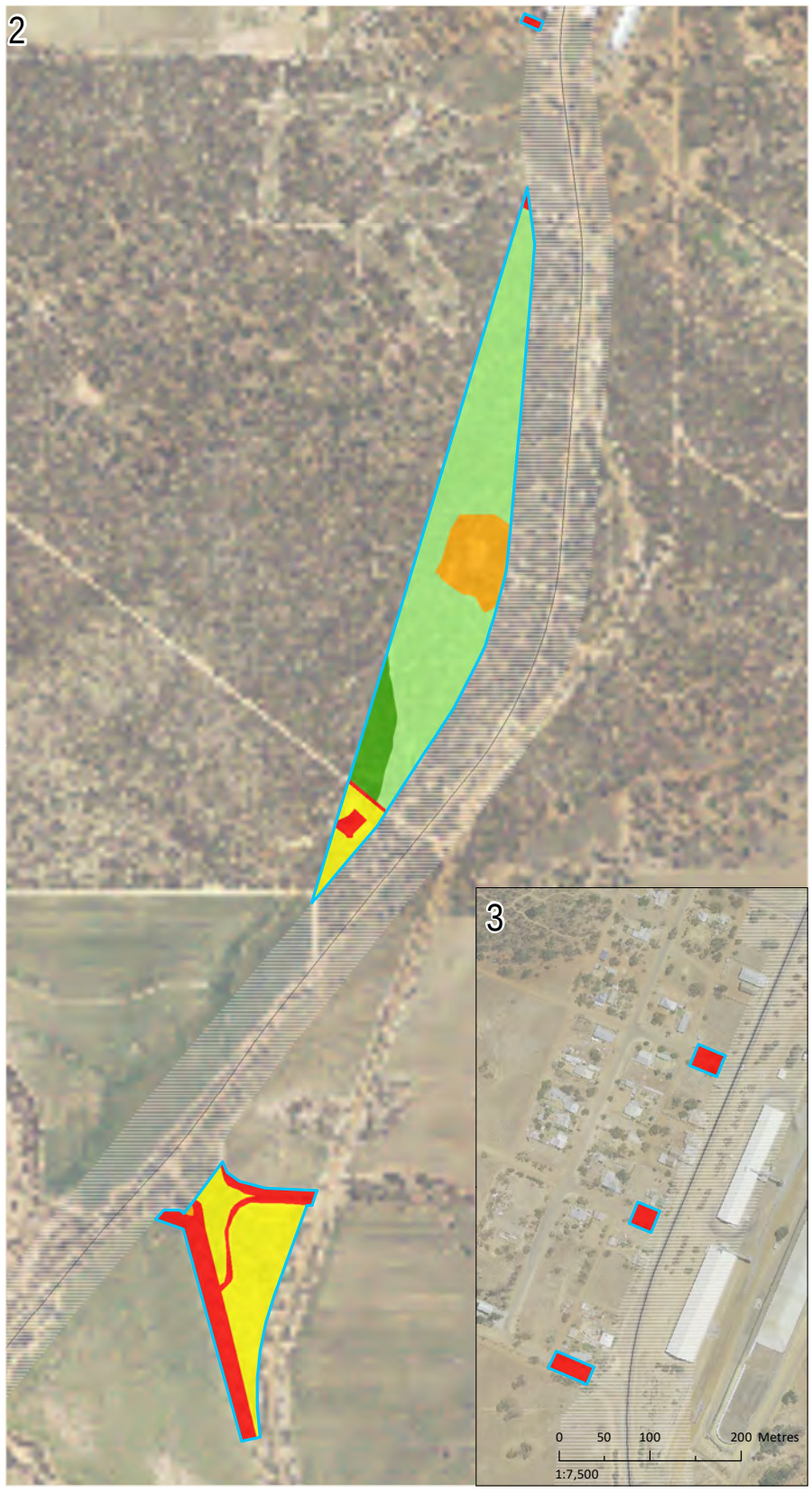
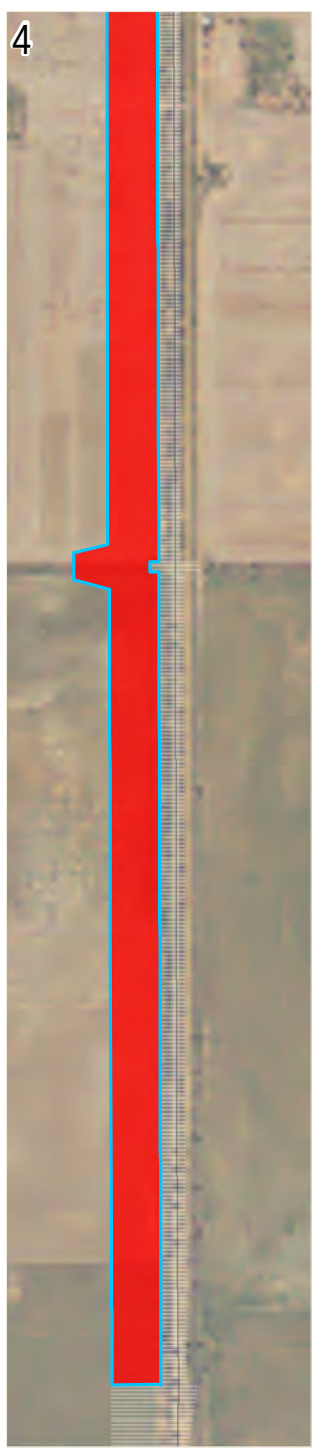
Appendix 6
Vegetation condition (Pithara)

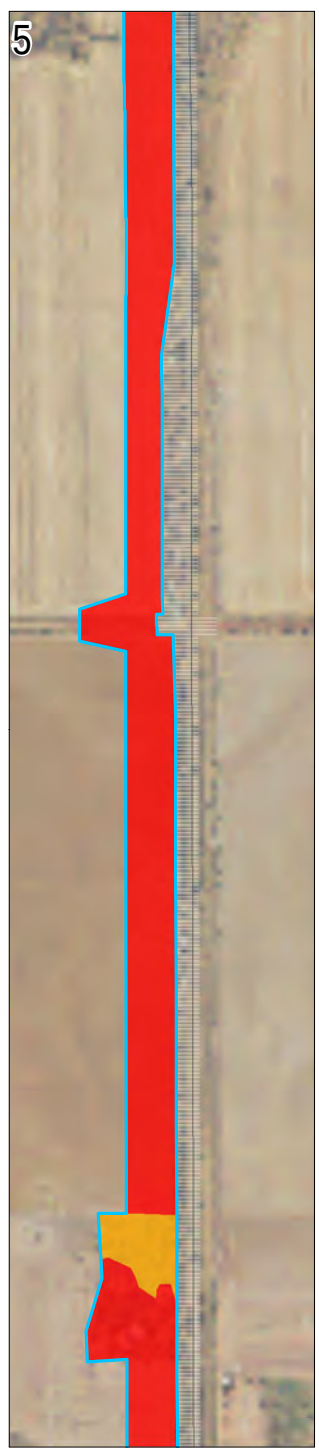
Gaps study area
Initial study area

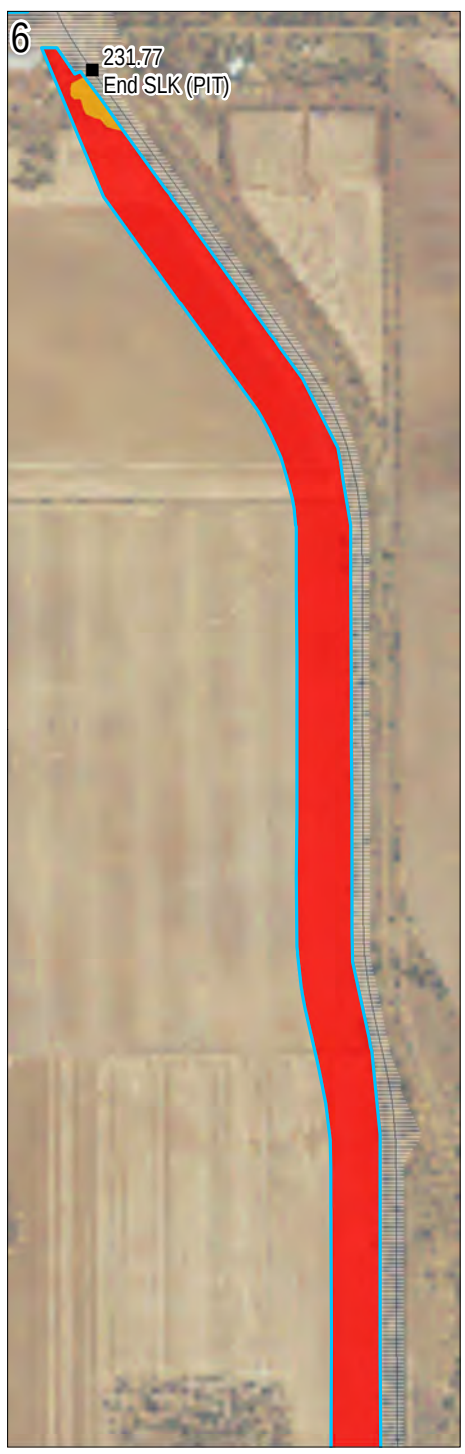
Vegetation condition
- Pristine
- Excellent
- Very Good
- Good
- Degraded
- Completely Degraded











0 0.5 1 2 3 Kilometres
1:100,000

Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 30-Nov-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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Appendix 6
Vegetation condition (Dalwallinu Bypass Improvements)

Gaps study area (DBY shown only)

Initial study area

Vegetation condition

- Pristine
- Excellent
- Very Good
- Good
- Degraded
- Completely Degraded

0 0.125 0.25 Kilometres

1:7,500

Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 30-Nov-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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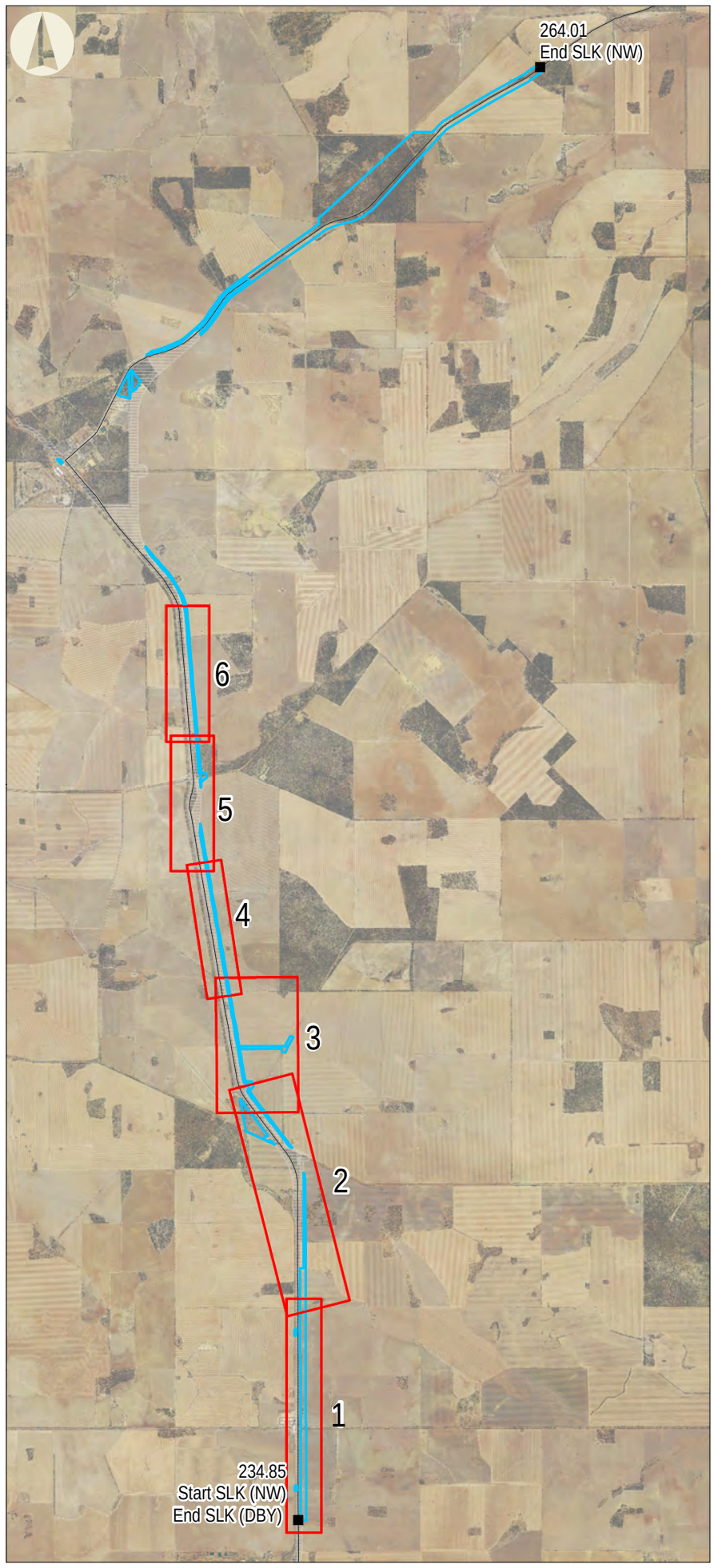
Appendix 6
Vegetation condition (Nugadong to Wubin - southern section)

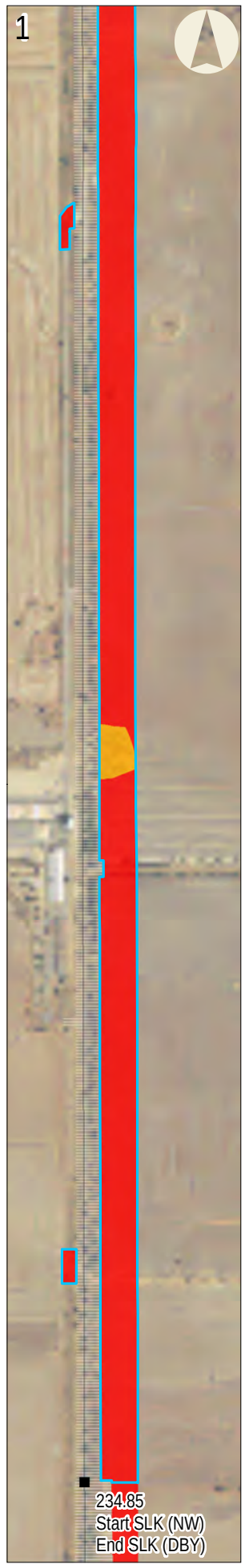
Gaps study area (NW shown only)

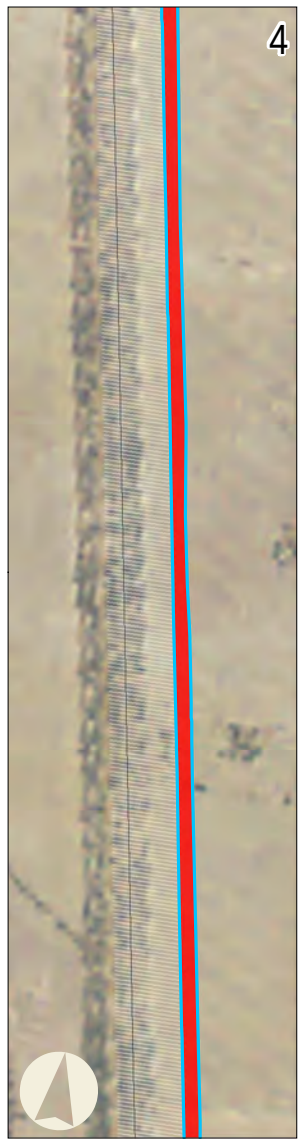
Initial study area

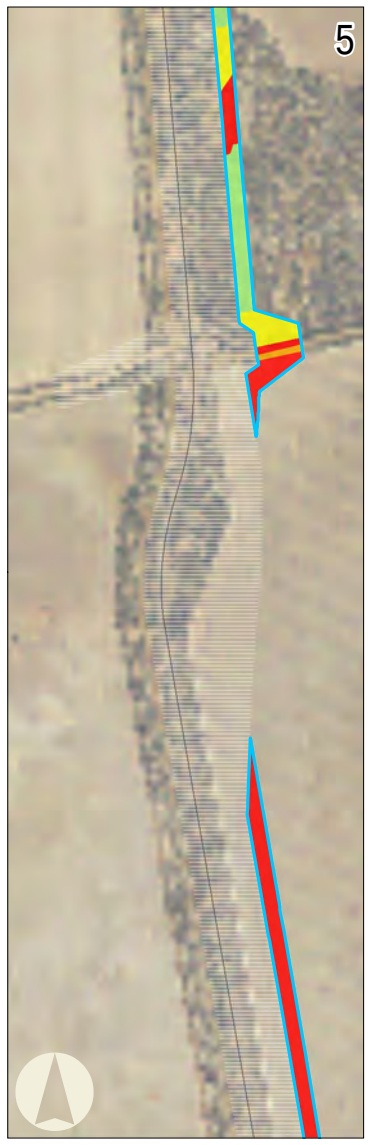
Vegetation condition

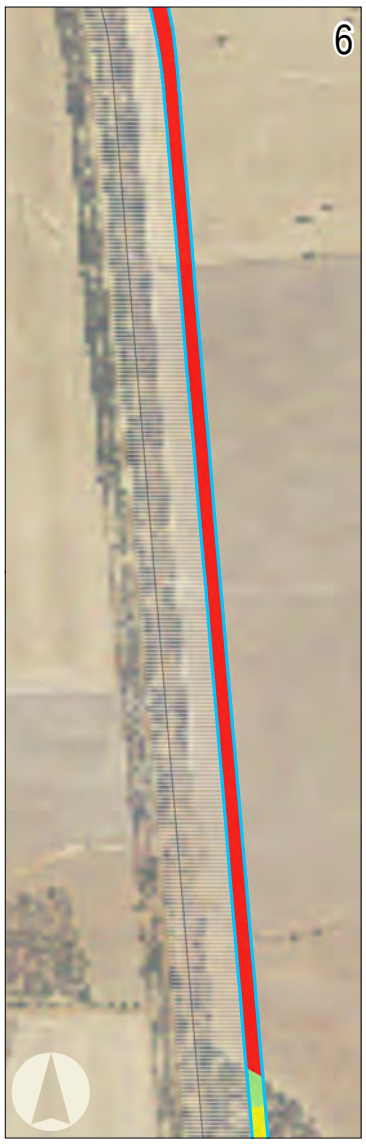
- Pristine
- Excellent
- Very Good
- Good
- Degraded
- Completely Degraded











0 0.5 1 2 3 Kilometres

1:100,000

Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 30-Nov-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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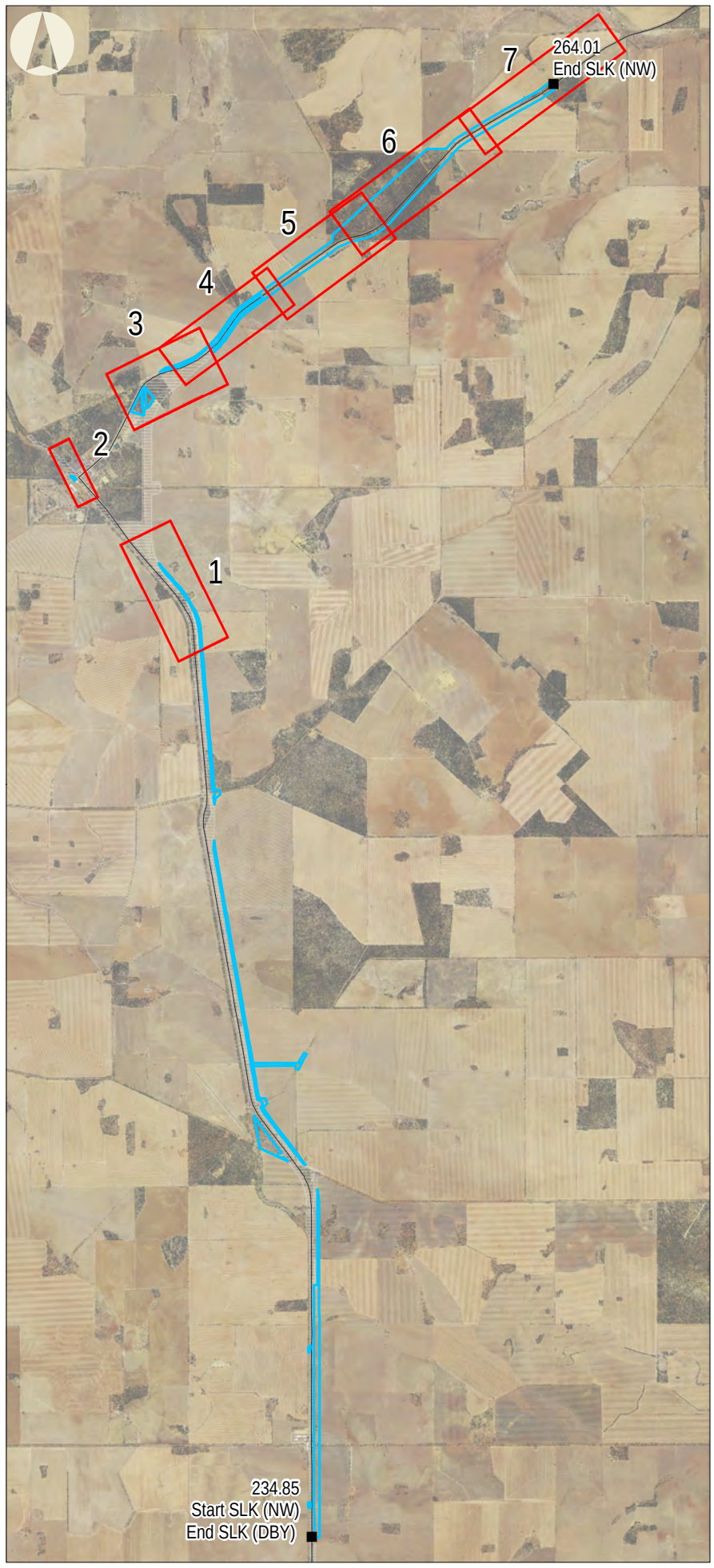
Appendix 6
Vegetation condition (Nugadong to Wubin - northern section)

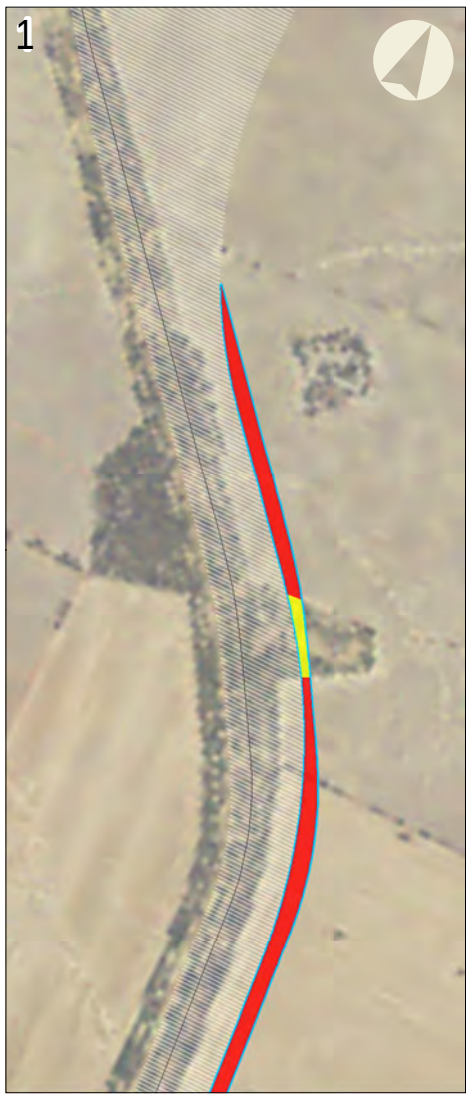
Gaps study area (NW shown only)

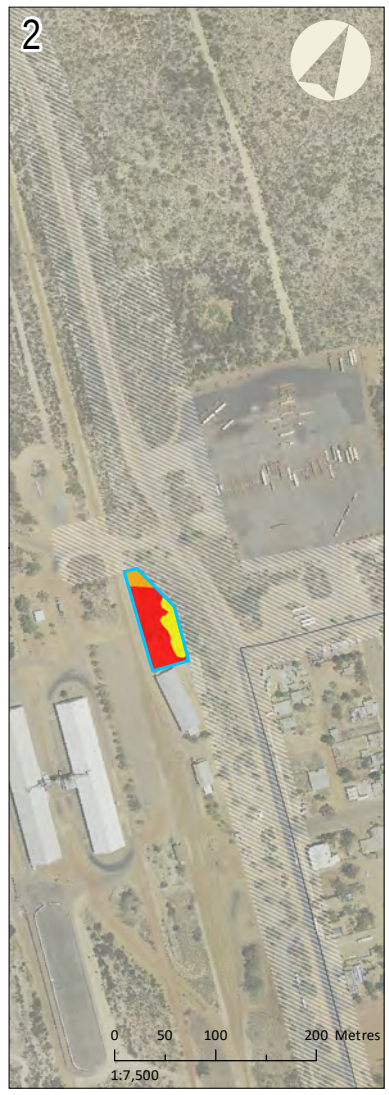
Initial study area

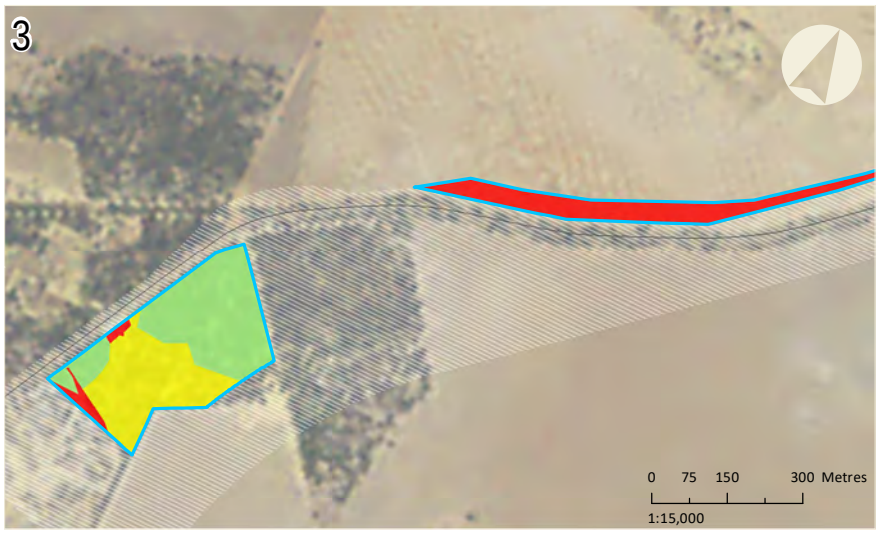
Vegetation condition

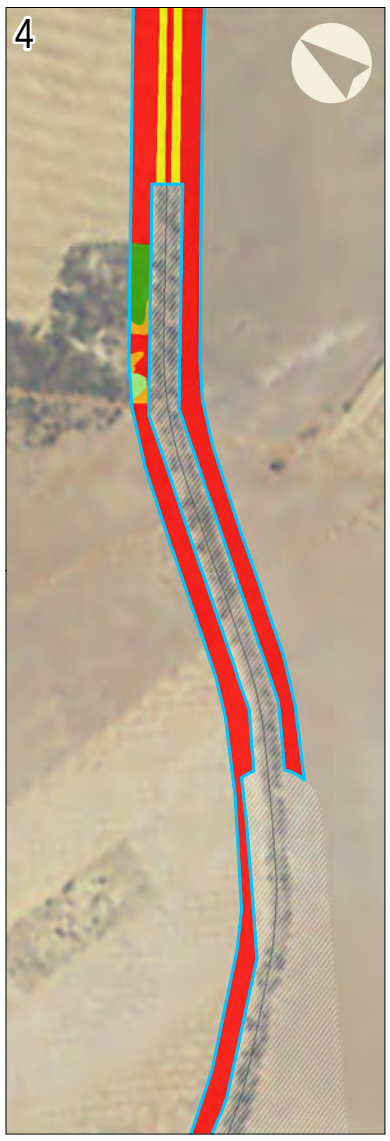
- Pristine
- Excellent
- Very Good
- Good
- Degraded
- Completely Degraded

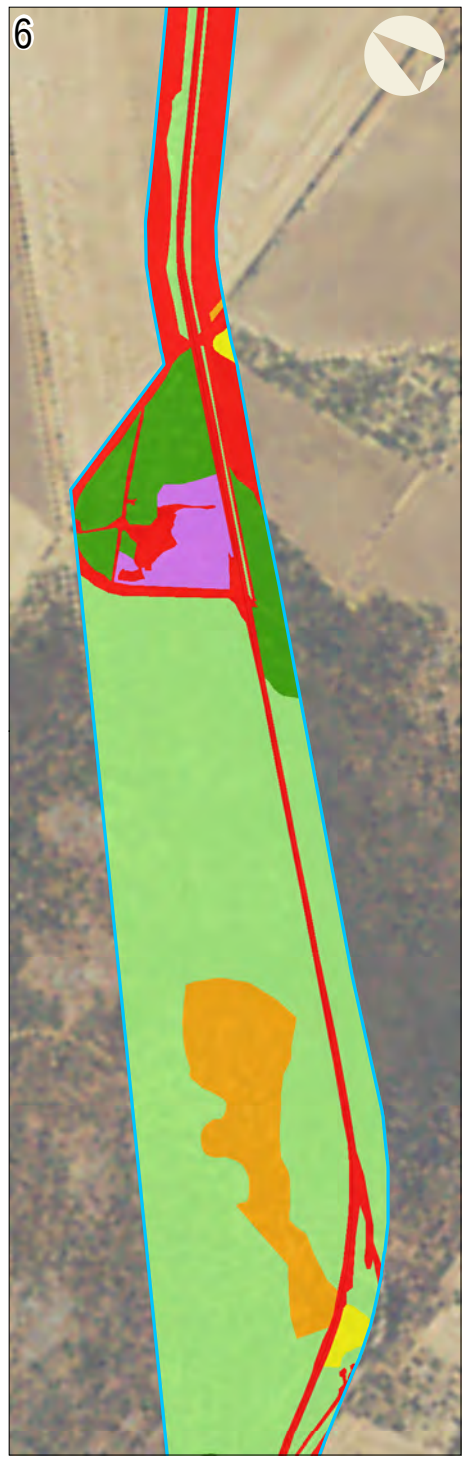


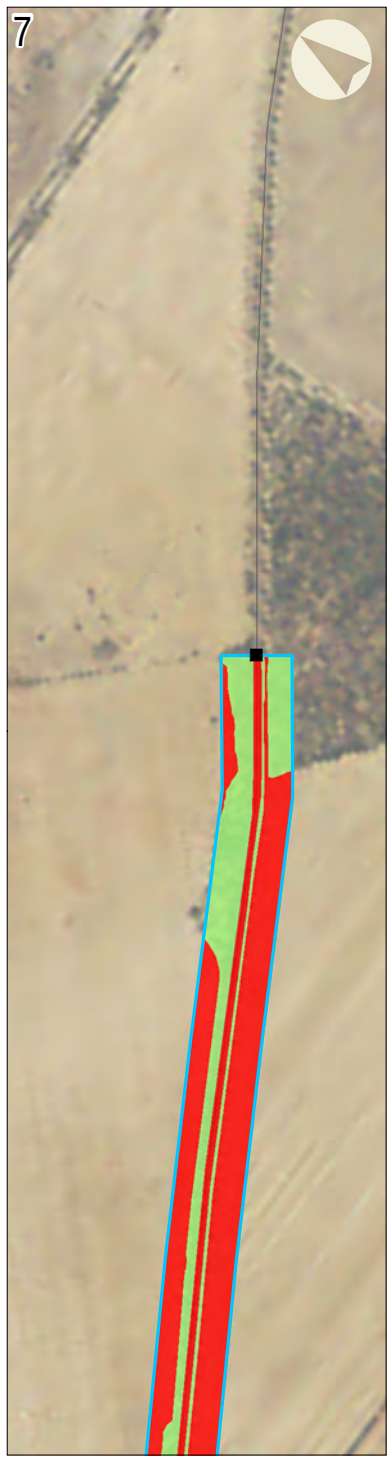












0 0.5 1 2 3 Kilometres
1:100,000

Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 30-Nov-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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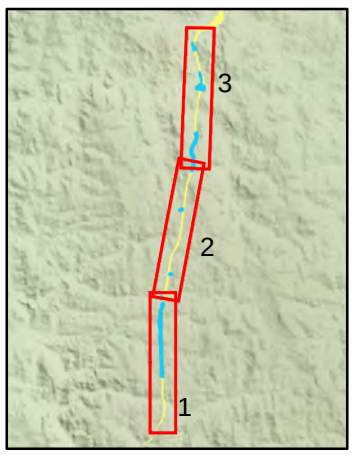
Appendix 7
Eucalypt woodlands of the Western Australian wheatbelt TEC - distribution in study area (Calingiri)

Sites assessed as TEC
TEC distribution
Gaps study area
Initial study area



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Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 20-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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Appendix 7
Eucalypt woodlands of the Western Australian wheatbelt TEC - distribution in study area
(Moore River)

Sites assessed as TEC
TEC distribution
Gaps study area
Initial study area

0 250 500 Metres
1:27,500

Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 20-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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126.8
End SLK (Moore River)
TEC051
TEC050
GAP018
TEC053
TEC054
TEC056
TEC058
TEC060
TEC059
TEC061
115.8
Start SLK (Moore River)

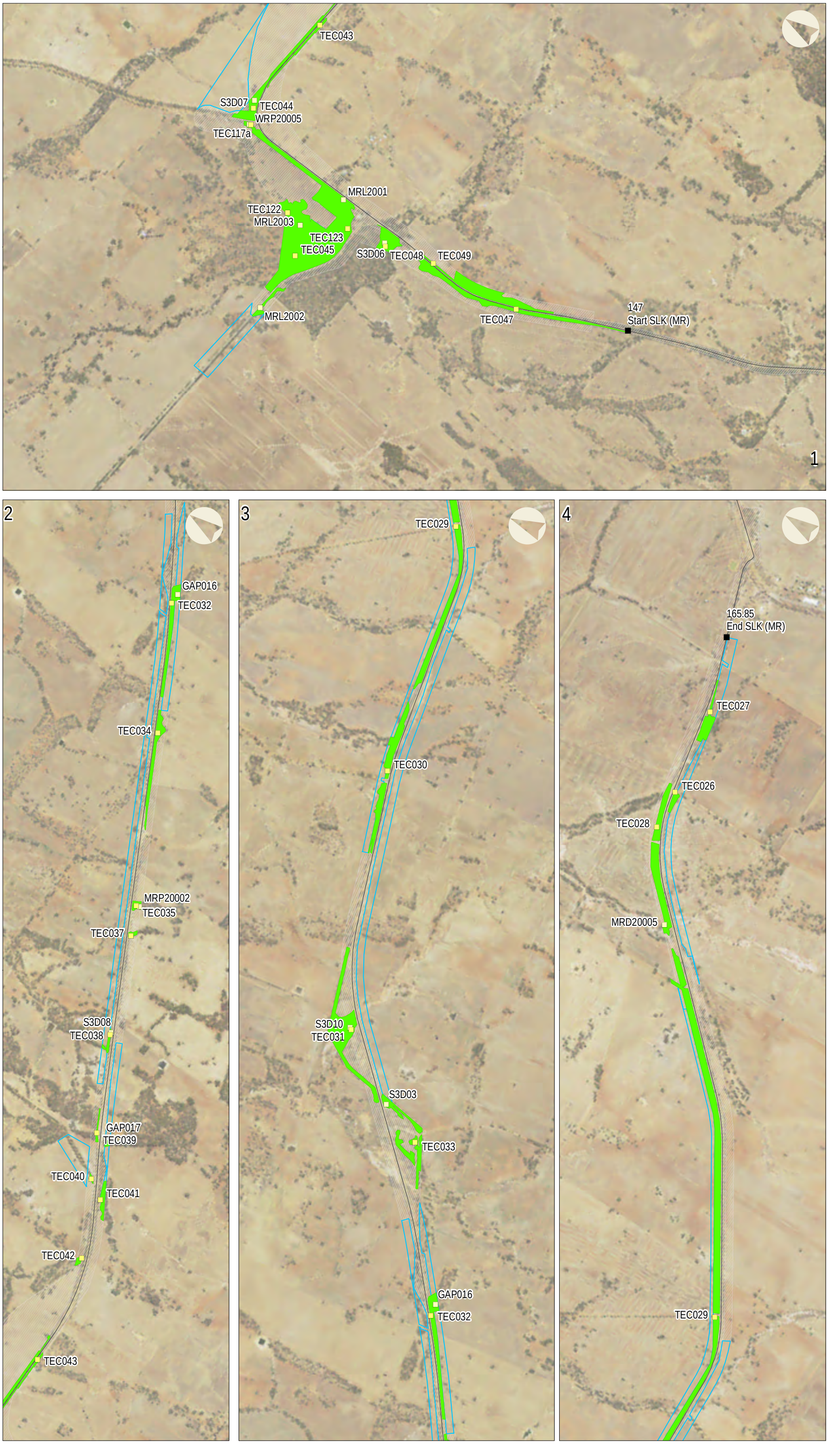
Appendix 7
Eucalypt woodlands of the Western Australian wheatbelt TEC - distribution in study area
(Midlands Road to Bindi Bindi)

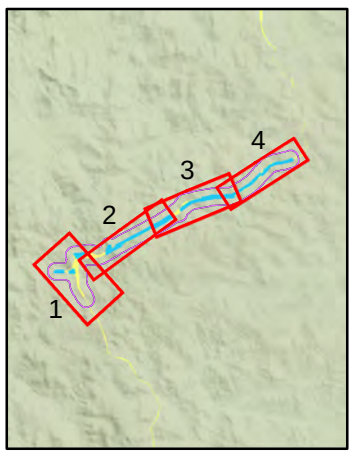
Sites assessed as TEC

TEC distribution

Gaps study area

Initial study area





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Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 20-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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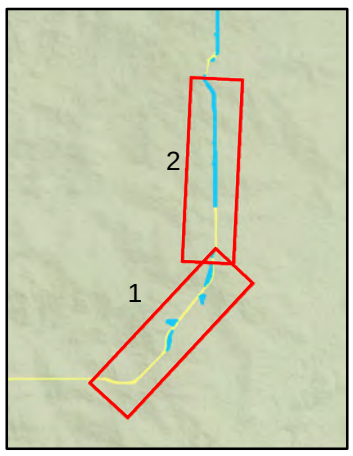
Appendix 7
Eucalypt woodlands of the Western Australian wheatbelt TEC - distribution in study area (Pithara)

Sites assessed as TEC

Gaps study area

TEC distribution

Initial study area



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1:30,000

Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 20-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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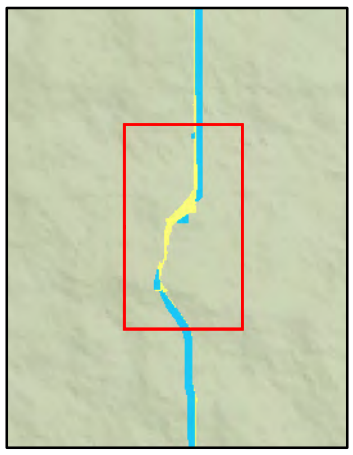
Appendix 7
Eucalypt woodlands of the Western Australian wheatbelt TEC - distribution in study area (Dalwalinu Bypass Improvements)

Sites assessed as TEC

TEC distribution

Gaps study area

Initial study area



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Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 02-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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234.85
End SLK (DBY)
Start SLK (NW)

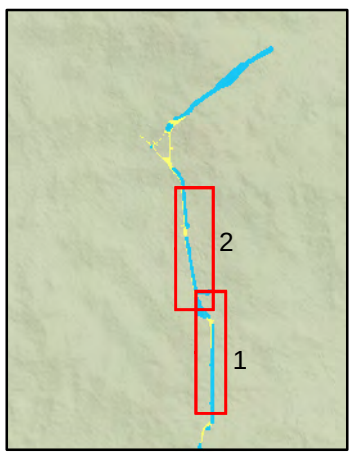
TECW014

TECW015

DBY001
TECW016

231.77
Start SLK (DBY)
End SLK (PIT)

Appendix 7
Eucalypt woodlands of the Western Australian wheatbelt TEC - distribution in study area (Nugadong to Wubin - southern section)



Sites assessed as TEC

TEC distribution

Gaps study area

Initial study area

0 250 500 Metres

1:20,000

Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 02-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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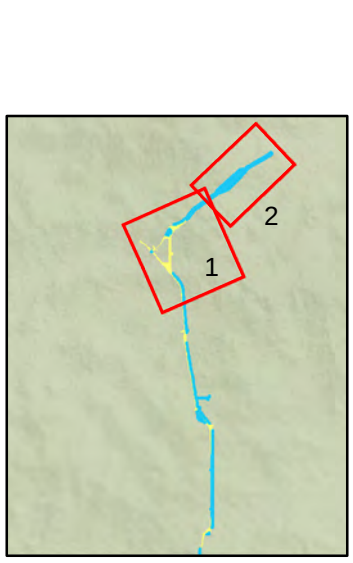
Appendix 7
Eucalypt woodlands of the Western Australian wheatbelt TEC - distribution in study area
(Nugadong to Wubin - northern section)

Sites assessed as TEC

TEC distribution

Gaps study area

Initial study area



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Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 20-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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Appendix 8 Eucalypt woodlands of the Western Australian wheatbelt TEC – site assessment

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
na	CALP20001	7	Medium woodland; York gum (E. loxophleba) & wandoo	Yes	Very Good	Location: JAF01	Yes, > 10%	Dominant species (70% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus wandoo subsp. Wandoo (15%)	Bare to sparse understorey	*Dianella revoluta*	Patch type: roadside, ≥ 5 m. Category A. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers. Mature trees may be present with at least 5 trees per 0.5 ha.	TEC
na	CALP20002	36	Shrublands; thicket, Acacia-Casuarina alliance species	No, Not TEC								NOT TEC
na	CALP20004	1182	Medium woodland; Eucalyptus rudis and Melaleuca rhaphiophylla	Yes	Good	Location: JAF01	No, Not TEC					NOT TEC
na	DBY002	1413	Shrublands, Acacia, Casuarina and Melaleuca thicket	No, Not TEC								NOT TEC
na	DBY003	1024	Shrublands; mallee & casuarina thicket	No, Not TEC								NOT TEC
na	DBY005	1024	Shrublands; mallee & casuarina thicket	No, Not TEC								NOT TEC
na	GAP001	1413	Shrublands; acacia, casuarina and melaleuca thicket	No, Not TEC								NOT TEC
na	GAP002	1413	Shrublands; acacia, casuarina and melaleuca thicket	No, Not TEC								NOT TEC
na	GAP003	551	Shrublands; Allocasuarina campestris thicket	No, Not TEC								NOT TEC
na	GAP004	495	Shrublands; thicket, Jam & Allocasuarina acutivalvis on ironstone	No, Not TEC								NOT TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
na	GAP005	36	Shrublands; thicket, Acacia-Casuarina alliance species	No, Not TEC								NOT TEC
na	GAP006	352	Medium woodland; York Gum	Yes	Very Good	Location: AVW01	Yes, > 10%	Dominant species (25% cover): Eucalyptus loxophleba subsp. Loxophleba	Herbaceous understorey	Shrubs: *Acacia microbotry, Hakea preissii, Acacia acuaria, Rhagodia drummondii*	Patch type: roadside, ≥ 5 m. Category A. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers. Mature trees may be present or absent.	TEC
na	GAP007	36	Shrublands; thicket, Acacia-Casuarina alliance species	No, Not TEC								NOT TEC
na	GAP008	551	Shrublands; Allocasuarina campestris thicket	No, Not TEC								NOT TEC
na	GAP009	n/a	Cleared and Planted	No, Not TEC								NOT TEC
na	GAP010	551	Shrublands; Allocasuarina campestris thicket	No, Not TEC								NOT TEC
na	GAP011	352	Medium woodland; York Gum	Yes	Degraded		No, Not TEC					NOT TEC
na	GAP012	352	Medium woodland; York Gum	Yes	Very Good		Yes, > 10%	Dominant species (40% cover) Eucalyptus loxophleba subsp. loxophleba, Eucalyptus salubris	Scrub or heath understorey	Shrubs: *Melaleuca adnata, Emchylaena tomentosa, Rhagodia preissii*	Patch type: roadside, ≥ 2 ha. Category A. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers. Mature trees may be present or absent.	TEC
na	GAP013	352	Medium woodland; York Gum	Yes	excellent		Yes, > 10%	Dominant species (35% cover) Eucalyptus loxophleba subsp. loxophleba	Scrub or heath understorey	Shrubs: *Acacia acuminata, Eremophila drummondii, Melaleuca acuminata subsp. websteri, Dampiera lavandulacea*	Patch type: roadside, ≥ 2 ha. Category A. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers. Mature trees may be present or absent.	TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
na	GAP013	1024	Shrublands; mallee and casuarina thicket	No, Not TEC								NOT TEC
na	GAP014	352	Medium woodland; York Gum	Yes	Good	Location: AVW02	Yes, > 10%	Dominant species (35% cover) Eucalyptus loxophleba subsp. loxophleba	Scrub or heath understorey	Shrubs: *Acacia acuminata, Rhagodia drummondii, Melaleuca atroviridis, Dampiera lavandulacea*	Patch type: non-roadside, ≥ 5 ha. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
na	GAP015	676	Succulent steppe; samphire	No, Not TEC								NOT TEC
na	GAP017	946	Medium woodland; Wandoo	Yes	Degraded	Location: AVW02	Yes, > 10%	Dominant species (60% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey		Patch type: non-roadside, ≥ 5 ha. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
na	GAP018	352	Medium woodland; York Gum	Yes	Degraded	Location: AVW02	Yes, > 10%	Dominant species (50% cover): Eucalyptus loxophleba subsp. loxophleba	Bare to sparse understorey	Shrubs: *Grevillea biternata, Hakea preisii, Dianella revoluta*	Patch type: non-roadside, ≥ 5 ha. Category D. Exotic plant species account for 30–50% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
na	GAP020	7	Medium woodland; York gum (E. loxophleba) & wandoo	Yes	Degraded	Location: JAF01	Yes, > 10%	Dominant species (47% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus wandoo subsp. wandoo, Eucalyptus rudis	Bare to sparse understorey		No, Not TEC Patch type: non-roadside, < 5 ha Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. No, Not TEC less than 5 mature trees per 0.5 ha.	NOT TEC
na	GAP021	946	Medium woodland; Wandoo	Yes	Excellent	Location: JAF01	Yes, > 10%	Dominant species (35% cover): Eucalyptus wandoo subsp. wandoo	Scrub or heath understorey		Patch type: roadside, ≥ 2 ha. Category A. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers. Mature trees may be present or absent.	TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
na	GAP022	946	Medium woodland; Wandoo	Yes	Excellent	Location: JAF01	Yes, > 10%	Dominant species (30% cover): Eucalyptus wandoo subsp. wandoo	Scrub or heath understorey		Patch type: roadside, ≥ 2 ha. Category A. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers. Mature trees may be present or absent.	TEC
na	GAP023	1034	Medium woodland; Marri, Wandoo and Powderbark	Yes	Pristine	Location: JAF01	Yes, > 10%	Dominant species (30% cover): Eucalyptus wandoo subsp. wandoo	Scrub or heath understorey		Patch type: roadside, ≥ 2 ha. Category A. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers. Mature trees may be present or absent.	TEC
na	GAP024	946	Medium woodland; Wandoo	Yes	Excellent	No, Not TEC: above 600 mm isohyet						NOT TEC
na	GAP025	1034	Medium woodland; Marri, Wandoo and Powderbark	Yes	Pristine	No, Not TEC: above 600 mm isohyet						NOT TEC
na	GAP026	1182	Medium woodland; Eucalyptus rudis and Melaleuca rhaphiophylla	Yes	Very Good	No, Not TEC: above 600 mm isohyet						NOT TEC
na	GAP027	1034	Medium woodland; Marri, Wandoo and Powderbark	Yes	Very Good	No, Not TEC: above 600 mm isohyet						NOT TEC
na	LBHP2007	968	Medium woodland; jarrah, marri & wandoo	No, Not TEC								NOT TEC
na	LBHP2008	1048	Mosaic: Shrublands; melaleuca patchy scrub / Succulent steppe; samphire	No, Not TEC								NOT TEC
na	LBHP2009	1034	Medium woodland; marri, wandoo & powderbark	Yes	Very Good	No, Not TEC: above 600 mm isohyet						NOT TEC
na	MBY001	631	Succulent steppe with woodland and	No, Not TEC								NOT TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
			thicket; York Gum over Melaleuca thyoides and samphire									
na	MBY002	352	Medium woodland; York Gum	Yes	Degraded	Location: AVW02		Dominant species: Eucalyptus loxophleba; Other tree canopy species: none present	Herbaceous understorey of chenopod species	*Maireana brevifolia, Atriplex semibaccata*	No, Not TEC Patch type: non-roadside, <5 ha Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. No, Not TEC mature trees not present at 5 trees per 0.5 ha.	Not TEC
na	MBY003	1024	Shrublands; mallee and casuarina thicket.	No, Not TEC								NOT TEC
na	MBY009	676	Succulent steppe; samphire	No, Not TEC								NOT TEC
na	MRD20005	142	Medium woodland; York Gum and Salmon Gum	Yes	Good	Location: AVW02	Yes, > 10%	Dominant species (35% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus salmonophloia	Chenopod-dominated.	Chenopods: *Maireana brevifolia, Atriplex semibaccata and Enchylaena tomentosa*	Patch type: roadside, ≥ 5 m. Category C. Vegetation condition is good and retains important habitat features. Less than 5 mature trees per 0.5 ha are present. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers.	TEC
na	MRL2001	352	Medium woodland; York Gum	Yes	Good	Location: AVW02	Yes, > 10%				Patch type: roadside, ≥ 5 m. Category D. Vegetation condition is degraded. Mature trees may be present with at least 5 trees per 0.5 ha Exotic plant species account for 25% of total vegetation cover in the understorey.	TEC
na	MRL2002	7	Medium woodland; York gum (E. loxophleba) & wandoo	Yes	Very good	Location: AVW02	Yes, > 10%	Dominant species (30% cover): Eucalyptus wandoo subsp. Wandoo. Other tree canopy species: Eucalyptus loxophleba subsp. Loxophleba	Scrub or heath understorey	*Astroloma serratifolium, Acacia lasiocarpa* and *Dampiera lavandulacea*	Patch type: roadside, ≥ 5 m. Category A. Vegetation condition is very good. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers.	TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
na	MRL2004	36	Shrublands; thicket, Acacia-Casuarina alliance species	No, Not TEC								NOT TEC
na	MRL2005	950	Medium woodland, Casuarina obesa	No, Not TEC								NOT TEC
na	MRP20005	352	Medium woodland; York Gum	Yes	Degraded	Location: AVW02	No, Not TEC					NOT TEC
na	MRP20006	1024	Shrublands; mallee & casuarina thicket	No, Not TEC								NOT TEC
na	NN3.1	7	Medium woodland; York Gum (Eucalyptus loxophleba) and Wandoo	Yes	Degraded	Location: AVW02					Patch type: roadside, ≥ 5 m. Category D. Vegetation condition is degraded. Mature trees may be present with at least 5 trees per 0.5 ha. Exotic plant species account for 50–70% of total vegetation cover in the understorey.	NOT TEC
na	NN3.2	7	Medium woodland; York gum (E. loxophleba) & wandoo	Yes	Degraded	Location: AVW02					Patch type: roadside, ≥ 5 m. Category D. Vegetation condition is degraded. Mature trees may be present with at least 5 trees per 0.5 ha Exotic plant species account for more than 50–70% (60%) of total vegetation cover in the understorey.	TEC
na	NWP2002	1024	Shrublands; mallee & casuarina thicket	No, Not TEC								NOT TEC
na	NWP2003	1024	Shrublands; mallee & casuarina thicket	No, Not TEC								NOT TEC
na	NWP2004	1024	Shrublands; mallee & casuarina thicket	No, Not TEC								NOT TEC
na	P001	354	Shrublands; jam and Acacia rostellifera (+ hakea) scrub with scattered York gum	No, Not TEC								NOT TEC
na	P006	352	Medium woodland; York Gum	Yes	Good	Location: AVW01	No, Not TEC					NOT TEC
na	P5.07	1048	Mosaic: Shrublands; melaleuca patchy	No, Not TEC								NOT TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
			scrub / succulent steppe; samphire									
na	P5.09	1048	Mosaic: Shrublands; melaleuca patchy scrub / succulent steppe; samphire	No, Not TEC								NOT TEC
na	P5.10	676	Succulent steppe; samphire	No, Not TEC								NOT TEC
na	P5.12	n/a	Cleared and planted	No, Not TEC								NOT TEC
na	P5.13	352	Medium woodland; York Gum	Yes	Degraded	Location: AVW02					No, Not TEC Patch type: roadside, <5 m wide. Category D. Vegetation condition is degraded. Mature trees (≥30cm DBH)3 not present at 5 trees per 0.5 ha.	NOT TEC
na	P5.15a	676	Succulent steppe; samphire	No, Not TEC								NOT TEC
na	P5.15a	676	Succulent steppe; samphire	No, Not TEC								NOT TEC
na	P5.16	142	Medium woodland; York Gum and Salmon Gum	Yes	Degraded	Location: AVW02						NOT TEC
na	P5.18	352	Medium woodland; York Gum	Yes	Degraded	Location: AVW02					No, Not TEC Patch type: roadside, <5 m wide. Category D. Vegetation condition is degraded. Mature trees not present at 5 trees per 0.5 ha.	NOT TEC
na	P5.19	352	Medium woodland; York Gum	Yes	Degraded	Location: AVW02					No, Not TEC Patch type: roadside, <5 m wide. Category D. Vegetation condition is degraded. Mature trees not present at 5 trees per 0.5 ha.	NOT TEC
na	P5.4	676	Succulent steppe; samphire	No, Not TEC								NOT TEC
na	P5.5	631	Succulent steppe with woodland and thicket; York Gum over Melaleuca	No, Not TEC								NOT TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
			thyoides and samphire									
na	P5.60	1024	Shrublands; mallee & casuarina thicket	No, Not TEC								NOT TEC
na	P5.61	1024	Shrublands; mallee & casuarina thicket	No, Not TEC								NOT TEC
na	P5.63a	1024	Shrublands; mallee & casuarina thicket	No, Not TEC								NOT TEC
na	P5.64A	352	Medium woodland; York Gum	Yes	Good	Location: AVW01	Yes, > 10%	No, Not TEC: Dominant species: no key species dominant Eucalyptus capillosa subsp. polyclada is present but only E. capillosa is listed as a key species, not the subspecies.				NOT TEC
na	P5.65	1024	Shrublands; mallee & casuarina thicket	No, Not TEC								NOT TEC
na	P5.66a	1024	Shrublands; mallee & casuarina thicket	No, Not TEC								NOT TEC
na	P5.81	676	Succulent steppe; samphire	No, Not TEC								NOT TEC
na	P5.82	1048	Mosaic: Shrublands; melaleuca patchy scrub / succulent steppe; samphire	No, Not TEC								NOT TEC
na	P5.86	n/a	Cleared and Planted	No, Not TEC								NOT TEC
na	P5.88	n/a	Cleared and Planted	No, Not TEC								NOT TEC
na	P5.89	676	Succulent steppe; samphire	No, Not TEC								NOT TEC
na	S3A21	352	Medium woodland; York Gum	Yes	Degraded	Location: AVW02	Yes, > 10%	Dominant species (39% cover): Eucalyptus loxophleba subsp. loxophleba;	Bare to sparse understorey		Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for less than 1% of total vegetation cover in the understorey. Mature	TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
								Other tree canopy species: none present			trees may be present with at least 5 trees per 0.5 ha.	
na	S3A23	991	Medium woodland; small Wandoo patches surrounded by other eucalypts	Yes	Good	Location: JAF01	Yes, > 10%	Dominant species (60% cover): Eucalyptus wandoo subsp. wandoo			Patch type: roadside, ≥ 5 m. Category B. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
na	S3A24	950	Medium woodland, Casuarina obesa	No, Not TEC								NOT TEC
na	S3A27	999	Medium woodland; Marri	No, Not TEC								NOT TEC
na	S3A28	1034	Medium woodland; marri, wandoo & powderbark	Yes	Very Good	Location: JAF01	Yes, > 10%	No, Not TEC: Co-dominant species (18%) Corymbia calophylla; (16%) Eucalyptus wandoo				NOT TEC
na	S3A29	4	Medium woodland; Marri and Wandoo	Yes	Very Good	Location: JAF01	Yes, > 10%	No, Not TEC: Dominant species (20%) Corymbia calophylla				NOT TEC
na	S3A31	973	Low forest; paperbark (Melaleuca rhaphiophylla)	No, Not TEC								NOT TEC
na	S3A34	946	Medium woodland; Wandoo	Yes	Good	No, Not TEC: above 600 mm isohyet						NOT TEC
na	S3A43	946	Medium woodland; Wandoo	Yes	Good	No, Not TEC: above 600 mm isohyet						NOT TEC
na	S3A44	973	Low forest; paperbark (Melaleuca rhaphiophylla)	No, Not TEC								NOT TEC
na	S3A44	973	Low forest; paperbark	No, Not TEC								NOT TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
			(Melaleuca rhaphiophylla)									
na	S3A45	1132	Medium forest; marri	No, Not TEC								NOT TEC
na	S3D03	352	Medium woodland; York Gum	Yes	Degraded	Location: AVW02	Yes, > 10%	Dominant species: Eucalyptus loxophleba		*Acacia* sp., *Acacia* sp., *Allocasuarina* sp. *and Melaleuca* sp.	Patch type: roadside, ≥ 5 m. Category D. Vegetation condition is degraded. Mature trees are present with at least 5 trees per 0.5 ha. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers.	TEC
na	S3D09	676	Succulent steppe; samphire	No, Not TEC								NOT TEC
na	S3D11	142	Medium woodland; York Gum and Salmon Gum	Yes	Degraded	Location: AVW02		No, Not TEC: no key species dominant Eucalyptus loxophleba present but only the mallee form (not single trunked)	Maireana sp. chenopod	*Maireana* sp. chenopod		NOT TEC
na	S5A01	551	Shrublands; Allocasuarina campestris thicket	No, Not TEC								NOT TEC
na	S5A02	1024	Shrublands; mallee and casuarina thicket	No, Not TEC								NOT TEC
na	S5A04	1413	Shrublands; acacia, casuarina and melaleuca thicket	No, Not TEC								NOT TEC
na	S5A05	1024	Shrublands; mallee and casuarina thicket	No, Not TEC								NOT TEC
na	S5A06	1413	Shrublands; acacia, casuarina and melaleuca thicket	No, Not TEC								NOT TEC
na	S5A07	1413	Shrublands, Acacia, Casuarina and Melaleuca thicket	No, Not TEC								NOT TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
na	S5A08	1024	Shrublands; mallee & casuarina thicket	No, Not TEC								NOT TEC
na	S5A09	1413	Shrublands, Acacia, Casuarina and Melaleuca thicket	No, Not TEC								NOT TEC
na	S5A10	1024	Shrublands; mallee & casuarina thicket	No, Not TEC								NOT TEC
na	S5A11	1413	Shrublands, Acacia, Casuarina and Melaleuca thicket	No, Not TEC								NOT TEC
na	S5A12	1024	Shrublands; mallee & casuarina thicket	No, Not TEC								NOT TEC
na	S5A13	1024	Shrublands; mallee & casuarina thicket	No, Not TEC								NOT TEC
na	S5A15	1024	Shrublands; mallee & casuarina thicket	No, Not TEC								NOT TEC
na	SP5.70	1024	Shrublands; mallee & casuarina thicket	No, Not TEC								NOT TEC
na	SP5.71	1024	Shrublands; mallee & casuarina thicket	No, Not TEC								NOT TEC
na	SP5.72	1024	Shrublands; mallee and casuarina thicket	No, Not TEC								NOT TEC
na	SP5.74	36	Shrublands; thicket, Acacia-Casuarina alliance species	No, Not TEC								NOT TEC
na	SP5.75	1024	Shrublands; mallee & casuarina thicket	No, Not TEC								NOT TEC
na	SP5.76	1024	Shrublands; mallee & casuarina thicket	No, Not TEC								NOT TEC
na	W6.01A	1024	Shrublands; mallee and casuarina thicket	No, Not TEC								NOT TEC
na	W6.02	1413	Shrublands; acacia, casuarina and melaleuca thicket	No, Not TEC								NOT TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
na	W6.03	n/a	Cleared and Planted	No, Not TEC								NOT TEC
na	W6.04	551	Shrublands; Allocasuarina campestris thicket	No, Not TEC								NOT TEC
na	W6.08	551	Shrublands; Allocasuarina campestris thicket	No, Not TEC								NOT TEC
na	W6.10A	1024	Shrublands; mallee and casuarina thicket	No, Not TEC								NOT TEC
na	W6.11	551	Shrublands; Allocasuarina campestris thicket	No, Not TEC								NOT TEC
na	W6.18	1024	Shrublands; mallee & casuarina thicket	No, Not TEC								NOT TEC
na	W6.21	1413	Shrublands, Acacia, Casuarina and Melaleuca thicket	No, Not TEC								NOT TEC
na	W6.22	1413	Shrublands; acacia, casuarina and melaleuca thicket	No, Not TEC								NOT TEC
na	W6.23	551	Shrublands; Allocasuarina campestris thicket	No, Not TEC								NOT TEC
na	W6.24	551	Shrublands; Allocasuarina campestris thicket	No, Not TEC								NOT TEC
na	W6.25	1024	Shrublands; mallee and casuarina thicket	No, Not TEC								NOT TEC
na	W6.26	1024	Shrublands; mallee and casuarina thicket	No, Not TEC								NOT TEC
na	W6.27	1024	Shrublands; mallee and casuarina thicket	No, Not TEC								NOT TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
na	W6.28	1024	Shrublands; mallee & casuarina thicket	No, Not TEC								NOT TEC
na	W6.29	1024	Shrublands; mallee & casuarina thicket	No, Not TEC								NOT TEC
na	W6.30	1413	Shrublands; acacia, casuarina and melaleuca thicket	No, Not TEC								NOT TEC
na	W6.31	n/a	Cleared and Planted	No, Not TEC								NOT TEC
na	W6.32	1024	Shrublands; mallee and casuarina thicket	No, Not TEC								NOT TEC
na	W6.33	1155	Medium woodland; York gum/Shrublands; Allocasuarina campestris thicket	No, Not TEC								NOT TEC
na	WP2001	1024	Shrublands; mallee and casuarina thicket	No, Not TEC								NOT TEC
TEC012	na	352	Medium woodland; York Gum	Yes	Degraded	Location: AVW01	No, Not TEC					NOT TEC
TEC015	na	1024	Shrublands; mallee and casuarina thicket	No, Not TEC								NOT TEC
TEC016	na	354	Shrublands; jam and Acacia rostellifera (+hakea) scrub with scattered York gum	No, Not TEC								NOT TEC
TEC017	na	354	Shrublands; jam and Acacia rostellifera (+hakea) scrub with scattered York gum	No, Not TEC								NOT TEC
TEC018	na	352	Medium woodland; York Gum	Yes	Good	Location: AVW01	Yes, > 10%	No, Not TEC: Key species not dominant				NOT TEC
TEC019	na	352	Medium woodland; York Gum	Yes	Good	Location: AVW01	Yes, > 10%	No, Not TEC: Key species not dominant				NOT TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
TEC020	na	352	Medium woodland; York Gum	Yes	Very Good	Location: AVW01	Yes, > 10%	No, Not TEC: Key species not dominant				NOT TEC
TEC021	P5.62A	352	Medium woodland; York Gum	Yes	Very Good	Location: AVW01	Yes, > 10%	Dominant species: Eucalyptus loxophleba subsp. loxophleba,	Bare to sparse understorey	Chenopods: *Enchylaena lanata / tomentosa complex, Maireana brevifolia*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC022	na	352	Medium woodland; York Gum	Yes	Very Good	Location: AVW01	Yes, > 10%	Dominant species (30% cover): Eucalyptus loxophleba subsp. loxophleba	Bare to sparse understorey	Chenopods: *Atriplex vesicaria, Enchylaena lanata / tomentosa complex, Maireana brevifolia*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC022A	na	n/a	Cleared and Planted	No, Not TEC								NOT TEC
TEC023	P5.60	1024	Shrublands; mallee and casuarina thicket	No, Not TEC								NOT TEC
TEC024	na	1024	Shrublands; mallee and casuarina thicket	No, Not TEC								NOT TEC
TEC024A	P5.51	142	Medium woodland; York Gum, Salmon Gum and Gimlet	Yes	Very Good	Location: AVW01	Yes, > 10%	Dominant species (25% cover): Eucalyptus loxophleba subsp. loxophleba; Co-dominant species (15% cover): Eucalyptus loxophleba subsp. lissophloia	Bare to sparse understorey	Shrubs: *Acacia microbotrya, Dodonaea inaequifolia, Hakea preissii*	Patch type: roadside, ≥ 5 m. Category A. Vegetation condition is very good. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers.	TEC
TEC026	na	352	Medium woodland; York Gum	Yes	Degraded	Location: AVW02	Yes, > 10%	Dominant species (30% cover): Eucalyptus loxophleba subsp. loxophleba	Bare to sparse understorey	Chenopods: *Enchylaena lanata / tomentosa complex, Maireana brevifolia*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
TEC027	na	352	Medium woodland; York Gum	Yes	Good	Location: AVW02	Yes, > 10%	Dominant species (30% cover): Eucalyptus loxophleba subsp. loxophleba	Bare to sparse understorey	Shrubs: *Acacia colletioides, Acacia microbotrya; Chenopods: Maireana brevifolia*	Patch type: roadside, ≥ 5 m. Category B. Exotic plant species account for 30–50% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC028	na	142	Medium woodland; York Gum and Salmon Gum	Yes	Degraded	Location: AVW02	Yes, > 10%	Dominant species (30% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus salmonophloia	Bare to sparse understorey	Shrubs: *Acacia microbotrya; Chenopods: Atriplex vesicaria, Enchylaena lanata / tomentosa complex, Maireana brevifolia*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC029	na	142	Medium woodland; York Gum and Salmon Gum		Degraded	Location: AVW02	Yes, > 10%	Dominant species (40% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus salmonophloia, Eucalyptus salubris	Bare to sparse understorey	Shrubs: *Acacia colletioides, Acacia hemiteles; Chenopods: Enchylaena lanata / tomentosa complex, Maireana brevifolia*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC030	na	352	Medium woodland; York Gum			Location: AVW02	Yes, > 10%	Dominant species (40% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus salmonophloia	Bare to sparse understorey	Shrubs: *Acacia microbotrya, Calothamnus quadrifidus, Melaleuca radula*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC031	S3D10	352	Medium woodland; York Gum	Yes	Degraded	Location: AVW02	Yes, > 10%	Dominant species (40% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus salmonophloia	Bare to sparse understorey	Shrubs: *Acacia microbotrya, Calothamnus quadrifidus; Chenopods: Enchylaena lanata / tomentosa*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
										complex, Maireana brevifolia		
TEC032	GAP016	352	Medium woodland; York Gum	Yes	Degraded	Location: AVW02	Yes, > 10%	Dominant species (30% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus salubris	Bare to sparse understorey	Shrubs: *Acacia hemiteles; Chenopods: Enchylaena lanata / tomentosa complex, Maireana brevifolia*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC033	na	352	Medium woodland; York Gum	Yes	Degraded	Location: AVW02	Yes, > 10%	Dominant species (50% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus salmonophloia	Bare to sparse understorey	Shrubs: *Acacia colletioides; Chenopods: Atriplex stipitata, Enchylaena lanata / tomentosa complex, Maireana brevifolia*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC034	na	352	Medium woodland; York Gum	Yes	Degraded	Location: AVW02	Yes, > 10%	Dominant species (15% cover): Eucalyptus loxophleba subsp. loxophleba	Bare to sparse understorey	Shrubs: *Acacia hemiteles, Melaleuca radula*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC035	MRP20002	946	Medium woodland; Wandoo	Yes	Degraded	Location: AVW02	Yes, > 10%	Dominant species (30% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus salmonophloia	Bare to sparse understorey	Shrubs: *Acacia colletioides, Acacia hemiteles, Dodonaea inaequifolia; Chenopods: Enchylaena lanata / tomentosa complex, Maireana brevifolia*	Patch type: roadside, ≥ 5 m. Category D. Vegetation condition is degraded. Mature trees (≥30cm DBH)4 are present with at least 5 trees per 0.5 ha. Exotic plant species account for 10% of total vegetation cover in the understorey.	TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
TEC036	na	n/a	Cleared and Planted	No, Not TEC								NOT TEC
TEC037	na	946	Medium woodland; Wandoo	Yes	Degraded	Location: AVW02	Yes, > 10%	Dominant species (35% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey		Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC038	S3D08	936	Medium woodland; Salmon Gum	Yes	Degraded to Good	Location: AVW02	Yes, > 10%	Dominant species (15% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Acacia hemiteles, Allocasuarina humilis, Dodonaea inaequifolia; Chenopods: Maireana brevifolia*	Patch type: roadside, ≥ 5 m. Category B. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC039	na	946	Medium woodland; Wandoo	Yes	Good	Location: AVW02	Yes, > 10%	Dominant species (20% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Acacia colletioides, Calothamnus quadrifidus, Dodonaea inaequifolia; Chenopods: Maireana brevifolia*	Patch type: roadside, ≥ 5 m. Category B. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC040	na	946	Medium woodland; Wandoo	Yes	Degraded	Location: AVW02	Yes, > 10%	Dominant species (20% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Graminoids: *Austrostipa elegantissima*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC041	na	946	Medium woodland; Wandoo	Yes	Degraded	Location: AVW02	Yes, > 10%	Dominant species (40% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Graminoids: *Austrostipa elegantissima, Austrostipa nitida*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
TEC042	na	946	Medium woodland; Wandoo	Yes	Degraded	Location: AVW02	Yes, > 10%	Dominant species (50% cover): Eucalyptus loxophleba subsp. loxophleba	Bare to sparse understorey	Graminoids: *Austrostipa elegantissima*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC043	na	946	Medium woodland; Wandoo	Yes	Degraded	Location: AVW02	Yes, > 10%	Dominant species (20% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Graminoids: *Austrostipa elegantissima, Neurachne alopecuroides,*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC043	na	946	Medium woodland; Wandoo	Yes	Degraded	AVW02	Yes, > 10%	Dominant species (20% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Graminoids: *Austrostipa elegantissima, Neurachne alopecuroides,*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC044	S3D07	946	Medium woodland; Wandoo	Yes	Degraded to Good	Location: AVW02	Yes, > 10%	Dominant species (35% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Chenopods: *Maireana brevifolia; Graminoids: Austrostipa elegantissima*	Patch type: roadside, ≥ 5 m. Category B. Exotic plant species account for 30–50% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC045	na	352	Medium woodland; York Gum	Yes	Degraded	Location: AVW02	Yes, > 10%	Dominant species (50% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Acacia microbotrya; Graminoids: Austrostipa elegantissima*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees may be present with at least 5 trees per 0.5 ha.	TEC
TEC047	na	352	Medium woodland; York Gum	Yes	Degraded	Location: AVW02	Yes, > 10%	Dominant species (40% cover): Eucalyptus loxophleba subsp. loxophleba	Bare to sparse understorey	Chenopods: *Enchylaena lanata / tomentosa complex; Graminoids: Austrostipa elegantissima,*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
										Neurachne alopecuroides		
TEC048	S3D06	1040	Medium woodland; York gum & Casuarina obesa	Yes	Degraded	Location: AVW02	Yes, > 10%	Dominant species (40% cover): Eucalyptus loxophleba subsp. loxophleba	Bare to sparse understorey	Shrubs: *Acacia hemiteles; Chenopods: Enchylaena lanata / tomentosa complex, Maireana brevifolia; Graminoids: Austrostipa elegantissima*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC049	na	352	Medium woodland; York Gum	Yes	Degraded	Location: AVW02	Yes, > 10%	Dominant species (15% cover): Eucalyptus loxophleba subsp. loxophleba	Bare to sparse understorey	Graminoids: *Austrostipa elegantissima, Austrostipa nitida*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC050	na	7	Medium woodland; York Gum (Eucalyptus loxophleba) and Wandoo	Yes	Good	Location: AVW02	Yes, > 10%	Dominant species (50% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Acacia microbotrya, Acacia pulchella; Chenopods: Enchylaena lanata / tomentosa complex, Maireana brevifolia*	Patch type: roadside, ≥ 5 m. Category B. Exotic plant species account for 30–50% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC051	na	7	Medium woodland; York Gum (Eucalyptus loxophleba) and Wandoo	Yes	Good	Location: AVW02	Yes, > 10%	Dominant species (40% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs*: Acacia hemiteles, Acacia pulchella; Chenopods: Enchylaena lanata / tomentosa complex, Maireana brevifolia*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
TEC052	na	7	Medium woodland; York Gum (Eucalyptus loxophleba) and Wandoo	Yes	Degraded		Yes, > 10%	Dominant species (30% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Chenopods: *Atriplex vesicaria, Enchylaena lanata / tomentosa complex, Maireana brevifolia*	Patch type: roadside, ≥ 5 m. Category B. Exotic plant species account for 30–50% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	NOT TEC
TEC053	na	352	Medium woodland; York Gum	Yes	Degraded	Location: AVW02	Yes, > 10%	Dominant species (40% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus rudis subsp. rudis	Bare to sparse understorey	Chenopods: *Enchylaena lanata / tomentosa complex, Maireana brevifolia; Graminoids: Austrostipa elegantissima, Austrostipa nitida*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC054	na	7	Medium woodland; York Gum (Eucalyptus loxophleba) and Wandoo	Yes	Very Good	Location: AVW02	Yes, > 10%	Dominant species (40% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Chenopods: *Enchylaena lanata / tomentosa complex; Graminoids: Austrostipa elegantissima*	Patch type: roadside, ≥ 5 m. Category A. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers. Mature trees may be present or absent.	TEC
TEC055	GAP019	950	Medium woodland; Casuarina obesa	No, Not TEC								NOT TEC
TEC056	na	7	Medium woodland; York Gum (Eucalyptus loxophleba) and Wandoo	Yes	Good	Location: AVW02	Yes, > 10%	Dominant species (45% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus salmonophloia, Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Acacia microbotrya, Acacia pulchella; Chenopods: Maireana brevifolia; Graminoids: Austrostipa elegantissima*	Patch type: roadside, ≥ 5 m. Category B. Exotic plant species account for 30–50% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC057	na		Medium woodland; York Gum (Eucalyptus	Yes	Degraded		Yes, > 10%	No, Not TEC: Key species not dominant				NOT TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
			loxophleba) and Wandoo									
TEC058	na	7	Medium woodland; York Gum (Eucalyptus loxophleba) and Wandoo	Yes	Degraded	Location: AVW02	Yes, > 10%	Dominant species (20% cover): Eucalyptus loxophleba subsp. loxophleba	Bare to sparse understorey	Chenopods: *Enchylaena lanata / tomentosa complex, Maireana brevifolia; Graminoids: Austrostipa elegantissima*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC059	na	7	Medium woodland; York Gum (Eucalyptus loxophleba) and Wandoo	Yes	Degraded	Location: AVW02	Yes, > 10%	Dominant species (20% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Chenopods: *Maireana brevifolia; Graminoids: Austrostipa elegantissima*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC060	na	7	Medium woodland; York Gum (Eucalyptus loxophleba) and Wandoo	Yes	Good	Location: AVW02	Yes, > 10%	Dominant species (30% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Chenopods: *Enchylaena lanata / tomentosa complex; Forbs: Caesia micrantha; Graminoids: Austrostipa elegantissima*	Patch type: roadside, ≥ 5 m. Category B. Exotic plant species account for 30–50% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC061	na	7	Medium woodland; York Gum (Eucalyptus loxophleba) and Wandoo	Yes	Degraded	Location: AVW02	Yes, > 10%	Dominant species (20% cover): Eucalyptus loxophleba subsp. loxophleba	Bare to sparse understorey		Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC062	na	7	Medium woodland; York Gum (Eucalyptus loxophleba) and Wandoo	Yes	Degraded	Location: AVW02	Yes, > 10%	Dominant species (30% cover): Eucalyptus loxophleba subsp. loxophleba	Bare to sparse understorey	Graminoids: *Austrostipa elegantissima*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
TEC063	na	7	Medium woodland; York Gum (Eucalyptus loxophleba) and Wandoo	Yes	Degraded	Location: AVW02	Yes, > 10%	Dominant species (30% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus rudis subsp. rudis	Bare to sparse understorey	Graminoids: *Austrostipa elegantissima*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC064	NN3.1a	1182	Medium woodland; Eucalyptus rudis and Melaleuca rhaphiophylla	Yes	Degraded	Location: AVW02	Yes, > 10%	Dominant species (20% cover): Eucalyptus rudis subsp. rudis	Bare to sparse understorey	Shrubs: *Melaleuca rhaphiophylla*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC065	na	352	Medium woodland; York Gum	Yes	Degraded	AVW02	Yes, > 10%	Dominant species (25% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey		Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC066	na	352	Medium woodland; York Gum	Yes	Degraded	AVW02	Yes, > 10%	Dominant species (30% cover): Eucalyptus accedens, Eucalyptus loxophleba subsp. loxophleba	Bare to sparse understorey		Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC067	S3A22	1182	Medium woodland; Eucalyptus rudis and Melaleuca rhaphiophylla	Yes	Degraded		Yes, > 10%	Dominant species (15% cover): Eucalyptus loxophleba subsp. loxophleba	Bare to sparse understorey		No, Not TEC Patch type: Roadside, <5 m Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	NOT TEC
TEC068	na	1182	Medium woodland; Eucalyptus rudis and Melaleuca rhaphiophylla	Yes		Location: JAF01	Yes, > 10%	Dominant species (30% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus rudis subsp. rudis	Bare to sparse understorey	Shrubs: *Acacia microbotrya, Melaleuca rhaphiophylla*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC068A	na	1182	Medium woodland; Eucalyptus rudis and	Yes	Degraded	Location: JAF01	Yes, > 10%	Dominant species (30% cover): Eucalyptus loxophleba	Bare to sparse understorey	Shrubs: *Acacia microbotrya*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in	TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
			Melaleuca rhaphiophylla					subsp. loxophleba, Eucalyptus rudis subsp. rudis			the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	
TEC069	na	1182	Medium woodland; Eucalyptus rudis and Melaleuca rhaphiophylla	Yes	Degraded		Yes, > 10%	Dominant species (45% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus rudis subsp. rudis	Bare to sparse understorey	No, Not TEC: No native understorey		NOT TEC
TEC070	na	1182	Medium woodland; Eucalyptus rudis and Melaleuca rhaphiophylla	Yes	Degraded	Location: JAF01	Yes, > 10%	Dominant species (30% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus rudis subsp. rudis, Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Graminoids: *Austrostipa elegantissima, Neurachne alopecuroides,*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC071	na	991	Medium woodland; small Wandoo patches surrounded by other eucalypts	Yes	Very Good	Location: JAF01	Yes, > 10%	Dominant species (25% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Forbs: *Podolepis lessonii; Graminoids: Austrostipa elegantissima, Neurachne alopecuroides,*	Patch type: roadside, ≥ 5 m. Category A. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers. Mature trees may be present or absent.	TEC
TEC072	na	991	Medium woodland; small Wandoo patches surrounded by other eucalypts	Yes	Degraded to Good	Location: JAF01	Yes, > 10%	Dominant species (30% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Calothamnus quadrifidus, Enchylaena lanata / tomentosa complex; Graminoids: Austrostipa elegantissima*	Patch type: roadside, ≥ 5 m. Category B. Exotic plant species account for 30–50% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC073	na	991	Medium woodland; small Wandoo patches surrounded by other eucalypts	Yes	Good	Location: JAF01	Yes, > 10%	Dominant species (40% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Enchylaena lanata / tomentosa complex; Graminoids:*	Patch type: roadside, ≥ 5 m. Category B. Exotic plant species account for 30–50% of total vegetation cover in the understorey layers. Mature trees	TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
										Austrostipa elegantissima	are present with at least 5 trees per 0.5 ha.	
TEC074	na	991	Medium woodland; small Wandoo patches surrounded by other eucalypts	Yes		Location: JAF01	Yes, > 10%	Dominant species (40% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Calothamnus quadrifidus; Graminoids: Austrostipa elegantissima*	Patch type: roadside, ≥ 5 m. Category B. Exotic plant species account for 30–50% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC075	S3A47	946	Medium woodland; Wandoo	Yes	Degraded	Location: JAF01	Yes, > 10%	Dominant species (30% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Allocasuarina humilis, Calothamnus quadrifidus, Hibbertia hypericoides; Graminoids: Austrostipa elegantissima, Neurachne alopecuroides,*	Patch type: roadside, ≥ 5 m. Category D. Vegetation condition is degraded. Mature trees (≥30cm DBH)4 are present with at least 5 trees per 0.5 ha. Exotic plant species account for less than 1% of total vegetation cover in the understorey.	TEC
TEC076	na	946	Medium woodland; Wandoo	Yes	Degraded	Location: JAF01	Yes, > 10%	Dominant species (25% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Calothamnus quadrifidus; Forbs: Podolepis lessonii; Graminoids: Austrostipa elegantissima*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC077	na	991	Medium woodland; small Wandoo patches surrounded by other eucalypts	Yes	Good	Location: JAF01	Yes, > 10%	Dominant species (35% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Hibbertia hypericoides, Melaleuca radula; Graminoids: Austrostipa elegantissima*	Patch type: roadside, ≥ 5 m. Category B. Exotic plant species account for 30–50% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC078	na	352	Medium woodland; York Gum	Yes	Good	Location: JAF01	Yes, > 10%	Dominant species (3% cover): Eucalyptus loxophleba subsp. loxophleba,	Bare to sparse understorey	Chenopods: *Enchylaena lanata / tomentosa complex; Graminoids:*	Patch type: roadside, ≥ 5 m. Category B. Exotic plant species account for 30–50% of total vegetation cover in the understorey layers. Mature trees	TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
								Eucalyptus wandoo subsp. wandoo		*Austrostipa elegantissima, Lepidosperma tenue, Neurachne alopecuroides,*	are present with at least 5 trees per 0.5 ha.	
TEC079	na	352	Medium woodland; York Gum	Yes	Good	Location: JAF01	Yes, > 10%	Dominant species (40% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Graminoids: *Austrostipa elegantissima*	Patch type: roadside, ≥ 5 m. Category B. Exotic plant species account for 30–50% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC080	na	352	Medium woodland; York Gum	Yes	Good	Location: JAF01	Yes, > 10%	Dominant species (30% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Acacia microbotrya, Hibbertia hypericoides; Graminoids: Austrostipa elegantissima*	Patch type: roadside, ≥ 5 m. Category B. Exotic plant species account for 30–50% of total vegetation cover in the understorey layers.	TEC
TEC081	na	352	Medium woodland; York Gum	Yes	Good	Location: JAF01	Yes, > 10%	Dominant species (40% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Hibbertia hypericoides; Graminoids: Austrostipa elegantissima, Neurachne alopecuroides*	Patch type: roadside, ≥ 5 m. Category B. Exotic plant species account for 30–50% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC082	na	352	Medium woodland; York Gum	Yes	Good	Location: JAF01	Yes, > 10%	Dominant species (30% cover): Eucalyptus loxophleba subsp. loxophleba	Bare to sparse understorey	Graminoids: *Austrostipa elegantissima, Neurachne alopecuroides*	Patch type: roadside, ≥ 5 m. Category B. Exotic plant species account for 30–50% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC083	na	352	Medium woodland; York Gum	Yes	Very Good	Location: JAF01	Yes, > 10%	Dominant species (40% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Hakea lissocarpha, Melaleuca radula; Graminoids: Austrostipa elegantissima,*	Patch type: roadside, ≥ 5 m. Category A. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers.	TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
										Neurachne alopecuroides,		
TEC084	na	4	Medium woodland; Marri and Wandoo	Yes		Location: JAF01	Yes, > 10%	No, Not TEC: Dominant species Corymbia calophylla		Graminoids: *Austrostipa elegantissima*		NOT TEC
TEC085	na	991	Medium woodland; small Wandoo patches surrounded by other eucalypts	Yes	Degraded	Location: JAF01	No, Not TEC					NOT TEC
TEC086	na	4	Medium woodland; Marri and Wandoo	Yes	Good	Location: JAF01	Yes, > 10%	Dominant species (25% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Calothamnus quadrifidus; Graminoids: Austrostipa elegantissima, Neurachne alopecuroides,*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	NOT TEC
TEC087	na	1034	Medium woodland; Marri, Wandoo and Powderbark	Yes	Excellent	Location: JAF01	Yes, > 10%	Dominant species (40% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Acacia pulchella, Allocasuarina humilis, Bossiaea eriocarpa, Calothamnus quadrifidus; Graminoids: Austrostipa elegantissima, Neurachne alopecuroides,*	Patch type: roadside, ≥ 5 m. Category A. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC088	na	1034	Medium woodland; Marri, Wandoo and Powderbark	Yes	Very Good	Location: JAF01	Yes, > 10%	Dominant species (28% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Acacia pulchella, Allocasuarina humilis, Banksia sessilis, Bossiaea eriocarpa, Hakea lissocarpha; Graminoids: Austrostipa*	Patch type: roadside, ≥ 5 m. Category A. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
										elegantissima, Neurachne alopecuroides,		
TEC089	na	4	Medium woodland; Marri and Wandoo	Yes	Good	Location: JAF01	Yes, > 10%	No, Not TEC: Dominant species Corymbia calophylla				NOT TEC
TEC090	na	4	Medium woodland; Marri and Wandoo	Yes	Good	Location: JAF01	Yes, > 10%	No, Not TEC: Dominant species Corymbia calophylla				NOT TEC
TEC091	na	4	Medium woodland; Marri and Wandoo	Yes	Very Good	Location: JAF01	Yes, > 10%	No, Not TEC: Dominant species Corymbia calophylla	Bare to sparse understorey	Shrubs: *Acacia pulchella, Allocasuarina humilis, Banksia sessilis, Bossiaea eriocarpa, Calothamnus quadrifidus subsp. asper, Conostylis setigera;* *Graminoids: Austrostipa elegantissima, Neurachne alopecuroides,*	Patch type: roadside, ≥ 5 m. Category A. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers. Mature trees may be present or absent.	NOT TEC
TEC092	na	4	Medium woodland; Marri and Wandoo	Yes	Very Good	Location: JAF01	Yes, > 10%	Dominant species (30% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Acacia pulchella, Allocasuarina humilis, Banksia sessilis, Bossiaea eriocarpa, Conostylis setigera, Hibbertia hypericoides;* *Graminoids: Austrostipa elegantissima, Neurachne alopecuroides,*	Patch type: roadside, ≥ 5 m. Category A. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers. Mature trees may be present or absent.	TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
TEC093	S3AB20001	1034	Medium woodland; Marri, Wandoo and Powderbark	Yes	Very Good	Location: JAF01	Yes, > 10%	Dominant species (30% cover): Eucalyptus accedens	Bare to sparse understorey	Shrubs: *Acacia pulchella, Allocasuarina humilis, Bossiaea eriocarpa, Hibbertia hypericoides; Graminoids: Austrostipa elegantissima, Neurachne alopecuroides*	Patch type: roadside, ≥ 5 m. Category A. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers. Mature trees may be present or absent.	TEC
TEC094	na	999	Medium woodland; Marri	No, Not TEC								NOT TEC
TEC095	na	999	Medium woodland; Marri	No, Not TEC								NOT TEC
TEC096	na	4	Medium woodland; Marri and Wandoo	Yes	Good	Location: JAF01	Yes, > 10%	Dominant species (25% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Bossiaea eriocarpa, Hakea varia, Hibbertia hypericoides; Graminoids: Austrostipa elegantissima, Neurachne alopecuroides*	Patch type: roadside, ≥ 5 m. Category B. Exotic plant species account for 30–50% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC096a	na	1034	Medium woodland; Marri, Wandoo and Powderbark	Yes	Good	Location: JAF01	Yes, > 10%	Dominant species (25% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Bossiaea eriocarpa, Hakea varia, Hibbertia hypericoides; Graminoids: Austrostipa elegantissima, Neurachne alopecuroides*	Patch type: roadside, ≥ 5 m. Category B. Exotic plant species account for 30–50% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC097	na	999	Medium woodland; Marri	No, Not TEC								NOT TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
TEC098	na	4	Medium woodland; Marri and Wandoo	Yes	Good	Location: JAF01	Yes, > 10%	Dominant species (30% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Allocasuarina humilis, Bossiaea eriocarpa, Calothamnus quadrifidus; Graminoids: Austrostipa elegantissima, Neurachne alopecuroides,*	Patch type: roadside, ≥ 5 m. Category B. Exotic plant species account for 30–50% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC099	na	4	Medium woodland; Marri and Wandoo	Yes	Good	Location: JAF01	No, Not TEC					NOT TEC
TEC100	na	4	Medium woodland; Marri and Wandoo	Yes	Very Good	Location: JAF01	No, Not TEC					NOT TEC
TEC101	na	4	Medium woodland; Marri and Wandoo	Yes	Good	Location: JAF01	No, Not TEC					NOT TEC
TEC102	na	4	Medium woodland; Marri and Wandoo	Yes	Very Good	Location: JAF01	Yes, > 10%	Dominant species (25% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Bossiaea eriocarpa, Hibbertia hypericoides; Graminoids: Austrostipa elegantissima, Lepidosperma tenue, Neurachne alopecuroides*	Patch type: roadside, ≥ 5 m. Category A. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers. Mature trees may be present or absent.	TEC
TEC103	na	1132	Medium forest; Marri	No, Not TEC								NOT TEC
TEC104	na	4	Medium woodland; Marri and Wandoo	Yes	Very Good	Location: JAF01	Yes, > 10%	No, Not TEC: Co-dominant species (25% cover) Eucalyptus wandoo subsp. wandoo; (15% cover) Corymbia calophylla				NOT TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
TEC105	na	4	Medium woodland; Marri and Wandoo	Yes	Very Good		Yes, > 10%	No, Not TEC: Dominant species Corymbia calophylla		Graminoids: *Austrostipa elegantissima*		NOT TEC
TEC106	S3A30	4	Medium woodland; Marri and Wandoo	Yes	Good - Very Good		Yes, > 10%	No, Not TEC: Dominant species (30% cover) Eucalyptus wandoo subsp. wandoo; Co-dominant species (10% cover) Corymbia calophylla				NOT TEC
TEC107	na	4	Medium woodland; Marri and Wandoo	Yes	Very Good	Location: JAF01	Yes, > 10%	Dominant species (30% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Bossiaea eriocarpa; Graminoids: Austrostipa elegantissima, Neurachne alopecuroides,*	Patch type: roadside, ≥ 5 m. Category A. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers. Mature trees may be present or absent.	TEC
TEC108	na	991	Medium woodland; small Wandoo patches surrounded by other eucalypts	Yes	Good	Location: JAF01	Yes, > 10%	Dominant species (40% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Bossiaea eriocarpa; Graminoids: Austrostipa elegantissima*	Patch type: roadside, ≥ 5 m. Category B. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC109	na	991	Medium woodland; small Wandoo patches surrounded by other eucalypts	Yes	Very Good	Location: JAF01	Yes, > 10%	Dominant species (30% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Bossiaea eriocarpa, Hibbertia hypericoides; Graminoids: Austrostipa elegantissima, Neurachne alopecuroides,*	Patch type: roadside, ≥ 5 m. Category A. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers. Mature trees may be present or absent.	TEC
TEC110	na	991	Medium woodland; small Wandoo patches surrounded by other eucalypts	Yes	Very Good	Location: JAF01	Yes, > 10%	Dominant species (30% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Bossiaea eriocarpa, Hibbertia hypericoides; Graminoids:*	Patch type: roadside, ≥ 5 m. Category A. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers. Mature trees may be present or absent.	TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
										Austrostipa elegantissima		
TEC111	S3A32	946	Medium woodland; Wandoo	Yes	Good	Location: JAF01	Yes, > 10%	Dominant species (30% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Bossiaea eriocarpa, Hibbertia hypericoides; Graminoids: Austrostipa elegantissima, Neurachne alopecuroides,*	Patch type: roadside, ≥ 5 m. Category B. Exotic plant species account for 30–50% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC112	na	946	Medium woodland; Wandoo	Yes	Good	Location: JAF01	Yes, > 10%	Dominant species (25% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Allocasuarina humilis, Banksia sessilis, Bossiaea eriocarpa; Graminoids: Austrostipa elegantissima, Neurachne alopecuroides,*	Patch type: roadside, ≥ 5 m. Category B. Exotic plant species account for 30–50% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC113	na	991	Medium woodland; small Wandoo patches surrounded by other eucalypts	Yes	Good	Location: JAF01	Yes, > 10%	Dominant species (25% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Bossiaea eriocarpa; Graminoids: Austrostipa elegantissima, Neurachne alopecuroides,*	Patch type: roadside, ≥ 5 m. Category B. Exotic plant species account for 30–50% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC114	na	991	Medium woodland; small Wandoo patches surrounded by other eucalypts	Yes	Good	Location: JAF01	Yes, > 10%	No, Not TEC: Co-dominant species (20% cover) Eucalyptus wandoo subsp. wandoo; (10% cover) Corymbia calophylla	Bare to sparse understorey	Shrubs: *Allocasuarina humilis, Bossiaea eriocarpa; Graminoids: Austrostipa elegantissima*	Patch type: roadside, ≥ 5 m. Category A. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers. Mature trees may be present or absent.	NOT TEC
TEC115	na	999	Medium woodland; Marri	No, Not TEC								NOT TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
TEC116	na	999	Medium woodland; Marri	No, Not TEC								NOT TEC
TEC116	S3A33	999	Medium woodland; Marri	No, Not TEC								NOT TEC
TEC117	na	4	Medium woodland; Marri and Wandoo	Yes	Degraded	Location: JAF01	Yes, > 10%	Dominant species (30% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Graminoids: *Austrostipa elegantissima*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC117a	WRP20005	946	Medium woodland; Wandoo	Yes	Very good	Location: AVW01	Yes, > 10%	Dominant species (50% cover): Eucalyptus wandoo subsp. Wandoo	Bare to sparse understorey	Graminoids: *Austrostipa elegantissima*	Patch type: roadside, ≥ 5 m. Category A. Vegetation condition is very good. Mature trees (≥30cm DBH)4 are present with at least 5 trees per 0.5 ha.	TEC
TEC118	na	4	Medium woodland; Marri and Wandoo	Yes	Good	Location: JAF01	Yes, > 10%	Dominant species (20% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Forbs: *Podolepis lessonii; Graminoids: Austrostipa elegantissima, Neurachne alopecuroides,*	Patch type: roadside, ≥ 5 m. Category B. Exotic plant species account for 30–50% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC119	na	4	Medium woodland; Marri and Wandoo	Yes	Very Good	Location: JAF01	Yes, > 10%	Dominant species (20% cover): Eucalyptus wandoo subsp. wandoo	Bare to sparse understorey	Shrubs: *Allocasuarina humilis, Bossiaea eriocarpa, Hibbertia hypericoides; Graminoids: Austrostipa elegantissima, Neurachne alopecuroides,*	Patch type: roadside, ≥ 5 m. Category A. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers. Mature trees may be present or absent.	TEC
TEC120	na	4	Medium woodland; Marri and Wandoo	Yes	Good	Location: JAF01	Yes, > 10%	No, Not TEC: Co-dominant species (20% cover) Eucalyptus wandoo subsp. wandoo; (10%				NOT TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
								cover) Corymbia calophylla				
TEC121	na	4	Medium woodland; Marri and Wandoo	Yes	Good	Location: JAF01	Yes, > 10%	Dominant species (25% cover): Eucalyptus wandoo	Bare to sparse understorey	Shrubs: *Acacia pulchella, Banksia sessilis; Graminiods: Neurachne alopecuroides*	Patch type: roadside, ≥ 5 m. Category B. Exotic plant species account for 30–50% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TEC122	MRL2003	352	Medium woodland; York Gum	Yes	Degraded	Location:AV W02	Yes, > 10%	Dominant species (30% cover): Eucalyptus loxophleba subsp. loxophleba	Bare to sparse understorey	*Shrubs: Hakea preissii; Graminoids: Austrostipa elegantissima*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees may be present with at least 5 trees per 0.5 ha.	TEC
TEC123	na	352	Medium woodland; York Gum	Yes	Degraded	Location:AV W02	Yes, > 10%	Dominant species (45% cover): Eucalyptus loxophleba subsp. loxophleba	Bare to sparse understorey	Graminoids: *Austrostipa elegantissima*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers.	TEC
TEC126	na	946	Medium woodland; Wandoo	Yes	Good	Location: JAF01	No, Not TEC					NOT TEC
TECW001	W6.20	8	Medium woodland; Salmon Gum and Gimlet	Yes	Good	Location:AV W01	Yes, > 10%	Dominant species (35% cover): Eucalyptus salmonophloia, Eucalyptus salubris	Bare to sparse understorey	Chenopods: *Atriplex vesicaria, Maireana brevifolia*	Patch type: roadside, ≥ 5 m. Category C. Exotic plant species account for 30–50% of total vegetation cover in the understorey layers. Mature trees either absent or less than 5 trees per 0.5 ha.	TEC
TECW002	na	8	Medium woodland; Salmon Gum and Gimlet	Yes	Degraded	Location:AV W01	Yes, > 10%	Dominant species (10% cover): Eucalyptus salmonophloia, Eucalyptus salubris	Bare to sparse understorey	Chenopods: *Atriplex vesicaria, Maireana brevifolia*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TECW003	na	8	Medium woodland; Salmon Gum and Gimlet	Yes	Degraded	Location:AV W01	Yes, > 10%	Dominant species (15% cover): Eucalyptus salubris	Bare to sparse understorey	Chenopods: *Enchylaena lanata / tomentosa complex, Maireana brevifolia,*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
										Sclerolaena diacantha		
TECW004	W6.19	8	Medium woodland; Salmon Gum and Gimlet	Yes	Good	Location:AVW01	Yes, > 10%	Dominant species (50% cover): Eucalyptus salmonophloia, Eucalyptus salubris	Bare to sparse understorey	Chenopods: *Atriplex vesicaria, Enchylaena lanata / tomentosa complex, Maireana brevifolia*	Patch type: roadside, ≥ 5 m. Category C. Exotic plant species account for 30–50% of total vegetation cover in the understorey layers. Mature trees either absent or less than 5 trees per 0.5 ha.	TEC
TECW006	W6.17	352	Medium woodland; York Gum	Yes	Excellent	Location: AVW01	Yes, > 10%	No, Not TEC. Dominant species: no key species dominant. Other tree canopy species: Eucalyptus loxophleba subsp. lissophloia dominant				Not TEC
TECW007	W6.12	352	Medium woodland; York Gum	Yes	Pristine	Location:AVW01	Yes, > 10%	Dominant species (40% cover): Eucalyptus loxophleba subsp. Loxophleba; Other tree canopy species: none present	Shrub and herbaceous understorey	*Acacia mackeyana, Grevillea huegelii, Olearia muelleri*	Patch type: roadside, ≥ 5 m. Category A. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers. Mature trees may be present or absent.	TEC
TECW008	na	352	Medium woodland; York Gum	Yes	Very Good		Yes, > 10%	No, Not TEC: Key species not dominant				Not TEC
TECW009	S5A03	352	Medium woodland; York Gum	Yes	Degraded	Location:AVW01	Yes, > 10%	Dominant species (15% cover): Eucalyptus loxophleba subsp. loxophleba	Bare to sparse understorey	*Melaleuca acuminata* subsp. *Websteri, Grevillea petrophiloides, Acacia acuminata, Melaleuca stereophloia, Acacia multispicata, Hibbertia drummondii*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TECW010	na	352	Medium woodland; York Gum	Yes	Degraded		Yes, > 10%	No, Not TEC: Co-dominant species				Not TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
								(10% cover) Eucalyptus loxophleba subsp. loxophleba; (8% cover) Eucalyptus leptopoda subsp. leptopoda				
TECW011	S5A14	352	Medium woodland; York Gum	No, Not TEC								NOT TEC
TECW012	na	352	Medium woodland; York Gum	Yes	Degraded	Location: AVW01	Yes, > 10%	Dominant species (15% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus salmonophloia	Bare to sparse understorey	Chenopods: *Sclerolaena diacantha; Forbs: Waitzia acuminata*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TECW013	na	352	Medium woodland; York Gum	Yes	Degraded	Location: AVW01	Yes, > 10%	Dominant species (15% cover): Eucalyptus loxophleba subsp. Loxophleba	Bare to sparse understorey	Shrubs: *Acacia hemiteles, Allocasuarina campestris, Melaleuca adnata, Senna artemisioides*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 30–50% of total vegetation cover in the understorey layers. Mature trees either absent or less than 5 trees per 0.5 ha.	NOT TEC
TECW014	na	142	Medium woodland; York Gum and Salmon Gum	Yes	Degraded	Location:AVW01	Yes, > 10%	Dominant species (10% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus salmonophloia	Bare to sparse understorey	Shrubs: *Dodonaea inaequifolia, Exocarpos aphyllus*	Patch type: roadside, ≥ 5 m. Category D. Mature trees are present with at least 5 trees per 0.5 ha.	TEC
TECW015	na	352	Medium woodland; York Gum	Yes	Very Good	Location:AVW01	Yes, > 10%	Dominant species (20% cover): Eucalyptus loxophleba subsp. loxophleba, Eucalyptus salmonophloia	Bare to sparse understorey	Shrubs: *Acacia hemiteles, Dodonaea inaequifolia, Eremophila decipiens, Santalum acuminata, Hibbertia drummondii*	Patch type: roadside, ≥ 5 m. Category A. Exotic plant species account for 0–30% of total vegetation cover in the understorey layers. Mature trees may be present or absent.	TEC

TEC site	Quadrat #	Veg code	Vegetation association	Eucalypt woodland quadrat?	Vegetation condition	Diagnostic 1 - Location	Diagnostic 2 – Min. crown canopy	Diagnostic 3 - Dominant tree canopy	Understorey category	Understorey species	Diagnostic 5 - Vegetation condition	Outcome
TECW016	DBY001	352	Medium woodland; York Gum	Yes	Good	Location:AVW01	Yes, > 10%	Dominant species (35%): Eucalyptus loxophleba Subsp. loxophleba Other tree canopy species: none present	Shrub and herbaceous understorey	Shrubs: *Grevillea huegelii, Melaleuca lateriflora, Melaleuca viminea*	Patch type: roadside, ≥ 5 m. Category D. Exotic plant species account for 50–70% of total vegetation cover in the understorey layers. Mature trees may be present with at least 5 trees per 0.5 ha.	TEC

Appendix 9
Vegetation extrapolated to 500 m (Calingiri)

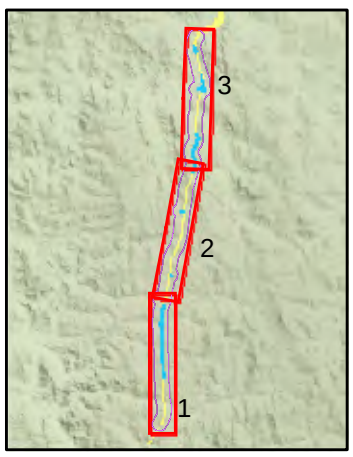
Gaps study area

Initial study area

Extrapolation study area

Vegetation

- 4 - Medium woodland; Marri and Wandoo
- 7 - Medium woodland; York Gum *(Eucalyptus loxophleba)* and Wandoo
- 36 - Shrublands; thicket, *Acacia-Casuarina* alliance species
- 352 - Medium woodland; York Gum
- 946 - Medium woodland; Wandoo
- 950 - Medium woodland; *Casuarina obesa*
- 965 - Medium woodland; Jarrah and Marri
- 968 - Medium woodland; Jarrah, Marri and Wandoo
- 973 - Low forest; Paperbark (*Melaleuca rhaphiophylla*)
- 991 - Medium woodland; small Wandoo patches surrounded by other Eucalypts
- 999 - Medium woodland; Marri
- 1034 - Medium woodland; Marri, Wandoo and Powderbark
- 1048 - Mosaic: Shrublands; *Melaleuca* patchy scrub/succulent steppe; samphire
- 1132 - Medium forest; Marri
- 1182 - Medium woodland; *Eucalyptus rudis* and *Melaleuca rhaphiophylla*



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Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 21-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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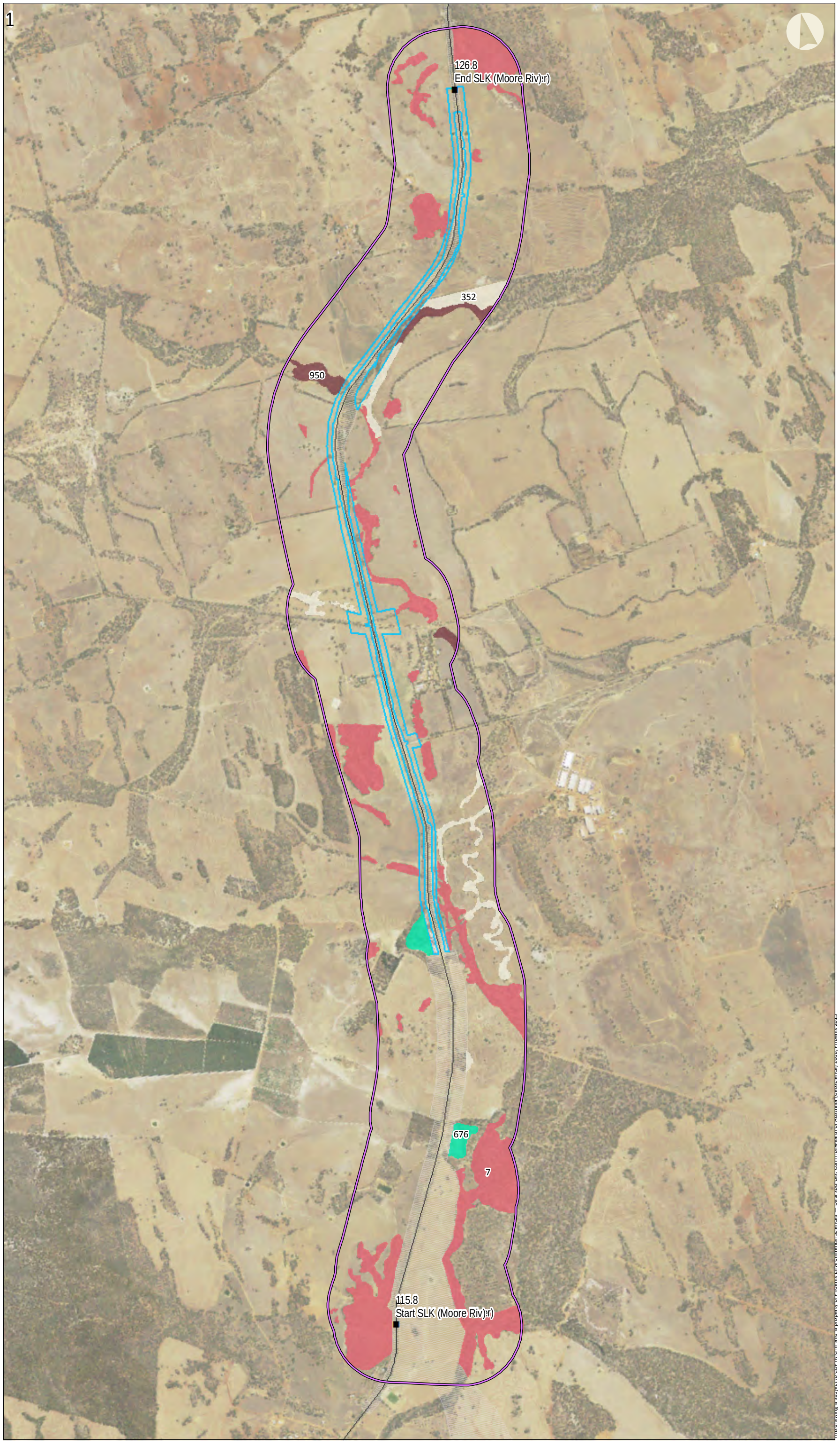
Appendix 9
Vegetation extrapolated to 500 m (Moore River)



Gaps study area
Initial study area
Extrapolation study area

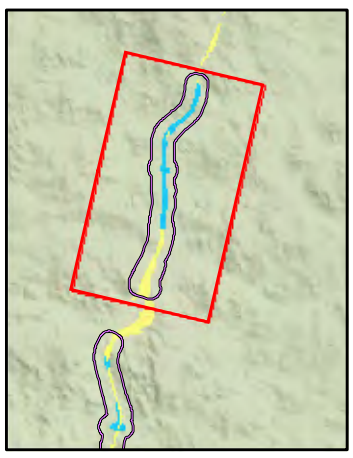
Vegetation

7 - Medium woodland; York Gum *(Eucalyptus loxophleba)* and Wandoo

352 - Medium woodland; York Gum

676 - Succulent steppe; samphire

950 - Medium woodland; *Casuarina obesa*



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1:30,000

Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 21-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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Appendix 9
Vegetation extrapolated to 500 m (Midlands Road to Bindi Bindi)

Gaps study area

Initial study area

Extrapolation study area

Vegetation

7 - Medium woodland; York Gum *(Eucalyptus loxophleba)* and Wandoo

142 - Medium woodland; York Gum and Salmon Gum

352 - Medium woodland; York Gum

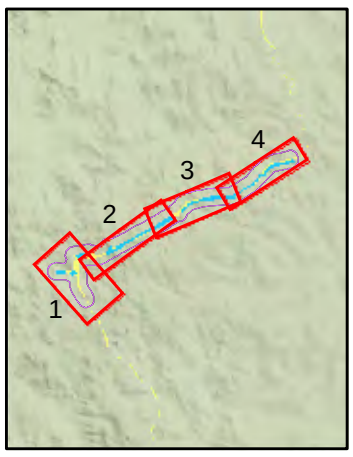
676 - Succulent steppe; samphire

936 - Medium woodland; Salmon Gum

946 - Medium woodland; Wandoo

950 - Medium woodland; *Casuarina obesa*

1024 - Shrublands; Mallee and *Casuarina* thicket



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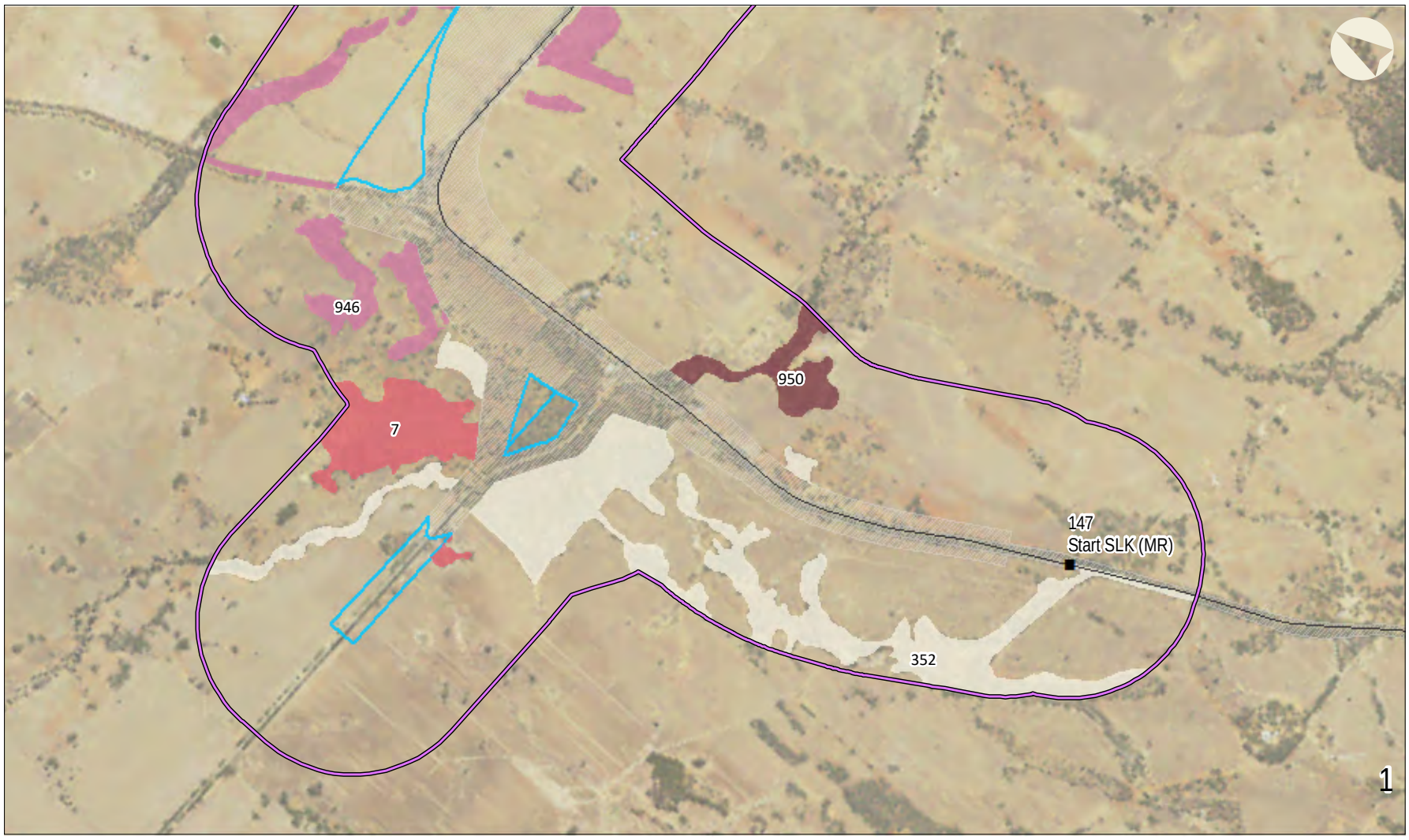
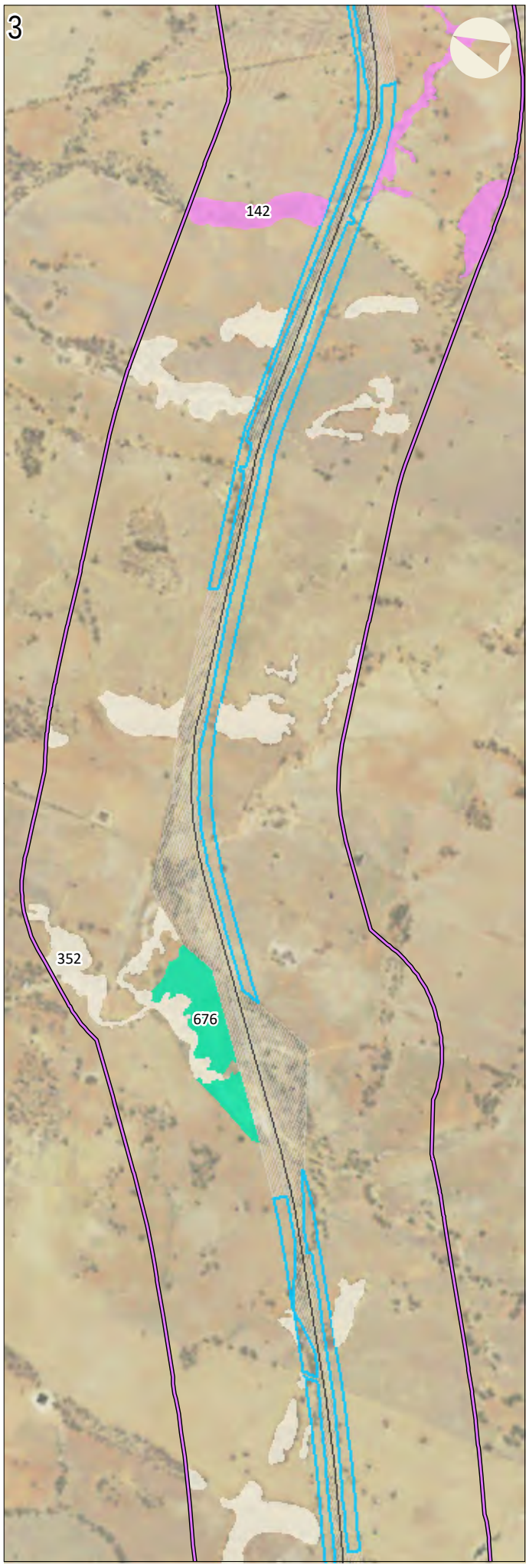
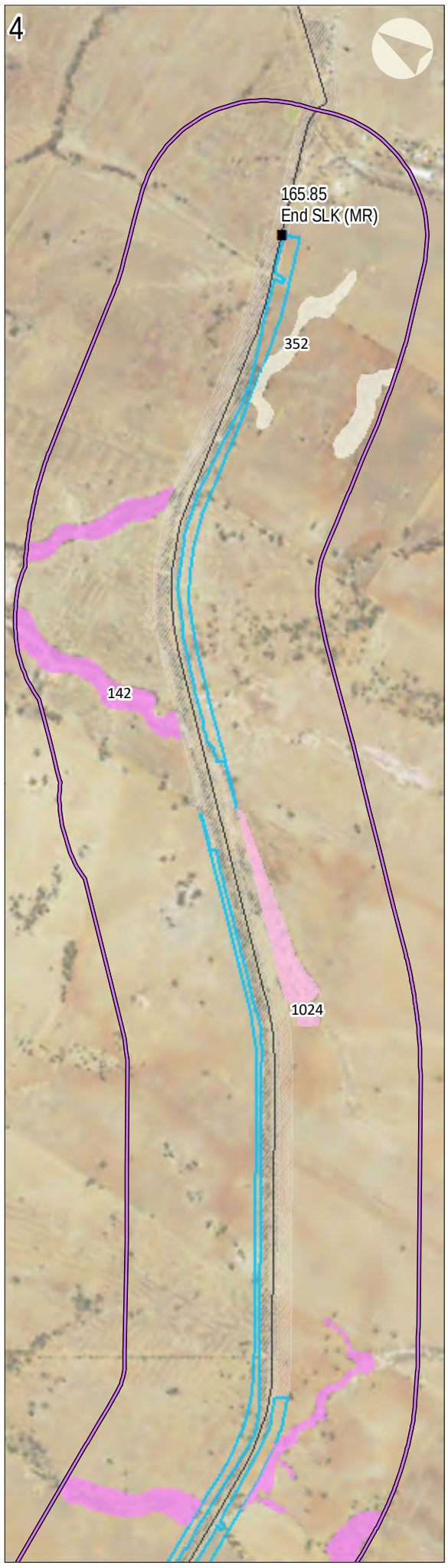
Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 21-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

PHOENIX ENVIRONMENTAL SCIENCES







Appendix 9
Vegetation extrapolated to 500 m (Pithara)

Gaps study area

Initial study area

Extrapolation study area

Vegetation

36 - Shrublands; thicket, *Acacia-Casuarina* alliance species

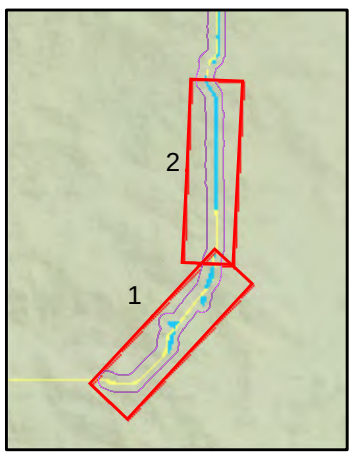
141 - Medium woodland; York Gum, Salmon Gum and Gimlet

352 - Medium woodland; York Gum

354 - Shrublands; Jam and *Acacia rostellifera* (+ *Hakea*) scrub with scattered York Gum

1024 - Shrublands; Mallee and *Casuarina* thicket

1048 - Mosaic: Shrublands; *Melaleuca* patchy scrub/succulent steppe; samphire



0 250 500 1,000 Metres

1:30,000

Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 21-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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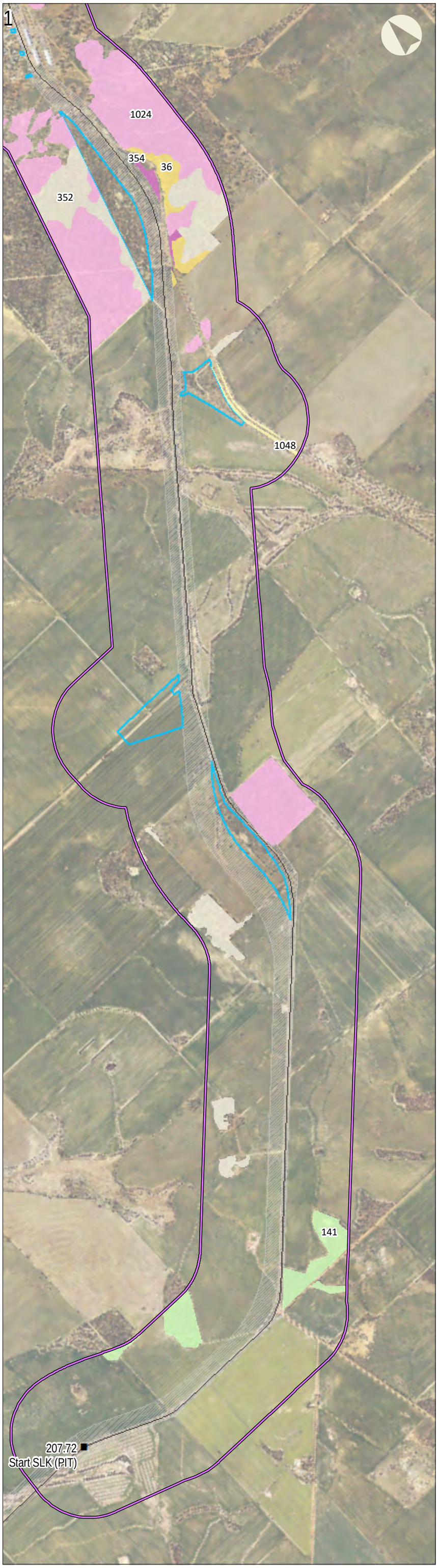
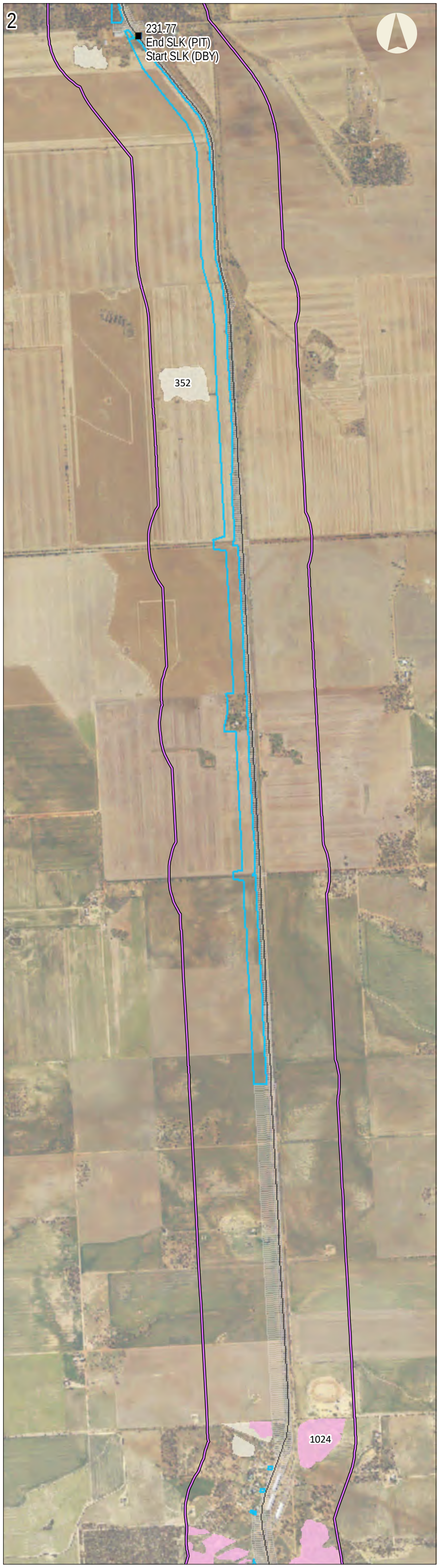




Appendix 9
Vegetation extrapolated to 500 m (Dalwalinu Bypass Improvements)

Gaps study area

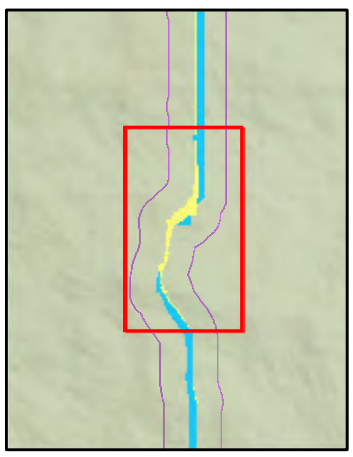
Initial study area

Extrapolation study area

Vegetation

352 - Medium woodland; York Gum

1413 - Shrublands; *Acacia, Casuarina* and *Melaleuca* thicket



0 175 350 Metres

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Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 21-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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234.85
End SLK (DBY)
Start SLK (NW)

1413

352

231.77
Start SLK (DBY)
End SLK (PIT)

Appendix 9
Vegetation extrapolated to 500 m (Nugadong to Wubin - southern section)

Gaps study area

Initial study area

Extrapolation study area

Vegetation

8 - Medium woodland; Salmon Gum and Gimlet

36 - Shrublands; thicket, *Acacia-Casuarina* alliance species

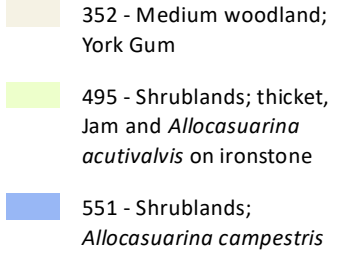
352 - Medium woodland; York Gum

495 - Shrublands; thicket, Jam and *Allocasuarina acutivalvis* on ironstone

551 - Shrublands; *Allocasuarina campestris* thicket

1024 - Shrublands; Mallee and *Casuarina* thicket

1413 - Shrublands; *Acacia, Casuarina* and *Melaleuca* thicket



0 250 500 Metres

1:20,000

Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 21-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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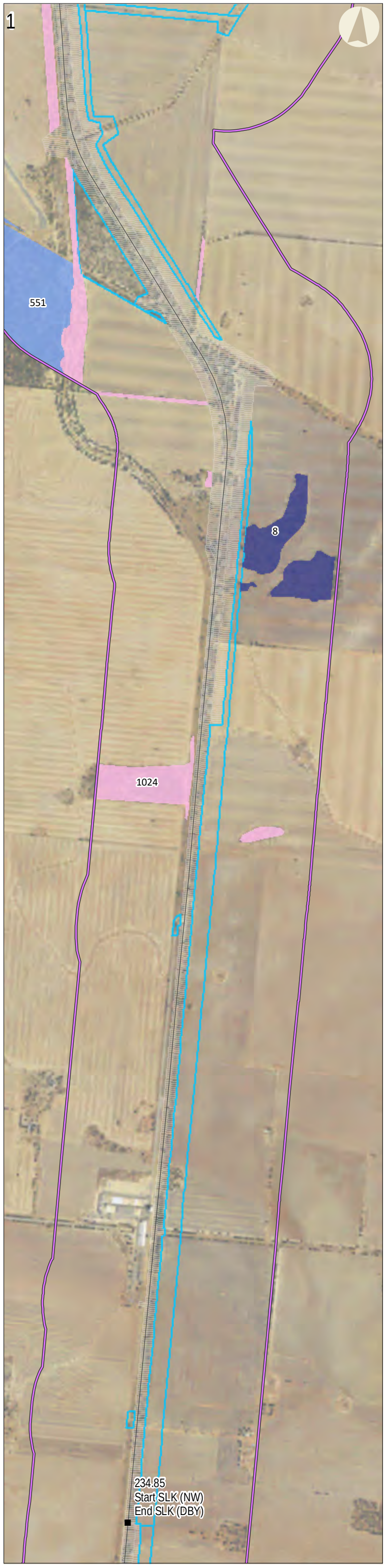
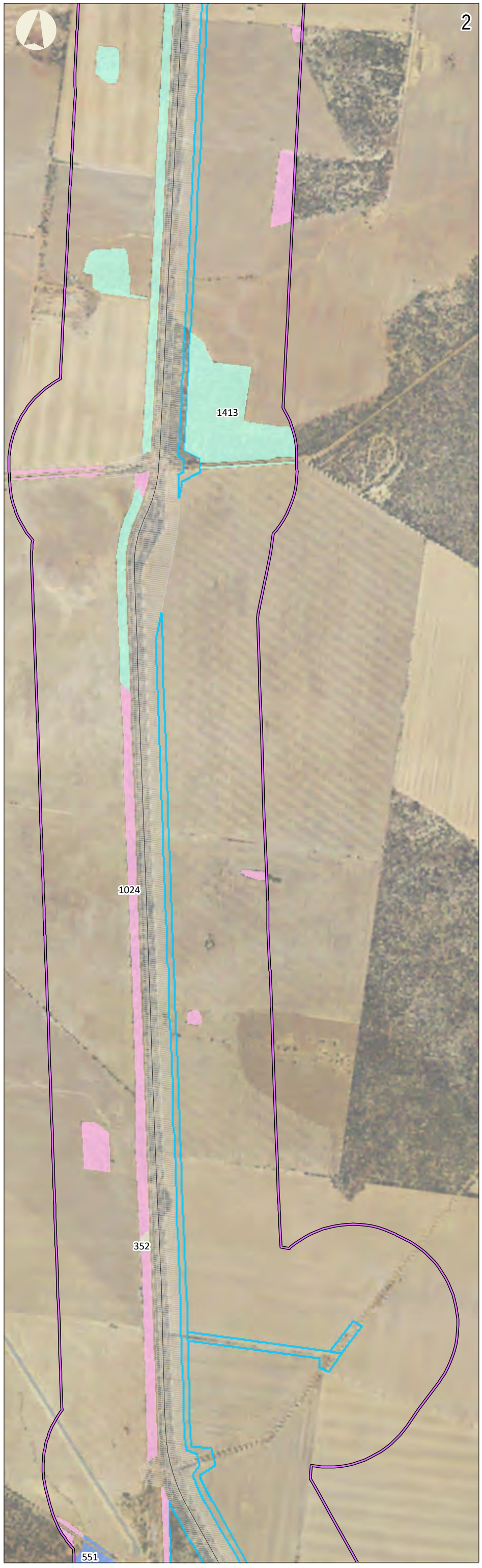




Appendix 9
Vegetation extrapolated to 500 m (Nugadong to Wubin - northern section)

Gaps study area

Initial study area

Extrapolation study area

Vegetation

8 - Medium woodland; Salmon Gum and Gimlet

36 - Shrublands; thicket, *Acacia-Casuarina* alliance species

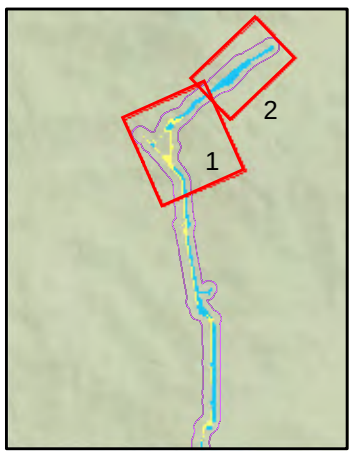
352 - Medium woodland; York Gum

495 - Shrublands; thicket, Jam and *Allocasuarina acutivalvis* on ironstone

551 - Shrublands; *Allocasuarina campestris* thicket

1024 - Shrublands; Mallee and *Casuarina* thicket

1413 - Shrublands; *Acacia, Casuarina* and *Melaleuca* thicket



0 250 500 Metres

1:25,000

Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 21-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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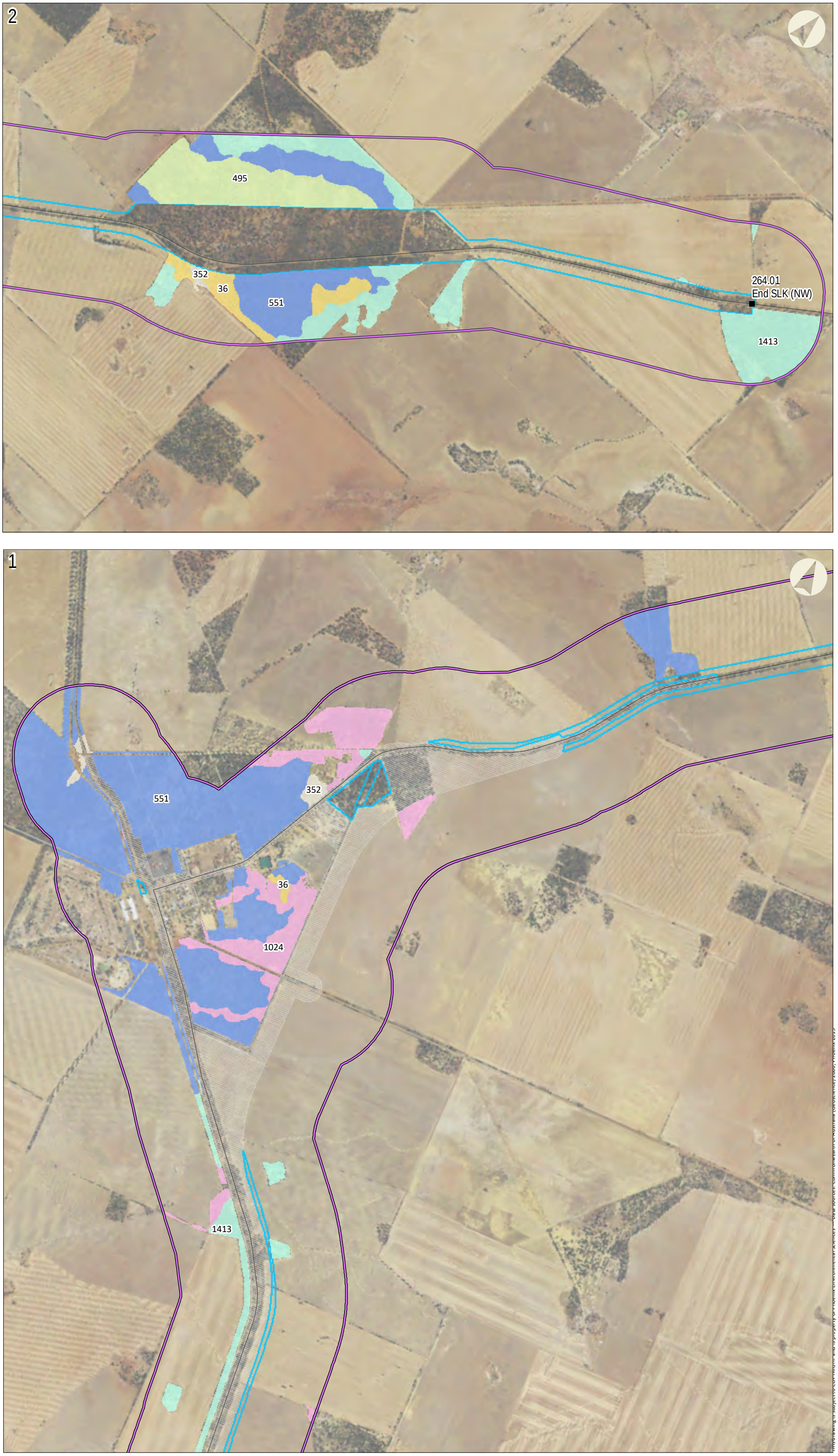

Appendix 10
Fauna habitats, conservation significant fauna and Carnaby's Black Cockatoo potential breeding trees (Calingiri)

Gaps study area

Initial study area

Potential breeding trees

- Potential breeding tree with suitable hollows and signs of use by Carnaby's Black Cockatoo (CBC)
- Potential breeding tree with suitable hollows but no signs of use by CBC
- Potential breeding tree with hollows but not suitable for use by CBC
- Potential breeding tree with no hollows

Conservation significant fauna

- Carnaby's Black Cockatoo, direct sighting
- Carnaby's Black Cockatoo, forage evidence
- Malleefowl, Mound (possible)
- Rainbow Bee-eater, direct sighting
- Rainbow Bee-eater, Calls

Fauna habitat

- Cleared (agriculture, road, infrastructure)
- Cleared and revegetated non-native woodland mosaic
- Shrubland (thicket)
- Succulent steppe/samphire
- Succulent steppe/samphire with woodland or shrubland
- Woodland (Jarrah, Marri, Wandoo and/or banksia)
- Woodland (York Gum, Wandoo, Salmon Gum and/or Gimlet)
- Woodland (paperbark or sheoak)

0 0.5 1 2 3 Kilometres
1:80,000

Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 21-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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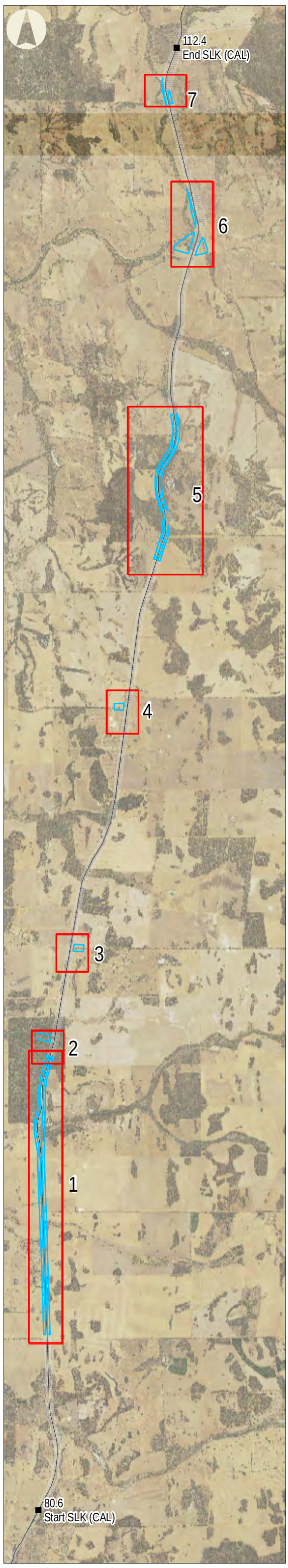

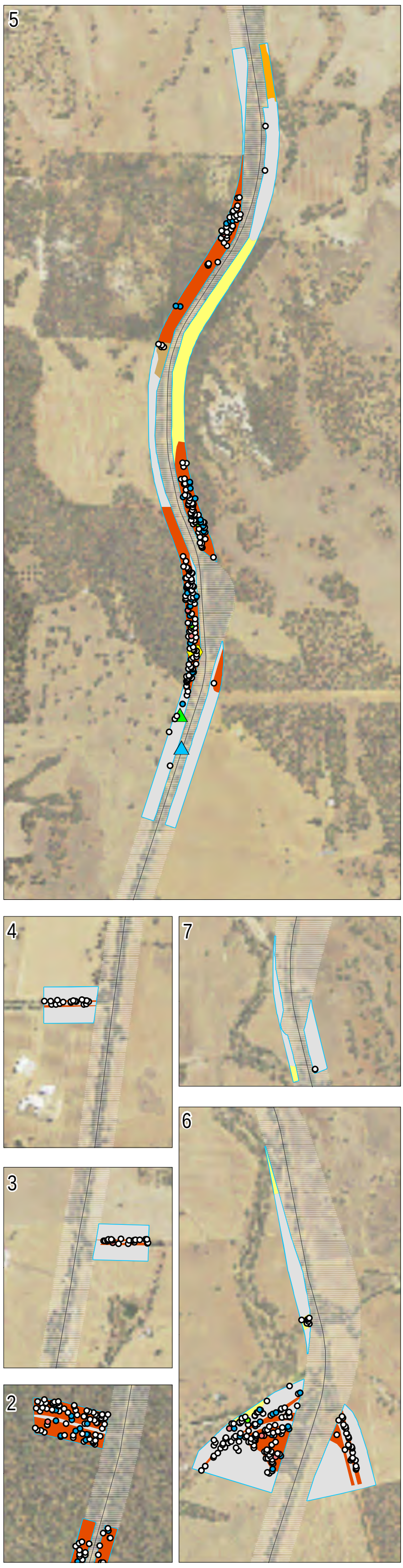

Appendix 10
Fauna habitats, conservation significant fauna and Carnaby's Black Cockatoo potential breeding trees (Moore River)

Gaps study area

Initial study area

Potential breeding trees

- Potential breeding tree with suitable hollows and signs of use by Carnaby's Black Cockatoo (CBC)
- Potential breeding tree with suitable hollows but no signs of use by CBC
- Potential breeding tree with hollows but not suitable for use by CBC
- Potential breeding tree with no hollows

Conservation significant fauna

- Carnaby's Black Cockatoo, direct sighting
- Carnaby's Black Cockatoo, forage evidence
- Malleefowl, Mound (possible)
- Rainbow Bee-eater, direct sighting
- Rainbow Bee-eater, Calls

Fauna Description

- Cleared (agriculture, road, infrastructure)
- Cleared and revegetated non-native woodland mosaic
- Shrubland (thicket)
- Succulent steppe/samphire
- Succulent steppe/samphire with woodland or shrubland
- Woodland (Jarrah, Marri, Wandoo and/or banksia)
- Woodland (York Gum, Wandoo, Salmon Gum and/or Gimlet)
- Woodland (paperbark or sheoak)

0 0.5 1 Kilometres
1:50,000

Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 21-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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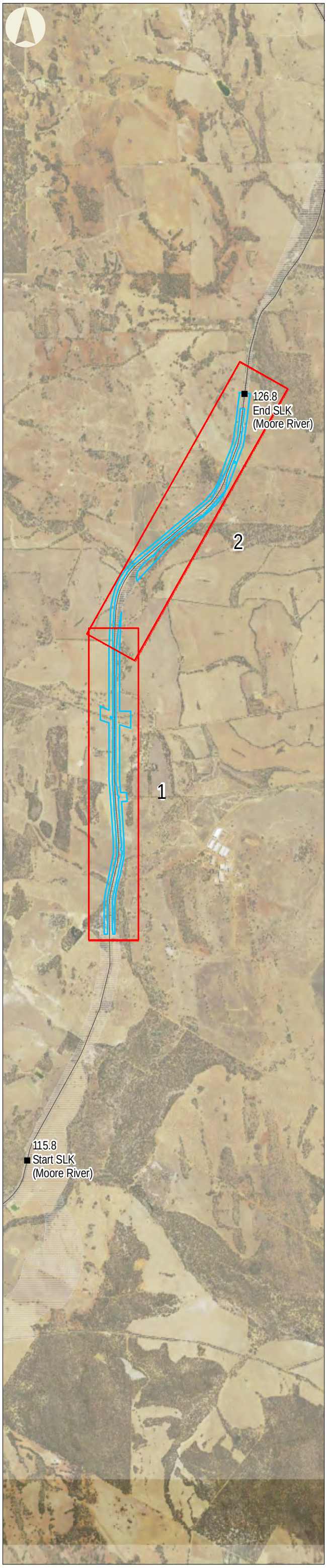
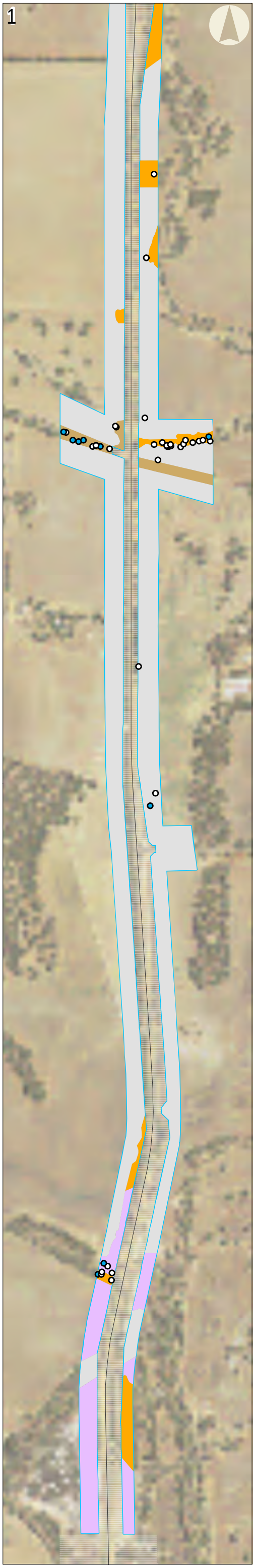
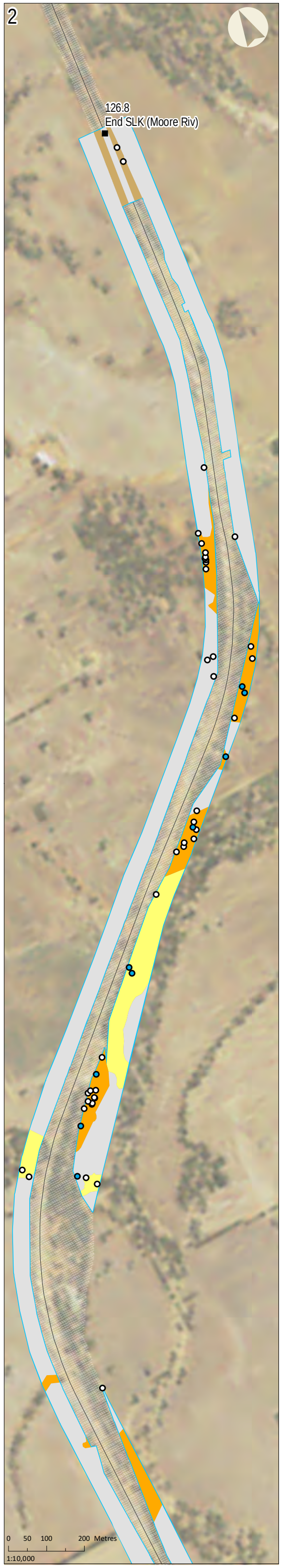






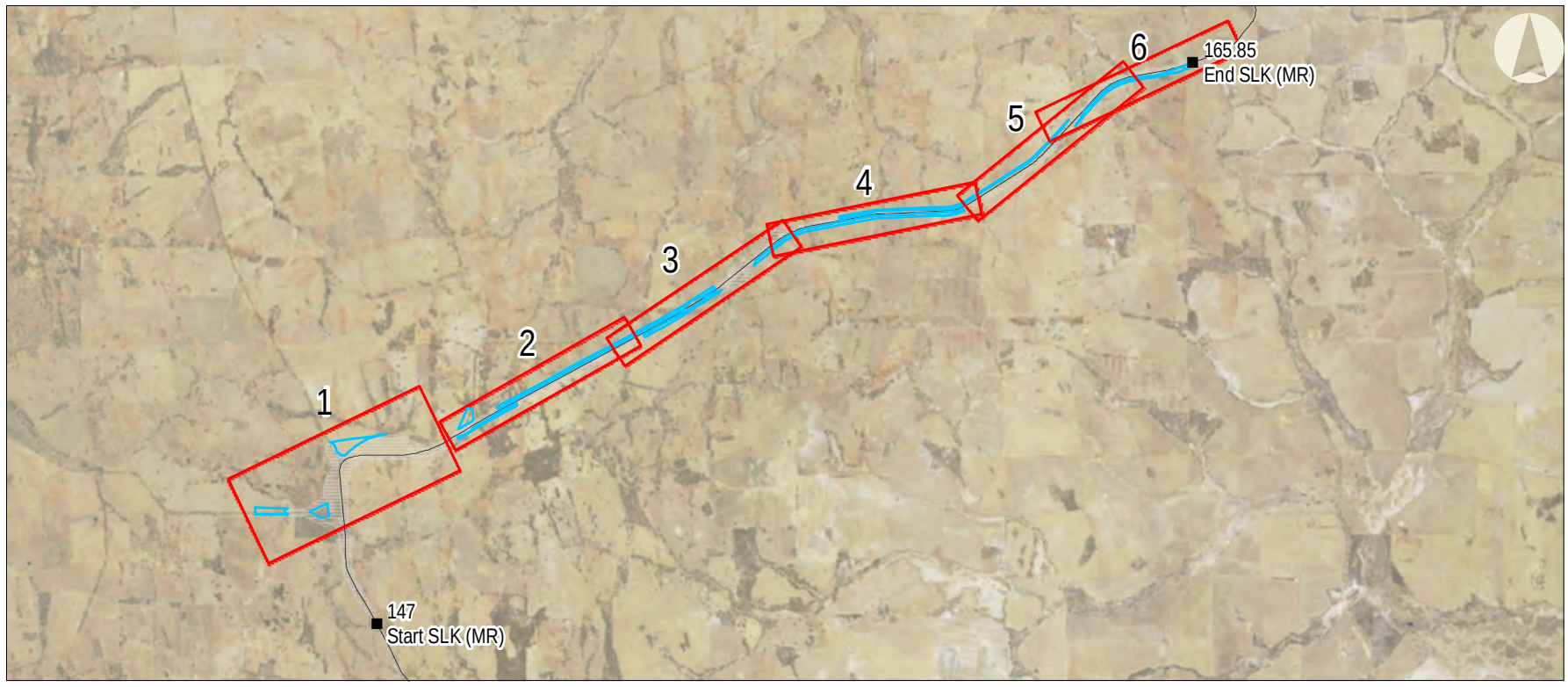
Appendix 10
Fauna habitats, conservation significant fauna and Carnaby's Black Cockatoo potential breeding trees (Midlands Road to Bindi Bindi)

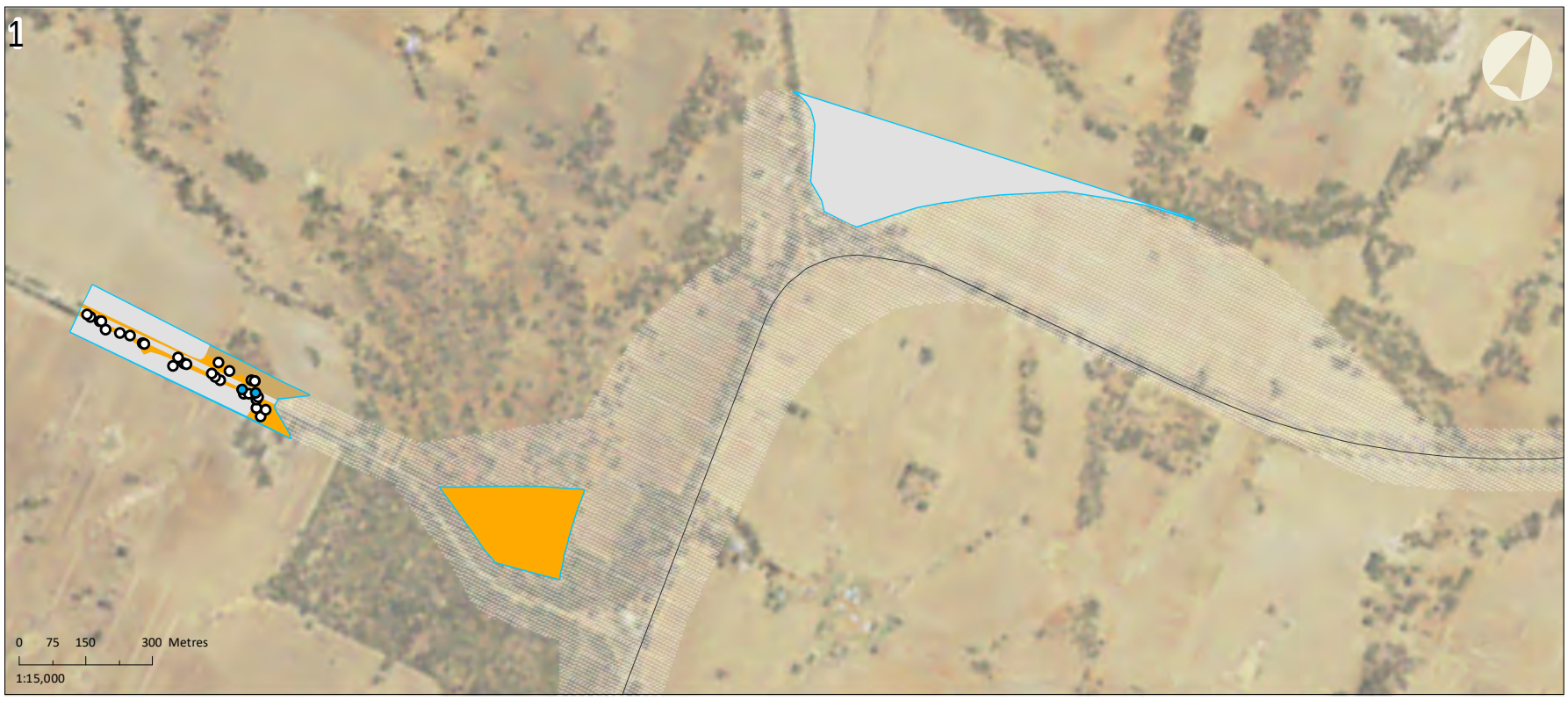
Gaps study area
Initial study area

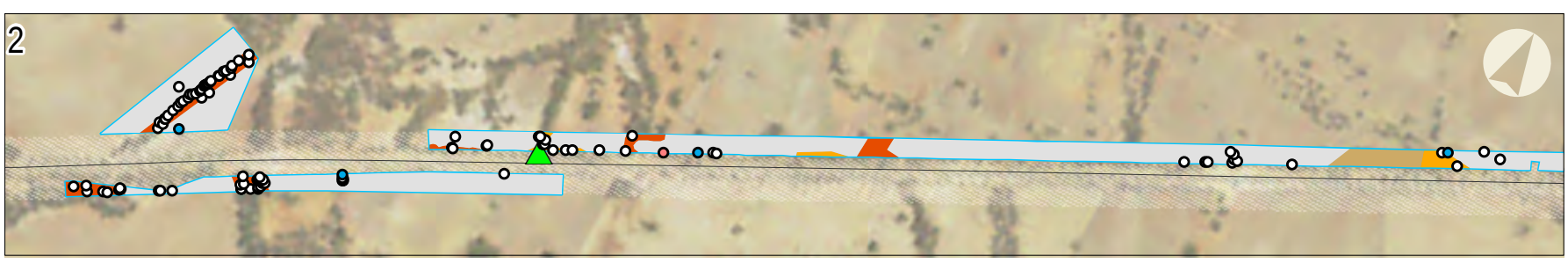
Potential breeding trees
- Potential breeding tree with suitable hollows and signs of use by Carnaby's Black Cockatoo (CBC)
- Potential breeding tree with suitable hollows but no signs of use by CBC
- Potential breeding tree with hollows but not suitable for use by CBC
- Potential breeding tree with no hollows

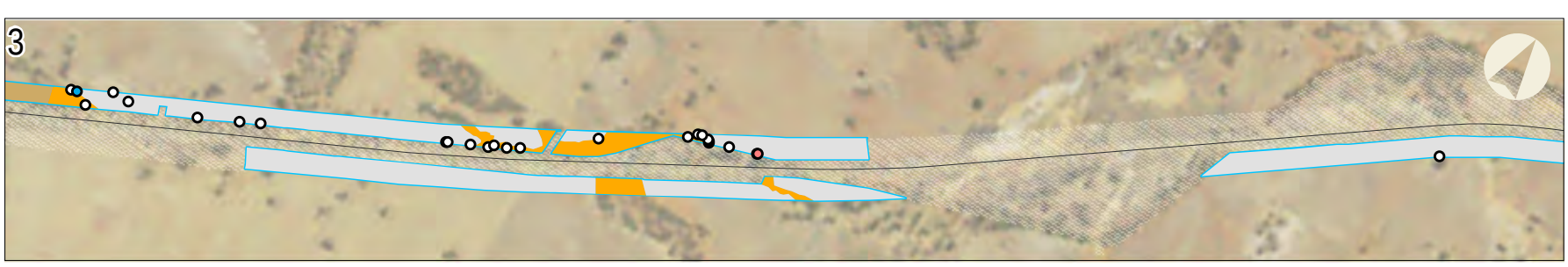
Conservation significant fauna
- Carnaby's Black Cockatoo, direct sighting
- Carnaby's Black Cockatoo, forage evidence
- Malleefowl, Mound (possible)
- Rainbow Bee-eater, direct sighting
- Rainbow Bee-eater, Calls

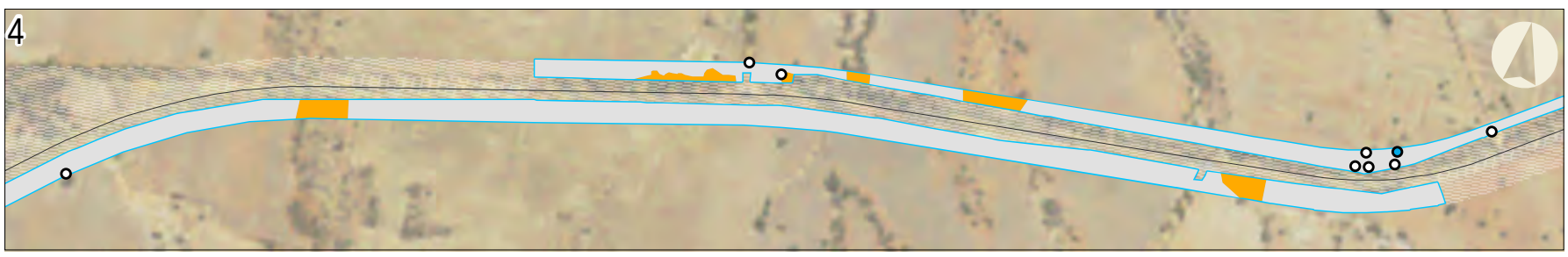
Fauna habitat
- Cleared (agriculture, road, infrastructure)
- Cleared and revegetated non-native woodland mosaic
- Shrubland (thicket)
- Succulent steppe/samphire
- Succulent steppe/samphire with woodland or shrubland
- Woodland (Jarrah, Marri, Wandoo and/or banksia)
- Woodland (York Gum, Wandoo, Salmon Gum and/or Gimlet)
- Woodland (paperbark or sheoak)

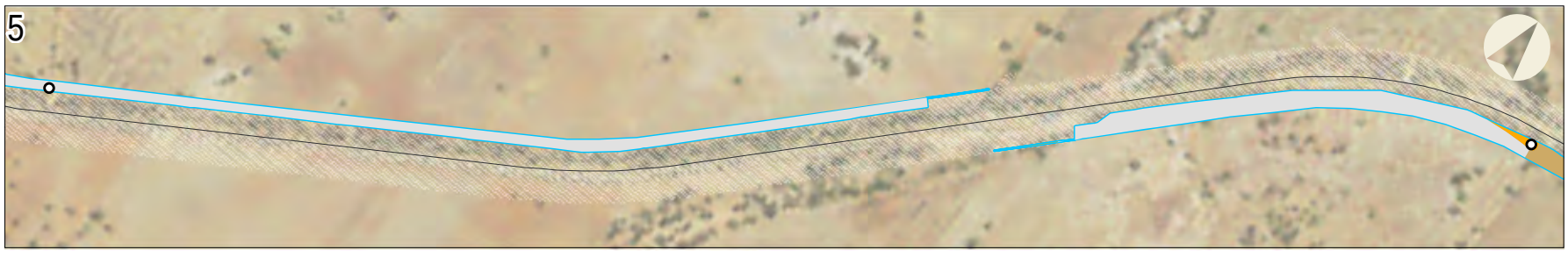


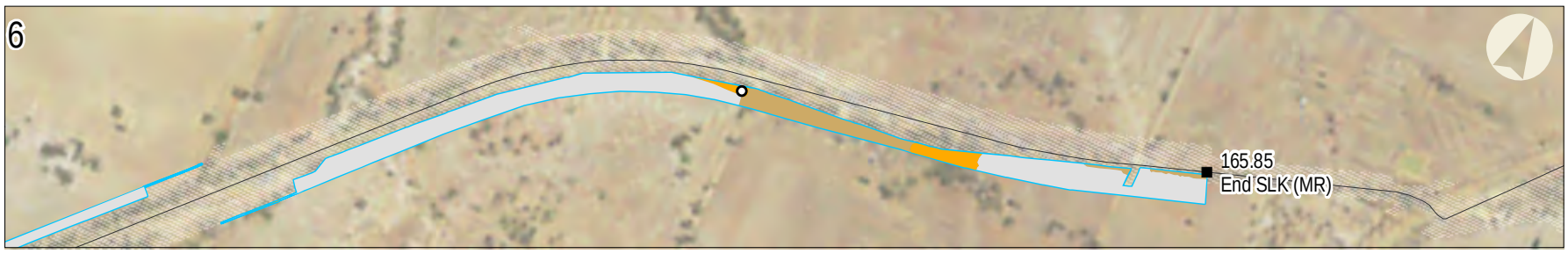












0 0.5 1 2 3 Kilometres
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Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 21-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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Appendix 10
Fauna habitats, conservation significant fauna and Carnaby's Black Cockatoo potential breeding trees (Pithara)

Gaps study area

Initial study area

Potential breeding trees

- Potential breeding tree with suitable hollows and signs of use by Carnaby's Black Cockatoo (CBC)
- Potential breeding tree with suitable hollows but no signs of use by CBC
- Potential breeding tree with hollows but not suitable for use by CBC
- Potential breeding tree with no hollows

Conservation significant fauna

- Carnaby's Black Cockatoo, direct sighting
- Carnaby's Black Cockatoo, forage evidence
- Malleefowl, Mound (possible)
- Rainbow Bee-eater, direct sighting
- Rainbow Bee-eater, Calls

Fauna Description

- Cleared (agriculture, road, infrastructure)
- Cleared and revegetated non-native woodland mosaic
- Shrubland (thicket)
- Succulent steppe/samphire
- Succulent steppe/samphire with woodland or shrubland
- Woodland (Jarrah, Marri, Wandoo and/or banksia)
- Woodland (York Gum, Wandoo, Salmon Gum and/or Gimlet)
- Woodland (paperbark or sheoak)

0 0.5 1 2 3 Kilometres
1:100,000

Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 21-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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231.77
End SLK (PIT)

207.72
Start SLK (PIT)

0 75 150 300 Metres
1:15,000

2

3

0 50 100 200 Metres
1:7,500

1

4

5

6

201.77
End SLK (PIT)

Appendix 10
Fauna habitats, conservation significant fauna and Carnaby's Black Cockatoo potential breeding trees (Dalwallinu Bypass Improvements)

Gaps study area (DBY shown only)

Initial study area

Potential breeding trees

- Potential breeding tree with suitable hollows and signs of use by Carnaby's Black Cockatoo (CBC)
- Potential breeding tree with suitable hollows but no signs of use by CBC
- Potential breeding tree with hollows but not suitable for use by CBC
- Potential breeding tree with no hollows

Conservation significant fauna

- Carnaby's Black Cockatoo, direct sighting
- Carnaby's Black Cockatoo, forage evidence
- Malleefowl, Mound (possible)
- Rainbow Bee-eater, direct sighting
- Rainbow Bee-eater, Calls

Fauna Description

- Cleared (agriculture, road, infrastructure)
- Cleared and revegetated non-native woodland mosaic
- Shrubland (thicket)
- Succulent steppe/samphire
- Succulent steppe/samphire with woodland or shrubland
- Woodland (Jarrah, Marri, Wandoo and/or banksia)
- Woodland (York Gum, Wandoo, Salmon Gum and/or Gimlet)
- Woodland (paperbark or sheoak)

0 0.125 0.25 Kilometres

1:7,500

Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 21-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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Appendix 10
Fauna habitats, conservation significant fauna and Carnaby's Black Cockatoo potential breeding trees (Nugadong to Wubin - southern section)

Gaps study area (NW shown only)

Initial study area

Potential breeding trees

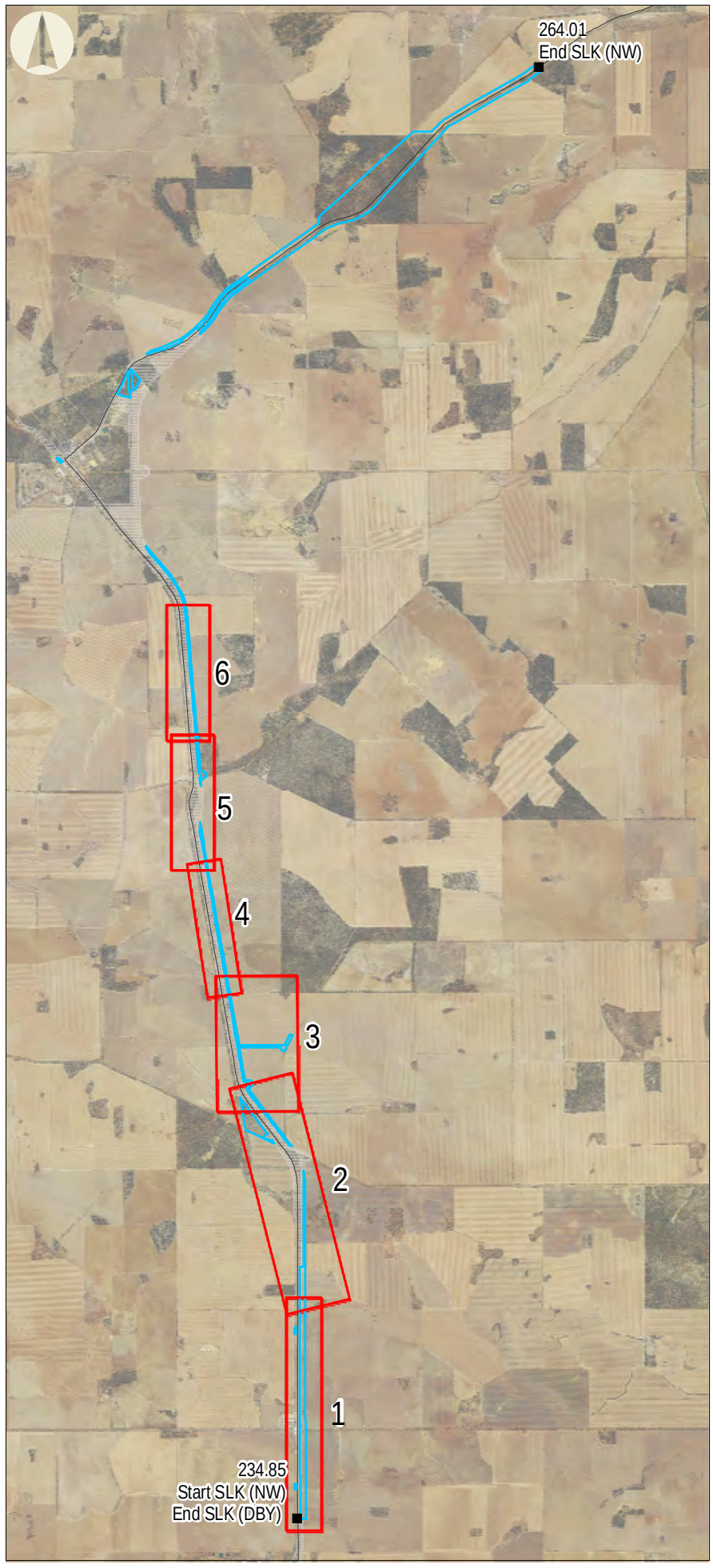
- Potential breeding tree with suitable hollows and signs of use by Carnaby's Black Cockatoo (CBC)
- Potential breeding tree with suitable hollows but no signs of use by CBC
- Potential breeding tree with hollows but not suitable for use by CBC
- Potential breeding tree with no hollows

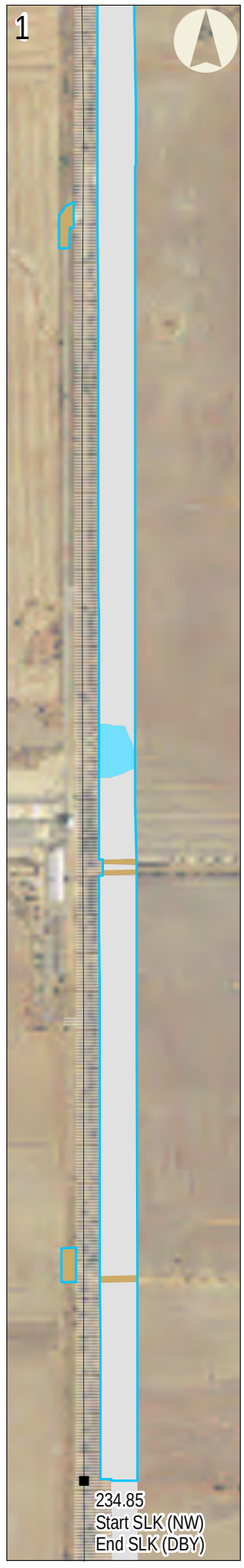
Conservation significant fauna

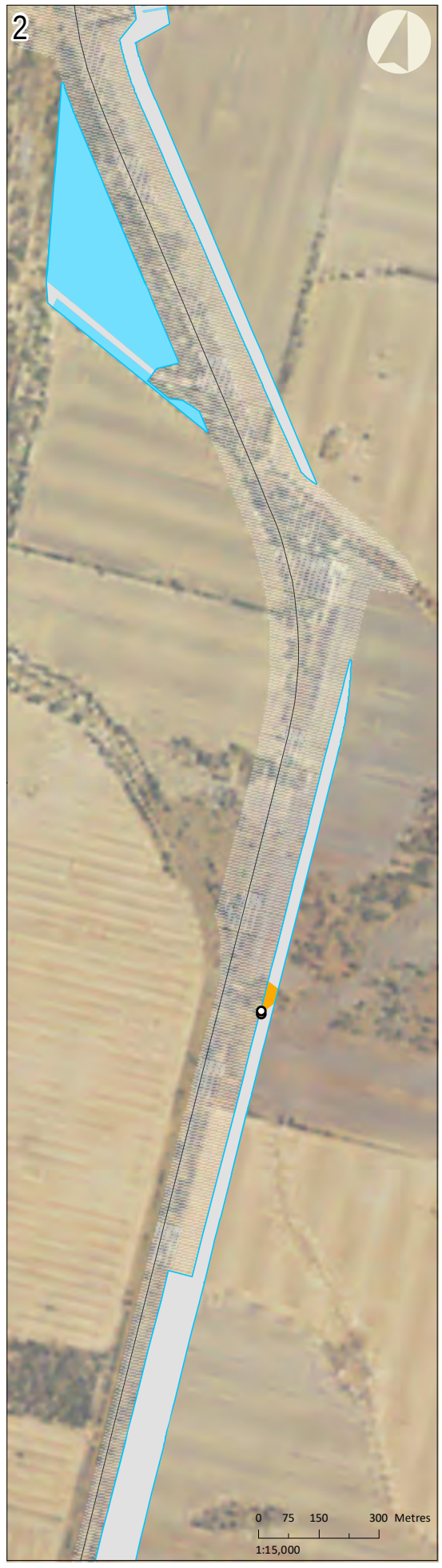
- Carnaby's Black Cockatoo, direct sighting
- Carnaby's Black Cockatoo, forage evidence
- Malleefowl, Mound (possible)
- Rainbow Bee-eater, direct sighting
- Rainbow Bee-eater, Calls

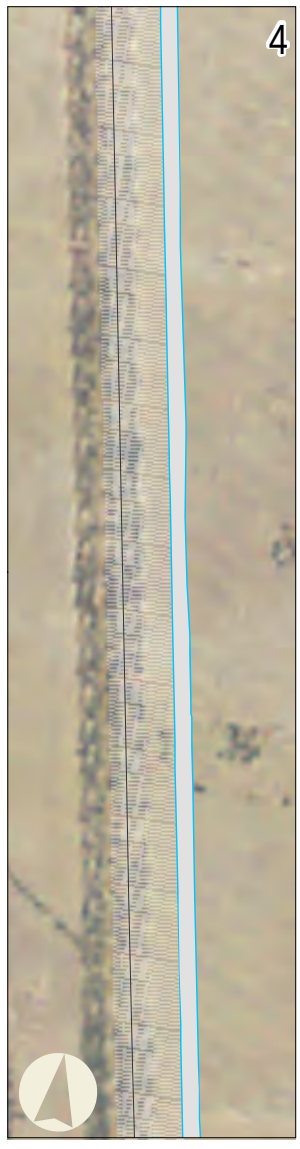
Fauna Description

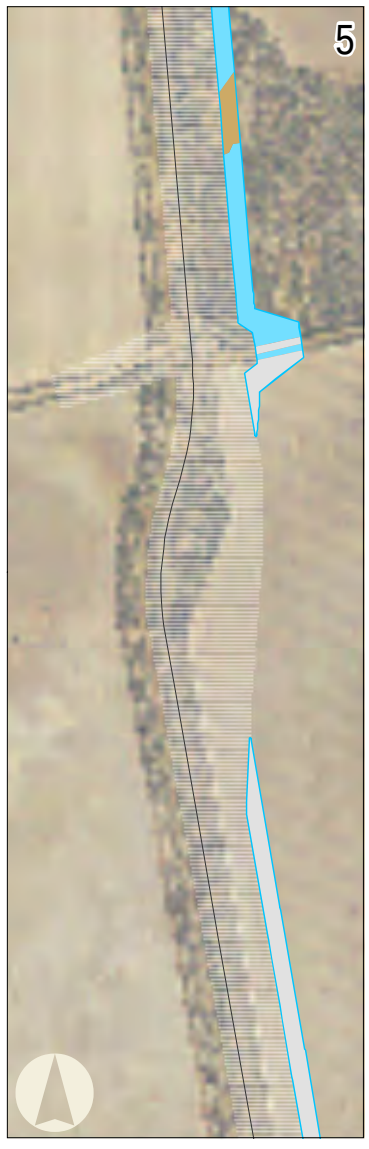
- Cleared (agriculture, road, infrastructure)
- Cleared and revegetated non-native woodland mosaic
- Shrubland (thicket)
- Succulent steppe/samphire
- Succulent steppe/samphire with woodland or shrubland
- Woodland (Jarrah, Marri, Wandoo and/or banksia)
- Woodland (York Gum, Wandoo, Salmon Gum and/or Gimlet)
- Woodland (paperbark or sheoak)

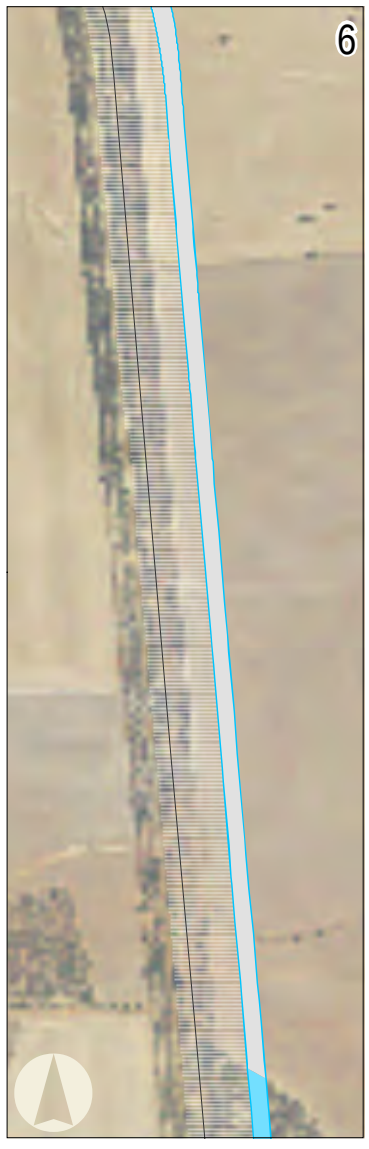












0 0.5 1 2 3 Kilometres
1:100,000

Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 21-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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Appendix 10
Fauna habitats, conservation significant fauna and Carnaby's Black Cockatoo potential breeding trees (Nugadong to Wubin - northern section)

Gaps study area (NW shown only)

Initial study area

Potential breeding trees

- Potential breeding tree with suitable hollows and signs of use by Carnaby's Black Cockatoo (CBC)
- Potential breeding tree with suitable hollows but no signs of use by CBC
- Potential breeding tree with hollows but not suitable for use by CBC
- Potential breeding tree with no hollows

Conservation significant fauna

- Carnaby's Black Cockatoo, direct sighting
- Carnaby's Black Cockatoo, forage evidence
- Malleefowl, Mound (possible)
- Rainbow Bee-eater, direct sighting
- Rainbow Bee-eater, Calls

Fauna Description

- Cleared (agriculture, road, infrastructure)
- Cleared and revegetated non-native woodland mosaic
- Shrubland (thicket)
- Succulent steppe/samphire
- Succulent steppe/samphire with woodland or shrubland
- Woodland (Jarrah, Marri, Wandoo and/or banksia)
- Woodland (York Gum, Wandoo, Salmon Gum and/or Gimlet)
- Woodland (paperbark or sheoak)

0 0.5 1 2 3 Kilometres
1:100,000

Client: Jacobs
Project: Great Northern Highway – Muchea to Wubin (Stage 2) Upgrades
Author: K. Wyatt
Date: 21-Dec-16

Coordinate System: GDA 1994 MGA Zone 50
Projection: Transverse Mercator
Datum: GDA 1994

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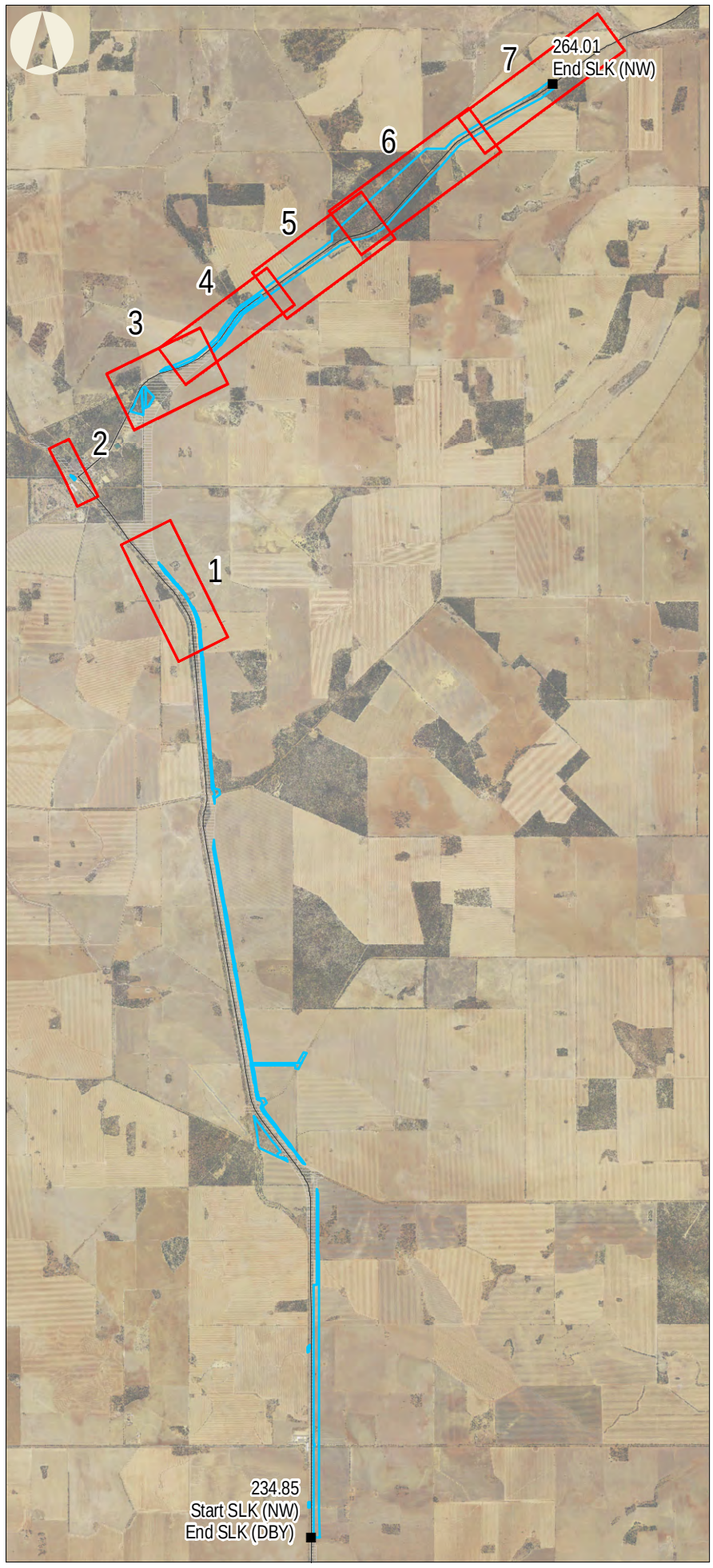

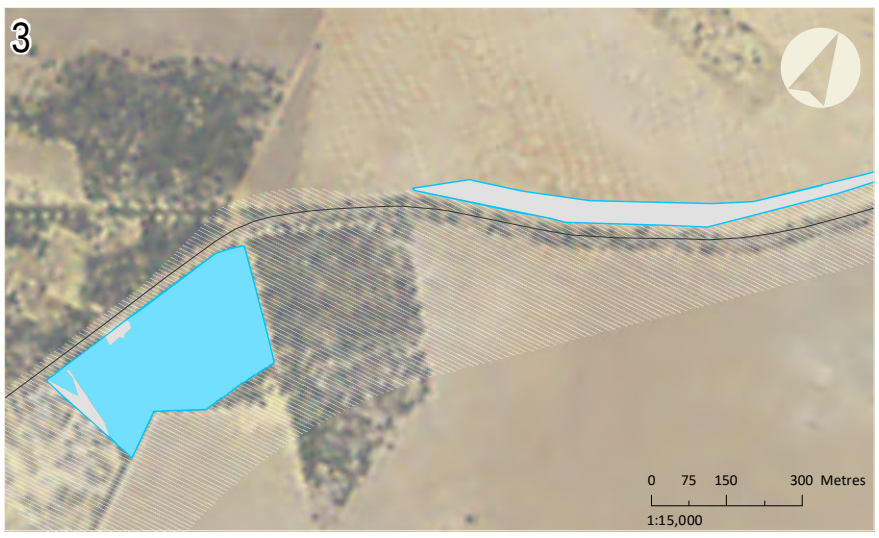

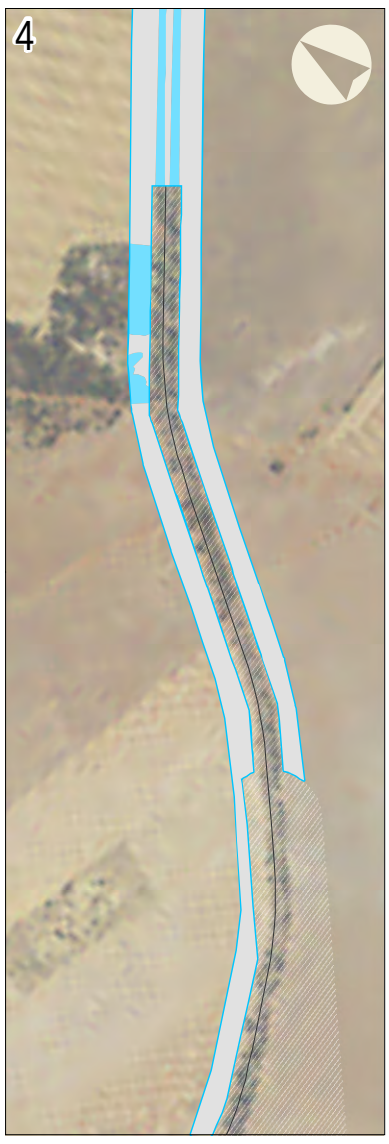

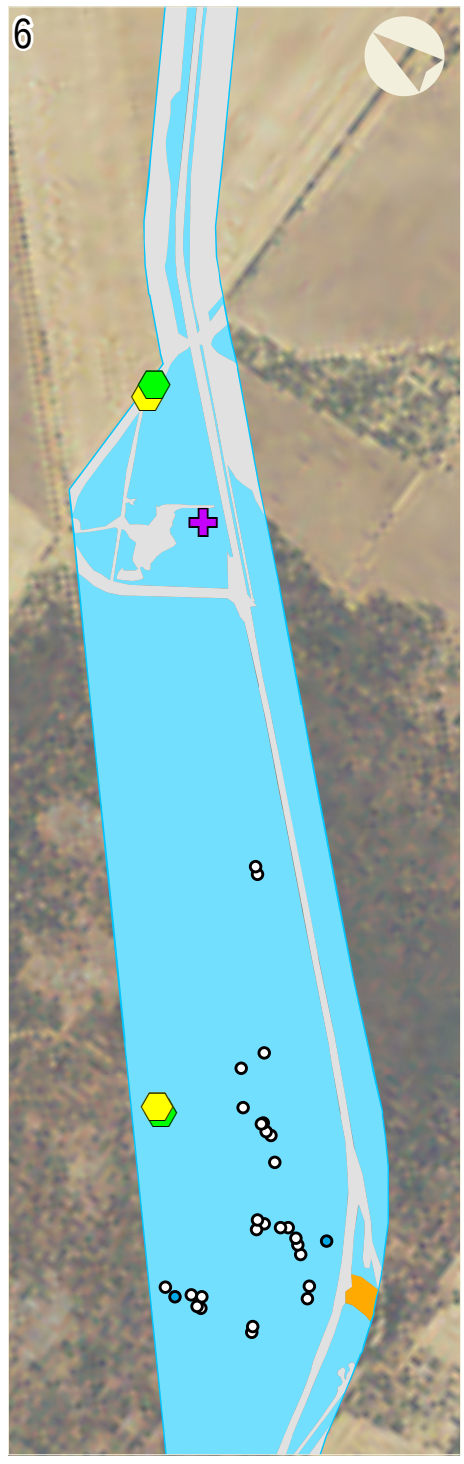

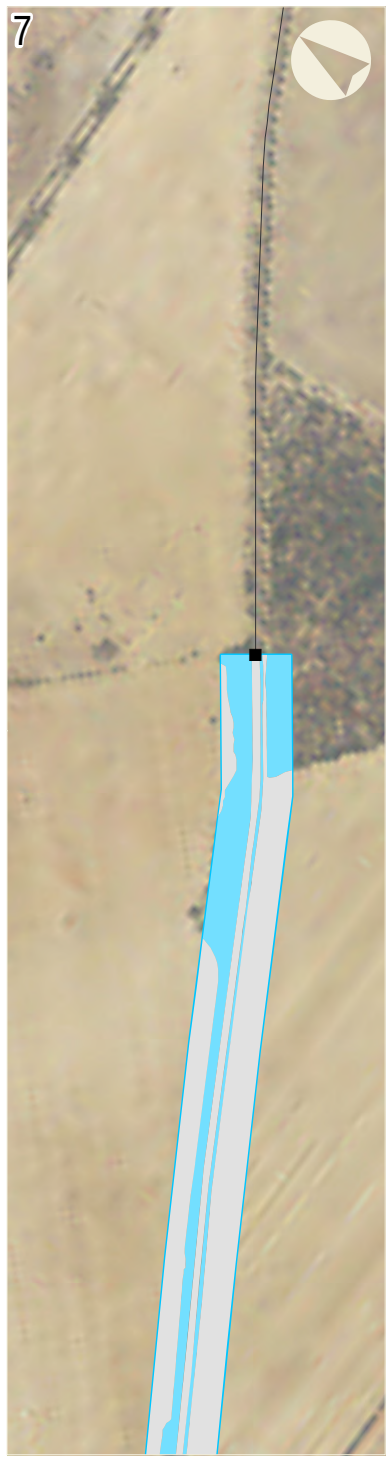

Appendix 11 Carnaby's Black Cockatoo potential breeding tree records

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT00111	22/10/2014	-30.4409	116.6379	*Eucalyptus salmonophloia*	500	Yes	No	No	
HT01299	19/02/2015	-31.212	116.1766	*Eucalyptus accedens*	540	No	No	No	
HT01643	19/02/2015	-31.2083	116.177	*Eucalyptus wandoo*	350	No	No	No	
HT01647	19/02/2015	-31.2085	116.177	*Eucalyptus wandoo*	450	No	No	No	
HT01650	19/02/2015	-31.2098	116.177	*Eucalyptus wandoo*	360	No	No	No	
HT01682	19/02/2015	-31.2136	116.1772	*Eucalyptus accedens*	320	No	No	No	
HT01686	19/02/2015	-31.2148	116.1772	*Eucalyptus accedens*	350	No	No	No	
HT01688	19/02/2015	-31.2146	116.1771	*Eucalyptus accedens*	350	No	No	No	
HT01689	19/02/2015	-31.2143	116.1771	*Eucalyptus accedens*	350	No	No	No	
HT01704	19/02/2015	-31.2163	116.1772	*Eucalyptus marginata*	850	No	No	No	
HT01711	19/02/2015	-31.2175	116.1772	*Eucalyptus wandoo*	370	No	No	No	
HT01712	19/02/2015	-31.218	116.1774	*Eucalyptus wandoo*	330	No	No	No	
HT01714	19/02/2015	-31.2182	116.1772	*Eucalyptus wandoo*	490	No	No	No	
HT01715	19/02/2015	-31.2184	116.1773	*Corymbia calophylla*	700	No	No	No	
HT01716	19/02/2015	-31.2188	116.1774	*Eucalyptus wandoo*	300	No	No	No	
HT01719	19/02/2015	-31.2196	116.1774	*Eucalyptus marginata*	500	No	No	No	
HT01727	19/02/2015	-31.221	116.1773	*Eucalyptus wandoo*	310	No	No	No	
HT01728	19/02/2015	-31.221	116.1773	*Eucalyptus wandoo*	410	No	No	No	
HT01729	19/02/2015	-31.2212	116.1773	*Eucalyptus wandoo*	350	No	No	No	
HT01730	19/02/2015	-31.2214	116.1774	*Eucalyptus wandoo*	350	No	No	No	
HT01731	19/02/2015	-31.2214	116.1774	*Eucalyptus marginata*	500	No	No	No	Dead.
HT01735	19/02/2015	-31.2221	116.1775	*Corymbia calophylla*	500	No	No	No	
HT01736	19/02/2015	-31.2222	116.1774	*Corymbia calophylla*	620	No	No	No	
HT01737	19/02/2015	-31.2223	116.1774	*Eucalyptus accedens*	500	No	No	No	
HT01739	19/02/2015	-31.2227	116.1774	*Corymbia calophylla*	550	No	No	No	
HT01742	19/02/2015	-31.223	116.1774	*Corymbia calophylla*	500	No	No	No	
HT01756	19/02/2015	-31.2247	116.1774	*Eucalyptus accedens*	340	No	No	No	
HT01763	19/02/2015	-31.2252	116.1774	*Eucalyptus accedens*	380	No	No	No	
HT01771	19/02/2015	-31.2259	116.1775	*Eucalyptus accedens*	320	No	No	No	
HT01772	26/02/2015	-31.0708	116.204	*Eucalyptus loxophleba*	1170	No	No	No	
HT01949	27/02/2015	-31.024	116.2076	*Eucalyptus wandoo*	440	No	No	No	
HT01950	28/02/2015	-31.0235	116.2082	*Eucalyptus wandoo*	470	No	No	No	
HT01951	1/03/2015	-31.0233	116.2085	*Eucalyptus* sp.	525	No	No	No	
HT01952	2/03/2015	-31.0231	116.2086	*Eucalyptus wandoo*	450	No	No	No	
HT01953	3/03/2015	-31.0231	116.2087	*Eucalyptus wandoo*	490	No	No	No	
HT01954	4/03/2015	-31.0231	116.2087	*Eucalyptus wandoo*	910	No	No	No	
HT01955	5/03/2015	-31.0229	116.2091	*Eucalyptus wandoo*	530	Yes	No	No	
HT01956	6/03/2015	-31.0227	116.2094	*Eucalyptus wandoo*	385	No	No	No	

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT01957	7/03/2015	-31.0226	116.2097	*Eucalyptus wandoo*	820	Yes	No	No	
HT01958	8/03/2015	-31.0225	116.2098	*Eucalyptus wandoo*	315	No	No	No	
HT01959	9/03/2015	-31.0224	116.2099	*Eucalyptus wandoo*	720	Yes	No	No	Multiple hollows present.
HT01960	10/03/2015	-31.0222	116.2104	*Eucalyptus wandoo*	470	No	No	No	
HT01961	11/03/2015	-31.0221	116.2105	*Eucalyptus wandoo*	710	Yes	No	No	Multiple large hollows present.
HT01962	12/03/2015	-31.0221	116.2106	*Eucalyptus wandoo*	800	Yes	No	No	Multiple large hollows present.
HT02005	25/02/2015	-31.0227	116.2111	*Eucalyptus wandoo*	1000	Yes	No	No	
HT02082	26/02/2015	-31.0736	116.2053	*Eucalyptus wandoo*	440	No	No	No	
HT02083	26/02/2015	-31.0733	116.2048	*Eucalyptus wandoo*	700	Yes	No	No	Dead. Multiple large hollows.
HT02254	26/02/2015	-31.0751	116.2045	*Eucalyptus accedens*	550	Yes	No	No	Hollow at 12 m.
HT02255	26/02/2015	-31.075	116.2046	*Eucalyptus accedens*	500	Yes	No	No	Hollow at 12 m.
HT02262	26/02/2015	-31.0715	116.204	*Eucalyptus wandoo*	600	Yes	No	No	Hollow at 5 m and 10 m and 15 m and 18 m.
HT02263	26/02/2015	-31.0723	116.2044	*Eucalyptus wandoo*	360	No	No	No	
HT02362	26/02/2015	-31.07	116.2037	*Eucalyptus loxophleba*	800	Possible	No	No	
HT02375	26/02/2015	-31.0582	116.2076	*Eucalyptus wandoo*	320	No	No	No	
HT02386	26/02/2015	-31.0598	116.2075	*Eucalyptus wandoo*	400	No	No	No	
HT02397	26/02/2015	-31.0625	116.206	*Eucalyptus wandoo*	550	No	No	No	
HT02400	26/02/2015	-31.0615	116.2065	*Eucalyptus wandoo*	500	No	No	No	
HT02401	26/02/2015	-31.0614	116.2065	*Eucalyptus wandoo*	300	No	No	No	
HT02546	13/03/2015	-31.0241	116.2075	*Eucalyptus* sp.	640	No	No	No	
HT02547	14/03/2015	-31.0237	116.208	*Eucalyptus* sp.	800	No	No	No	
HT02548	15/03/2015	-31.0236	116.208	*Eucalyptus* sp.	700	No	No	No	
HT02549	16/03/2015	-31.0231	116.209	*Eucalyptus wandoo*	400	No	No	No	
HT02550	17/03/2015	-31.0229	116.2093	*Eucalyptus wandoo*	500	No	No	No	
HT02551	18/03/2015	-31.0229	116.2094	*Eucalyptus wandoo*	300	No	No	No	
HT02552	19/03/2015	-31.0226	116.2103	*Eucalyptus wandoo*	300	No	No	No	
HT02553	20/03/2015	-31.0225	116.2105	*Eucalyptus wandoo*	330	No	No	No	
HT02554	21/03/2015	-31.0226	116.2111	*Eucalyptus wandoo*	600	Yes	No	No	Hollow at 5 m. 2 hollows at 6 m.
HT02622	6/03/2015	-30.8798	116.252	*Eucalyptus wandoo*	440	No	No	No	
HT02733	6/03/2015	-30.8896	116.241	*Eucalyptus loxophleba*	1020	No	No	No	
HT02735	6/03/2015	-30.8896	116.2409	*Eucalyptus loxophleba*	700	No	No	No	
HT02737	6/03/2015	-30.8898	116.241	*Eucalyptus loxophleba*	600	No	No	No	
HT02739	6/03/2015	-30.8898	116.2408	*Eucalyptus loxophleba*	680	No	No	No	
HT02741	6/03/2015	-30.8897	116.2408	*Eucalyptus loxophleba*	500	No	No	No	
HT02743	6/03/2015	-30.8898	116.2406	*Eucalyptus loxophleba*	840	No	No	No	
HT02753	6/03/2015	-30.8958	116.2372	*Eucalyptus loxophleba*	660	No	No	No	

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT02895	6/03/2015	-30.9133	116.2363	*Eucalyptus camaldulensis*	1000	No	No	No	
HT03115	17/03/2015	-30.681	116.2353	*Eucalyptus wandoo*	580	No	No	No	
HT03116	17/03/2015	-30.6809	116.2357	*Eucalyptus wandoo*	500	No	No	No	
HT03204	18/03/2015	-30.6785	116.2393	*Eucalyptus wandoo*	300	No	No	No	
HT03206	18/03/2015	-30.6785	116.2393	*Eucalyptus wandoo*	320	No	No	No	
HT03214	18/03/2015	-30.677	116.2424	*Eucalyptus loxophleba*	540	No	No	No	
HT03215	18/03/2015	-30.6768	116.243	*Eucalyptus loxophleba*	760	No	No	No	
HT03216	18/03/2015	-30.6764	116.2438	*Eucalyptus loxophleba*	600	Yes	Yes	No	Hollow at 6 m. Good hollow but shows no signs of use.
HT03221	18/03/2015	-30.6761	116.2445	*Eucalyptus wandoo*	1640	Yes	No	No	Hollow at 4 m.
HT03223	18/03/2015	-30.676	116.2448	*Eucalyptus wandoo*	460	No	No	No	
HT03224	18/03/2015	-30.6759	116.2449	*Eucalyptus wandoo*	460	No	No	No	
HT03230	18/03/2015	-30.6712	116.2551	*Eucalyptus wandoo*	360	No	No	No	
HT03233	18/03/2015	-30.6704	116.2569	*Eucalyptus wandoo*	500	No	No	No	
HT03246	18/03/2015	-30.6678	116.2627	*Eucalyptus loxophleba*	660	No	No	No	
HT03255	18/03/2015	-30.6654	116.2679	*Eucalyptus loxophleba*	520	No	No	No	
HT03256	18/03/2015	-30.6654	116.2679	*Eucalyptus loxophleba*	500	No	No	No	
HT03258	18/03/2015	-30.6652	116.2684	*Eucalyptus loxophleba*	560	No	No	No	
HT03260	18/03/2015	-30.665	116.2688	*Eucalyptus loxophleba*	1180	No	No	No	
HT03261	18/03/2015	-30.6649	116.2689	*Eucalyptus loxophleba*	800	No	No	No	
HT03262	18/03/2015	-30.6648	116.2692	*Eucalyptus loxophleba*	600	No	No	No	
HT03263	18/03/2015	-30.6647	116.2694	*Eucalyptus loxophleba*	520	No	No	No	
HT03264	18/03/2015	-30.6636	116.2709	*Eucalyptus loxophleba*	680	No	No	No	
HT03461	17/03/2015	-30.682	116.234	*Eucalyptus wandoo*	300	No	No	No	
HT03464	17/03/2015	-30.6821	116.2338	*Eucalyptus wandoo*	420	No	No	No	
HT03465	17/03/2015	-30.6821	116.2338	*Eucalyptus wandoo*	320	No	No	No	
HT03571	18/03/2015	-30.6775	116.2414	*Eucalyptus wandoo*	300	No	No	No	
HT03574	18/03/2015	-30.6774	116.2417	*Eucalyptus salmonophloia*	440	No	No	No	
HT03576	18/03/2015	-30.6773	116.2419	*Eucalyptus salmonophloia*	300	No	No	No	
HT03598	18/03/2015	-30.6715	116.2546	*Eucalyptus wandoo*	500	No	No	No	
HT03600	18/03/2015	-30.6712	116.2551	*Eucalyptus wandoo*	350	No	No	No	
HT03603	18/03/2015	-30.6674	116.2636	*Eucalyptus loxophleba*	500	No	No	No	
HT03610	18/03/2015	-30.6672	116.264	*Eucalyptus loxophleba*	750	No	No	No	
HT03614	18/03/2015	-30.6626	116.2726	*Eucalyptus loxophleba*	650	No	No	No	
HT03624	18/03/2015	-30.6623	116.2736	*Eucalyptus loxophleba*	850	No	No	No	

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT03629	18/03/2015	-30.6621	116.2742	*Eucalyptus salmonophloia*	580	Yes	Yes	Yes	Hollow at 5 m. Artificial nest box shows heavy signs of use by Carnaby's Black Cockatoo.
HT03630	18/03/2015	-30.6621	116.2742	*Eucalyptus salmonophloia*	700	Yes	Yes	No	Artificial nest box at 10 m.
HT05881	31/08/2015	-30.4434	116.6365	*Eucalyptus salmonophloia*	750	No	No	No	
HT08900	18/11/2015	-31.1733	116.1789	*Eucalyptus wandoo*	300	No	No	No	
HT08939	18/11/2015	-31.1895	116.1753	*Eucalyptus wandoo*	320	No	No	No	
HT08940	18/11/2015	-31.1894	116.1753	*Eucalyptus wandoo*	400	No	No	No	
HT08941	18/11/2015	-31.1893	116.1755	*Eucalyptus wandoo*	340	No	No	No	
HT08942	18/11/2015	-31.1892	116.1755	*Eucalyptus wandoo*	300	No	No	No	
HT08943	18/11/2015	-31.1889	116.1755	*Eucalyptus wandoo*	460	No	No	No	
HT08944	18/11/2015	-31.1889	116.1756	*Eucalyptus wandoo*	500	No	No	No	
HT08945	18/11/2015	-31.1887	116.1757	*Eucalyptus wandoo*	300	No	No	No	
HT08946	18/11/2015	-31.1887	116.1757	*Eucalyptus wandoo*	320	No	No	No	
HT08947	18/11/2015	-31.1885	116.1757	*Eucalyptus wandoo*	400	No	No	No	
HT08948	18/11/2015	-31.1882	116.1757	*Eucalyptus wandoo*	300	No	No	No	
HT08949	18/11/2015	-31.1883	116.1758	*Eucalyptus wandoo*	420	No	No	No	
HT08951	18/11/2015	-31.188	116.1758	*Eucalyptus wandoo*	300	No	No	No	
HT08952	18/11/2015	-31.188	116.1757	*Eucalyptus wandoo*	320	No	No	No	
HT08953	18/11/2015	-31.1879	116.1757	*Eucalyptus wandoo*	320	No	No	No	
HT08954	18/11/2015	-31.1879	116.1757	*Eucalyptus wandoo*	320	No	No	No	
HT08955	18/11/2015	-31.1879	116.1756	*Eucalyptus wandoo*	350	No	No	No	
HT08956	18/11/2015	-31.1878	116.1756	*Eucalyptus wandoo*	400	No	No	No	
HT08957	18/11/2015	-31.1876	116.1757	*Eucalyptus wandoo*	300	No	No	No	
HT08958	18/11/2015	-31.1875	116.1759	*Eucalyptus wandoo*	300	No	No	No	
HT08959	18/11/2015	-31.1875	116.1759	*Eucalyptus wandoo*	300	No	No	No	
HT08960	18/11/2015	-31.1876	116.176	*Eucalyptus wandoo*	300	No	No	No	
HT08961	18/11/2015	-31.1875	116.176	*Eucalyptus wandoo*	320	No	No	No	
HT08962	18/11/2015	-31.1873	116.1759	*Eucalyptus wandoo*	800	No	No	No	
HT08963	18/11/2015	-31.1871	116.1759	*Eucalyptus wandoo*	450	No	No	No	
HT08964	18/11/2015	-31.1871	116.1759	*Eucalyptus wandoo*	400	No	No	No	
HT08966	18/11/2015	-31.1866	116.1762	*Eucalyptus wandoo*	300	No	No	No	
HT08967	18/11/2015	-31.1866	116.1761	*Eucalyptus accedens*	300	No	No	No	
HT08968	18/11/2015	-31.1866	116.176	*Eucalyptus accedens*	500	No	No	No	
HT08969	18/11/2015	-31.1865	116.1759	*Eucalyptus accedens*	500	No	No	No	
HT08972	18/11/2015	-31.1862	116.1762	*Eucalyptus accedens*	300	No	No	No	
HT08977	18/11/2015	-31.1853	116.1762	*Eucalyptus wandoo*	340	No	No	No	
HT08979	18/11/2015	-31.1853	116.1762	*Eucalyptus wandoo*	300	No	No	No	

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT08980	18/11/2015	-31.1853	116.1762	*Eucalyptus wandoo*	340	No	No	No	
HT08982	18/11/2015	-31.1849	116.1761	*Eucalyptus wandoo*	300	No	No	No	
HT08983	18/11/2015	-31.1848	116.1761	*Eucalyptus wandoo*	320	Yes	No	No	Hollow at 5 m.
HT08984	18/11/2015	-31.1846	116.1761	*Eucalyptus wandoo*	600	Yes	No	Yes	Hollows at 7 m and 12 m. Hollow with chewed entrance.
HT08989	18/11/2015	-31.184	116.176	*Eucalyptus accedens*	800	Yes	No	No	Hollow at 10 m.
HT08990	18/11/2015	-31.1839	116.176	*Eucalyptus accedens*	400	No	No	No	
HT08992	18/11/2015	-31.1837	116.1761	*Eucalyptus wandoo*	300	No	No	No	
HT08996	18/11/2015	-31.1839	116.1762	*Eucalyptus accedens*	330	No	No	No	
HT09000	18/11/2015	-31.1844	116.1762	*Eucalyptus accedens*	420	No	No	No	
HT09057	19/11/2015	-31.1943	116.1765	*Eucalyptus accedens*	300	No	No	No	
HT10017	18/11/2015	-31.1779	116.1781	*Eucalyptus marginata*	500	No	No	No	
HT10018	18/11/2015	-31.1778	116.1778	*Corymbia calophylla*	840	No	No	No	
HT10019	18/11/2015	-31.1779	116.1777	*Eucalyptus marginata*	900	No	No	No	
HT10022	18/11/2015	-31.178	116.1775	*Eucalyptus marginata*	540	No	No	No	
HT10023	18/11/2015	-31.1782	116.1777	*Eucalyptus marginata*	530	No	No	No	
HT10024	18/11/2015	-31.1783	116.1777	*Eucalyptus marginata*	600	No	No	No	
HT10025	18/11/2015	-31.1784	116.1777	*Eucalyptus marginata*	610	No	No	No	
HT10026	18/11/2015	-31.1782	116.1779	*Corymbia calophylla*	1000	No	No	No	
HT10027	18/11/2015	-31.1783	116.1779	*Corymbia calophylla*	600	No	No	No	
HT10028	18/11/2015	-31.1785	116.1778	*Eucalyptus marginata*	1130	No	No	No	
HT10029	18/11/2015	-31.1786	116.1776	*Eucalyptus marginata*	810	Yes	No	No	Hollow at 7 m.
HT10031	18/11/2015	-31.1794	116.1783	*Corymbia calophylla*	850	No	No	No	
HT10035	18/11/2015	-31.1786	116.1786	*Corymbia calophylla*	540	No	No	No	
HT10036	18/11/2015	-31.1786	116.1786	*Corymbia calophylla*	710	No	No	No	
HT10037	18/11/2015	-31.1783	116.1784	*Corymbia calophylla*	1020	No	No	No	
HT10039	18/11/2015	-31.178	116.1785	*Corymbia calophylla*	520	No	No	No	
HT10042	18/11/2015	-31.1777	116.1789	*Corymbia calophylla*	680	No	No	No	
HT10043	18/11/2015	-31.1777	116.179	*Corymbia calophylla*	710	No	No	No	
HT10044	18/11/2015	-31.1775	116.1789	*Eucalyptus wandoo*	1010	Yes	No	No	Hollow at 4 m.
HT10045	18/11/2015	-31.1774	116.1789	*Eucalyptus wandoo*	380	No	No	No	
HT10046	18/11/2015	-31.1776	116.1786	*Eucalyptus wandoo*	410	No	No	No	
HT10093	18/11/2015	-31.1833	116.1762	*Eucalyptus wandoo*	1010	Yes	No	No	Hollow at 9 m.
HT10094	18/11/2015	-31.1831	116.1762	*Eucalyptus wandoo*	980	Yes	No	No	Hollow at 6 m.
HT10095	18/11/2015	-31.183	116.1761	*Eucalyptus wandoo*	420	No	No	No	
HT10096	18/11/2015	-31.1828	116.1761	*Eucalyptus wandoo*	420	No	No	No	
HT10098	18/11/2015	-31.1826	116.1763	*Eucalyptus wandoo*	480	No	No	No	
HT10100	18/11/2015	-31.1823	116.1765	*Eucalyptus wandoo*	520	No	No	No	
HT10101	18/11/2015	-31.1823	116.1763	*Eucalyptus wandoo*	1010	Yes	No	No	Hollow at 4 m.
HT10102	18/11/2015	-31.1821	116.1762	*Eucalyptus wandoo*	880	No	No	No	

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT10104	18/11/2015	-31.1818	116.1765	*Eucalyptus wandoo*	600	Yes	No	No	Hollow at 8 m.
HT10105	18/11/2015	-31.1818	116.1765	*Eucalyptus wandoo*	450	No	No	No	
HT10106	18/11/2015	-31.1818	116.1765	*Eucalyptus wandoo*	360	No	No	No	
HT10107	18/11/2015	-31.1814	116.1765	*Corymbia calophylla*	920	No	No	No	
HT10108	18/11/2015	-31.181	116.1766	*Eucalyptus wandoo*	360	No	No	No	
HT10109	18/11/2015	-31.1809	116.1766	*Eucalyptus wandoo*	410	No	No	No	
HT10110	18/11/2015	-31.1808	116.1769	*Eucalyptus wandoo*	920	No	No	No	
HT10111	18/11/2015	-31.1806	116.1769	*Eucalyptus wandoo*	390	No	No	No	
HT10112	18/11/2015	-31.1806	116.1769	*Eucalyptus wandoo*	320	No	No	No	
HT10113	18/11/2015	-31.1806	116.1769	*Eucalyptus wandoo*	310	No	No	No	
HT10115	18/11/2015	-31.1804	116.1772	*Corymbia calophylla*	700	No	No	No	
HT10118	18/11/2015	-31.18	116.1771	*Corymbia calophylla*	580	No	No	No	
HT10119	18/11/2015	-31.18	116.177	*Eucalyptus wandoo*	630	No	No	No	
HT10120	18/11/2015	-31.1798	116.1772	*Eucalyptus wandoo*	360	No	No	No	
HT10123	18/11/2015	-31.1797	116.1774	*Eucalyptus salmonophloia*	400	No	No	No	
HT10124	18/11/2015	-31.1796	116.1773	*Eucalyptus wandoo*	590	Yes	No	No	Hollow at 8 m and 7 m.
HT10125	18/11/2015	-31.1795	116.1774	*Eucalyptus wandoo*	720	Yes	No	No	Hollow at 8 m.
HT10126	18/11/2015	-31.1795	116.1774	*Eucalyptus wandoo*	500	No	No	No	
HT10127	18/11/2015	-31.1795	116.1774	*Eucalyptus salmonophloia*	520	No	No	No	
HT10129	18/11/2015	-31.1792	116.1775	*Eucalyptus wandoo*	800	Yes	No	No	Hollow at 7 m.
HT10195	19/11/2015	-31.2038	116.1763	*Eucalyptus marginata*	760	No	No	No	
HT10196	19/11/2015	-31.2039	116.1761	*Corymbia calophylla*	810	No	No	No	
HT10197	19/11/2015	-31.204	116.1763	*Eucalyptus wandoo*	780	No	No	No	
HT12852	7/09/2016	-30.0685	116.6801	*Eucalyptus loxophleba*	550	No	No	No	
HT12853	7/09/2016	-30.0683	116.6811	*Eucalyptus loxophleba*	600	Yes	No	No	Hollow present in tree.
HT12854	7/09/2016	-30.2856	116.6622	*Eucalyptus wandoo*	530	Yes	No	No	Hollow at 7 m.
HT12855	7/09/2016	-30.6812	116.2354	*Eucalyptus wandoo*	430	No	No	No	
HT12856	7/09/2016	-30.6813	116.2354	*Eucalyptus wandoo*	440	No	No	No	
HT12857	7/09/2016	-30.6813	116.2354	*Eucalyptus wandoo*	340	No	No	No	
HT12858	7/09/2016	-30.6812	116.2354	*Eucalyptus wandoo*	470	No	No	No	
HT12859	7/09/2016	-30.6812	116.2356	*Eucalyptus wandoo*	480	No	No	No	
HT12861	7/09/2016	-30.6827	116.2327	*Eucalyptus wandoo*	575	No	No	No	
HT12863	7/09/2016	-30.6828	116.2323	*Eucalyptus wandoo*	380	No	No	No	
HT12866	7/09/2016	-30.681	116.233	*Eucalyptus wandoo*	385	No	No	No	
HT12867	7/09/2016	-30.6809	116.233	*Eucalyptus wandoo*	570	No	No	No	
HT12868	7/09/2016	-30.6809	116.2331	*Eucalyptus wandoo*	510	No	No	No	
HT12869	7/09/2016	-30.6801	116.2336	*Eucalyptus wandoo*	650	No	No	No	
HT12870	7/09/2016	-30.6799	116.2337	*Eucalyptus wandoo*	450	No	No	No	

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT12871	7/09/2016	-30.6794	116.2339	*Eucalyptus wandoo*	580	No	No	No	
HT12872	7/09/2016	-30.679	116.2341	*Eucalyptus wandoo*	420	No	No	No	
HT12873	7/09/2016	-30.6788	116.2341	*Eucalyptus wandoo*	405	No	No	No	
HT12874	7/09/2016	-30.679	116.2339	*Eucalyptus wandoo*	605	No	No	No	
HT12875	7/09/2016	-30.6624	116.2731	*Eucalyptus loxophleba*	650	No	No	No	
HT12876	7/09/2016	-30.6624	116.2729	*Eucalyptus loxophleba*	650	No	No	No	
HT12877	7/09/2016	-30.6688	116.2603	*Eucalyptus loxophleba*	540	No	No	No	
HT12878	7/09/2016	-30.6687	116.26	*Eucalyptus loxophleba*	600	Yes	No	No	Hollow present in tree. Dead.
HT12879	7/09/2016	-30.6687	116.2599	*Eucalyptus loxophleba*	500	No	No	No	
HT12880	7/09/2016	-30.6708	116.2556	*Eucalyptus wandoo*	750	No	No	No	
HT12881	7/09/2016	-30.6708	116.2555	*Eucalyptus wandoo*	300	No	No	No	
HT12882	7/09/2016	-30.6774	116.241	*Eucalyptus wandoo*	400	No	No	No	
HT12883	7/09/2016	-30.6774	116.241	*Eucalyptus wandoo*	400	No	No	No	
HT12884	7/09/2016	-30.6782	116.2393	*Eucalyptus wandoo*	450	No	No	No	
HT12887	7/09/2016	-30.6935	116.2009	*Eucalyptus wandoo*	345	No	No	No	
HT12888	7/09/2016	-30.6935	116.201	*Eucalyptus wandoo*	520	No	No	No	
HT12889	7/09/2016	-30.6935	116.201	*Eucalyptus* sp.	420	No	No	No	
HT12891	7/09/2016	-30.694	116.2015	*Eucalyptus wandoo*	510	No	No	No	
HT12892	7/09/2016	-30.6941	116.2015	*Eucalyptus wandoo*	450	No	No	No	
HT12894	7/09/2016	-30.694	116.2013	*Eucalyptus wandoo*	550	No	No	No	
HT12895	7/09/2016	-30.6939	116.2012	*Eucalyptus wandoo*	375	No	No	No	
HT12896	7/09/2016	-30.8781	116.2522	*Eucalyptus wandoo*	600	No	No	No	
HT12898	7/09/2016	-31.0189	116.212	*Eucalyptus camaldulensis*	740	No	No	No	
HT12899	7/09/2016	-31.0188	116.212	*Eucalyptus camaldulensis*	700	No	No	No	
HT12900	7/09/2016	-31.0189	116.2119	*Eucalyptus camaldulensis*	570	No	No	No	
HT12902	7/09/2016	-31.0232	116.2084	*Eucalyptus wandoo*	450	No	No	No	
HT12903	7/09/2016	-31.0232	116.2084	*Eucalyptus wandoo*	550	No	No	No	
HT12904	7/09/2016	-31.0226	116.2087	*Eucalyptus wandoo*	1400	Yes	Yes	No	Hollow present in tree. One small but possibly used hollow and two with good entraces but no signs of use.
HT12905	7/09/2016	-31.0226	116.2089	*Eucalyptus wandoo*	1380	Yes	No	No	Hollow present in tree.
HT12906	7/09/2016	-31.0225	116.2088	*Eucalyptus wandoo*	520	No	No	No	
HT12907	7/09/2016	-31.0225	116.2087	*Eucalyptus wandoo*	630	No	No	No	
HT12908	7/09/2016	-31.0224	116.2091	*Eucalyptus wandoo*	435	No	No	No	
HT12909	7/09/2016	-31.0224	116.2092	*Eucalyptus wandoo*	365	No	No	No	

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT12910	7/09/2016	-31.0223	116.2092	*Eucalyptus wandoo*	350	No	No	No	
HT12911	7/09/2016	-31.0222	116.2093	*Eucalyptus wandoo*	600	No	No	No	
HT12912	7/09/2016	-31.0223	116.2094	*Eucalyptus wandoo*	675	Yes	Yes	Yes	Hollow at 6 m. Worn hollow entrances suitable.
HT12913	7/09/2016	-31.0222	116.2097	*Eucalyptus wandoo*	385	No	No	No	
HT12914	7/09/2016	-31.0222	116.2097	*Eucalyptus wandoo*	370	No	No	No	
HT12915	7/09/2016	-31.0221	116.2098	*Eucalyptus wandoo*	370	No	No	No	
HT12916	7/09/2016	-31.022	116.2099	*Eucalyptus wandoo*	665	No	No	No	
HT12917	7/09/2016	-31.022	116.2099	*Eucalyptus wandoo*	470	Yes	No	No	Hollow at 10 m. Dead.
HT12918	7/09/2016	-31.0221	116.2099	*Eucalyptus wandoo*	735	No	No	No	
HT12919	7/09/2016	-31.0217	116.2102	*Eucalyptus wandoo*	725	No	No	No	
HT12921	7/09/2016	-31.0211	116.2112	*Eucalyptus rudis*	730	No	No	No	
HT12922	7/09/2016	-31.0214	116.2116	*Eucalyptus wandoo*	1030	Yes	No	No	Hollows at 12 m.
HT12923	7/09/2016	-31.0237	116.2137	*Eucalyptus wandoo*	660	No	No	No	
HT12924	7/09/2016	-31.0238	116.2139	*Eucalyptus wandoo*	530	No	No	No	
HT12925	7/09/2016	-31.0241	116.2139	*Eucalyptus wandoo*	460	No	No	No	
HT12926	7/09/2016	-31.024	116.2139	*Eucalyptus wandoo*	460	No	No	No	
HT12927	7/09/2016	-31.0241	116.2139	*Eucalyptus wandoo*	555	Yes	No	No	Dead.
HT12928	7/09/2016	-31.0241	116.2139	*Eucalyptus wandoo*	710	No	No	No	
HT12929	7/09/2016	-31.0608	116.2064	*Eucalyptus wandoo*	490	No	No	No	
HT12930	7/09/2016	-31.0613	116.2062	*Eucalyptus wandoo*	480	No	No	No	
HT12931	7/09/2016	-31.0613	116.2062	*Eucalyptus wandoo*	575	Yes	No	No	Hollow present in tree. Dead.
HT12932	7/09/2016	-31.0615	116.2061	*Eucalyptus wandoo*	435	No	No	No	
HT12933	7/09/2016	-31.0616	116.2062	*Eucalyptus wandoo*	740	Yes	No	No	Hollow at 7 m.
HT12934	7/09/2016	-31.0616	116.2061	*Eucalyptus wandoo*	490	Yes	No	No	Hollow at 6 m.
HT12935	7/09/2016	-31.0617	116.2059	*Eucalyptus wandoo*	795	Yes	No	No	Hollow at 7 m.
HT12937	7/09/2016	-31.0618	116.2059	*Eucalyptus wandoo*	395	No	No	No	
HT12938	7/09/2016	-31.062	116.2059	*Eucalyptus wandoo*	480	No	No	No	
HT12939	7/09/2016	-31.0621	116.2058	*Eucalyptus wandoo*	510	Yes	Yes	No	Hollow present in tree. Good hollow but has no signs of use.
HT12940	7/09/2016	-31.062	116.2058	*Eucalyptus wandoo*	370	No	No	No	
HT12941	7/09/2016	-31.062	116.2057	*Eucalyptus wandoo*	350	No	No	No	
HT12942	7/09/2016	-31.0622	116.2057	*Eucalyptus wandoo*	600	No	No	No	
HT12943	7/09/2016	-31.0623	116.2057	*Eucalyptus wandoo*	370	No	No	No	
HT12944	7/09/2016	-31.0631	116.2052	*Eucalyptus wandoo*	390	No	No	No	
HT12945	7/09/2016	-31.0632	116.2052	*Eucalyptus wandoo*	460	No	No	No	
HT12946	7/09/2016	-31.0646	116.2038	*Eucalyptus* sp.	600	Yes	No	No	Hollow at 9 m. Dead.

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT12947	7/09/2016	-31.0729	116.205	*Eucalyptus wandoo*	340	No	No	No	
HT12948	7/09/2016	-31.0727	116.205	*Eucalyptus wandoo*	360	No	No	No	
HT12949	7/09/2016	-31.0727	116.2049	*Eucalyptus wandoo*	520	Yes	No	No	Hollow at 10 m. Dead.
HT12950	7/09/2016	-31.0727	116.2048	*Eucalyptus wandoo*	770	No	No	No	
HT12951	7/09/2016	-31.0725	116.205	*Eucalyptus wandoo*	460	No	No	No	
HT12952	7/09/2016	-31.0726	116.2049	*Eucalyptus wandoo*	590	Yes	No	No	Hollow present in tree. Dead.
HT12953	7/09/2016	-31.0725	116.2049	*Eucalyptus wandoo*	785	Yes	No	No	Hollow at 10 m.
HT12954	7/09/2016	-31.0724	116.2047	*Eucalyptus wandoo*	545	Yes	No	No	Hollow at 7 m. Dead.
HT12955	7/09/2016	-31.0723	116.2048	*Eucalyptus wandoo*	800	Yes	No	No	Hollows at 10 m and 11 m.
HT12956	7/09/2016	-31.0724	116.2049	*Eucalyptus wandoo*	500	No	No	No	
HT12957	7/09/2016	-31.0724	116.2049	*Eucalyptus wandoo*	765	No	No	No	
HT12958	7/09/2016	-31.0723	116.2048	*Eucalyptus wandoo*	465	Yes	No	No	2 hollows at 14 m.
HT12959	7/09/2016	-31.0721	116.2047	*Eucalyptus wandoo*	360	No	No	No	
HT12960	7/09/2016	-31.0721	116.2046	*Eucalyptus wandoo*	455	No	No	No	
HT12961	7/09/2016	-31.0715	116.2046	*Eucalyptus wandoo*	540	Yes	No	No	Hollow at 6 m.
HT12962	7/09/2016	-31.0712	116.2043	*Eucalyptus wandoo*	490	Yes	No	No	Hollows at 7 m, 8 m and 9 m. Dead.
HT12963	7/09/2016	-31.071	116.2043	*Eucalyptus wandoo*	705	No	No	No	
HT12964	7/09/2016	-31.0709	116.2043	*Eucalyptus wandoo*	680	Yes	No	No	Hollows at 6 m, 8 m, and 11 m. Dead.
HT12966	7/09/2016	-31.0781	116.2053	*Eucalyptus wandoo*	400	No	No	No	
HT12967	7/09/2016	-31.081	116.2034	*Corymbia calophylla*	830	No	No	No	
HT12968	7/09/2016	-31.1109	116.1949	*Eucalyptus wandoo*	440	No	No	No	
HT12969	7/09/2016	-31.1109	116.195	*Eucalyptus wandoo*	300	No	No	No	
HT12970	7/09/2016	-31.1108	116.1951	*Eucalyptus wandoo*	440	No	No	No	
HT12971	7/09/2016	-31.1108	116.1951	*Eucalyptus wandoo*	400	No	No	No	
HT12972	7/09/2016	-31.1108	116.195	*Eucalyptus wandoo*	480	No	No	No	
HT12973	7/09/2016	-31.1108	116.195	*Eucalyptus wandoo*	340	No	No	No	
HT12974	7/09/2016	-31.1107	116.1948	*Eucalyptus wandoo*	680	No	No	No	
HT12975	7/09/2016	-31.1108	116.1946	*Eucalyptus wandoo*	400	No	No	No	
HT12976	7/09/2016	-31.1108	116.1946	*Eucalyptus wandoo*	369	No	No	No	
HT12977	7/09/2016	-31.1108	116.1945	*Eucalyptus wandoo*	360	No	No	No	
HT12978	7/09/2016	-31.1108	116.1945	*Eucalyptus wandoo*	540	No	No	No	
HT12979	7/09/2016	-31.1108	116.1944	*Eucalyptus wandoo*	540	No	No	No	
HT12980	7/09/2016	-31.1108	116.1944	*Eucalyptus wandoo*	420	No	No	No	
HT12981	7/09/2016	-31.1108	116.1941	*Corymbia calophylla*	900	No	No	No	
HT12982	7/09/2016	-31.1107	116.1938	*Corymbia calophylla*	860	No	No	No	
HT12983	7/09/2016	-31.1108	116.1935	*Corymbia calophylla*	860	No	No	No	

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT12984	7/09/2016	-31.1108	116.1933	*Corymbia calophylla*	680	No	No	No	
HT12985	7/09/2016	-31.1109	116.1936	*Corymbia calophylla*	600	No	No	No	
HT12986	7/09/2016	-31.1109	116.1938	*Eucalyptus wandoo*	540	No	No	No	
HT12987	7/09/2016	-31.1566	116.1843	*Eucalyptus wandoo*	380	No	No	No	
HT12988	7/09/2016	-31.1566	116.1843	*Eucalyptus wandoo*	460	No	No	No	
HT12989	7/09/2016	-31.1566	116.1844	*Eucalyptus wandoo*	360	No	No	No	
HT12990	7/09/2016	-31.1566	116.1844	*Eucalyptus wandoo*	380	No	No	No	
HT12991	7/09/2016	-31.1566	116.1845	*Eucalyptus wandoo*	520	No	No	No	
HT12992	7/09/2016	-31.1566	116.1846	*Eucalyptus wandoo*	540	No	No	No	
HT12993	7/09/2016	-31.1566	116.1846	*Eucalyptus wandoo*	580	No	No	No	
HT12994	7/09/2016	-31.1566	116.185	*Eucalyptus wandoo*	500	No	No	No	
HT12995	7/09/2016	-31.1566	116.1853	*Corymbia calophylla*	680	No	No	No	
HT12996	7/09/2016	-31.1566	116.1855	*Eucalyptus wandoo*	320	No	No	No	
HT12997	7/09/2016	-31.1566	116.1856	*Eucalyptus wandoo*	440	No	No	No	
HT12998	7/09/2016	-31.1566	116.1858	*Corymbia calophylla*	1320	No	No	No	
HT12999	7/09/2016	-31.1566	116.186	*Eucalyptus wandoo*	480	No	No	No	
HT13000	7/09/2016	-31.1566	116.1861	*Eucalyptus wandoo*	520	No	No	No	
HT13001	7/09/2016	-31.1567	116.1861	*Corymbia calophylla*	1600	No	No	No	
HT13003	7/09/2016	-31.1567	116.1861	*Eucalyptus wandoo*	1220	No	No	No	
HT13004	7/09/2016	-31.1567	116.1861	*Eucalyptus wandoo*	880	No	No	No	
HT13005	7/09/2016	-31.1728	116.176	*Eucalyptus wandoo*	540	No	No	No	
HT13006	7/09/2016	-31.1729	116.1761	*Eucalyptus wandoo*	380	No	No	No	
HT13007	7/09/2016	-31.1728	116.1762	*Eucalyptus wandoo*	600	No	No	No	
HT13008	7/09/2016	-31.1729	116.1763	*Eucalyptus wandoo*	560	No	No	No	
HT13009	7/09/2016	-31.1729	116.1766	*Eucalyptus wandoo*	320	No	No	No	
HT13010	7/09/2016	-31.1729	116.1766	*Eucalyptus wandoo*	460	No	No	No	
HT13011	7/09/2016	-31.1729	116.1766	*Eucalyptus wandoo*	380	No	No	No	
HT13012	7/09/2016	-31.1729	116.1767	*Eucalyptus wandoo*	580	No	No	No	
HT13013	7/09/2016	-31.1729	116.1766	*Eucalyptus wandoo*	420	No	No	No	
HT13014	7/09/2016	-31.1729	116.1768	*Eucalyptus wandoo*	360	No	No	No	
HT13015	7/09/2016	-31.1728	116.1768	*Eucalyptus wandoo*	300	No	No	No	
HT13016	7/09/2016	-31.173	116.1769	*Eucalyptus wandoo*	380	No	No	No	Dead.
HT13017	7/09/2016	-31.173	116.1768	*Eucalyptus wandoo*	340	No	No	No	
HT13018	7/09/2016	-31.1731	116.1771	*Corymbia calophylla*	1000	No	No	No	
HT13019	7/09/2016	-31.1732	116.1772	*Corymbia calophylla*	500	No	No	No	Dead.
HT13020	7/09/2016	-31.173	116.1775	*Eucalyptus wandoo*	600	No	No	No	
HT13021	7/09/2016	-31.173	116.1775	*Eucalyptus wandoo*	680	No	No	No	
HT13022	7/09/2016	-31.1732	116.1775	*Eucalyptus wandoo*	700	No	No	No	
HT13023	7/09/2016	-31.1733	116.1776	*Eucalyptus wandoo*	860	No	No	No	
HT13024	7/09/2016	-31.1734	116.1779	*Eucalyptus wandoo*	520	No	No	No	

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT13025	7/09/2016	-31.1734	116.1779	*Eucalyptus wandoo*	800	No	No	No	
HT13026	7/09/2016	-31.1734	116.1779	*Eucalyptus wandoo*	740	No	No	No	
HT13027	7/09/2016	-31.1732	116.178	*Eucalyptus wandoo*	340	No	No	No	
HT13028	7/09/2016	-31.1732	116.178	*Eucalyptus wandoo*	300	No	No	No	
HT13029	7/09/2016	-31.1732	116.1781	*Corymbia calophylla*	600	No	No	No	
HT13030	7/09/2016	-31.1732	116.1783	*Eucalyptus wandoo*	360	No	No	No	
HT13031	7/09/2016	-31.1733	116.1784	*Eucalyptus wandoo*	300	No	No	No	
HT13032	7/09/2016	-31.1734	116.1785	*Eucalyptus* sp.	560	No	No	No	Dead.
HT13033	7/09/2016	-31.1734	116.1786	*Eucalyptus wandoo*	500	No	No	No	
HT13034	7/09/2016	-31.1733	116.1787	*Eucalyptus wandoo*	360	No	No	No	
HT13035	7/09/2016	-31.1733	116.1787	*Eucalyptus wandoo*	300	No	No	No	
HT13036	7/09/2016	-31.1734	116.1788	*Eucalyptus wandoo*	580	No	No	No	
HT13037	7/09/2016	-31.1737	116.1787	*Eucalyptus wandoo*	840	No	No	No	
HT13038	7/09/2016	-31.1738	116.1786	*Eucalyptus wandoo*	380	No	No	No	
HT13039	7/09/2016	-31.1742	116.1784	*Eucalyptus wandoo*	720	No	No	No	
HT13040	7/09/2016	-31.1744	116.1783	*Corymbia calophylla*	760	No	No	No	Dead.
HT13041	7/09/2016	-31.1743	116.1783	*Eucalyptus wandoo*	340	No	No	No	
HT13042	7/09/2016	-31.1743	116.1783	*Eucalyptus wandoo*	420	No	No	No	
HT13043	7/09/2016	-31.1743	116.1783	*Eucalyptus wandoo*	300	No	No	No	
HT13044	7/09/2016	-31.1742	116.1781	*Eucalyptus wandoo*	380	No	No	No	
HT13045	7/09/2016	-31.1742	116.178	*Corymbia calophylla*	880	Yes	No	No	Hollow at 7 m. Dead.
HT13046	7/09/2016	-31.1743	116.1779	*Eucalyptus wandoo*	440	No	No	No	
HT13047	7/09/2016	-31.1741	116.1774	*Eucalyptus wandoo*	360	No	No	No	
HT13048	7/09/2016	-31.174	116.1774	*Eucalyptus wandoo*	320	No	No	No	
HT13049	7/09/2016	-31.174	116.1771	*Corymbia calophylla*	1040	No	No	No	
HT13050	7/09/2016	-31.1741	116.1769	*Eucalyptus wandoo*	700	No	No	No	
HT13051	7/09/2016	-30.0664	116.6783	*Eucalyptus loxophleba*	500	No	No	No	
HT13052	7/09/2016	-30.0667	116.6783	*Eucalyptus loxophleba*	600	Yes	No	No	Hollow present in tree.
HT13053	7/09/2016	-30.0671	116.6784	*Eucalyptus loxophleba*	500	No	No	No	
HT13054	7/09/2016	-30.0671	116.6784	*Eucalyptus loxophleba*	640	No	No	No	
HT13055	7/09/2016	-30.0686	116.6799	*Eucalyptus loxophleba*	540	No	No	No	
HT13056	7/09/2016	-30.068	116.6805	*Eucalyptus loxophleba*	560	No	No	No	
HT13057	7/09/2016	-30.0672	116.6806	*Eucalyptus loxophleba*	600	No	No	No	
HT13058	7/09/2016	-30.0678	116.6807	*Eucalyptus loxophleba*	640	No	No	No	
HT13059	7/09/2016	-30.0675	116.6808	*Eucalyptus loxophleba*	560	No	No	No	
HT13060	7/09/2016	-30.2859	116.6618	*Eucalyptus salmonophloia*	500	No	No	No	
HT13061	7/09/2016	-30.2855	116.6618	*Eucalyptus salmonophloia*	500	No	No	No	
HT13062	7/09/2016	-30.2853	116.6621	*Eucalyptus salmonophloia*	520	No	No	No	

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT13063	7/09/2016	-30.63	116.3487	*Eucalyptus salmonophloia*	500	No	No	No	
HT13064	7/09/2016	-30.6479	116.3205	*Eucalyptus salmonophloia*	500	No	No	No	
HT13065	7/09/2016	-30.6491	116.3178	*Eucalyptus loxophleba*	500	No	No	No	
HT13066	7/09/2016	-30.6492	116.3175	*Eucalyptus loxophleba*	500	No	No	No	
HT13067	7/09/2016	-30.6489	116.3177	*Eucalyptus loxophleba*	540	No	No	No	
HT13068	7/09/2016	-30.6487	116.3184	*Eucalyptus loxophleba*	660	Yes	No	No	Hollow at 4 m.
HT13069	7/09/2016	-30.649	116.3184	*Eucalyptus loxophleba*	500	No	No	No	
HT13070	7/09/2016	-30.6544	116.2876	*Eucalyptus wandoo*	400	No	No	No	
HT13071	7/09/2016	-30.6784	116.2407	*Eucalyptus wandoo*	440	No	No	No	
HT13072	7/09/2016	-30.68	116.2374	*Eucalyptus wandoo*	400	Yes	No	No	Hollow at 3 m.
HT13073	7/09/2016	-30.6801	116.2374	*Eucalyptus wandoo*	340	No	No	No	
HT13074	7/09/2016	-30.6801	116.2374	*Eucalyptus wandoo*	340	No	No	No	
HT13075	7/09/2016	-30.6801	116.2374	*Eucalyptus wandoo*	320	No	No	No	
HT13076	7/09/2016	-30.6801	116.2375	*Eucalyptus wandoo*	300	No	No	No	
HT13077	7/09/2016	-30.6809	116.2358	*Eucalyptus wandoo*	500	No	No	No	
HT13078	7/09/2016	-30.6809	116.2359	*Eucalyptus wandoo*	380	No	No	No	
HT13079	7/09/2016	-30.681	116.2358	*Eucalyptus wandoo*	300	No	No	No	
HT13080	7/09/2016	-30.6809	116.2358	*Eucalyptus wandoo*	300	No	No	No	
HT13081	7/09/2016	-30.681	116.2358	*Eucalyptus wandoo*	360	No	No	No	
HT13082	7/09/2016	-30.6809	116.2357	*Eucalyptus wandoo*	300	No	No	No	
HT13083	7/09/2016	-30.681	116.2357	*Eucalyptus wandoo*	320	No	No	No	
HT13084	7/09/2016	-30.6811	116.2358	*Eucalyptus wandoo*	300	No	No	No	
HT13085	7/09/2016	-30.6811	116.2358	*Eucalyptus wandoo*	300	No	No	No	
HT13086	7/09/2016	-30.681	116.2357	*Eucalyptus wandoo*	300	No	No	No	
HT13087	7/09/2016	-30.6825	116.2329	*Eucalyptus wandoo*	520	No	No	No	
HT13088	7/09/2016	-30.6825	116.2329	*Eucalyptus wandoo*	600	No	No	No	
HT13089	7/09/2016	-30.6825	116.2329	*Eucalyptus wandoo*	340	No	No	No	
HT13090	7/09/2016	-30.6827	116.2326	*Eucalyptus wandoo*	300	No	No	No	
HT13091	7/09/2016	-30.6828	116.2322	*Eucalyptus wandoo*	320	No	No	No	
HT13092	7/09/2016	-30.6829	116.2319	*Eucalyptus wandoo*	460	No	No	No	
HT13093	7/09/2016	-30.6808	116.2331	*Eucalyptus wandoo*	520	No	No	No	
HT13094	7/09/2016	-30.6808	116.2331	*Eucalyptus wandoo*	620	No	No	No	
HT13095	7/09/2016	-30.6807	116.2331	*Eucalyptus wandoo*	500	No	No	No	
HT13096	7/09/2016	-30.6806	116.2331	*Eucalyptus wandoo*	420	No	No	No	
HT13097	7/09/2016	-30.6804	116.2332	*Eucalyptus wandoo*	620	No	No	No	
HT13098	7/09/2016	-30.6804	116.2332	*Eucalyptus wandoo*	500	No	No	No	
HT13099	7/09/2016	-30.6803	116.2332	*Eucalyptus wandoo*	400	No	No	No	
HT13100	7/09/2016	-30.6802	116.2333	*Eucalyptus wandoo*	340	No	No	No	
HT13101	7/09/2016	-30.6801	116.2333	*Eucalyptus wandoo*	460	No	No	No	

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT13102	7/09/2016	-30.6801	116.2334	*Eucalyptus wandoo*	360	No	No	No	
HT13103	7/09/2016	-30.68	116.2334	*Eucalyptus wandoo*	460	No	No	No	
HT13104	7/09/2016	-30.68	116.2335	*Eucalyptus wandoo*	380	No	No	No	
HT13105	7/09/2016	-30.6799	116.2335	*Eucalyptus wandoo*	360	No	No	No	
HT13106	7/09/2016	-30.6799	116.2335	*Eucalyptus wandoo*	300	No	No	No	
HT13107	7/09/2016	-30.6798	116.2335	*Eucalyptus wandoo*	420	No	No	No	
HT13108	7/09/2016	-30.6798	116.2335	*Eucalyptus wandoo*	320	No	No	No	
HT13109	7/09/2016	-30.6798	116.2335	*Eucalyptus wandoo*	340	No	No	No	
HT13110	7/09/2016	-30.6797	116.2336	*Eucalyptus wandoo*	300	No	No	No	
HT13111	7/09/2016	-30.6797	116.2336	*Eucalyptus wandoo*	400	No	No	No	
HT13112	7/09/2016	-30.6797	116.2336	*Eucalyptus wandoo*	360	No	No	No	
HT13113	7/09/2016	-30.6795	116.2337	*Eucalyptus wandoo*	340	No	No	No	
HT13114	7/09/2016	-30.6795	116.2337	*Eucalyptus wandoo*	420	No	No	No	
HT13115	7/09/2016	-30.6794	116.2337	*Eucalyptus wandoo*	660	No	No	No	
HT13116	7/09/2016	-30.6793	116.2338	*Eucalyptus wandoo*	520	No	No	No	
HT13117	7/09/2016	-30.6792	116.2338	*Eucalyptus wandoo*	380	No	No	No	
HT13118	7/09/2016	-30.6792	116.2338	*Eucalyptus wandoo*	400	No	No	No	Dead.
HT13119	7/09/2016	-30.6801	116.233	*Eucalyptus wandoo*	620	No	No	No	
HT13120	7/09/2016	-30.6808	116.2335	*Eucalyptus wandoo*	900	Yes	No	No	Hollow present in tree.
HT13121	8/09/2016	-30.6495	116.303	*Eucalyptus loxophleba*	600	No	No	No	
HT13122	8/09/2016	-30.6496	116.3038	*Eucalyptus wandoo*	580	No	No	No	
HT13123	8/09/2016	-30.6624	116.2731	*Eucalyptus loxophleba*	620	No	No	No	
HT13124	8/09/2016	-30.6624	116.273	*Eucalyptus loxophleba*	500	No	No	No	
HT13125	8/09/2016	-30.6624	116.2728	*Eucalyptus loxophleba*	540	No	No	No	
HT13126	8/09/2016	-30.6683	116.2607	*Eucalyptus loxophleba*	640	No	No	No	
HT13127	8/09/2016	-30.6683	116.2611	*Eucalyptus loxophleba*	500	No	No	No	
HT13128	8/09/2016	-30.671	116.2556	*Eucalyptus wandoo*	300	No	No	No	
HT13129	8/09/2016	-30.6709	116.2556	*Eucalyptus wandoo*	320	No	No	No	
HT13130	8/09/2016	-30.6709	116.2557	*Eucalyptus wandoo*	300	No	No	No	
HT13131	8/09/2016	-30.6765	116.2429	*Eucalyptus wandoo*	300	No	No	No	
HT13132	8/09/2016	-30.6774	116.2412	*Eucalyptus wandoo*	600	No	No	No	
HT13133	8/09/2016	-30.6775	116.2412	*Eucalyptus wandoo*	540	No	No	No	
HT13134	8/09/2016	-30.6775	116.2412	*Eucalyptus wandoo*	300	No	No	No	
HT13135	8/09/2016	-30.6775	116.2412	*Eucalyptus wandoo*	320	No	No	No	
HT13136	8/09/2016	-30.6774	116.2411	*Eucalyptus wandoo*	300	No	No	No	
HT13137	8/09/2016	-30.6781	116.24	*Eucalyptus wandoo*	360	No	No	No	
HT13138	8/09/2016	-30.6781	116.24	*Eucalyptus wandoo*	300	No	No	No	
HT13140	8/09/2016	-30.6938	116.1967	*Eucalyptus wandoo*	420	No	No	No	
HT13141	8/09/2016	-30.6938	116.1968	*Eucalyptus wandoo*	300	No	No	No	
HT13142	8/09/2016	-30.6938	116.1971	*Eucalyptus wandoo*	520	No	No	No	

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT13143	8/09/2016	-30.6938	116.1971	*Eucalyptus wandoo*	360	No	No	No	
HT13144	8/09/2016	-30.6939	116.1973	*Eucalyptus wandoo*	500	No	No	No	
HT13145	8/09/2016	-30.6938	116.1976	*Eucalyptus loxophleba*	560	No	No	No	
HT13146	8/09/2016	-30.6938	116.1979	*Eucalyptus loxophleba*	660	No	No	No	
HT13147	8/09/2016	-30.6938	116.1982	*Eucalyptus loxophleba*	560	No	No	No	
HT13148	8/09/2016	-30.6938	116.1983	*Eucalyptus loxophleba*	940	No	No	No	
HT13149	8/09/2016	-30.694	116.1991	*Eucalyptus loxophleba*	540	No	No	No	
HT13150	8/09/2016	-30.6938	116.1991	*Eucalyptus loxophleba*	1020	No	No	No	
HT13151	8/09/2016	-30.6938	116.1993	*Eucalyptus loxophleba*	500	No	No	No	
HT13152	8/09/2016	-30.6938	116.1994	*Eucalyptus loxophleba*	780	No	No	No	
HT13153	8/09/2016	-30.6938	116.2	*Eucalyptus loxophleba*	500	No	No	No	
HT13154	8/09/2016	-30.6935	116.2	*Eucalyptus loxophleba*	500	No	No	No	
HT13155	8/09/2016	-30.6938	116.2001	*Eucalyptus wandoo*	320	No	No	No	
HT13156	8/09/2016	-30.6938	116.2002	*Eucalyptus loxophleba*	500	No	No	No	
HT13157	8/09/2016	-30.6936	116.2003	*Eucalyptus loxophleba*	740	No	No	No	
HT13158	8/09/2016	-30.6938	116.2008	*Eucalyptus wandoo*	1280	Yes	No	No	Hollow at 6 m.
HT13159	8/09/2016	-30.6939	116.2009	*Eucalyptus wandoo*	480	No	No	No	
HT13160	8/09/2016	-30.6938	116.201	*Eucalyptus wandoo*	420	No	No	No	
HT13161	8/09/2016	-30.6937	116.2011	*Eucalyptus wandoo*	660	Yes	No	No	Hollow at 5 m and 6 m.
HT13162	8/09/2016	-30.6938	116.2012	*Eucalyptus wandoo*	400	No	No	No	
HT13163	8/09/2016	-30.8705	116.2545	*Eucalyptus wandoo*	300	No	No	No	
HT13164	8/09/2016	-30.8708	116.2544	*Eucalyptus wandoo*	400	No	No	No	
HT13165	8/09/2016	-30.9963	116.2066	*Eucalyptus wandoo*	600	No	No	No	
HT13166	8/09/2016	-30.9963	116.2066	*Eucalyptus wandoo*	600	No	No	No	
HT13167	8/09/2016	-31.0187	116.212	*Eucalyptus rudis*	540	No	No	No	
HT13168	8/09/2016	-31.0187	116.212	*Eucalyptus rudis*	460	No	No	No	
HT13169	8/09/2016	-31.0188	116.2119	*Eucalyptus rudis*	500	No	No	No	
HT13170	8/09/2016	-31.0188	116.2117	*Eucalyptus rudis*	660	No	No	No	
HT13171	8/09/2016	-31.0233	116.2083	*Eucalyptus wandoo*	1020	No	No	No	
HT13172	8/09/2016	-31.0231	116.2081	*Eucalyptus wandoo*	380	No	No	No	
HT13173	8/09/2016	-31.023	116.208	*Eucalyptus wandoo*	600	No	No	No	
HT13174	8/09/2016	-31.0232	116.208	*Eucalyptus wandoo*	660	No	No	No	
HT13175	8/09/2016	-31.023	116.2085	*Eucalyptus wandoo*	340	No	No	No	
HT13176	8/09/2016	-31.023	116.2085	*Eucalyptus wandoo*	440	No	No	No	
HT13177	8/09/2016	-31.023	116.2088	*Eucalyptus wandoo*	320	No	No	No	
HT13178	8/09/2016	-31.0229	116.2089	*Eucalyptus wandoo*	340	No	No	No	
HT13179	8/09/2016	-31.0228	116.2091	*Eucalyptus wandoo*	400	No	No	No	
HT13180	8/09/2016	-31.0224	116.2091	*Eucalyptus wandoo*	320	No	No	No	
HT13181	8/09/2016	-31.0225	116.2094	*Eucalyptus wandoo*	500	No	No	No	
HT13182	8/09/2016	-31.0225	116.2097	*Eucalyptus wandoo*	480	No	No	No	

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT13183	8/09/2016	-31.0225	116.2097	*Eucalyptus wandoo*	380	No	No	No	
HT13184	8/09/2016	-31.0221	116.2101	*Eucalyptus loxophleba*	620	No	No	No	
HT13185	8/09/2016	-31.022	116.2108	*Eucalyptus wandoo*	340	No	No	No	
HT13186	8/09/2016	-31.0219	116.2108	*Eucalyptus wandoo*	360	No	No	No	
HT13187	8/09/2016	-31.0219	116.2109	*Eucalyptus loxophleba*	560	No	No	No	
HT13188	8/09/2016	-31.0218	116.2115	*Eucalyptus wandoo*	460	No	No	No	
HT13189	8/09/2016	-31.0214	116.2115	*Eucalyptus wandoo*	780	No	No	No	
HT13190	8/09/2016	-31.0221	116.2111	*Eucalyptus wandoo*	500	No	No	No	
HT13191	8/09/2016	-31.0221	116.2111	*Eucalyptus wandoo*	340	No	No	No	
HT13192	8/09/2016	-31.0222	116.2112	*Eucalyptus wandoo*	320	No	No	No	
HT13193	8/09/2016	-31.0222	116.2111	*Eucalyptus wandoo*	460	No	No	No	
HT13195	8/09/2016	-31.0222	116.211	*Eucalyptus wandoo*	460	No	No	No	
HT13196	8/09/2016	-31.0223	116.2108	*Eucalyptus wandoo*	300	No	No	No	
HT13197	8/09/2016	-31.0222	116.2108	*Eucalyptus wandoo*	440	No	No	No	
HT13198	8/09/2016	-31.0224	116.2132	*Eucalyptus wandoo*	600	No	No	No	
HT13199	8/09/2016	-31.0222	116.2133	*Eucalyptus wandoo*	360	No	No	No	
HT13200	8/09/2016	-31.0223	116.2134	*Eucalyptus wandoo*	440	No	No	No	
HT13201	8/09/2016	-31.0225	116.2134	*Eucalyptus wandoo*	460	No	No	No	
HT13202	8/09/2016	-31.0226	116.2135	*Eucalyptus wandoo*	320	No	No	No	
HT13203	8/09/2016	-31.0226	116.2134	*Eucalyptus wandoo*	320	No	No	No	
HT13204	8/09/2016	-31.0226	116.2134	*Eucalyptus wandoo*	320	No	No	No	
HT13205	8/09/2016	-31.0227	116.2135	*Eucalyptus wandoo*	620	No	No	No	
HT13206	8/09/2016	-31.0228	116.2135	*Eucalyptus wandoo*	420	No	No	No	
HT13207	8/09/2016	-31.0229	116.2135	*Eucalyptus wandoo*	460	No	No	No	
HT13208	8/09/2016	-31.023	116.2136	*Eucalyptus wandoo*	600	No	No	No	
HT13209	8/09/2016	-31.023	116.2136	*Eucalyptus wandoo*	600	No	No	No	
HT13210	8/09/2016	-31.0233	116.2136	*Eucalyptus wandoo*	500	No	No	No	
HT13211	8/09/2016	-31.0233	116.2136	*Eucalyptus wandoo*	320	No	No	No	
HT13212	8/09/2016	-31.0233	116.2137	*Eucalyptus wandoo*	700	No	No	No	
HT13213	8/09/2016	-31.0234	116.2137	*Eucalyptus wandoo*	300	No	No	No	
HT13214	8/09/2016	-31.0234	116.2137	*Eucalyptus wandoo*	340	No	No	No	
HT13215	8/09/2016	-31.0235	116.2137	*Eucalyptus wandoo*	780	No	No	No	
HT13216	8/09/2016	-31.0237	116.2137	*Eucalyptus wandoo*	500	No	No	No	
HT13217	8/09/2016	-31.0237	116.2137	*Eucalyptus wandoo*	400	No	No	No	
HT13218	8/09/2016	-31.0238	116.2137	*Eucalyptus wandoo*	300	No	No	No	
HT13219	8/09/2016	-31.0234	116.2134	*Eucalyptus wandoo*	340	No	No	No	
HT13220	8/09/2016	-31.0229	116.2131	*Eucalyptus wandoo*	460	No	No	No	
HT13221	8/09/2016	-31.0608	116.2065	*Eucalyptus wandoo*	300	No	No	No	
HT13222	8/09/2016	-31.0611	116.2064	*Eucalyptus wandoo*	440	No	No	No	
HT13223	8/09/2016	-31.0612	116.2064	*Eucalyptus wandoo*	680	No	No	No	

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT13224	8/09/2016	-31.0614	116.2064	*Eucalyptus wandoo*	500	No	No	No	
HT13225	8/09/2016	-31.0615	116.2063	*Eucalyptus wandoo*	360	No	No	No	
HT13226	8/09/2016	-31.0616	116.2064	*Eucalyptus wandoo*	320	No	No	No	
HT13227	8/09/2016	-31.0618	116.2062	*Eucalyptus wandoo*	300	No	No	No	
HT13228	8/09/2016	-31.0618	116.2062	*Eucalyptus wandoo*	300	No	No	No	
HT13229	8/09/2016	-31.0619	116.2061	*Eucalyptus wandoo*	480	No	No	No	
HT13230	8/09/2016	-31.062	116.206	*Eucalyptus wandoo*	760	No	No	No	
HT13231	8/09/2016	-31.062	116.206	*Eucalyptus wandoo*	420	No	No	No	
HT13232	8/09/2016	-31.0622	116.206	*Eucalyptus wandoo*	700	No	No	No	
HT13233	8/09/2016	-31.0623	116.206	*Eucalyptus wandoo*	340	No	No	No	
HT13234	8/09/2016	-31.0624	116.2058	*Eucalyptus wandoo*	400	No	No	No	
HT13235	8/09/2016	-31.0631	116.2056	*Eucalyptus wandoo*	340	No	No	No	
HT13236	8/09/2016	-31.0632	116.2051	*Eucalyptus wandoo*	380	No	No	No	
HT13237	8/09/2016	-31.0632	116.2052	*Eucalyptus wandoo*	400	No	No	No	
HT13238	8/09/2016	-31.0647	116.204	*Eucalyptus* sp.	360	Yes	No	No	Hollow at 5 m. Dead.
HT13239	8/09/2016	-31.066	116.2031	*Eucalyptus rudis*	580	No	No	No	
HT13240	8/09/2016	-31.066	116.2032	*Eucalyptus rudis*	500	No	No	No	
HT13241	8/09/2016	-31.0661	116.2032	*Eucalyptus rudis*	500	No	No	No	
HT13242	8/09/2016	-31.0661	116.2033	*Eucalyptus rudis*	580	No	No	No	
HT13243	8/09/2016	-31.0732	116.2048	*Eucalyptus wandoo*	360	No	No	No	
HT13244	8/09/2016	-31.0732	116.2048	*Eucalyptus wandoo*	340	No	No	No	
HT13245	8/09/2016	-31.0731	116.2048	*Eucalyptus wandoo*	540	No	No	No	
HT13246	8/09/2016	-31.0731	116.2048	*Eucalyptus wandoo*	460	No	No	No	
HT13247	8/09/2016	-31.0729	116.2048	*Eucalyptus wandoo*	300	No	No	No	
HT13248	8/09/2016	-31.0727	116.2047	*Eucalyptus wandoo*	480	No	No	No	
HT13249	8/09/2016	-31.0726	116.2047	*Eucalyptus wandoo*	320	No	No	No	
HT13250	8/09/2016	-31.0724	116.2047	*Eucalyptus wandoo*	560	Yes	Yes	Yes	Hollow at 5 m. Dead. Well chewed hollow.
HT13251	8/09/2016	-31.1737	116.1764	*Eucalyptus wandoo*	360	No	No	No	
HT13252	8/09/2016	-31.1737	116.1764	*Eucalyptus wandoo*	440	No	No	No	
HT13253	8/09/2016	-31.1739	116.1762	*Eucalyptus wandoo*	300	No	No	No	
HT13254	8/09/2016	-31.1739	116.1761	*Eucalyptus wandoo*	400	No	No	No	
HT13255	8/09/2016	-31.1738	116.1759	*Eucalyptus wandoo*	320	No	No	No	
HT13256	8/09/2016	-31.1738	116.1759	*Eucalyptus wandoo*	380	No	No	No	
HT13257	8/09/2016	-31.0724	116.2045	*Eucalyptus wandoo*	320	No	No	No	
HT13258	8/09/2016	-31.0724	116.2045	*Eucalyptus wandoo*	320	No	No	No	
HT13259	8/09/2016	-31.0724	116.2045	*Eucalyptus wandoo*	340	No	No	No	
HT13260	8/09/2016	-31.0723	116.2045	*Eucalyptus wandoo*	360	No	No	No	
HT13261	8/09/2016	-31.0721	116.2046	*Eucalyptus wandoo*	700	No	No	No	
HT13262	8/09/2016	-31.0721	116.2046	*Eucalyptus wandoo*	420	No	No	No	

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT13263	8/09/2016	-31.0721	116.2046	*Eucalyptus wandoo*	440	No	No	No	
HT13264	8/09/2016	-31.0721	116.2045	*Eucalyptus wandoo*	300	No	No	No	
HT13265	8/09/2016	-31.0722	116.2044	*Eucalyptus wandoo*	540	No	No	No	
HT13266	8/09/2016	-31.0722	116.2044	*Eucalyptus wandoo*	360	No	No	No	Dead.
HT13267	8/09/2016	-31.0721	116.2044	*Eucalyptus wandoo*	540	No	No	No	
HT13268	8/09/2016	-31.0721	116.2044	*Eucalyptus wandoo*	300	No	No	No	
HT13269	8/09/2016	-31.072	116.2044	*Eucalyptus wandoo*	460	No	No	No	
HT13270	8/09/2016	-31.072	116.2045	*Eucalyptus wandoo*	300	No	No	No	
HT13271	8/09/2016	-31.0719	116.2044	*Eucalyptus wandoo*	440	No	No	No	
HT13272	8/09/2016	-31.0719	116.2044	*Eucalyptus wandoo*	480	No	No	No	
HT13273	8/09/2016	-31.0718	116.2044	*Eucalyptus wandoo*	420	No	No	No	
HT13274	8/09/2016	-31.0717	116.2045	*Eucalyptus wandoo*	1060	Yes	Yes	Yes	Hollow at 6 m. Well chewed hollow.
HT13275	8/09/2016	-31.0717	116.2045	*Eucalyptus wandoo*	320	No	No	No	
HT13276	8/09/2016	-31.0717	116.2044	*Eucalyptus wandoo*	300	No	No	No	
HT13277	8/09/2016	-31.0717	116.2043	*Eucalyptus wandoo*	480	No	No	No	
HT13278	8/09/2016	-31.0717	116.2043	*Eucalyptus wandoo*	380	No	No	No	
HT13279	8/09/2016	-31.0717	116.2043	*Eucalyptus wandoo*	320	No	No	No	Dead.
HT13280	8/09/2016	-31.0717	116.2043	*Eucalyptus wandoo*	440	No	No	No	
HT13281	8/09/2016	-31.0716	116.2043	*Eucalyptus wandoo*	540	No	No	No	
HT13282	8/09/2016	-31.0715	116.2043	*Eucalyptus wandoo*	460	No	No	No	
HT13283	8/09/2016	-31.0714	116.2043	*Eucalyptus loxophleba*	500	No	No	No	
HT13284	8/09/2016	-31.0714	116.2042	*Eucalyptus wandoo*	320	No	No	No	
HT13285	8/09/2016	-31.0714	116.2041	*Eucalyptus wandoo*	1240	No	No	No	
HT13286	8/09/2016	-31.0712	116.2042	*Eucalyptus loxophleba*	580	No	No	No	
HT13287	8/09/2016	-31.071	116.2041	*Eucalyptus wandoo*	320	No	No	No	
HT13288	8/09/2016	-31.071	116.2041	*Eucalyptus* sp.	660	No	No	No	Dead.
HT13289	8/09/2016	-31.0708	116.2041	*Eucalyptus wandoo*	460	No	No	No	
HT13290	8/09/2016	-31.0704	116.2041	*Eucalyptus loxophleba*	820	No	No	No	
HT13291	8/09/2016	-31.0702	116.204	*Eucalyptus loxophleba*	500	No	No	No	
HT13292	8/09/2016	-31.0702	116.2042	*Eucalyptus loxophleba*	720	No	No	No	
HT13293	8/09/2016	-31.0788	116.204	*Corymbia calophylla*	1080	Yes	No	No	Hollow at 7 m.
HT13297	8/09/2016	-31.0798	116.2034	*Corymbia calophylla*	980	No	No	No	
HT13298	8/09/2016	-31.0716	116.2043	*Eucalyptus wandoo*	440	No	No	No	
HT13300	8/09/2016	-31.1109	116.1939	*Corymbia calophylla*	600	No	No	No	
HT13301	8/09/2016	-31.1566	116.1844	*Eucalyptus wandoo*	720	No	No	No	
HT13302	8/09/2016	-31.1567	116.1846	*Eucalyptus wandoo*	880	Yes	Yes	No	Hollows at 6 m, 7 m, and 12 m. Good hollows but none show signs of use.
HT13303	8/09/2016	-31.1567	116.1849	*Eucalyptus wandoo*	405	No	No	No	

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT13304	8/09/2016	-31.1567	116.1853	*Corymbia calophylla*	810	No	No	No	
HT13305	8/09/2016	-31.1567	116.1856	*Corymbia calophylla*	810	No	No	No	
HT13306	8/09/2016	-31.1731	116.1759	*Eucalyptus wandoo*	850	No	No	No	
HT13307	8/09/2016	-31.1732	116.1761	*Eucalyptus wandoo*	400	No	No	No	
HT13308	8/09/2016	-31.1731	116.1762	*Eucalyptus wandoo*	440	No	No	No	
HT13309	8/09/2016	-31.1731	116.1764	*Eucalyptus wandoo*	490	No	No	No	
HT13310	8/09/2016	-31.1731	116.1766	*Eucalyptus wandoo*	350	No	No	No	
HT13311	8/09/2016	-31.1732	116.1766	*Eucalyptus wandoo*	440	No	No	No	
HT13312	8/09/2016	-31.1731	116.1767	*Eucalyptus* sp.	460	Yes	No	No	Hollows present in tree. Dead.
HT13313	8/09/2016	-31.1732	116.1769	*Eucalyptus wandoo*	700	No	No	No	
HT13314	8/09/2016	-31.1734	116.1774	*Eucalyptus wandoo*	600	Yes	No	No	Hollows present in tree.
HT13315	8/09/2016	-31.1735	116.1774	*Eucalyptus wandoo*	750	Yes	No	No	Hollows present in tree.
HT13316	8/09/2016	-31.1736	116.1779	*Eucalyptus* sp.	600	No	No	No	Dead.
HT13317	8/09/2016	-31.1736	116.178	*Eucalyptus wandoo*	830	Yes	No	No	Hollows present in tree.
HT13318	8/09/2016	-31.1735	116.1781	*Eucalyptus wandoo*	795	No	No	No	
HT13319	8/09/2016	-31.1735	116.1783	*Eucalyptus wandoo*	495	No	No	No	
HT13320	8/09/2016	-31.1736	116.1784	*Eucalyptus wandoo*	560	No	No	No	
HT13321	8/09/2016	-31.1736	116.1784	*Eucalyptus wandoo*	600	No	No	No	
HT13322	8/09/2016	-31.1736	116.1784	*Eucalyptus wandoo*	460	No	No	No	
HT13323	8/09/2016	-31.1735	116.1786	*Eucalyptus wandoo*	660	No	No	No	
HT13324	8/09/2016	-31.1734	116.1786	*Eucalyptus wandoo*	690	No	No	No	
HT13325	8/09/2016	-31.1741	116.1786	*Eucalyptus wandoo*	895	No	No	No	
HT13326	8/09/2016	-31.174	116.1784	*Eucalyptus wandoo*	660	No	No	No	
HT13327	8/09/2016	-31.174	116.1781	*Eucalyptus wandoo*	595	No	No	No	
HT13328	8/09/2016	-31.174	116.178	*Eucalyptus wandoo*	670	Yes	No	No	Hollows present in tree.
HT13329	8/09/2016	-31.174	116.1778	*Corymbia calophylla*	660	No	No	No	
HT13330	8/09/2016	-31.1738	116.1777	*Corymbia calophylla*	800	Yes	No	No	Hollow present in tree. Dead.
HT13331	8/09/2016	-31.1739	116.1776	*Eucalyptus wandoo*	1030	Yes	No	No	Hollow present in tree.
HT13332	8/09/2016	-31.1741	116.1769	*Eucalyptus wandoo*	1079	Yes	No	No	Hollows present in tree.
HT13333	8/09/2016	-31.1736	116.1771	*Corymbia calophylla*	880	No	No	No	Dead tree.
HT13334	8/09/2016	-31.1735	116.1767	*Eucalyptus wandoo*	1100	Yes	No	No	Hollows present in tree.
HT13335	8/09/2016	-31.1736	116.1764	*Eucalyptus wandoo*	989	Yes	Yes	No	Hollows present in tree. Suitable hollow but shows no sign of use.

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT13337	13/10/2016	-31.0771	116.2046	*Eucalyptus wandoo*	300	No	No	No	
HT13338	13/10/2016	-30.0633	116.6864	*Eucalyptus loxophleba*	600	No	No	No	
HT13339	13/10/2016	-31.078	116.2042	*Eucalyptus wandoo*	350	Yes	No	No	Hollow at 6 m.
HT13340	13/10/2016	-30.0667	116.6817	*Eucalyptus loxophleba*	500	No	No	No	
HT13341	13/10/2016	-31.078	116.2042	*Eucalyptus wandoo*	400	Yes	No	No	Hollow at 10 m.
HT13342	13/10/2016	-30.0679	116.6806	*Eucalyptus loxophleba*	540	No	No	No	
HT13343	13/10/2016	-31.0779	116.2042	*Eucalyptus wandoo*	900	No	No	No	
HT13344	13/10/2016	-30.0674	116.6807	*Eucalyptus loxophleba*	620	No	No	No	
HT13345	13/10/2016	-31.0779	116.2043	*Eucalyptus wandoo*	400	No	No	No	
HT13346	13/10/2016	-30.0671	116.6804	*Eucalyptus loxophleba*	500	No	No	No	
HT13347	13/10/2016	-31.0776	116.2043	*Eucalyptus wandoo*	350	No	No	No	
HT13348	13/10/2016	-30.067	116.6806	*Eucalyptus loxophleba*	580	No	No	No	
HT13349	13/10/2016	-31.0776	116.2043	*Corymbia calophylla*	650	Yes	No	No	Hollow at 7 m.
HT13350	13/10/2016	-30.067	116.6786	*Eucalyptus loxophleba*	500	No	No	No	
HT13351	13/10/2016	-31.0775	116.2043	*Eucalyptus wandoo*	450	No	No	No	
HT13352	13/10/2016	-30.0669	116.6785	*Eucalyptus loxophleba*	600	No	No	No	
HT13353	13/10/2016	-31.0773	116.2043	*Eucalyptus wandoo*	800	Yes	No	No	Hollow at 6 m.
HT13354	13/10/2016	-30.0681	116.6786	*Eucalyptus loxophleba*	660	No	No	No	
HT13355	13/10/2016	-31.0767	116.2043	*Eucalyptus* sp.	500	Yes	No	No	Hollow at 5 m. Dead.
HT13356	13/10/2016	-30.0681	116.6787	*Eucalyptus loxophleba*	760	No	No	No	
HT13357	13/10/2016	-31.0765	116.2044	*Eucalyptus wandoo*	650	No	No	No	
HT13358	13/10/2016	-31.0769	116.2046	*Eucalyptus wandoo*	320	No	No	No	
HT13359	13/10/2016	-31.0772	116.2044	*Eucalyptus wandoo*	550	No	No	No	
HT13360	13/10/2016	-30.0634	116.6863	*Eucalyptus loxophleba*	500	No	No	No	
HT13361	13/10/2016	-31.0764	116.2044	*Eucalyptus wandoo*	800	Yes	Yes	No	Hollow at 7 m. Good hollow but shows no sign of use.
HT13362	13/10/2016	-31.0769	116.2045	*Eucalyptus wandoo*	400	No	No	No	
HT13363	13/10/2016	-31.0762	116.2043	*Eucalyptus wandoo*	500	No	No	No	
HT13364	13/10/2016	-31.0769	116.2045	*Eucalyptus wandoo*	600	No	No	No	
HT13365	13/10/2016	-31.0761	116.2043	*Eucalyptus wandoo*	400	No	No	No	
HT13366	13/10/2016	-31.0769	116.2044	*Eucalyptus wandoo*	400	No	No	No	
HT13367	13/10/2016	-31.076	116.2044	*Eucalyptus wandoo*	450	Yes	Yes	Yes	Hollow at 7 m. Chewed hollow. Suitable for Carnaby's Black Cockatoo.
HT13368	13/10/2016	-31.0769	116.2043	*Eucalyptus wandoo*	600	No	No	No	
HT13369	13/10/2016	-31.076	116.2043	*Eucalyptus wandoo*	450	Yes	No	No	Hollow at 6 m.
HT13370	13/10/2016	-31.0772	116.2043	*Eucalyptus wandoo*	720	No	No	No	
HT13371	13/10/2016	-31.0757	116.2043	*Eucalyptus wandoo*	600	Yes	No	No	Hollow at 4 m.

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT13372	13/10/2016	-31.0774	116.2042	*Eucalyptus wandoo*	360	No	No	No	
HT13373	13/10/2016	-31.0755	116.2042	*Eucalyptus wandoo*	850	Yes	Yes	No	Hollow at 5 m. Good hollow but shows no signs of use.
HT13374	13/10/2016	-31.0776	116.2042	*Eucalyptus wandoo*	340	No	No	No	
HT13375	13/10/2016	-31.0754	116.2043	*Eucalyptus wandoo*	500	Yes	No	No	Hollow at 4 m.
HT13376	13/10/2016	-31.0776	116.2043	*Corymbia calophylla*	560	No	No	No	
HT13377	13/10/2016	-31.0752	116.2043	*Eucalyptus wandoo*	500	No	No	No	
HT13378	13/10/2016	-31.0776	116.2043	*Eucalyptus wandoo*	300	No	No	No	
HT13379	13/10/2016	-31.0751	116.2044	*Eucalyptus wandoo*	600	Yes	No	No	Hollow at 4 m.
HT13381	13/10/2016	-31.0776	116.2044	*Eucalyptus wandoo*	400	No	No	No	
HT13382	13/10/2016	-30.0654	116.6834	*Eucalyptus loxophleba*	550	No	No	No	
HT13383	13/10/2016	-31.075	116.2043	*Eucalyptus wandoo*	300	No	No	No	
HT13384	13/10/2016	-31.0778	116.2042	*Eucalyptus wandoo*	420	No	No	No	
HT13385	13/10/2016	-31.0749	116.2042	*Eucalyptus wandoo*	400	Yes	No	No	Hollow at 5 m.
HT13386	13/10/2016	-31.0779	116.2041	*Eucalyptus wandoo*	600	No	No	No	
HT13387	13/10/2016	-31.0747	116.2042	*Eucalyptus wandoo*	900	Yes	No	No	Hollow at 8 m.
HT13388	13/10/2016	-31.0779	116.2043	*Eucalyptus wandoo*	640	No	No	No	
HT13389	13/10/2016	-31.0746	116.2042	*Eucalyptus wandoo*	400	No	No	No	
HT13390	13/10/2016	-31.078	116.2042	*Eucalyptus wandoo*	380	No	No	No	
HT13391	13/10/2016	-31.0746	116.2043	*Eucalyptus wandoo*	350	No	No	No	
HT13392	13/10/2016	-31.078	116.2042	*Eucalyptus wandoo*	300	No	No	No	
HT13393	13/10/2016	-31.0746	116.2043	*Eucalyptus wandoo*	450	Yes	No	No	Hollow at 6 m. Dead.
HT13394	13/10/2016	-31.078	116.2041	*Eucalyptus wandoo*	300	No	No	No	
HT13395	13/10/2016	-31.0748	116.2044	*Eucalyptus wandoo*	350	Yes	No	No	Hollow at 4 m.
HT13396	13/10/2016	-31.0782	116.2041	*Eucalyptus wandoo*	340	No	No	No	
HT13397	13/10/2016	-31.0753	116.2043	*Eucalyptus wandoo*	400	Yes	No	No	Hollow at 5 m.
HT13398	13/10/2016	-31.0785	116.2042	*Corymbia calophylla*	1100	No	No	No	
HT13399	13/10/2016	-31.0756	116.2044	*Eucalyptus wandoo*	500	No	No	No	
HT13400	13/10/2016	-31.0793	116.2037	*Corymbia calophylla*	1200	No	No	No	
HT13401	13/10/2016	-31.0762	116.2044	*Eucalyptus wandoo*	400	No	No	No	
HT13402	13/10/2016	-31.0794	116.2037	*Corymbia calophylla*	1000	No	No	No	
HT13403	13/10/2016	-31.0777	116.2044	*Eucalyptus wandoo*	400	Yes	No	No	Hollow at 5 m.
HT13404	13/10/2016	-30.0652	116.6829	*Eucalyptus loxophleba*	660	No	No	No	
HT13406	13/10/2016	-31.0779	116.2044	*Eucalyptus wandoo*	300	No	No	No	
HT13407	13/10/2016	-31.0777	116.2044	*Eucalyptus wandoo*	340	No	No	No	
HT13408	13/10/2016	-31.0774	116.2045	*Eucalyptus wandoo*	380	No	No	No	
HT13409	13/10/2016	-31.0772	116.2046	*Eucalyptus wandoo*	340	No	No	No	
HT13411	13/10/2016	-31.0764	116.2042	*Eucalyptus wandoo*	300	No	No	No	
HT13412	13/10/2016	-31.0763	116.2043	*Eucalyptus wandoo*	580	No	No	No	

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT13413	13/10/2016	-31.076	116.2042	*Eucalyptus wandoo*	320	No	No	No	
HT13414	13/10/2016	-31.0755	116.2042	*Eucalyptus wandoo*	620	No	No	No	
HT13415	13/10/2016	-31.0779	116.2043	*Eucalyptus wandoo*	400	No	No	No	
HT13416	13/10/2016	-30.0656	116.6823	*Eucalyptus loxophleba*	640	No	No	No	
HT13417	13/10/2016	-31.0754	116.2043	*Eucalyptus wandoo*	300	No	No	No	
HT13418	13/10/2016	-31.0751	116.2041	*Eucalyptus wandoo*	400	No	No	No	
HT13419	13/10/2016	-31.0751	116.2041	*Eucalyptus wandoo*	520	No	No	No	
HT13420	13/10/2016	-31.075	116.2041	*Eucalyptus wandoo*	500	No	No	No	
HT13421	13/10/2016	-31.0747	116.2042	*Eucalyptus wandoo*	1000	No	No	No	
HT13422	13/10/2016	-31.0746	116.2042	*Eucalyptus wandoo*	340	No	No	No	
HT13423	13/10/2016	-31.0743	116.2042	*Eucalyptus wandoo*	320	No	No	No	
HT13424	13/10/2016	-31.0743	116.2041	*Eucalyptus wandoo*	300	No	No	No	
HT13425	13/10/2016	-31.0739	116.2041	*Eucalyptus wandoo*	600	No	No	No	Dead.
HT13426	13/10/2016	-31.0736	116.204	*Eucalyptus wandoo*	360	No	No	No	
HT13427	13/10/2016	-31.0784	116.2042	*Corymbia calophylla*	1000	No	No	No	
HT13428	13/10/2016	-30.0661	116.6823	*Eucalyptus loxophleba*	500	No	No	No	
HT13429	13/10/2016	-31.0737	116.2042	*Eucalyptus wandoo*	320	No	No	No	
HT13430	13/10/2016	-31.074	116.2042	*Eucalyptus wandoo*	300	No	No	No	
HT13431	13/10/2016	-31.074	116.2042	*Eucalyptus wandoo*	300	No	No	No	
HT13432	13/10/2016	-31.074	116.2043	*Eucalyptus wandoo*	300	No	No	No	
HT13433	13/10/2016	-31.074	116.2043	*Eucalyptus wandoo*	300	No	No	No	
HT13434	13/10/2016	-31.0741	116.2043	*Eucalyptus wandoo*	320	No	No	No	
HT13435	13/10/2016	-31.0741	116.2043	*Eucalyptus wandoo*	300	No	No	No	
HT13436	13/10/2016	-31.0742	116.2044	*Eucalyptus wandoo*	320	No	No	No	
HT13437	13/10/2016	-31.0742	116.2044	*Eucalyptus wandoo*	300	No	No	No	
HT13438	13/10/2016	-31.0742	116.2043	*Eucalyptus wandoo*	300	No	No	No	
HT13439	13/10/2016	-30.0661	116.6822	*Eucalyptus loxophleba*	500	No	No	No	
HT13440	13/10/2016	-31.0744	116.2044	*Eucalyptus wandoo*	400	No	No	No	
HT13441	13/10/2016	-31.0745	116.2044	*Eucalyptus wandoo*	300	No	No	No	
HT13442	13/10/2016	-31.0745	116.2044	*Eucalyptus wandoo*	500	No	No	No	
HT13443	13/10/2016	-31.0745	116.2044	*Eucalyptus wandoo*	380	No	No	No	
HT13444	13/10/2016	-31.0746	116.2044	*Eucalyptus wandoo*	600	No	No	No	
HT13445	13/10/2016	-31.0748	116.2044	*Eucalyptus wandoo*	660	No	No	No	
HT13446	13/10/2016	-31.0749	116.2044	*Eucalyptus wandoo*	660	No	No	No	
HT13447	13/10/2016	-31.075	116.2044	*Eucalyptus wandoo*	560	No	No	No	
HT13448	13/10/2016	-31.0751	116.2045	*Eucalyptus wandoo*	480	No	No	No	
HT13449	13/10/2016	-31.0753	116.2045	*Eucalyptus wandoo*	300	No	No	No	
HT13450	13/10/2016	-31.0782	116.2042	*Eucalyptus wandoo*	350	No	No	No	
HT13451	13/10/2016	-30.0662	116.6821	*Eucalyptus loxophleba*	500	No	No	No	
HT13452	13/10/2016	-31.0758	116.2045	*Eucalyptus wandoo*	640	No	No	No	

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT13453	13/10/2016	-31.076	116.2045	*Eucalyptus wandoo*	700	No	No	No	
HT13454	13/10/2016	-31.0761	116.2045	*Eucalyptus wandoo*	500	No	No	No	
HT13455	13/10/2016	-31.0763	116.2045	*Eucalyptus wandoo*	500	No	No	No	
HT13456	13/10/2016	-31.0765	116.2045	*Eucalyptus wandoo*	420	No	No	No	
HT13457	13/10/2016	-31.0766	116.2045	*Eucalyptus wandoo*	300	No	No	No	
HT13458	13/10/2016	-31.0768	116.2044	*Eucalyptus wandoo*	300	No	No	No	
HT13459	13/10/2016	-31.0768	116.2044	*Eucalyptus wandoo*	700	No	No	No	
HT13460	13/10/2016	-30.9017	116.2368	*Eucalyptus loxophleba*	540	No	No	No	
HT13461	13/10/2016	-30.4079	116.6623	*Eucalyptus loxophleba*	580	No	No	No	
HT13462	13/10/2016	-31.0781	116.2042	*Eucalyptus wandoo*	350	No	No	No	
HT13463	13/10/2016	-30.0663	116.6821	*Eucalyptus loxophleba*	700	No	No	No	
HT13464	13/10/2016	-30.4066	116.6628	*Eucalyptus loxophleba*	660	No	No	No	
HT13469	13/10/2016	-31.1962	116.1769	*Corymbia calophylla*	600	No	No	No	
HT13470	13/10/2016	-31.1961	116.1769	*Corymbia calophylla*	600	No	No	No	
HT13471	13/10/2016	-31.196	116.1769	*Eucalyptus marginata*	500	No	No	No	
HT13472	13/10/2016	-31.1959	116.1769	*Eucalyptus* sp.	500	No	No	No	
HT13473	13/10/2016	-31.1958	116.1768	*Corymbia calophylla*	700	No	No	No	
HT13474	13/10/2016	-31.1955	116.1767	*Eucalyptus wandoo*	700	No	No	No	
HT13475	13/10/2016	-31.1962	116.1766	*Eucalyptus wandoo*	400	No	No	No	
HT13476	13/10/2016	-31.201	116.1761	*Corymbia calophylla*	1000	No	No	No	
HT13608	13/10/2016	-30.3348	116.6685	*Eucalyptus camaldulensis*	800	Yes	No	No	Hollow at 5 m.
HT13609	13/10/2016	-30.3343	116.6687	*Eucalyptus camaldulensis*	690	No	No	No	
HT13610	13/10/2016	-30.3339	116.6682	*Eucalyptus salmonophloia*	980	No	No	No	
HT13611	13/10/2016	-30.8793	116.2511	*Eucalyptus camaldulensis*	670	No	No	No	
HT13612	13/10/2016	-30.8796	116.2511	*Eucalyptus wandoo*	720	No	No	No	
HT13613	13/10/2016	-30.8798	116.251	*Eucalyptus wandoo*	410	No	No	No	
HT13614	13/10/2016	-30.8799	116.251	*Eucalyptus wandoo*	390	No	No	No	
HT13615	13/10/2016	-30.8799	116.251	*Eucalyptus wandoo*	410	No	No	No	
HT13616	13/10/2016	-30.88	116.251	*Eucalyptus wandoo*	410	No	No	No	
HT13617	13/10/2016	-30.88	116.2509	*Eucalyptus wandoo*	380	No	No	No	
HT13618	13/10/2016	-30.8802	116.2508	*Eucalyptus wandoo*	440	No	No	No	
HT13620	13/10/2016	-30.8821	116.2498	*Eucalyptus camaldulensis*	630	No	No	No	
HT13621	13/10/2016	-30.8821	116.2496	*Eucalyptus camaldulensis*	1020	No	No	No	
HT13623	13/10/2016	-30.885	116.2473	*Eucalyptus camaldulensis*	520	No	No	No	
HT13624	13/10/2016	-30.8852	116.2471	*Eucalyptus camaldulensis*	610	No	No	No	
HT13625	13/10/2016	-30.8853	116.247	*Eucalyptus camaldulensis*	710	Yes	No	No	Hollow at 4 m.

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT13626	13/10/2016	-30.8854	116.2471	*Eucalyptus camaldulensis*	550	No	No	No	
HT13627	13/10/2016	-30.8856	116.2469	*Eucalyptus camaldulensis*	680	No	No	No	
HT13628	13/10/2016	-30.8855	116.2466	*Eucalyptus camaldulensis*	550	No	No	No	
HT13629	13/10/2016	-30.8856	116.2465	*Eucalyptus camaldulensis*	510	No	No	No	
HT13630	13/10/2016	-30.8857	116.2463	*Eucalyptus camaldulensis*	610	No	No	No	
HT13631	13/10/2016	-30.8863	116.2452	*Eucalyptus camaldulensis*	510	No	No	No	
HT13632	13/10/2016	-30.8904	116.2383	*Eucalyptus camaldulensis*	760	No	No	No	
HT13633	13/10/2016	-30.8906	116.2383	*Eucalyptus camaldulensis*	560	No	No	No	
HT13634	13/10/2016	-30.9082	116.2355	*Eucalyptus wandoo*	410	No	No	No	
HT13635	13/10/2016	-30.9081	116.2353	*Eucalyptus wandoo*	480	Yes	No	No	Hollow at 5 m.
HT13636	13/10/2016	-30.9081	116.2352	*Eucalyptus wandoo*	510	No	No	No	
HT13637	13/10/2016	-30.9081	116.2352	*Eucalyptus wandoo*	320	No	No	No	
HT13638	13/10/2016	-30.9081	116.2351	*Eucalyptus wandoo*	480	No	No	No	
HT13639	13/10/2016	-30.9079	116.2348	*Eucalyptus wandoo*	380	Yes	No	No	Hollow at 6 m.
HT13640	13/10/2016	-30.908	116.2347	*Eucalyptus wandoo*	420	Yes	No	No	Hollow at 4 m.
HT13641	13/10/2016	-30.9079	116.2345	*Eucalyptus wandoo*	490	Yes	No	No	Hollow at 6 m.
HT13642	13/10/2016	-30.9077	116.2343	*Eucalyptus wandoo*	810	Yes	No	No	Hollow at 4 m.
HT13643	13/10/2016	-30.9078	116.2343	*Eucalyptus wandoo*	340	No	No	No	
HT13644	13/10/2016	-30.9076	116.2357	*Eucalyptus wandoo*	510	No	No	No	
HT13645	13/10/2016	-30.9076	116.2357	*Eucalyptus wandoo*	610	No	No	No	
HT13646	13/10/2016	-30.9279	116.2354	*Eucalyptus wandoo*	350	No	No	No	
HT13647	13/10/2016	-30.9277	116.2355	*Eucalyptus wandoo*	310	No	No	No	
HT13648	13/10/2016	-30.9275	116.2353	*Eucalyptus* sp.	610	No	No	No	
HT13649	1/11/2016	-31.0228	116.2108	*Eucalyptus wandoo*	360	No	No	No	
HT13650	1/11/2016	-31.0227	116.2109	*Eucalyptus wandoo*	410	No	No	No	
HT13651	1/11/2016	-31.0226	116.2109	*Eucalyptus wandoo*	390	No	No	No	
HT13652	1/11/2016	-31.0228	116.2107	*Eucalyptus wandoo*	480	No	No	No	
HT13653	1/11/2016	-31.0227	116.2107	*Eucalyptus wandoo*	610	No	No	No	
HT13654	1/11/2016	-31.0229	116.2105	*Eucalyptus wandoo*	480	No	No	No	
HT13655	1/11/2016	-31.0229	116.2104	*Eucalyptus wandoo*	520	Yes	No	No	Hollow at 4 m.
HT13656	1/11/2016	-31.0228	116.2105	*Eucalyptus wandoo*	390	No	No	No	
HT13657	1/11/2016	-31.0228	116.2103	*Eucalyptus wandoo*	500	No	No	No	
HT13658	1/11/2016	-31.0227	116.2102	*Eucalyptus wandoo*	490	No	No	No	
HT13659	1/11/2016	-31.0227	116.2101	*Eucalyptus wandoo*	560	No	No	No	
HT13660	1/11/2016	-31.0227	116.2101	*Eucalyptus wandoo*	410	No	No	No	
HT13661	1/11/2016	-31.0229	116.2097	*Eucalyptus wandoo*	320	No	No	No	

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT13662	1/11/2016	-31.0231	116.2097	*Eucalyptus wandoo*	750	No	No	No	
HT13663	1/11/2016	-31.0232	116.2097	*Eucalyptus wandoo*	310	No	No	No	
HT13664	1/11/2016	-31.0233	116.2097	*Eucalyptus wandoo*	460	No	No	No	
HT13665	1/11/2016	-31.0233	116.2097	*Eucalyptus wandoo*	350	No	No	No	
HT13666	1/11/2016	-31.0231	116.2094	*Eucalyptus wandoo*	370	No	No	No	
HT13667	1/11/2016	-31.0233	116.2089	*Eucalyptus wandoo*	390	No	No	No	
HT13668	1/11/2016	-31.0234	116.209	*Eucalyptus wandoo*	580	No	No	No	
HT13669	1/11/2016	-31.0237	116.2101	*Eucalyptus wandoo*	470	No	No	No	
HT13670	1/11/2016	-31.0237	116.2102	*Eucalyptus wandoo*	720	No	No	No	
HT13671	1/11/2016	-31.0238	116.2104	*Eucalyptus wandoo*	420	No	No	No	
HT13672	1/11/2016	-31.0239	116.2104	*Eucalyptus wandoo*	520	No	No	No	
HT13673	1/11/2016	-31.0239	116.2105	*Eucalyptus wandoo*	630	No	No	No	
HT13674	1/11/2016	-31.0242	116.2102	*Eucalyptus wandoo*	520	No	No	No	
HT13675	1/11/2016	-31.0243	116.2103	*Eucalyptus wandoo*	420	No	No	No	
HT13676	1/11/2016	-31.0241	116.2104	*Eucalyptus wandoo*	610	Yes	No	No	Hollow at 7 m.
HT13677	1/11/2016	-31.0242	116.2104	*Eucalyptus wandoo*	620	Yes	No	No	Hollow at 6 m.
HT13678	1/11/2016	-31.0242	116.2104	*Eucalyptus wandoo*	610	No	No	No	
HT13714	1/11/2016	-31.2201	116.1766	*Corymbia calophylla*	1840	No	No	No	
HT13715	1/11/2016	-31.2198	116.1767	*Eucalyptus wandoo*	360	No	No	No	
HT13716	1/11/2016	-31.2197	116.1768	*Eucalyptus wandoo*	730	No	No	No	
HT13717	1/11/2016	-31.2197	116.1768	*Eucalyptus wandoo*	400	No	No	No	
HT13718	1/11/2016	-31.2196	116.1768	*Eucalyptus wandoo*	480	No	No	No	
HT13719	1/11/2016	-31.2196	116.1767	*Eucalyptus wandoo*	700	Yes	No	No	Hollow at 5 m.
HT13720	1/11/2016	-31.2197	116.1766	*Eucalyptus wandoo*	650	No	No	No	
HT13721	1/11/2016	-31.2194	116.1766	*Eucalyptus wandoo*	650	Yes	No	No	Hollow at 6 m.
HT13722	1/11/2016	-31.2196	116.1767	*Eucalyptus wandoo*	650	No	No	No	
HT13723	1/11/2016	-31.2196	116.1767	*Eucalyptus wandoo*	520	No	No	No	
HT13724	1/11/2016	-31.2193	116.1768	*Eucalyptus wandoo*	570	No	No	No	
HT13725	1/11/2016	-31.2193	116.1767	*Eucalyptus wandoo*	480	No	No	No	
HT13726	1/11/2016	-31.2193	116.1768	*Eucalyptus wandoo*	490	Yes	No	No	
HT13727	1/11/2016	-31.2192	116.1766	*Eucalyptus wandoo*	700	Yes	No	No	Hollow at 7 m.
HT13728	1/11/2016	-31.219	116.1767	*Eucalyptus wandoo*	880	Yes	Yes	Yes	Hollow at 8 m. Chewed hollow. Suitable for Carnaby's Black Cockatoo.
HT13729	1/11/2016	-31.2188	116.1766	*Eucalyptus marginata*	710	No	No	No	
HT13730	1/11/2016	-31.2187	116.1767	*Eucalyptus wandoo*	470	No	No	No	
HT13731	1/11/2016	-31.2185	116.1765	*Corymbia calophylla*	1010	No	No	No	
HT13732	1/11/2016	-31.2184	116.1766	*Eucalyptus wandoo*	300	No	No	No	
HT13733	1/11/2016	-31.2184	116.1764	*Eucalyptus marginata*	680	No	No	No	

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT13734	1/11/2016	-31.2183	116.1767	*Eucalyptus wandoo*	920	Yes	No	No	Hollow at 7 m.
HT13735	1/11/2016	-31.2181	116.1767	*Eucalyptus wandoo*	510	Yes	No	No	Hollow at 8 m.
HT13736	1/11/2016	-31.2181	116.1766	*Eucalyptus wandoo*	420	No	No	No	
HT13737	1/11/2016	-31.2181	116.1765	*Eucalyptus marginata*	1470	No	No	No	
HT13738	1/11/2016	-31.218	116.1764	*Eucalyptus* sp.	510	No	No	No	
HT13739	1/11/2016	-31.2178	116.1765	*Eucalyptus wandoo*	700	No	No	No	
HT13740	1/11/2016	-31.2176	116.1763	*Eucalyptus* sp.	740	No	No	No	
HT13741	1/11/2016	-31.2175	116.1767	*Corymbia calophylla*	1000	No	No	No	
HT13742	1/11/2016	-31.2173	116.1766	*Eucalyptus wandoo*	450	No	No	No	
HT13743	1/11/2016	-31.2172	116.1767	*Eucalyptus marginata*	820	No	No	No	
HT13744	1/11/2016	-31.2171	116.1764	*Eucalyptus wandoo*	450	No	No	No	
HT13745	1/11/2016	-31.2172	116.1763	*Eucalyptus wandoo*	840	No	No	No	
HT13746	1/11/2016	-31.2171	116.1764	*Eucalyptus wandoo*	500	No	No	No	
HT13747	1/11/2016	-31.2171	116.1765	*Eucalyptus wandoo*	410	No	No	No	
HT13748	1/11/2016	-31.2169	116.1766	*Corymbia calophylla*	980	No	No	No	
HT13749	1/11/2016	-31.2169	116.1766	*Eucalyptus wandoo*	710	No	No	No	
HT13750	1/11/2016	-31.2164	116.1767	*Eucalyptus wandoo*	620	No	No	No	
HT13751	1/11/2016	-31.2162	116.1765	*Corymbia calophylla*	780	No	No	No	
HT13752	1/11/2016	-31.2162	116.1764	*Corymbia calophylla*	850	No	No	No	
HT13753	1/11/2016	-31.2149	116.1764	*Corymbia calophylla*	1300	No	No	No	
HT13754	1/11/2016	-31.2087	116.1771	*Eucalyptus rudis*	980	No	No	No	
HT13755	1/11/2016	-31.2092	116.1774	*Corymbia calophylla*	520	No	No	No	
HT13756	1/11/2016	-31.2067	116.1773	*Corymbia calophylla*	650	No	No	No	
HT13757	1/11/2016	-31.2067	116.1772	*Corymbia calophylla*	520	No	No	No	
HT13758	1/11/2016	-31.2048	116.1762	*Eucalyptus wandoo*	450	No	No	No	
HT13759	1/11/2016	-31.2048	116.1761	*Corymbia calophylla*	720	No	No	No	
HT13760	1/11/2016	-31.1931	116.1765	*Eucalyptus wandoo*	970	Yes	Yes	No	Hollows at 6 - 10 m. Hollow with suitable entrance but shows no signs of use.
HT13761	1/11/2016	-31.1929	116.1765	*Eucalyptus wandoo*	490	No	No	No	
HT13762	1/11/2016	-31.1928	116.1768	*Eucalyptus* sp.	690	No	No	No	
HT13763	1/11/2016	-31.1927	116.177	*Corymbia calophylla*	710	No	No	No	
HT13764	1/11/2016	-31.1925	116.177	*Eucalyptus salmonophloia*	590	No	No	No	
HT13765	1/11/2016	-31.1925	116.1769	*Corymbia calophylla*	580	No	No	No	
HT13766	1/11/2016	-31.1926	116.1767	*Eucalyptus* sp.	600	Yes	No	No	Hollow at 6 m.
HT13767	1/11/2016	-31.1922	116.177	*Corymbia calophylla*	720	No	No	No	
HT13768	1/11/2016	-31.1922	116.177	*Eucalyptus wandoo*	420	No	No	No	
HT13769	1/11/2016	-31.1921	116.1771	*Eucalyptus wandoo*	410	No	No	No	
HT13770	1/11/2016	-31.1921	116.177	*Eucalyptus wandoo*	700	No	No	No	

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT13771	1/11/2016	-31.192	116.1769	*Corymbia calophylla*	520	No	No	No	
HT13772	1/11/2016	-31.1919	116.1769	*Corymbia calophylla*	710	Yes	No	No	Hollows at 6 - 10 m.
HT13773	1/11/2016	-31.1918	116.1771	*Eucalyptus wandoo*	650	No	No	No	
HT13774	1/11/2016	-31.1918	116.1771	*Corymbia calophylla*	530	No	No	No	
HT13775	1/11/2016	-31.1918	116.1771	*Eucalyptus wandoo*	720	Yes	No	No	Hollow at 6 m.
HT13776	1/11/2016	-31.1916	116.177	*Eucalyptus wandoo*	720	Yes	No	No	Hollows at 5 - 10 m.
HT13777	1/11/2016	-31.1916	116.1769	*Corymbia calophylla*	590	No	No	No	
HT13778	1/11/2016	-31.1916	116.1769	*Eucalyptus wandoo*	730	Yes	No	No	Hollow at 8 m.
HT13779	1/11/2016	-31.1916	116.1771	*Eucalyptus wandoo*	690	No	No	No	
HT13780	1/11/2016	-31.1872	116.1773	*Eucalyptus wandoo*	580	No	No	No	
HT13808	13/10/2016	-30.2201	116.6711	*Eucalyptus salmonophloia*	645	Yes	Yes	No	Hollows at 10 and 13 m. Hollow with good entrance but floor of hollow can be seen through crack.
HT13809	13/10/2016	-30.22	116.671	*Eucalyptus salmonophloia*	530	No	No	No	
HT13810	13/10/2016	-30.3349	116.6694	*Eucalyptus loxophleba*	595	No	No	No	
HT13811	13/10/2016	-30.3353	116.6693	*Eucalyptus loxophleba*	500	No	No	No	
HT13812	13/10/2016	-30.3362	116.6691	*Eucalyptus loxophleba*	460	No	No	No	
HT13813	13/10/2016	-30.3361	116.6683	*Eucalyptus loxophleba*	615	No	No	No	
HT13814	13/10/2016	-30.8823	116.2509	*Eucalyptus loxophleba*	500	No	No	No	
HT13815	13/10/2016	-30.8826	116.2507	*Eucalyptus loxophleba*	720	No	No	No	
HT13816	13/10/2016	-30.883	116.2501	*Eucalyptus wandoo*	1030	Yes	No	No	Multiple unsuitable small hollows.
HT13817	13/10/2016	-30.8832	116.2501	*Eucalyptus wandoo*	1170	Yes	No	No	Multiple unsuitable small hollows.
HT13818	13/10/2016	-30.8836	116.2495	*Eucalyptus loxophleba*	550	No	No	No	
HT13819	13/10/2016	-30.8843	116.2488	*Eucalyptus loxophleba*	550	Yes	No	No	Small hollow present in tree.
HT13820	13/10/2016	-30.8825	116.2496	*Eucalyptus loxophleba*	1030	No	No	No	
HT13822	13/10/2016	-30.8893	116.2413	*Eucalyptus loxophleba*	910	Yes	No	No	Hollow at 6 m, 7 m, and 8 m.
HT13823	13/10/2016	-30.889	116.2417	*Eucalyptus loxophleba*	540	No	No	No	
HT13824	13/10/2016	-30.8876	116.2436	*Eucalyptus* sp.	1190	Yes	No	No	Large hollow in tree.
HT13825	13/10/2016	-30.8875	116.2436	*Eucalyptus* sp.	690	Yes	No	No	Hollow at 6 m.
HT13826	13/10/2016	-30.8896	116.2411	*Eucalyptus loxophleba*	880	No	No	No	
HT13827	13/10/2016	-30.8897	116.241	*Eucalyptus loxophleba*	750	No	No	No	
HT13828	13/10/2016	-30.8898	116.2408	*Eucalyptus loxophleba*	800	No	No	No	

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT13829	13/10/2016	-30.8902	116.2402	*Eucalyptus loxophleba*	640	Yes	No	No	Multiple small hollows in tree.
HT13830	13/10/2016	-30.8912	116.2395	*Eucalyptus loxophleba*	630	Yes	No	No	Too small unsuitable at present.
HT13831	13/10/2016	-30.8913	116.2397	*Eucalyptus loxophleba*	585	No	No	No	
HT13832	13/10/2016	-30.8916	116.2399	*Eucalyptus loxophleba*	510	No	No	No	
HT13833	13/10/2016	-30.9036	116.2366	*Eucalyptus* sp.	800	No	No	No	
HT13834	13/10/2016	-30.9084	116.2369	*Eucalyptus loxophleba*	640	No	No	No	
HT13835	13/10/2016	-30.9081	116.2368	*Eucalyptus loxophleba*	780	No	No	No	
HT13836	13/10/2016	-30.908	116.237	*Eucalyptus* sp.	600	No	No	No	
HT13837	13/10/2016	-30.9081	116.2371	*Eucalyptus wandoo*	400	No	No	No	
HT13838	13/10/2016	-30.9081	116.2371	*Eucalyptus loxophleba*	520	Yes	Yes	No	Hollow at 10 m. Good hollow but has Galahs present.
HT13839	13/10/2016	-30.9081	116.2372	*Eucalyptus wandoo*	355	No	No	No	
HT13840	13/10/2016	-30.9081	116.2372	*Eucalyptus wandoo*	550	No	No	No	
HT13841	13/10/2016	-30.9081	116.2372	*Eucalyptus wandoo*	630	No	No	No	
HT13842	13/10/2016	-30.9081	116.2375	*Eucalyptus loxophleba*	695	No	No	No	
HT13843	13/10/2016	-30.9081	116.2376	*Eucalyptus wandoo*	560	No	No	No	
HT13844	13/10/2016	-30.908	116.2376	*Eucalyptus loxophleba*	530	No	No	No	
HT13845	13/10/2016	-30.908	116.2378	*Eucalyptus wandoo*	585	No	No	No	
HT13846	13/10/2016	-30.908	116.238	*Eucalyptus wandoo*	340	No	No	No	
HT13847	13/10/2016	-30.908	116.2381	*Eucalyptus wandoo*	705	No	No	No	
HT13848	13/10/2016	-30.9079	116.2383	*Eucalyptus loxophleba*	1110	Yes	No	No	Small hollows present in tree.
HT13849	13/10/2016	-30.908	116.2383	*Eucalyptus loxophleba*	845	No	No	No	
HT13850	13/10/2016	-30.9074	116.2365	*Eucalyptus loxophleba*	1118	No	No	No	
HT13851	13/10/2016	-30.9163	116.2367	*Eucalyptus wandoo*	750	No	No	No	
HT13852	13/10/2016	-30.9166	116.2366	*Eucalyptus wandoo*	700	Yes	No	No	Large hollow present in tree. Galah in hollow.
HT13853	13/10/2016	-30.9277	116.2352	*Eucalyptus wandoo*	405	No	No	No	
HT13854	13/10/2016	-30.9277	116.2352	*Eucalyptus wandoo*	495	No	No	No	
HT13855	13/10/2016	-30.9277	116.2351	*Eucalyptus loxophleba*	660	Yes	No	No	Hollow at 8 m. Galah in hollow.
HT13856	13/10/2016	-30.9275	116.2352	*Eucalyptus* sp.	550	Yes	No	No	Hollows at 8 m and 14 m.
HT13857	1/11/2016	-31.0231	116.2106	*Eucalyptus wandoo*	890	No	No	No	
HT13858	1/11/2016	-31.0232	116.2104	*Eucalyptus wandoo*	430	No	No	No	
HT13859	1/11/2016	-31.0229	116.21	*Eucalyptus wandoo*	780	Yes	Yes	No	Hollow at 8 m and 10 m. Good hollow but shows no signs of use.

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT13860	1/11/2016	-31.0229	116.2101	*Eucalyptus wandoo*	525	Yes	Yes	No	Hollow at 6 m. Good hollow but shows no signs of use.
HT13861	1/11/2016	-31.0229	116.2097	*Eucalyptus wandoo*	570	No	No	No	
HT13862	1/11/2016	-31.0229	116.2098	*Eucalyptus wandoo*	340	No	No	No	
HT13863	1/11/2016	-31.0229	116.2098	*Eucalyptus wandoo*	390	No	No	No	
HT13864	1/11/2016	-31.0229	116.2098	*Eucalyptus wandoo*	415	No	No	No	
HT13865	1/11/2016	-31.023	116.2097	*Eucalyptus wandoo*	650	No	No	No	
HT13866	1/11/2016	-31.023	116.2097	*Eucalyptus wandoo*	390	No	No	No	
HT13867	1/11/2016	-31.0231	116.2097	*Eucalyptus wandoo*	350	Yes	Yes	No	Good hollow but shows no signs of use.
HT13868	1/11/2016	-31.023	116.2097	*Eucalyptus wandoo*	460	No	No	No	
HT13869	1/11/2016	-31.023	116.2095	*Eucalyptus wandoo*	610	No	No	No	
HT13870	1/11/2016	-31.0231	116.2095	*Eucalyptus wandoo*	515	No	No	No	
HT13871	1/11/2016	-31.0235	116.2101	*Eucalyptus wandoo*	655	No	No	No	
HT13872	1/11/2016	-31.0235	116.2102	*Eucalyptus wandoo*	550	No	No	No	
HT13873	1/11/2016	-31.0234	116.2103	*Eucalyptus wandoo*	455	No	No	No	
HT13874	1/11/2016	-31.0234	116.2102	*Eucalyptus wandoo*	745	No	No	No	
HT13875	1/11/2016	-31.0235	116.2104	*Eucalyptus wandoo*	760	No	No	No	
HT13876	1/11/2016	-31.0236	116.2103	*Eucalyptus wandoo*	560	No	No	No	
HT13877	1/11/2016	-31.0236	116.2103	*Eucalyptus wandoo*	560	No	No	No	
HT13878	1/11/2016	-31.0237	116.2104	*Eucalyptus wandoo*	365	No	No	No	
HT13879	1/11/2016	-31.0237	116.2104	*Eucalyptus wandoo*	460	No	No	No	
HT13880	1/11/2016	-31.0237	116.2106	*Eucalyptus wandoo*	520	Yes	Yes	No	Hollow at 7 m and 10 m. Good hollow but shows no signs of use.
HT13881	1/11/2016	-31.0235	116.2106	*Eucalyptus wandoo*	625	No	No	No	
HT13882	1/11/2016	-31.0236	116.2107	*Eucalyptus wandoo*	500	No	No	No	
HT13883	1/11/2016	-31.0236	116.2108	*Eucalyptus* sp.	460	Yes	No	No	Large hollow present in tree.
HT13900	1/11/2016	-31.2201	116.1776	*Eucalyptus marginata*	725	No	No	No	
HT13901	1/11/2016	-31.22	116.1776	*Eucalyptus marginata*	1030	No	No	No	
HT13902	1/11/2016	-31.22	116.1778	*Corymbia calophylla*	790	No	No	No	
HT13903	1/11/2016	-31.2197	116.1778	*Eucalyptus wandoo*	580	No	No	No	
HT13904	1/11/2016	-31.2197	116.1778	*Eucalyptus wandoo*	650	Yes	No	No	Hollow at 9 m.
HT13905	1/11/2016	-31.2196	116.1776	*Corymbia calophylla*	790	Yes	Yes	Yes	Hollow at 9 m. Chewed hollow.
HT13907	1/11/2016	-31.2192	116.1777	*Eucalyptus marginata*	880	Yes	No	No	Hollow in tree.
HT13908	1/11/2016	-31.219	116.1776	*Corymbia calophylla*	800	No	No	No	6 Carnaby's Black Cockatoo roosting in tree.

Name	Date	Latitude	Longitude	Tree species	DBH (mm)	Hollows present	Suitable for Carnaby's	Evidence of use by Carnaby's	Comments
HT13909	1/11/2016	-31.219	116.1776	*Eucalyptus marginata*	530	No	No	No	
HT13910	1/11/2016	-31.2192	116.1775	*Corymbia calophylla*	530	No	No	No	
HT13911	1/11/2016	-31.2193	116.1775	*Eucalyptus marginata*	700	No	No	No	
HT13912	1/11/2016	-31.2197	116.1775	*Eucalyptus marginata*	620	No	No	No	
HT13913	1/11/2016	-31.2197	116.1775	*Corymbia calophylla*	525	No	No	No	
HT13914	1/11/2016	-31.2198	116.1774	*Eucalyptus marginata*	600	No	No	No	
HT13915	1/11/2016	-31.2117	116.1763	*Corymbia calophylla*	570	No	No	No	16 Carnaby's Black Cockatoo feeding in tree.
HT13916	1/11/2016	-31.2118	116.1761	*Eucalyptus wandoo*	540	No	No	No	
HT13917	1/11/2016	-31.212	116.1761	*Eucalyptus wandoo*	460	No	No	No	
HT13918	1/11/2016	-31.2122	116.1763	*Eucalyptus wandoo*	390	No	No	No	
HT13919	1/11/2016	-31.2122	116.1763	*Eucalyptus wandoo*	340	No	No	No	
HT13920	1/11/2016	-31.2124	116.1764	*Eucalyptus wandoo*	470	No	No	No	
HT13921	1/11/2016	-31.2125	116.1764	*Eucalyptus wandoo*	460	No	No	No	
HT13922	1/11/2016	-31.2125	116.1766	*Eucalyptus wandoo*	450	No	No	No	
HT13923	1/11/2016	-31.2126	116.1765	*Eucalyptus wandoo*	395	No	No	No	
HT13924	1/11/2016	-31.2127	116.1766	*Eucalyptus wandoo*	660	No	No	No	
HT13925	1/11/2016	-31.2127	116.1762	*Corymbia calophylla*	845	No	No	No	
HT13926	1/11/2016	-31.2132	116.1765	*Corymbia calophylla*	636	No	No	No	
HT13927	1/11/2016	-31.2138	116.1763	*Corymbia calophylla*	710	No	No	No	
HT13928	1/11/2016	-31.2138	116.1765	*Corymbia calophylla*	570	No	No	No	
HT13929	1/11/2016	-31.2138	116.1765	*Corymbia calophylla*	565	No	No	No	
HT13930	1/11/2016	-31.2094	116.1774	*Eucalyptus wandoo*	415	No	No	No	
HT13933	1/11/2016	-31.2049	116.176	*Eucalyptus wandoo*	390	No	No	No	
HT13934	1/11/2016	-31.1932	116.1768	*Eucalyptus wandoo*	955	No	No	No	
HT13935	1/11/2016	-31.1931	116.1767	*Corymbia calophylla*	610	No	No	No	
HT13936	1/11/2016	-31.1926	116.1765	*Eucalyptus* sp.	630	No	No	No	
HT13937	1/11/2016	-31.1923	116.1765	*Corymbia calophylla*	990	Yes	No	No	Hollow at 10 m.
HT13938	1/11/2016	-31.192	116.1767	*Eucalyptus* sp.	730	Yes	No	No	Hollow at 10 m.
HT13940	1/11/2016	-31.1914	116.1767	*Eucalyptus* sp.	1110	No	No	No	
HT13941	1/11/2016	-31.1914	116.1771	*Eucalyptus wandoo*	1000	Yes	No	No	Small hollows present in tree.
HT13942	1/11/2016	-31.1877	116.1771	*Eucalyptus wandoo*	1000	No	No	No	
HT13975	6/11/2016	-31.1844	116.1762	*Corymbia calophylla*	500	Yes	Yes	No	Marri with two hollows showing no signs of use.
HT13978	6/11/2016	-31.0747	116.2045	*Eucalyptus wandoo*	300	Yes	Yes	Yes	Hollow with chewed entrance.