TECHNICAL REPORT

1

Biodiversity development assessment report

PART 3 OF 3

Appendix I to M

NARROMINE TO NARRABRI ENVIRONMENTAL IMPACT STATEMENT

The Australian Government is delivering Inland Rail through the Australian Rail Track Corporation (ARTC), in partnership with the private sector.

TECHNICAL REPORT

1

Biodiversity development assessment report

Appendix I Threatened species information, species polygon maps and justification for species polygons

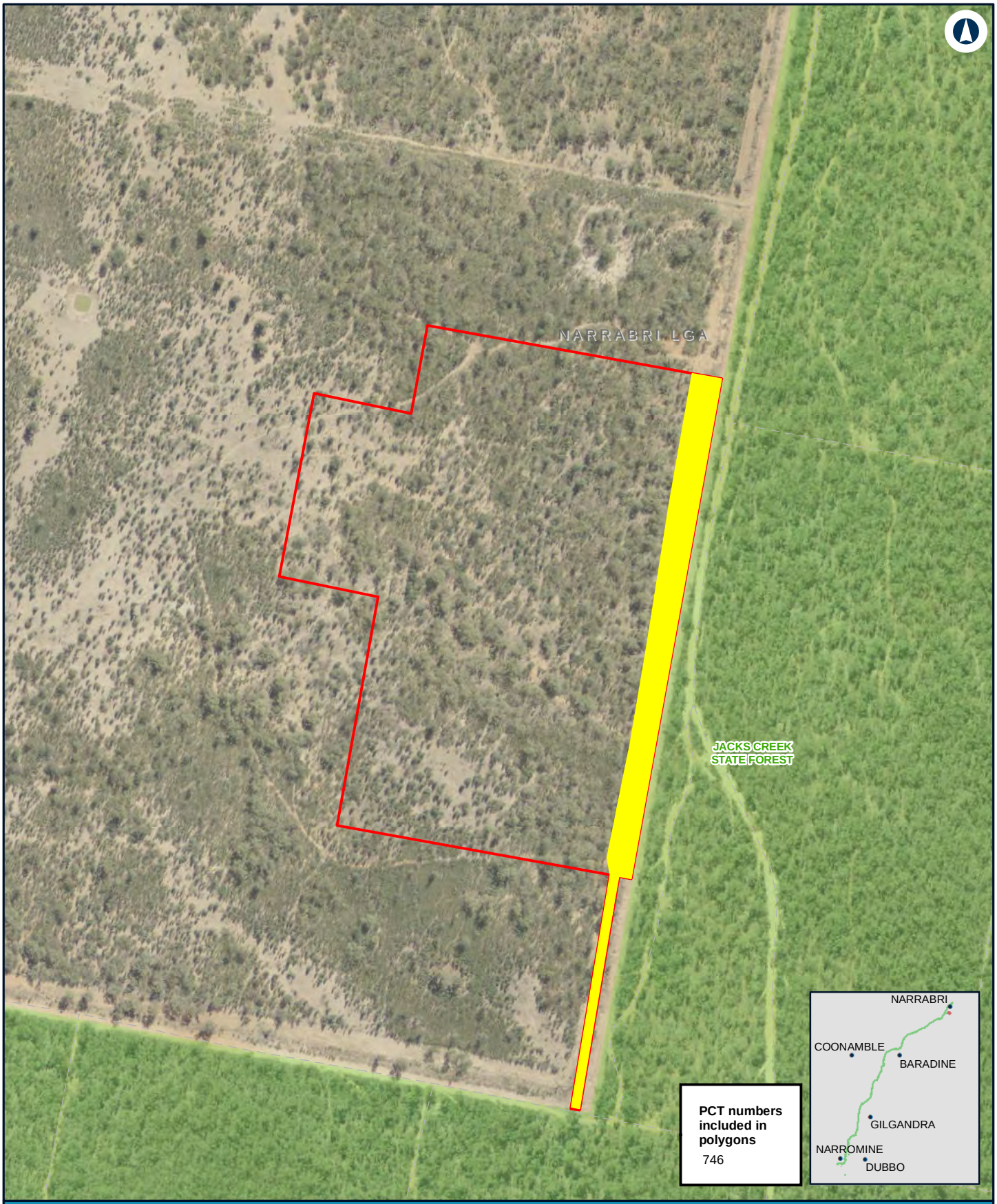
NARROMINE TO NARRABRI ENVIRONMENTAL IMPACT STATEMENT

Table I1 *Pterostylis cobarensis* (Greenhood Orchid)

Pterostylis cobarensis (Greenhood Orchid)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	193.04 hectares
Breeding requirements	• Flowers from September to November. Vegetative reproduction is not common in this group of Greenhoods, but some species may form more than one dropper annually. Plants are deciduous and die back to the large, underground tubers after seed release (Harden, 1993 in Threatened Species Scientific Committee, 2013). New rosettes are produced following soaking autumn and winter rains (OEH, 2019b). • Pollinated by the males of small gnats which are attracted to the flower by some pseudosexual perfume (OEH, 2019b).
Habitat requirements	• Habitats are eucalypt woodlands, open mallee or Callitris shrublands on low stony ridges and slopes in skeletal sandy-loam soils (OEH, 2019b). • Associated species include Eucalyptus morrisii, E. viridis, E. intertexta, E. vicina, Callitris glaucophylla, Geijera parviflora, Casuarina cristata, Acacia doratoxylon, Senna spp. and Eremophila spp. (OEH, 2019b). • The group includes some of the most drought tolerant orchids in Australia. Survival strategies include the large tuberoids which store moisture, the overlapping rosette leaves which trap moisture and direct it to the root zone, and the tendency to grow in sites of litter accumulation and near rocks where run-off is concentrated (OEH, 2019b). • Pterostylis cobarensis occurs as frequent to abundant plants sometimes occasional in usually very localised populations (OEH, 2019b).
Habitat in the study area	Habitat within the study area lies primarily within the Pilliga State Forest. This is due to the shrubby, low slopes on sandy soils of which this species distribution is characteristic. PCTs which reflect this species habitat requirements include: • 394- Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions • 398- Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion • These vegetation communities are located within the study area throughout the Pilliga State Forest. Previous observations have been made within the wider locality of the study area.

***Pterostylis cobarensis* (Greenhood Orchid)**	
Known populations	Recorded from Bourke, Nyngan, Cobar, Nymagee, Warren, Gilgandra, Narrabri, Coonabarabran districts. Recorded from a number of reserves and state forests including Mutawintji, Gundabooka, Culgoa, Warrumbungles National Parks, Quanda, Yathong Nature Reserves, Mt Grenfell Historic Site and Bimbilwindi and Pilliga East State Forests. There are also records from the Darling Downs district of Queensland. (OEH, 2019b)
Survey requirements	Survey months: October Use flowers to locate and identify. Rosette growth and flowering dependent on soaking rains in autumn and winter. Plants are deciduous and die back to the large, underground tubers after seed release or in dry weather, and become undetectable (OEH, 2019b).
Survey effort	Flora surveys were conducted in the following months in the study area: • September 2018: 5 days, two ecologists– rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, 4 ecologists– flora plot surveys and threatened flora searches • March 2019: 4 ecologists over 10 days- flora plot surveys and threatened flora searches • September 2019: 3 ecologists over 10 days- targeted flora searches and flora plot surveys. Surveys included targeted searches for the species, as well as opportunistic observations while undertaking other survey types.
Survey results	Four individual plants were recorded at one location in Pilliga East forest. These individuals were recorded rising up out of an ephemeral creek in PCT398 (Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion)
Species polygon guidance and justification	Species polygons have been made based on survey guidelines (OEH, 2017). The standard 30 metre buffer for threatened plants has been increased to 150 metres based on individual species advice and consultation with BCD accountable officers. In addition, the species has been assumed to be present in associated PCTs observed in the proposal site within Segment 10 (Pilliga) and Segment 11 (Pilliga to Narrabri), where drought conditions have impacted species detectability.

***Pterostylis cobarensis* (Greenhood Orchid)**	
Relevant PCTs	• 88 - Pilliga Box - White Cypress Pine- Buloke shrubby woodland in the Brigalow Belt South Bioregion • 141 - Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions. Brigalow Belt South Bioregion • 148 - Dirty Gum - Buloke - White cypress pine - ironbark shrubby woodland of the deep sandy soils on the Liverpool Plains Region of the Brigalow Belt South Bioregion • 244 - Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt) • 255 - Mugga Ironbark - Buloke - Pilliga Box - White Cypress Pine shrubby woodland • 256 - Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion • 397 - Poplar Box- White Cypress Pine shrub grass tall woodland of th Pilliga - Warialda region, Brigalow Belt South Bioregion • 404 - Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga fore • 406 - White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests • 746 - Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion • 1384 - White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Relevant IBRA subregions	Pilliga – known Pilliga Outwash – known Bogan Macquarie - Known



NARROMINE TO NARRABRI Flora Species Polygons - Pterostylis cobariensis Segment 7 Borrow Pit D MAP 1 OF 5

0 0.085 0.17 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:6,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- *Pterostylis cobariensis* species polygon

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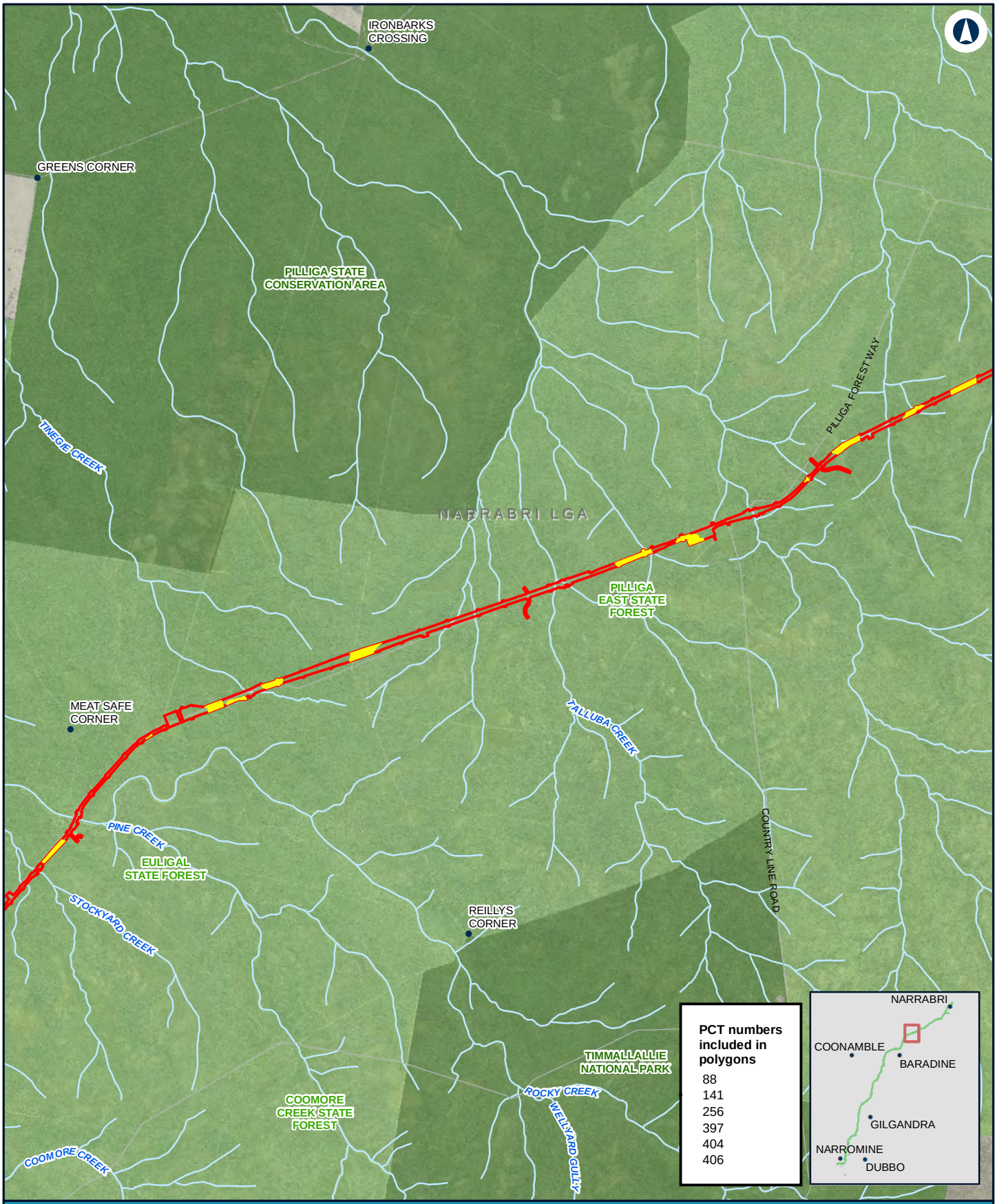

NARROMINE TO NARRABRI Flora Species Polygons - Pterostylis cobariensis Segment 10 Pilliga B MAP 2 OF 5

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS;

LEGEND

The proposal

Pterostylis cobariensis species polygon

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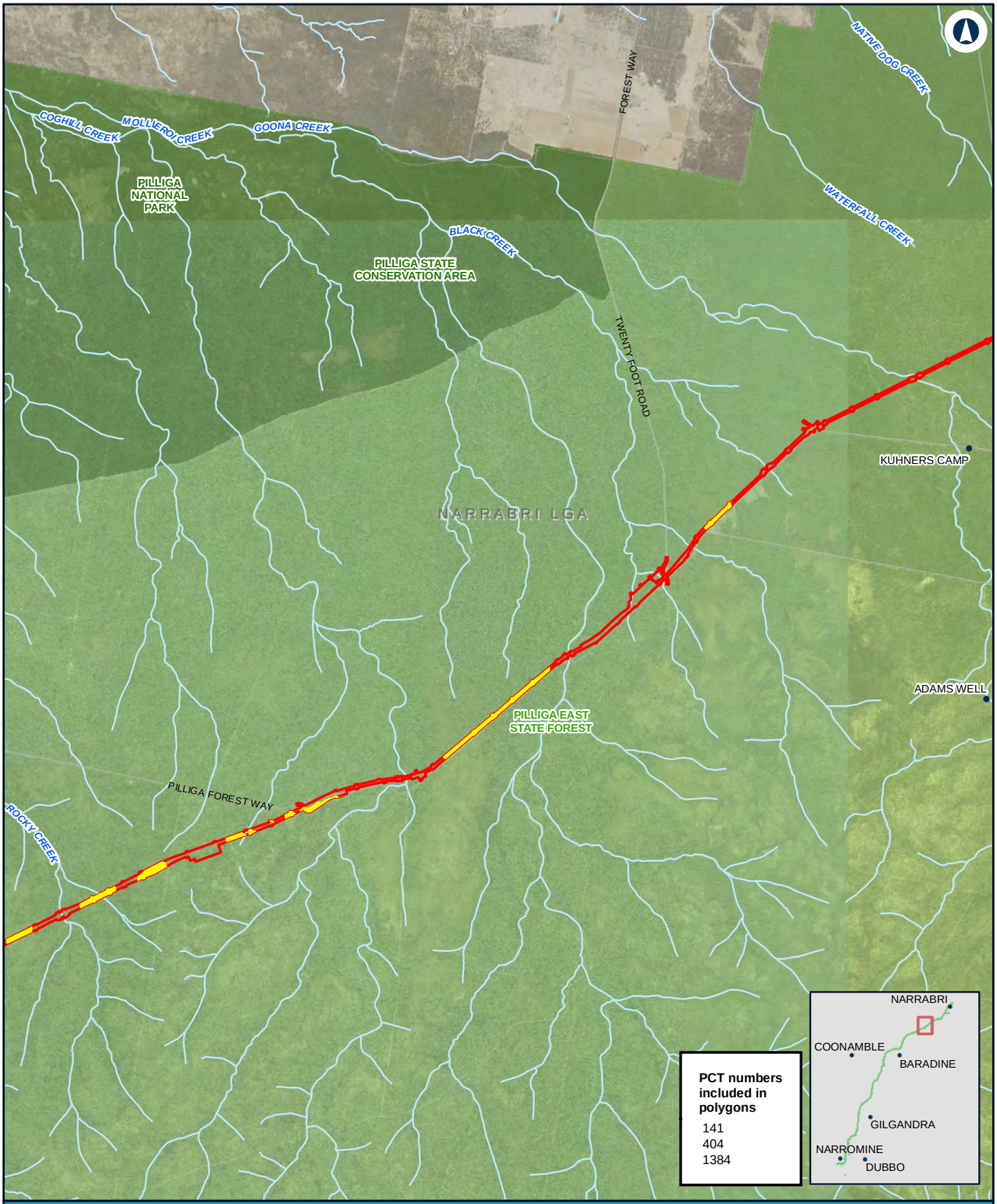

NARROMINE TO NARRABRI Flora Species Polygons - Pterostylis cobariensis Segment 10 Pilliga C MAP 3 OF 5

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS;

LEGEND

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- *Pterostylis cobariensis* species polygon

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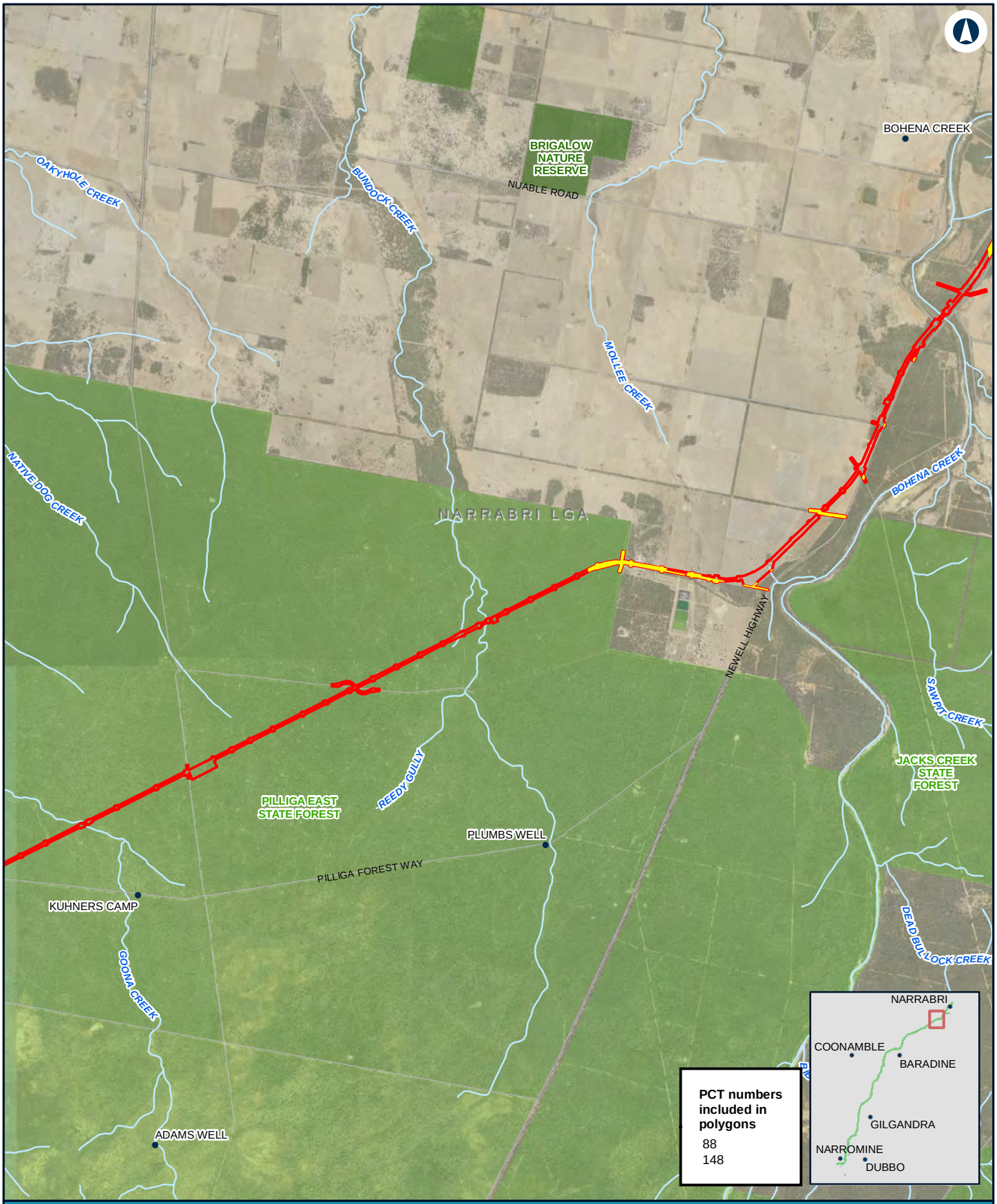

NARROMINE TO NARRABRI Flora Species Polygons - Pterostylis cobariensis Segment 10 Pilliga D MAP 4 OF 5

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- *Pterostylis cobariensis* species polygon

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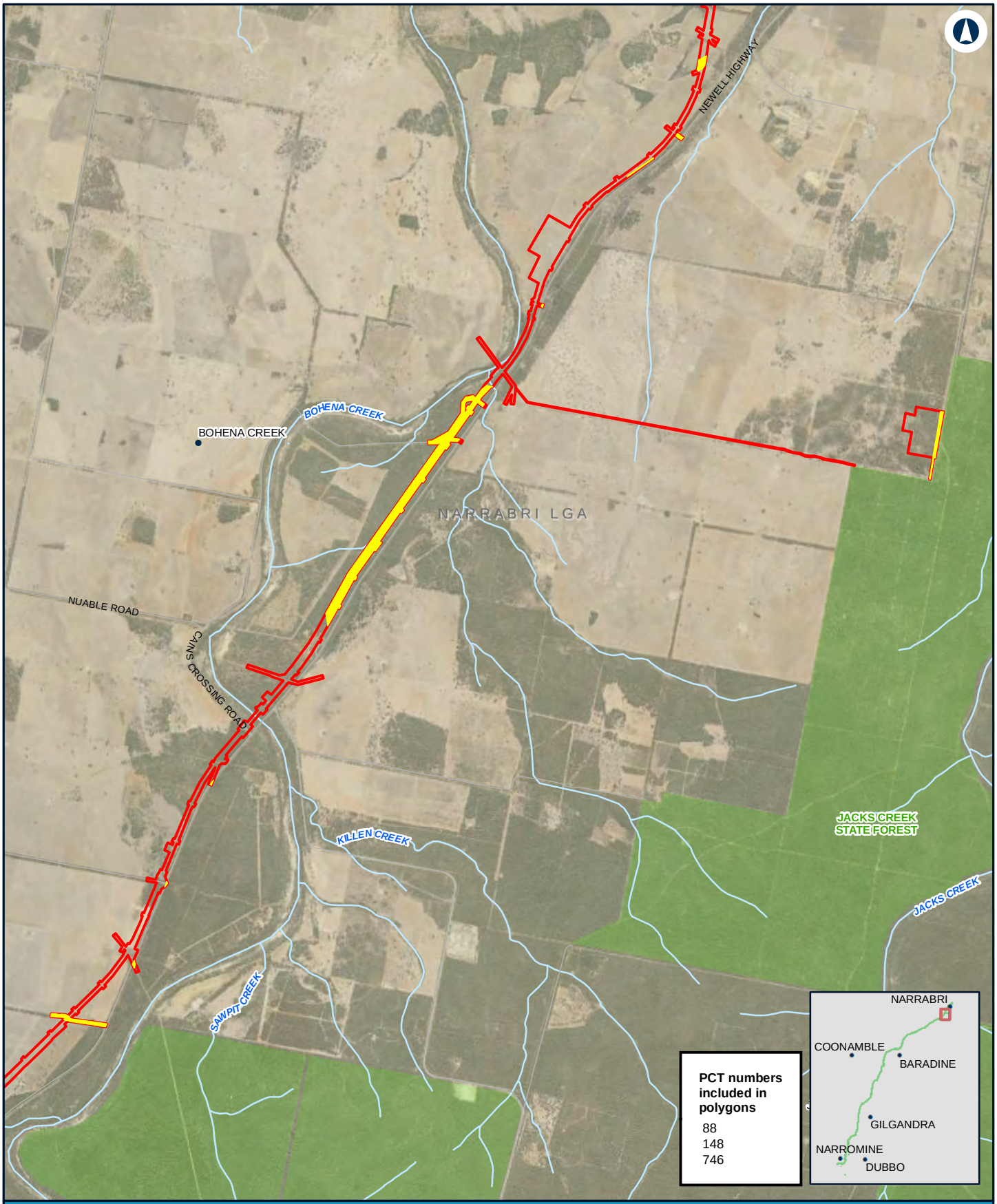

NARROMINE TO NARRABRI Flora Species Polygons - Pterostylis cobariensis Segment 11 Pilliga to Narrabri MAP 5 OF 5

0 0.9 1.8 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:65,000
Data Sources: Basemap layers: NSWSS;

LEGEND

The proposal

Pterostylis cobariensis species polygon

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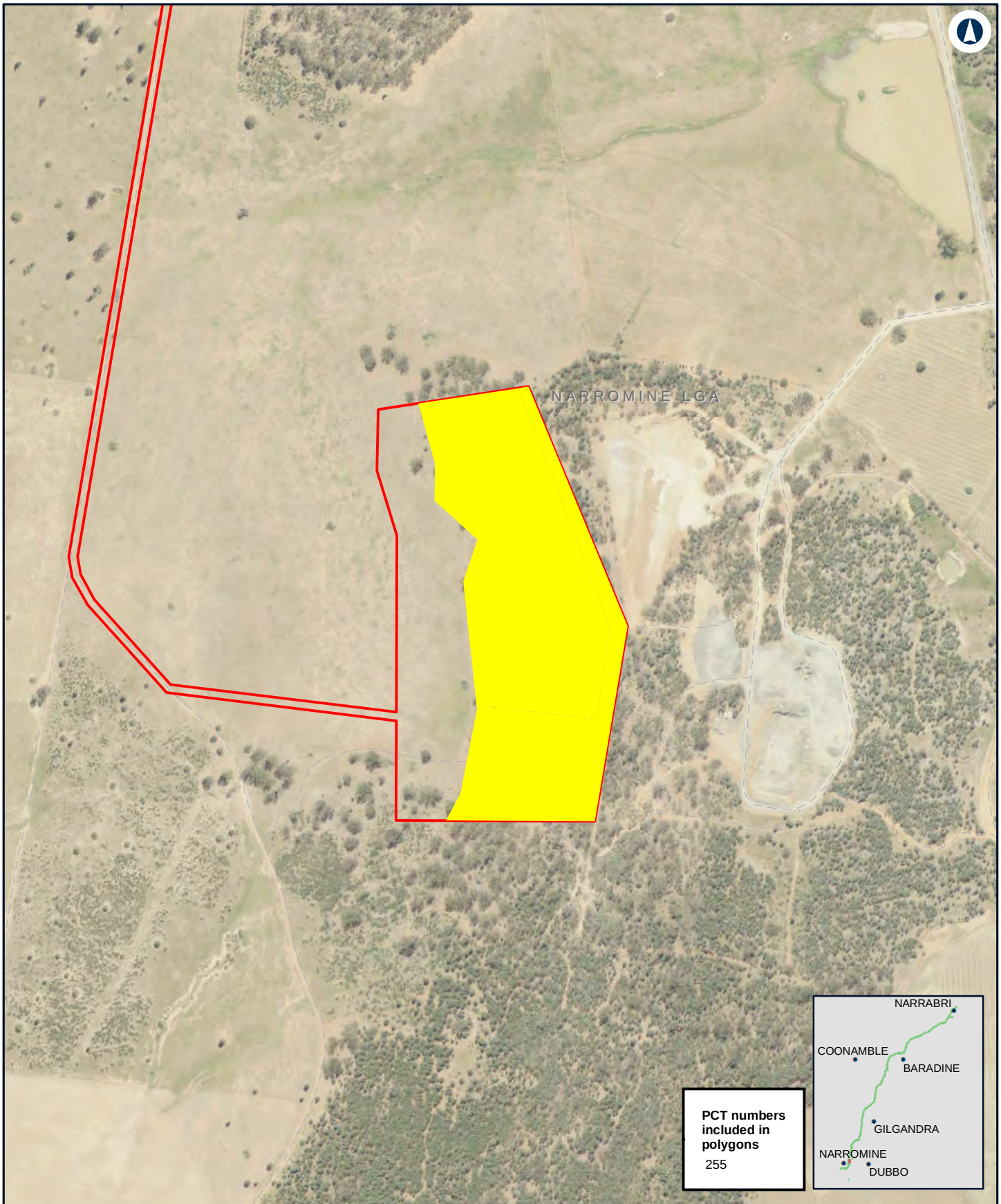
Table I2 *Diuris tricolor* (Pine Donkey Orchid)

Diuris tricolor (Pine Donkey Orchid)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	629.97 hectares
Breeding requirements	Usually flowers between early September to late October. The species is a tuberous, deciduous terrestrial orchid (OEH, 2019b).
Habitat requirements	• Will grow in disturbed areas/grassland • Associated species include Callitris glaucophylla, Eucalyptus populnea, Eucalyptus intertexta, Ironbark and Acacia shrubland. The understorey is often grassy with herbaceous plants such as Bulbine species. • The Pine Donkey Orchid grows in sclerophyll forest among grass, often with native Cypress Pine (Callitris spp.). It is found in sandy soils, either on flats or small rises. Also recorded from a red earth soil in a Bimble Box community in western NSW. (OEH, 2019b; Officer-Environment and Community, 2018)
Habitat in the study area	Species habitat lies primarily within the study area located within the Pilliga State Forest. Species habitat requirements are characteristic of the sandy soils and grassy woodlands located within the Pilliga State Forest and reflect previous records within the locality. Previous observations have been made within the locality primarily within the Pilliga State Forest.
Known populations	Sporadically distributed on the western slopes of NSW, extending from south of Narrandera all the way to the north of NSW. Localities in the south include Red Hill north of Narrandera, Coolamon, and several sites west of Wagga Wagga. Condobolin-Nymagee road, Wattamondara towards Cowra, Eugowra, Girilambone, Dubbo and Cooyal, in the Central West. Pilliga SCA, Pilliga National Park and Bibblewindi State Forest in the north and Muswellbrook in the east. (OEH, 2019b).
Survey requirements	Survey months: September and October (OEH, 2019b)

***Diuris tricolor* (Pine Donkey Orchid)**	
Survey effort	Flora surveys were conducted in the following months in the study area: • September 2018: 5 days, two ecologists– rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, 4 ecologists– flora plot surveys and threatened flora searches • March 2019: 4 ecologists over 10 days- flora plot surveys and threatened flora searches • September 2019: 3 ecologists over 10 days- targeted flora searches and flora plot surveys. Surveys included targeted searches for the species, as well as opportunistic observations while driving or undertaking other survey types.
Survey results	Species was not observed in any survey period. Dry conditions likely to have affected growth and detectability. Assumed to occur and suitable potential habitat occurs in the proposal site.
Species polygon guidance and justification	Species polygons have been made based on survey guidelines (OEH, 2017). The standard 30 metre buffer for threatened plants has been increased to 150 metres based on individual species advice and consultation with BCD accountable officers. In addition, the species has been assumed to be present in associated PCTs observed in the proposal site within Segment 7 (Borrow pit D), Segment 8 (alignment – Narromine to Curban), Segment 9 (Alignment – Curban to Pilliga), Segment 10 (Pilliga) and Segment 11 (Pilliga to Narrabri), where drought conditions have impacted species detectability
Relevant PCTs	• 88 - Pilliga Box - White Cypress Pine- Buloke shrubby woodland in the Brigalow Belt South Bioregion • 248 - Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW • 255 - Mugga Ironbark - Buloke - Pilliga Box - White Cypress Pine shrubby woodland • 397- Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion • 398 - Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion • 399 - Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Piliga - Goonoo sandstone forests, Brigalow Belt South Bioregion • 404 - Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga fores • 409 - Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion • 414 - White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion

***Diuris tricolor* (Pine Donkey Orchid)**	
	• 469 - White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion • 473 - Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion • 589 - White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion • 746 - Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion • 1384 - White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Relevant IBRA subregions	Pilliga – known Pilliga Outwash – known Northern Basalts – predicted Bogan Macquarie – known Inland Slopes - known



NARROMINE TO NARRABRI Flora Species Polygons - Pine Donkey Orchid - Segment 6 Borrow Pit C MAP 1 OF 9

0 0.085 0.17 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:6,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Pine Donkey Orchid *(Diuris tricolor)* species polygon

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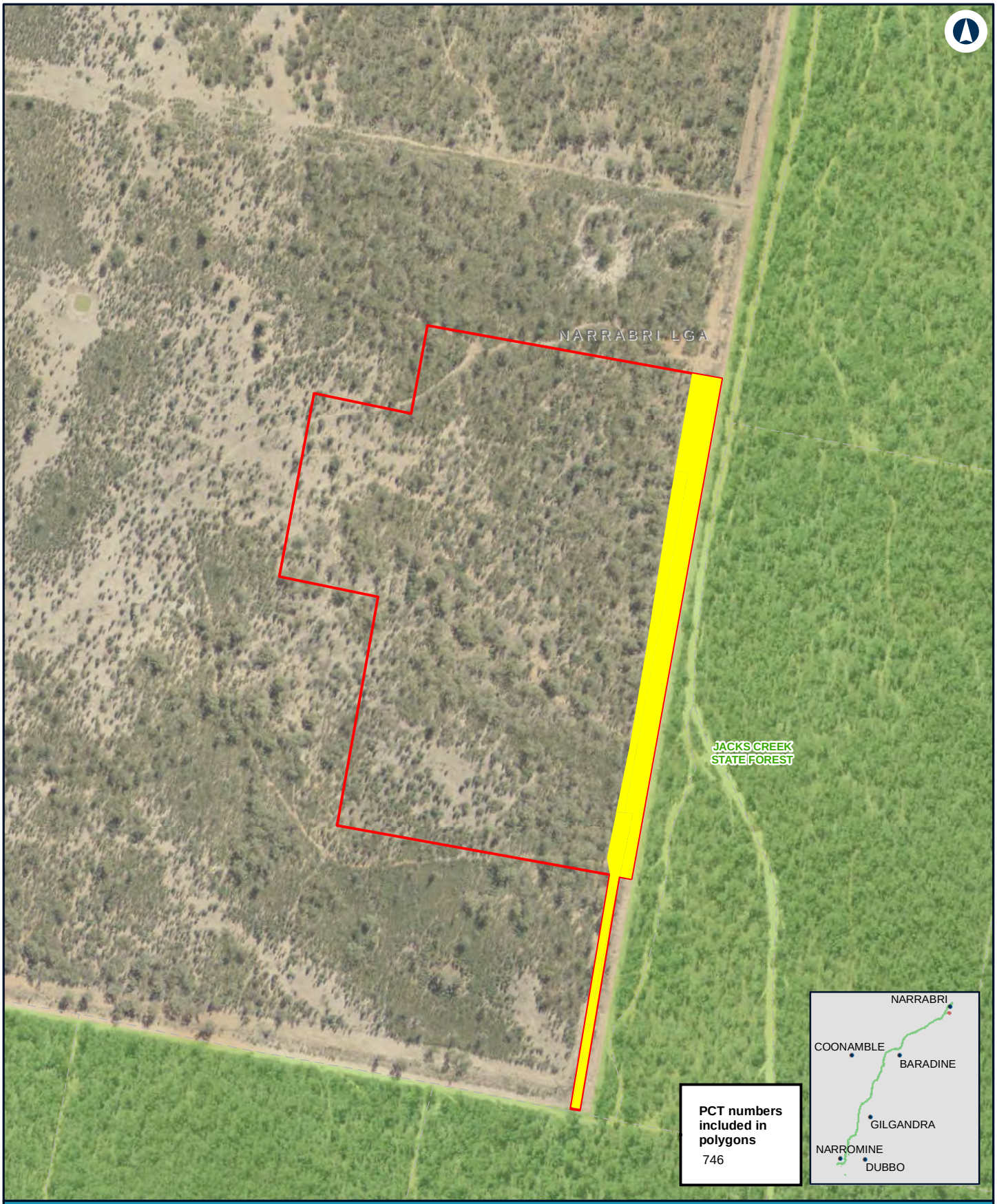

NARROMINE TO NARRABRI Flora Species Polygons - Pine Donkey Orchid - Segment 7 Borrow Pit D MAP 2 OF 9

0 0.085 0.17 Km

Coordinate System: GDA 1994 MGA Zone 55

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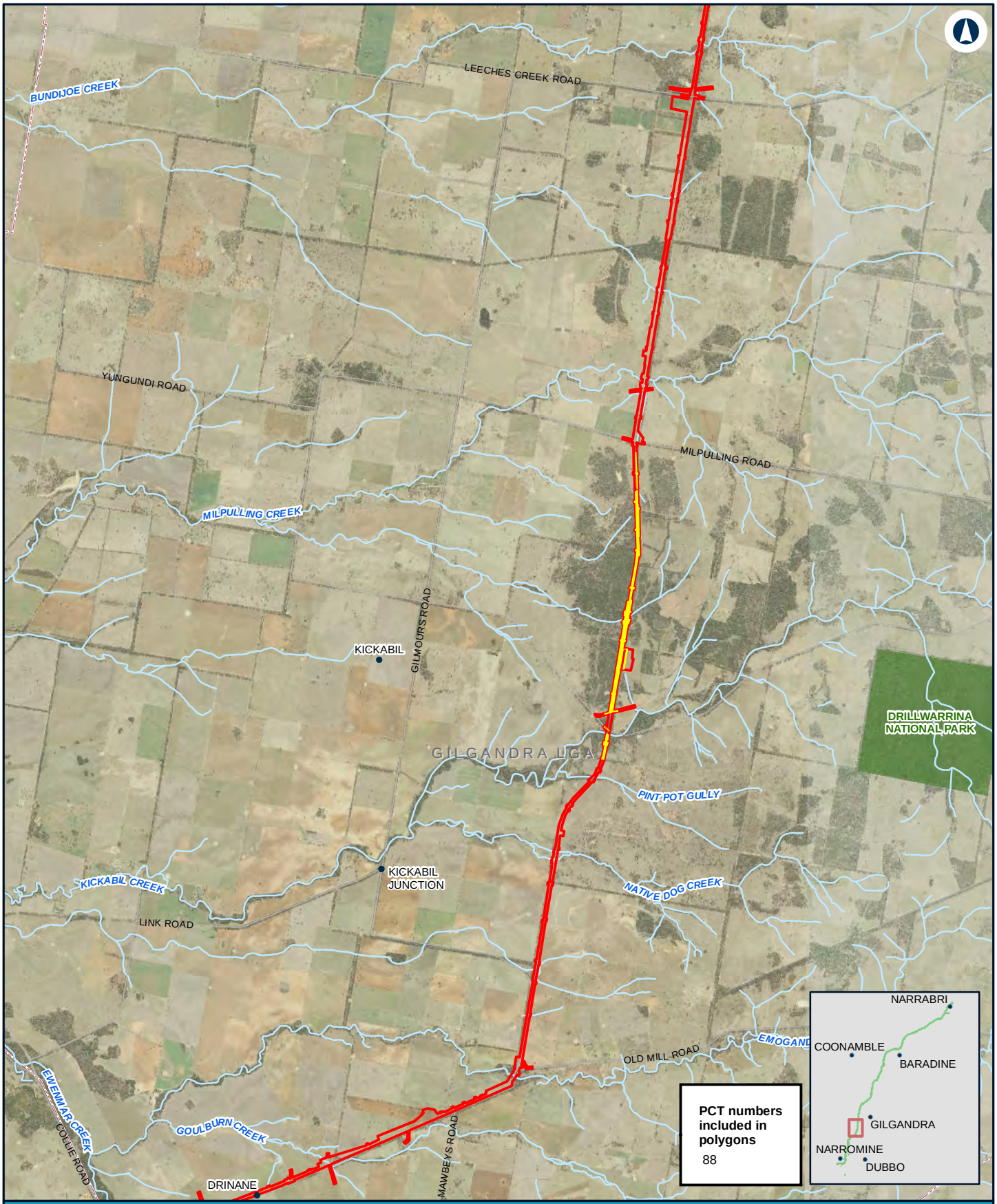

NARROMINE TO NARRABRI Flora Species Polygons - Pine Donkey Orchid - Segment 8 Narromine to Curban C MAP 3 OF 9

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

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LEGEND

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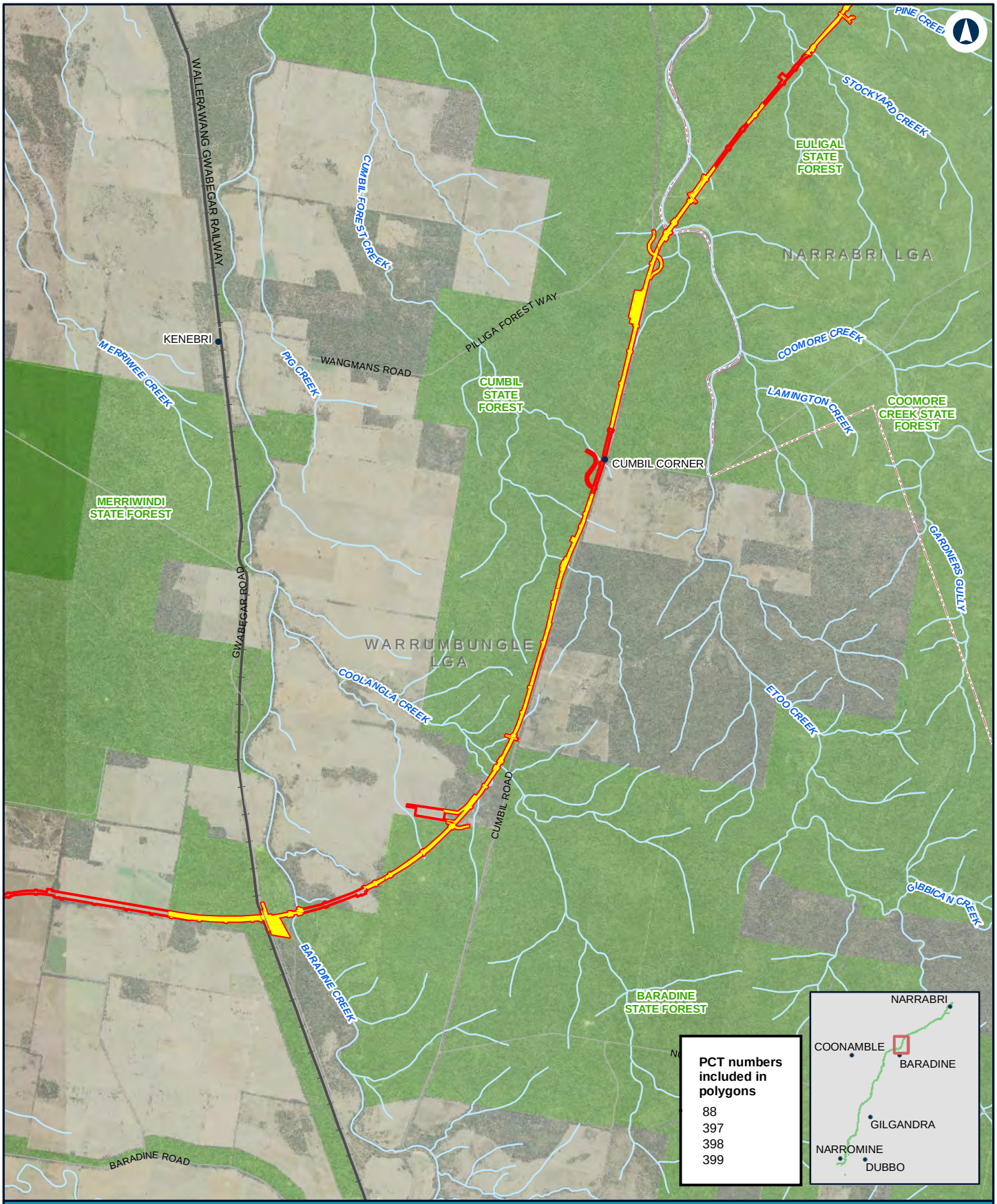

NARROMINE TO NARRABRI Flora Species Polygons - Pine Donkey Orchid - Segment 10 Pilliga A MAP 4 OF 9

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

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LEGEND

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- Pine Donkey Orchid *(Diuris tricolor)* species polygon

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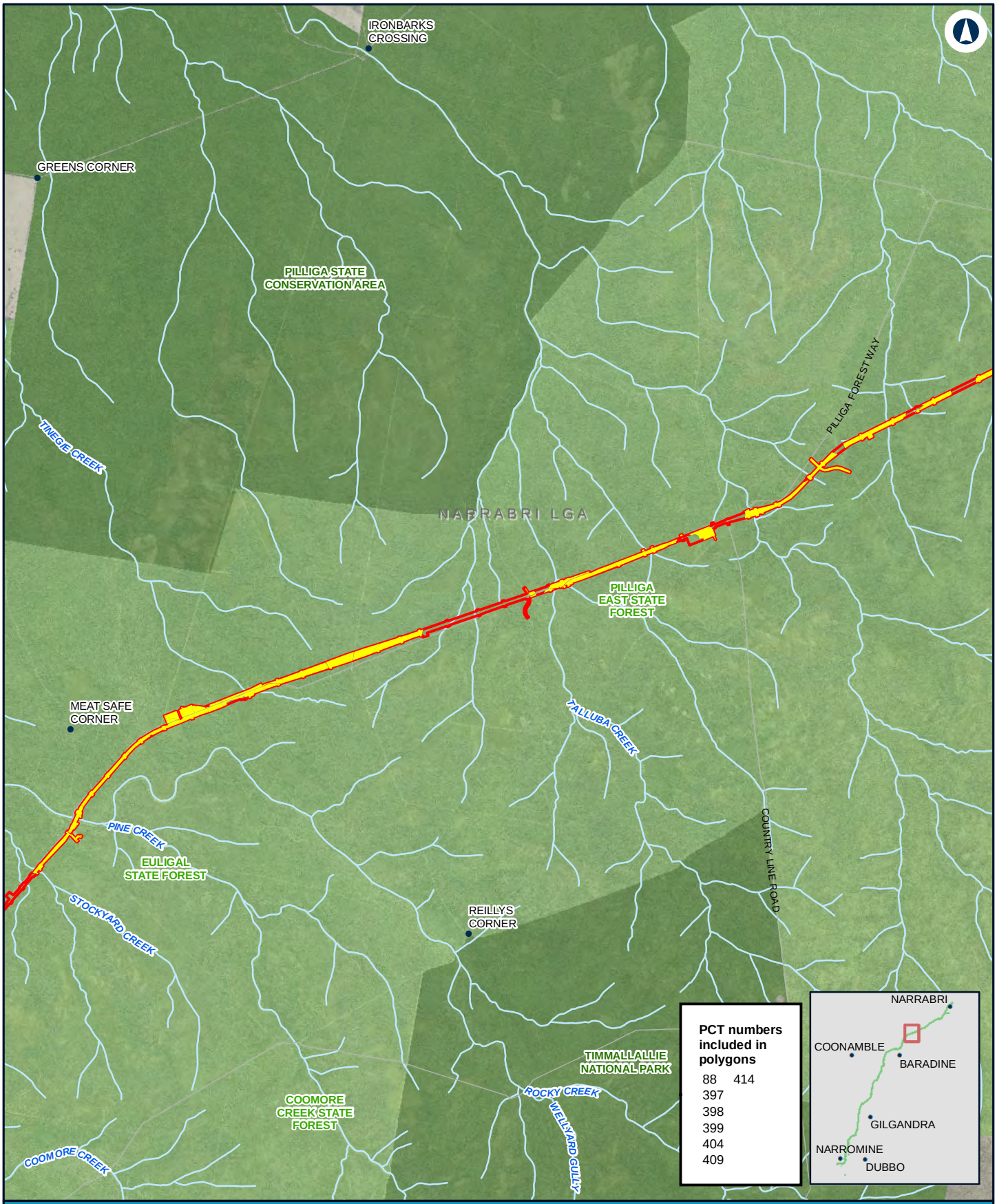

NARROMINE TO NARRABRI Flora Species Polygons - Pine Donkey Orchid - Segment 10 Pilliga B MAP 5 OF 9

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Pine Donkey Orchid *(Diuris tricolor)* species polygon

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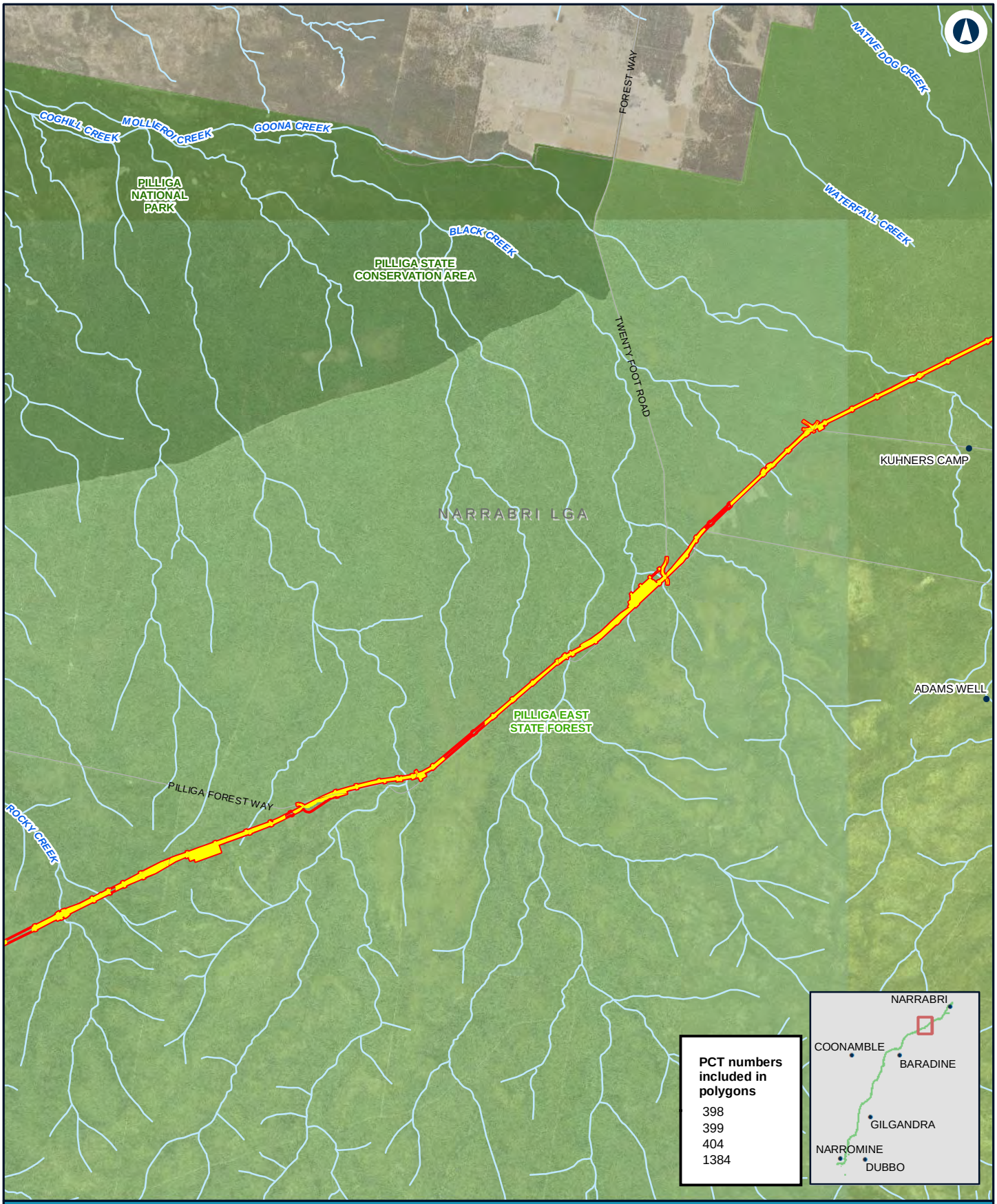

NARROMINE TO NARRABRI Flora Species Polygons - Pine Donkey Orchid - Segment 10 Pilliga C MAP 6 OF 9

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
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LEGEND

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- Pine Donkey Orchid *(Diuris tricolor)* species polygon

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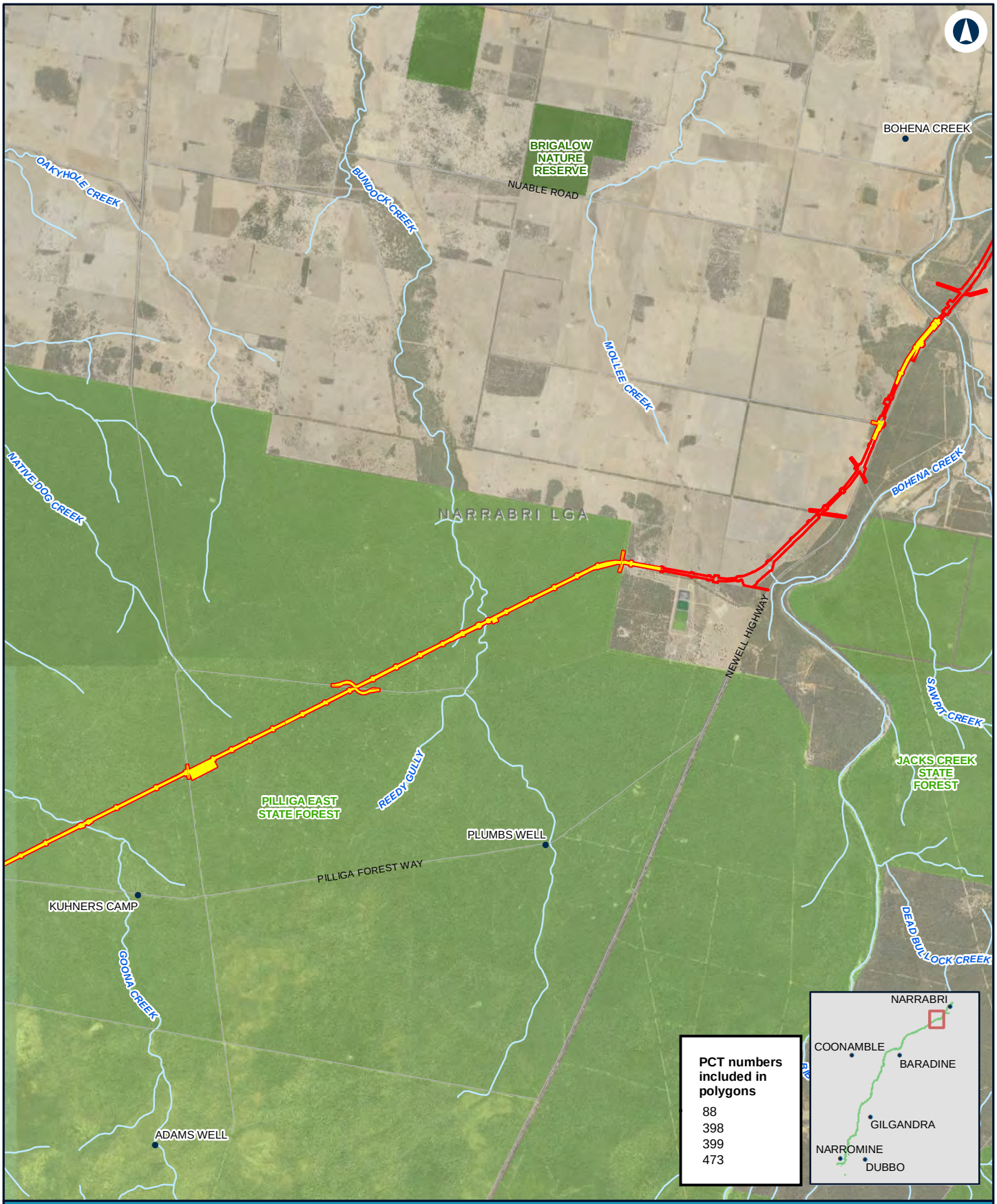

NARROMINE TO NARRABRI Flora Species Polygons - Pine Donkey Orchid - Segment 10 Pilliga D MAP 7 OF 9

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
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LEGEND

- The proposal
- Pine Donkey Orchid *(Diuris tricolor)* species polygon

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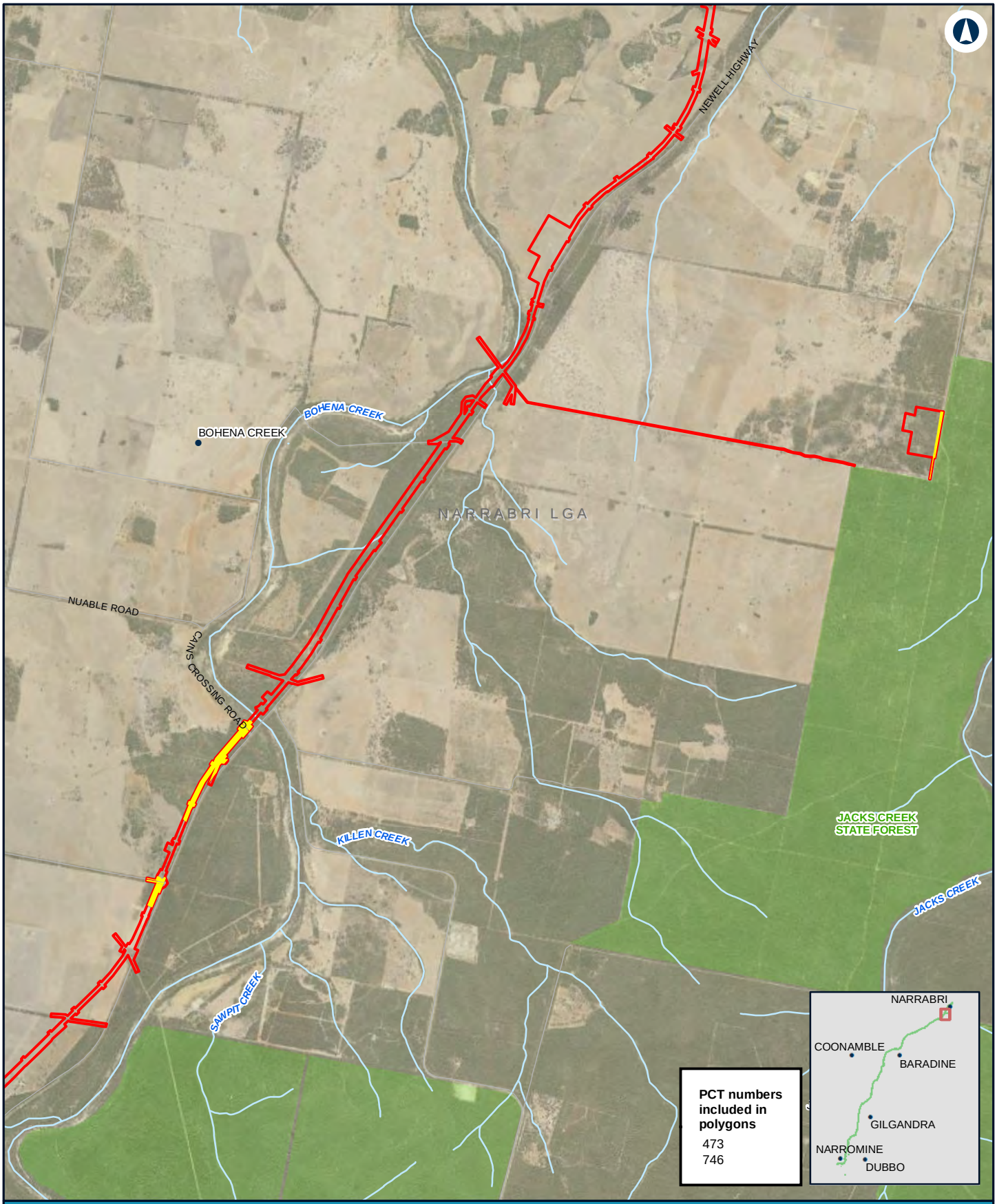

NARROMINE TO NARRABRI Flora Species Polygons - Pine Donkey Orchid - Segment 11 Pilliga to Narrabri MAP 8 OF 9

0 0.9 1.8 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
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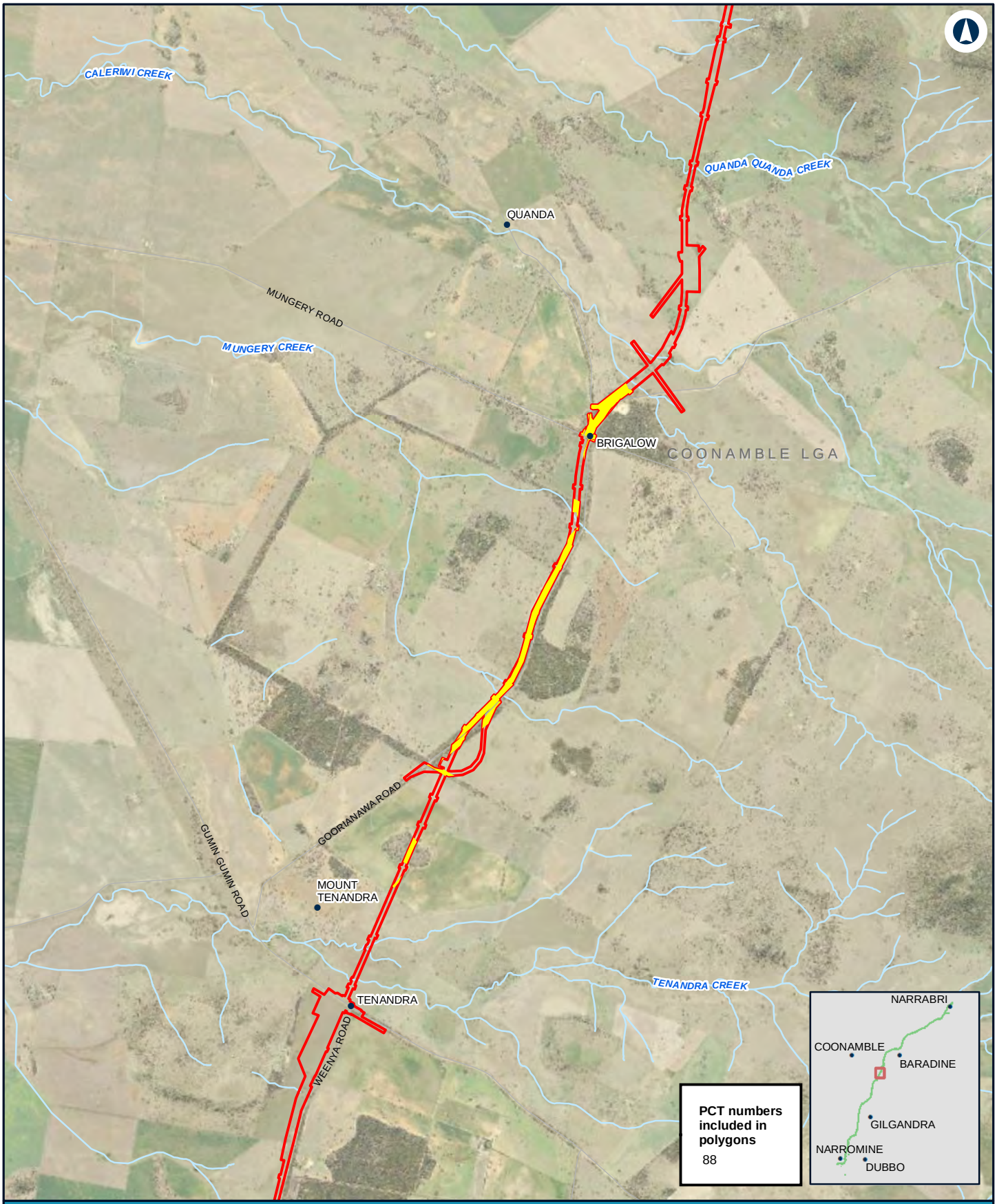

NARROMINE TO NARRABRI

Flora Species Polygons - Pine Donkey Orchid - Segment 9 Curban to Pilliga B

MAP 9 OF 9

0 0.85 1.7 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:60,000
Data Sources: Basemap layers: NSWSS;

LEGEND

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- Pine Donkey Orchid *(Diuris tricolor)* species polygon

INLAND RAIL ARTC

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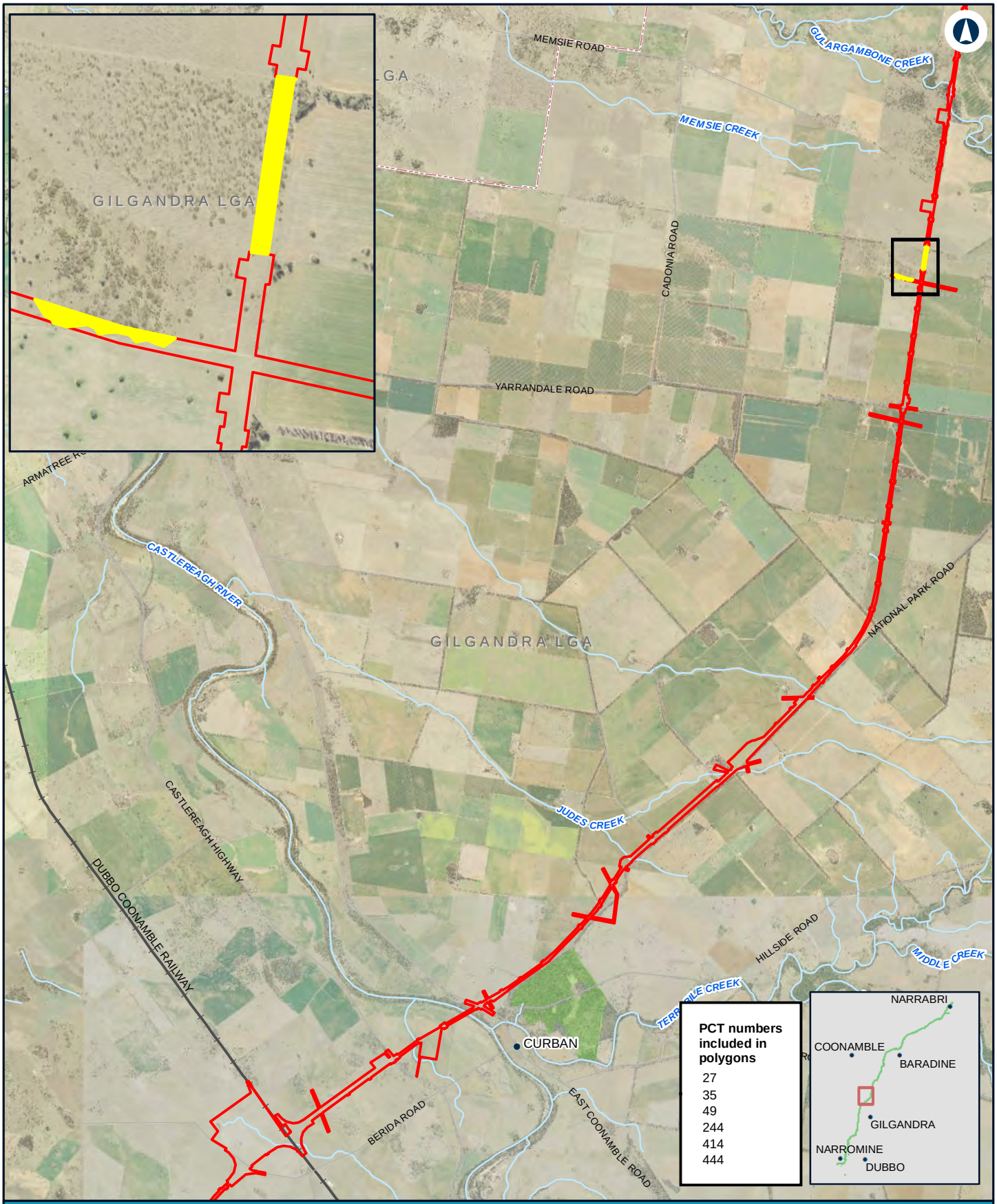
Table I3 *Swainsona murrayana* (Slender Darling Pea)

Swainsona murrayana (Slender Darling Pea)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Vulnerable
Species polygon area	43.58 hectares
Breeding requirements	• Plants produce winter-spring growth, flower in spring to early summer and then die back after flowering. They re-shoot readily and often carpet the landscape after good cool-season rains (OEH, 2019b). • One study on the Murray Valley Plain, in northern Victoria, found that the Slender Darling-pea was only pollinated by Trichocolletes maximus, a solitary, ground nesting bee. The bee may fare poorly during extended drought and the Slender Darling-pea may be susceptible to reproductive failure if this specialist pollinator declined (Morgan & Williams 2015). • Copious flowers and abundant quantities of seed can be produced under favourable conditions (NSW SC 2008b).
Habitat requirements	• The species has been collected from clay-based soils, ranging from grey, red and brown cracking clays to red-brown earths and loams (OEH, 2019b) • Grows in a variety of vegetation types including bladder saltbush, black box and grassland communities on level plains, floodplains and depressions and is often found with Maireana species. Plants have been found in remnant native grasslands or grassy woodlands that have been intermittently grazed or cultivated (OEH, 2019b). • The species may require some disturbance and has been known to occur in paddocks that have been moderately grazed or occasionally cultivated (OEH, 2019b)
Habitat in the study area	Species habitat lies primarily where the study area extends beyond the Pilliga State Forest including its outskirts. This species habitat is dependent on clay soils which are prevalent to the south of the study area. Grassy woodlands and derived grasslands are also located within this extent.
Known populations	Found throughout NSW, it has been recorded in the Jerilderie and Deniliquin areas of the southern riverine plain, the Hay plain as far north as Willandra National Park, near Broken Hill and in various localities between Dubbo and Moree. (OEH, 2019b). In NSW, Swainsona murrayana occurs in the central western slopes, the Western Division, and the Riverina area (DECC, 2005; CPBR, 2008 in Threatened Species Scientific Committee, 2008a)

***Swainsona murrayana* (Slender Darling Pea)**	
Survey requirements	Survey months: September
Survey effort	Flora surveys were conducted in the following months in the study area: • September 2018: 5 days, two ecologists– rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, 4 ecologists– flora plot surveys and threatened flora searches • March 2019: 4 ecologists over 10 days- flora plot surveys and threatened flora searches • September 2019: 3 ecologists over 10 days- targeted flora searches and flora plot surveys. Surveys included targeted searches for the species, as well as opportunistic observations while driving or undertaking other survey types.
Survey results	Species was not observed in any survey period. Dry conditions likely to have affected growth and detectability. Assumed to occur and suitable potential habitat occurs in the proposal site.
Species polygon guidance and justification	Species polygons have been made based on survey guidelines (OEH, 2017). The standard 30 metre buffer for threatened plants has been increased to 150 metres based on individual species advice and consultation with BCD accountable officers. In addition, the species has been assumed to be present in associated PCTs observed in the proposal site within Segment 7 (Borrow pit D), Segment 8 (Alignment – Narromine to Curban), Segment 9 (Alignment – Curban to Pilliga), Segment 10 (Pilliga) and Segment 11 (Pilliga to Narrabri), where drought conditions have impacted species detectability.
Relevant PCTs	PCTs which reflect this species habitat requirements include: • 27 - Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion • 35 - Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion • 49 - Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion • 56 - Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW • 168 - Derived Copperburr shrubland of the NSW northern inland alluvial floodplains • 244 - Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt) • 247 - Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion • 248 - Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW

***Swainsona murrayana* (Slender Darling Pea)**	
	• 414 - White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion • 444 - Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion. PCT 35 occurs to the north, whilst the remaining vegetation communities occur to the south of the study area. Previous observations have been made within the locality of the study area, with a small number being located within the Pilliga State Forest. Whilst *Maireana* spp. is the only flora species characteristic of these PCTs within the study area, *Swainsona murrayana* may occur within these habitats due to the soil and floodplain characteristics of each PCT.
Relevant IBRA subregions	Northern Basalts – known Liverpool Plains – known Pilliga – known Pilliga Outwash – predicted Castlereagh Barwon – known Bogan Macquarie – predicted



NARROMINE TO NARRABRI Flora Species Polygons -Slender Darling Pea - Segment 9 Curban to Pilliga A MAP 1 OF 6

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 13/08/2020 Paper: A4
Author: JacobsGHD Scale: 1:12,500
Data Sources: Basemap layers: NSWSS;

LEGEND

The proposal

Slender Darling Pea *(Swainsona murrayana)* species polygon

INLAND RAIL ARTC

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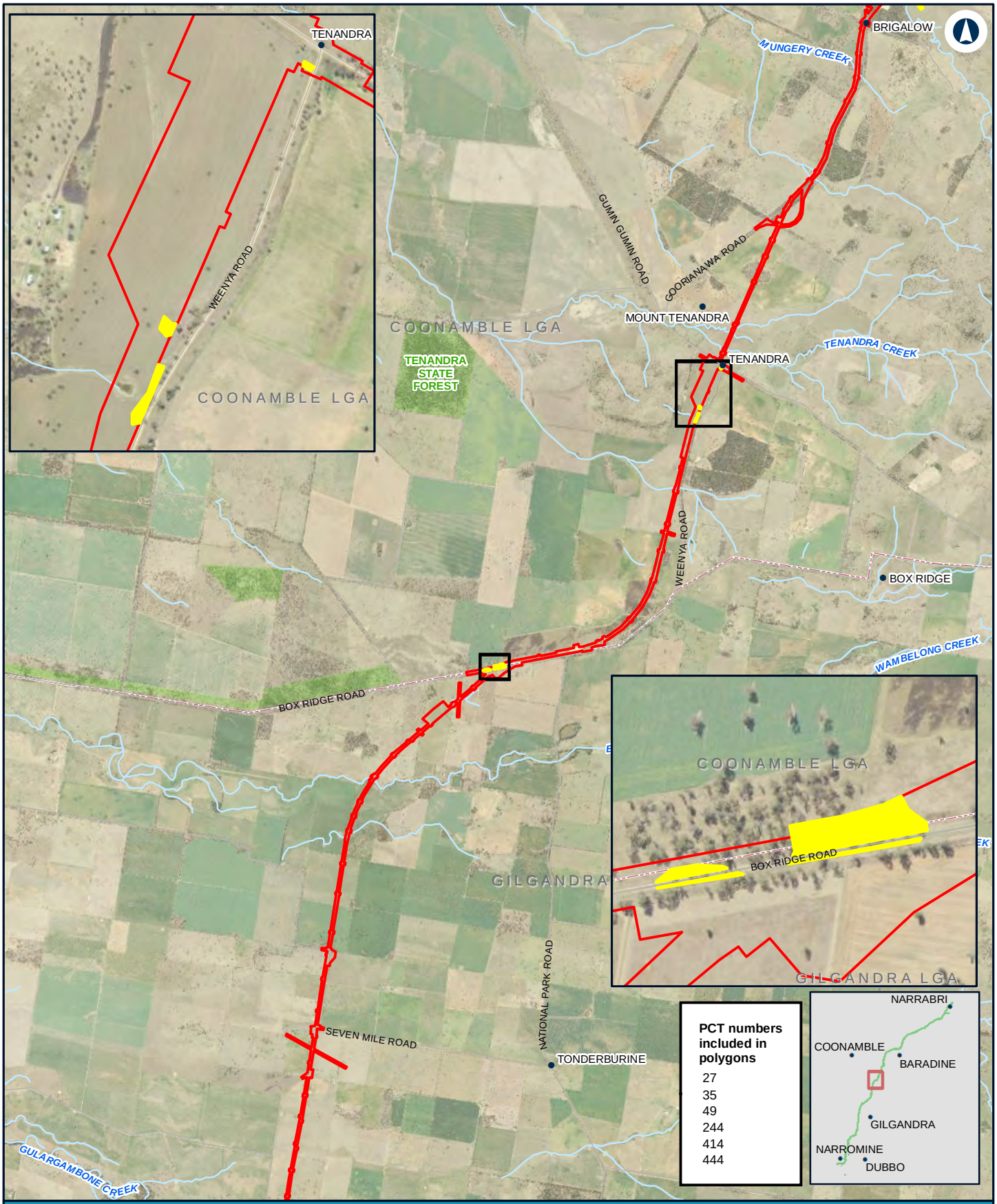

NARROMINE TO NARRABRI Flora Species Polygons -Slender Darling Pea - Segment 9 Curban to Pilliga B MAP 2 OF 6

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 13/08/2020 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS;

LEGEND

The proposal

Slender Darling Pea *(Swainsona murrayana)* species polygon

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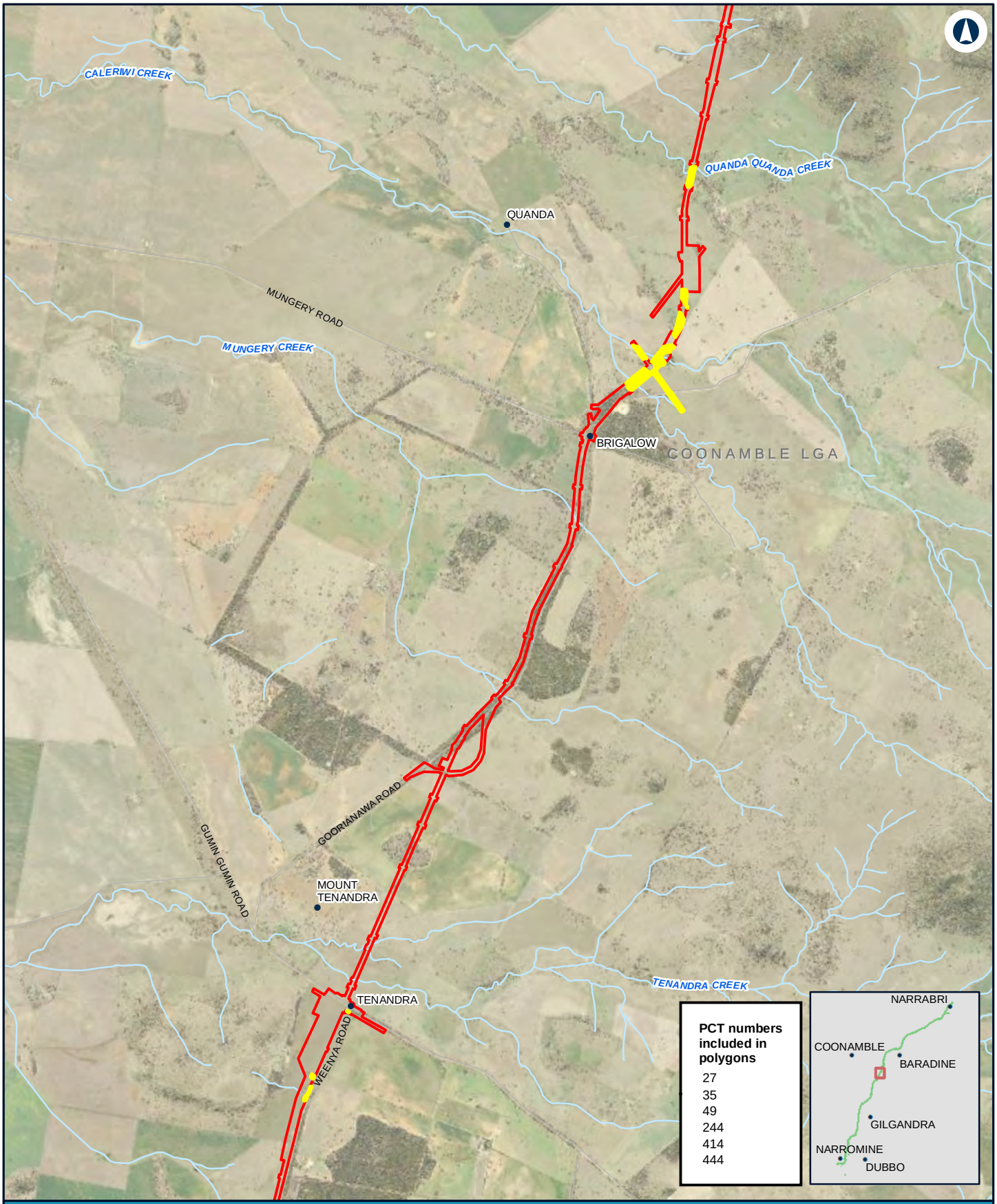

NARROMINE TO NARRABRI Flora Species Polygons -Slender Darling Pea - Segment 9 - Curban to Pilliga MAP 3 OF 6

0 0.8 1.6 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 13/08/2020 Paper: A4
Author: JacobsGHD Scale: 1:60,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Slender Darling Pea *(Swainsona murrayana)* species polygon

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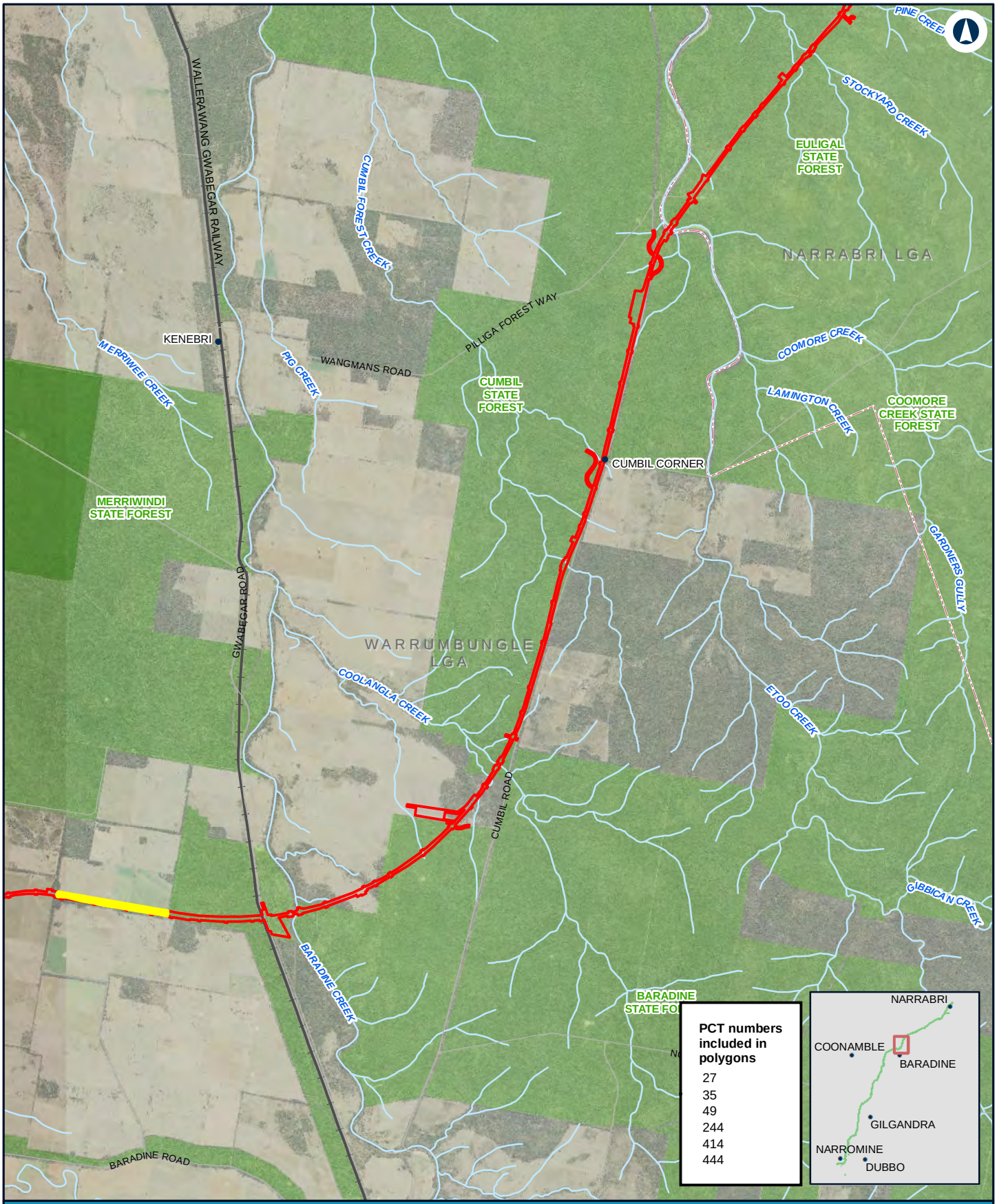

NARROMINE TO NARRABRI Flora Species Polygons -Slender Darling Pea - Segment 10 Pilliga A MAP 4 OF 6

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 13/08/2020 Paper: A4
Author: JacobsGHD Scale: 1:27,117
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Slender Darling Pea *(Swainsona murrayana)* species polygon

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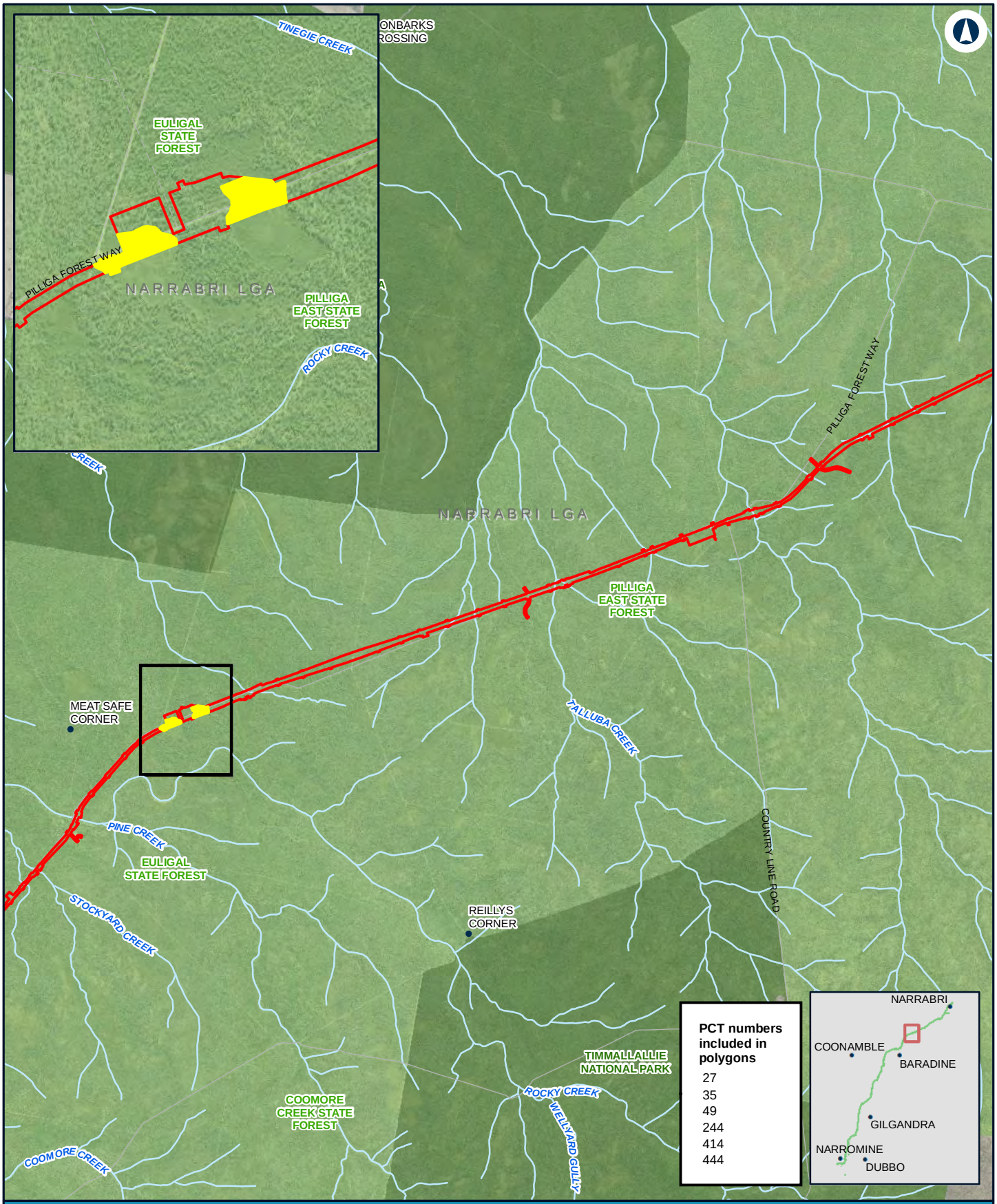

NARROMINE TO NARRABRI Flora Species Polygons -Slender Darling Pea - Segment 10 Pilliga B MAP 5 OF 6

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 13/08/2020 Paper: A4
Author: JacobsGHD Scale: 1:25,000
Data Sources: Basemap layers: NSWSS;

LEGEND

The proposal

Slender Darling Pea *(Swainsona murrayana)* species polygon

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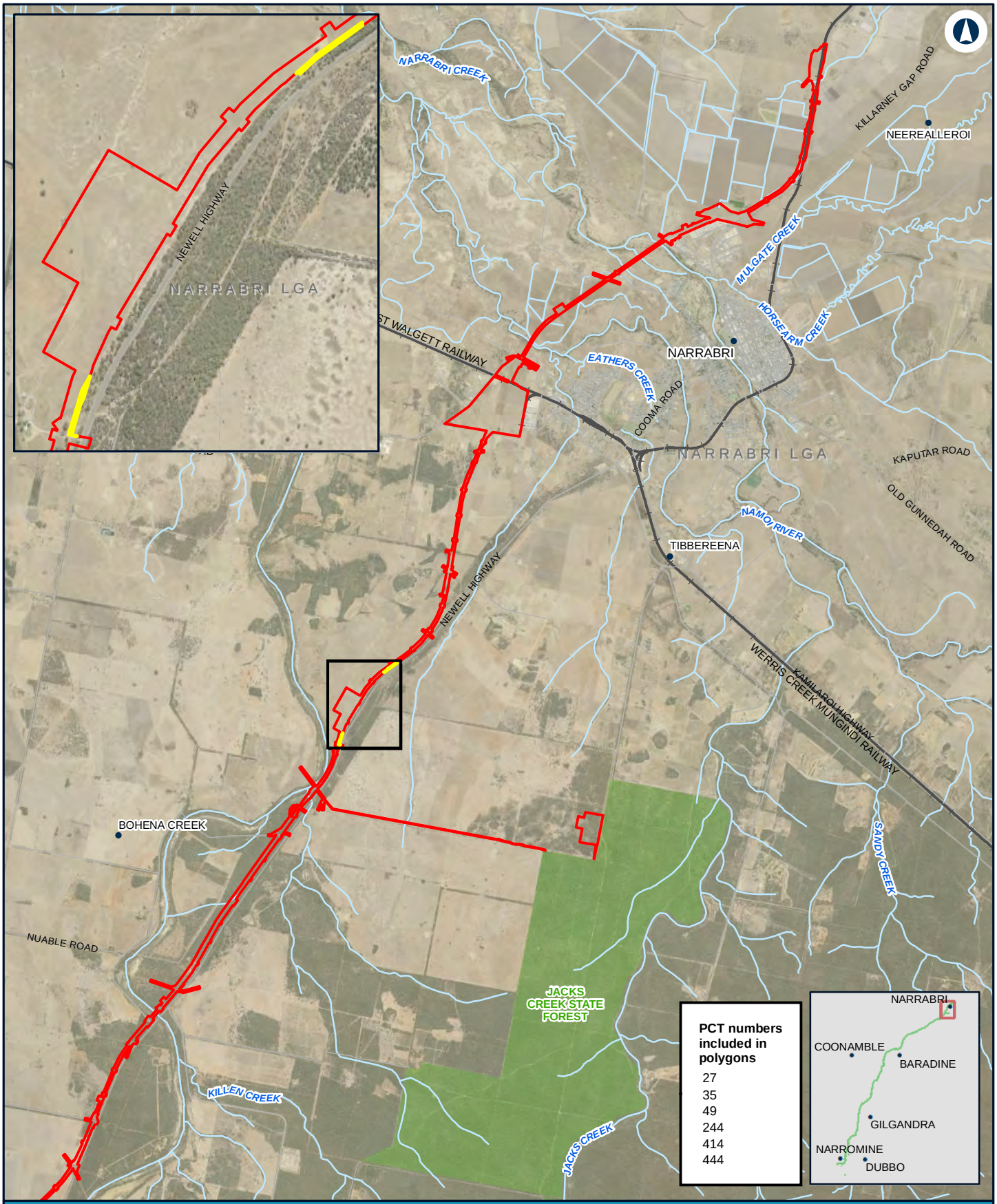

NARROMINE TO NARRABRI Flora Species Polygons -Slender Darling Pea - Segment 11 Pilliga to Narrabri MAP 6 OF 6

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 13/08/2020 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Slender Darling Pea *(Swainsona Murrayana)* species polygon

INLAND RAIL ARTC

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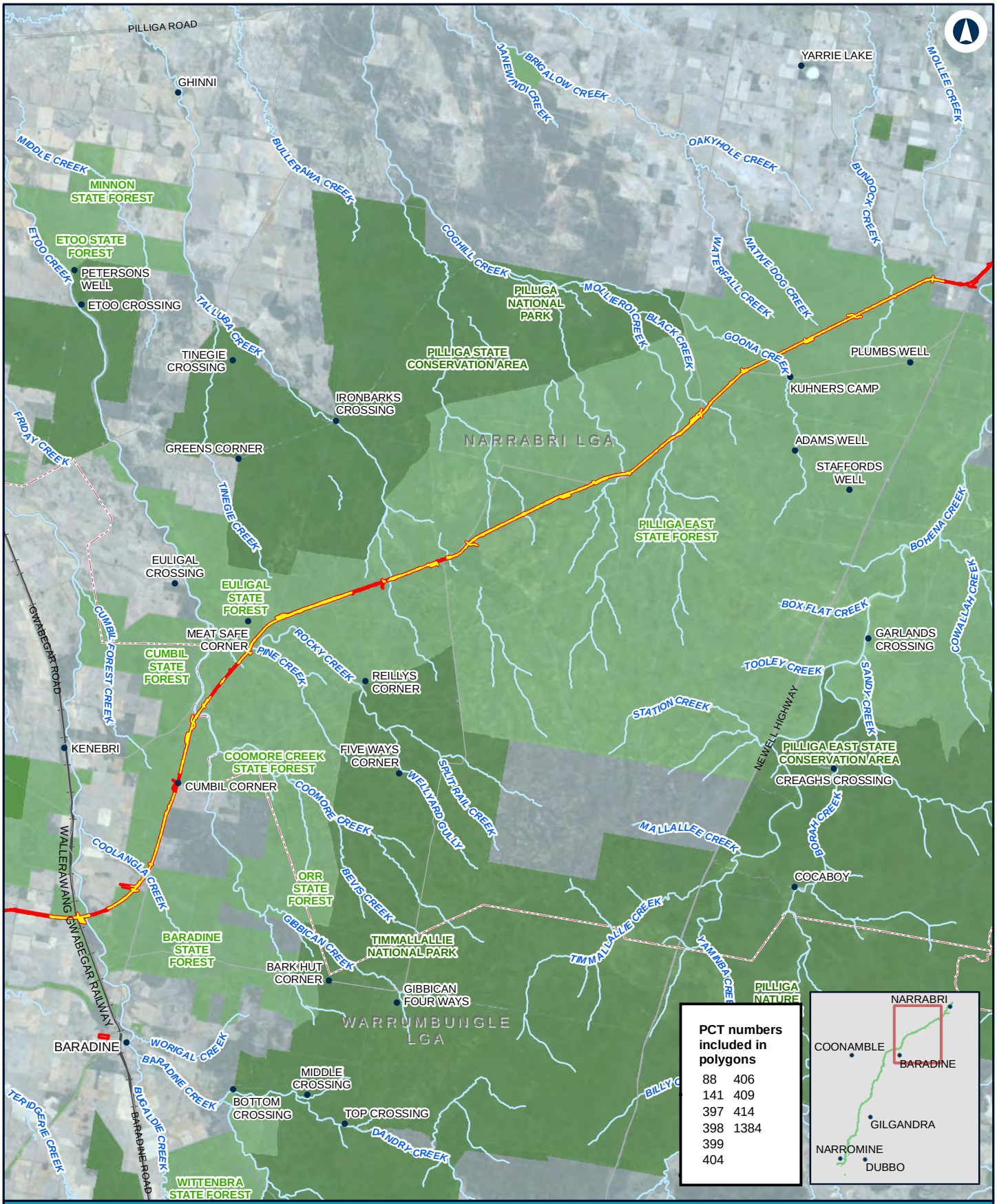
Table I4 *Commersonia procumbens*

Commersonia procumbens	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Vulnerable
Species polygon area	565.14 hectares
Breeding requirements	• Fruiting period is summer to autumn. Flowers from August to December (OEH, 2019b). • Appears to produce seed which persists for some time in the seed bank. Large numbers of seedlings have been observed germinating after fire at sites where the species was not apparent above ground before the fires. Clusters of individuals may be clonal (OEH, 2019b). • Has been recorded in populations of 50+ individuals of various ages, 28 plants on the western side of the road and 58 plants on the sunnier eastern side. Populations may comprise a single cohort of individuals, or have a multi-aged structure where some individuals appear to be old with thickened runners (OEH, 2019b).
Habitat requirements	• Pilliga sandstone (OEH, 2019b). • Grows in sandy sites, often along roadsides (OEH, 2019b). • Recorded in Eucalyptus dealbata and Eucalyptus sideroxylon communities, Melaleuca uncinata scrub, under mallee eucalypts with a Calytrix tetragona understorey, and in a recently burnt Ironbark and Callitris area. Also in Eucalyptus fibrosa subsp. nubila, Eucalyptus dealbata, Eucalyptus albens and Callitris glaucophylla woodlands north of Dubbo (OEH, 2019b). • Other associated species include Acacia triptera, Callitris endlicheri, Eucalyptus melliodora, Allocasuarina diminuta, Philotheca salsolifolia, Xanthorrhoea species, Exocarpos cupressiformis, Leptospermum parvifolium and Kunzea parvifolia (OEH, 2019b). • The species is often found as a pioneer species of disturbed habitats. It has been recorded colonising disturbed areas such as roadsides, the edges of quarries and gravel stockpiles and a recently cleared easement under power lines. (OEH, 2019b)

Commersonia procumbens	
Habitat in the study area	This species habitat is prevalent within the study area in the Pilliga State Forest on sandy soils. Due to a large habitat range and occurrence in disturbed sites also, this species is associated with many PCTs within the study area. PCTs which reflect this species habitat requirements include: • 88 - Pilliga Box - White Cypress Pine- Buloke shrubby woodland in the Brigalow Belt South Bioregion • 141 - Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions. Brigalow Belt South Bioregion • 148 - Dirty Gum - Buloke - White cypress pine - ironbark shrubby woodland of the deep sandy soils on the Liverpool Plains Region of the Brigalow Belt South Bioregion • 255 - Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland • 397 - Poplar Box- White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion • 398 - Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion • 399 - Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Piliga - Goonoo sandstone forests, Brigalow Belt South Bioregion • 404 - Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forest • 406 - White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests • 409- Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion • 414 - White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion • 469 - White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion • 473 - Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion • 746 - Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion • 1384 - White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion These PCTs occur throughout the study area, extending from the Pilliga State Forest. Previous observations have been made within the locality which reflect these PCTs extent.

Commersonia procumbens	
Known populations	Endemic to NSW, mainly confined to the Dubbo-Mendooran-Gilgandra region, but also in the Pilliga and Nymagee areas. Recent collections made from the Upper Hunter region, and additional populations found in Goonoo SCA in response to the 2007 fires. (OEH, 2019b). Biodiversity surveys of the Brigalow Belt South in 2002 recorded *Commersonia procumbens* at only one of 32 previously known locations. It was not relocated at Pilliga East State Forest (Threatened Species Scientific Committee, 2008b).
Survey requirements	Survey months: August to May Survey: Survey recent fire or mechanical disturbance areas. Fire or disturbance within the last 1 to 2 seasons required for above ground identification. Species will then revert to underground thickened rootstock. General: Senescence age estimated - returns to underground stock in unfavourable conditions. (OEH, 2019b)
Survey effort	Flora surveys were conducted in the following months in the study area: • September 2018: 5 days, two ecologists– rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, 4 ecologists– flora plot surveys and threatened flora searches • March 2019: 4 ecologists over 10 days- flora plot surveys and threatened flora searches • September 2019: 3 ecologists over 10 days- targeted flora searches and flora plot surveys. Surveys included targeted searches for the species, as well as opportunistic observations while driving or undertaking other survey types.
Survey results	Species was not observed in any survey period. Dry conditions likely to have affected growth and detectability. Assumed to occur and suitable potential habitat occurs in the proposal site. Other species of *Commersonia* were observed during targeted surveys for this species.
Species polygon guidance and justification	Species polygons have been made based on survey guidelines (OEH, 2017). The standard 30 metre buffer for threatened plants has been increased to 150 metres based on individual species advice and consultation with BCD accountable officers. In addition, the species has been assumed to be present in associated PCTs observed in the proposal site within Segment 10 (Pilliga) and Segment 11 (Pilliga to Narrabri), where drought conditions have impacted species detectability.
Relevant IBRA subregions	Pilliga – known Pilliga Outwash – predicted Castlereagh Barwon – predicted



NARROMINE TO NARRABRI Flora Species Polgons - Commersonia procumbens - Segment 10 Pilliga MAP 1 OF 1

0 4.5 9 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:340,000
Data Sources: Basemap layers: NSWSS;

LEGEND

The proposal

Commersonia procumbens species polygon

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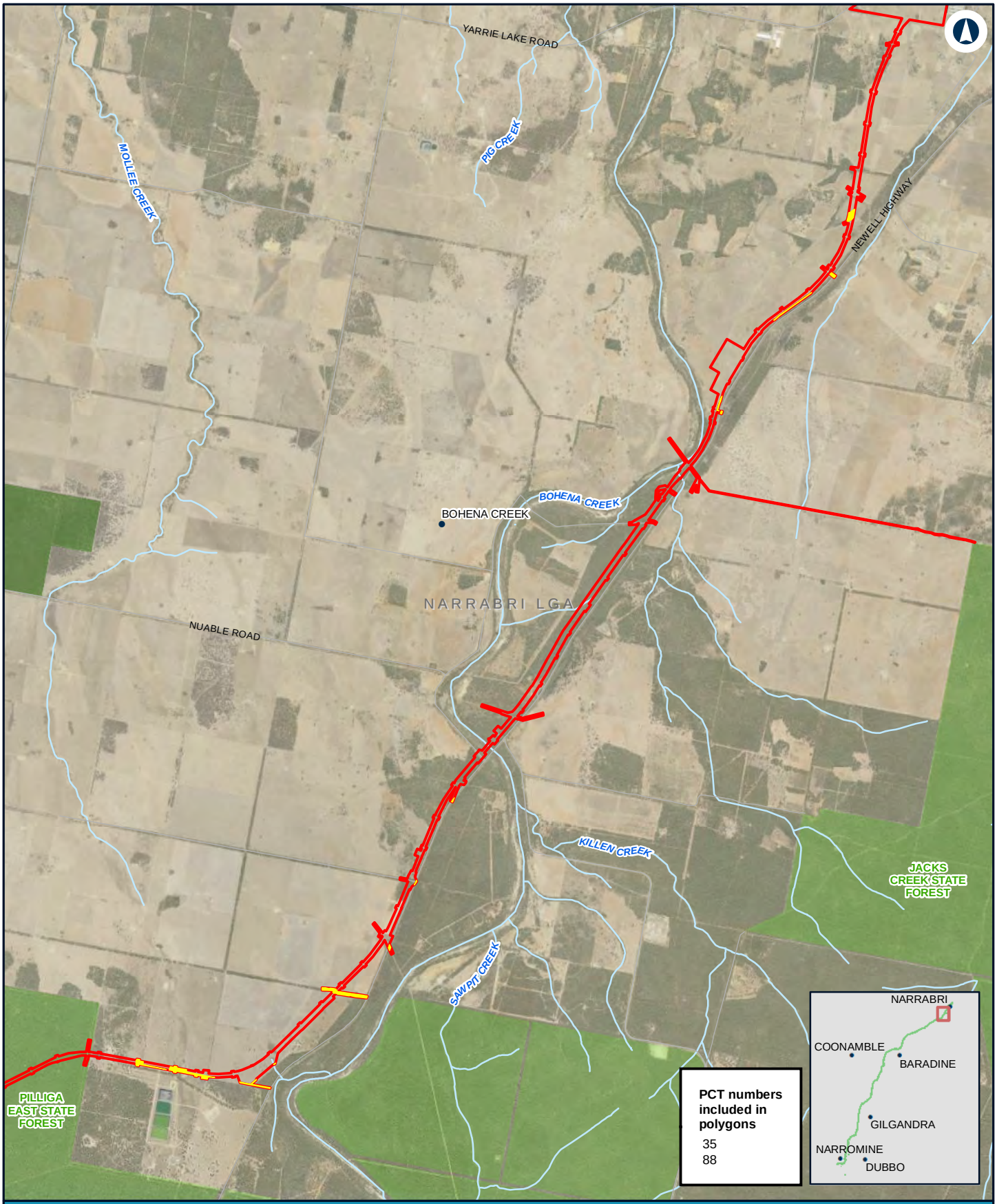
Table I5 *Lepidium aschersonii* (Spiny Peppercress)

Lepidium aschersonii (*Spiny Peppercress*)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Vulnerable
Species polygon area	10.27 hectares
Breeding requirements	• Flowers from spring to autumn (OEH, 2019b). • Plants in the Narrabri population have been observed producing abundant seed, and as the species is believed to be short-lived and large numbers of plants were present at the site, Lepidium aschersonii appears to be successfully reproducing (OEH, 2019b). • Populations have been known to immediately disappear following inundation by flooding, reappearing several seasons later. An apparent increase in numbers during drought conditions has also been observed. The species is reported to be salt and submergence tolerant and also grows well under dry conditions (OEH, 2019b; Carter, 2010).
Habitat requirements	Found on ridges of gilgai clays dominated by Brigalow (Acacia harpophylla), Belah (Casuarina cristata), Buloke (Allocasuarina luehmanii) and Grey Box (Eucalyptus microcarpa). In the south has been recorded growing in Bull Mallee (Eucalyptus behriana). Often the understorey is dominated by introduced plants. The species grows as a component of the ground flora, in grey loamy clays. Vegetation structure varies from open to dense, with sparse grassy understorey and occasional heavy litter. (OEH, 2019b).
Habitat in the study area	Species habitat lies primarily in the south and north of the study area. Despite having a variable structural requirement, the clay soils are located predominantly to the south of the Pilliga (eSPADE, 2020). PCTs which reflect this species habitat requirements include: • 35- Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion • 55- Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions • 56- Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW • 256- Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion All PCTs are located to the south of the study area with the exception of PCT 256. PCT 256 is located within the Pilliga State Forest. Previous observations have been made within the locality primarily to the north of the Pilliga State Forest around Narrabri. Isolated observations have also been made south of the study area.

Lepidium aschersonii (*Spiny Peppercress*)	
Known populations	Not widespread, occurring in the marginal central-western slopes and north-western plains regions of NSW (and potentially the south western plains). In the north of the State recent surveys have recorded a number of new sites including Brigalow Nature Reserve, Brigalow State Conservation Area, Leard State Conservation Area and Bobbiwaa State Conservation Area. Also known from the West Wyalong in the south of the State. Records from Barmedman and Temora areas are likely to be no longer present. Approximately 50 per cent of the total Lepidium aschersonii recorded for Australia occurs in NSW. Recorded population sizes vary from 18 to 5000+ plants. Plant numbers decrease with increasing overstorey density, and plants were not found where the Brigalow canopy cover exceeded about 60 per cent. The species is often described as a "weed" where it dominates paddocks. (OEH, 2019b).
Survey requirements	Survey months: November to April
Survey effort	Flora surveys were conducted in the following months in the study area: • September 2018: 5 days, two ecologists– rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, 4 ecologists– flora plot surveys and threatened flora searches • March 2019: 4 ecologists over 10 days- flora plot surveys and threatened flora searches • September 2019: 3 ecologists over 10 days- targeted flora searches and flora plot surveys. Surveys included targeted searches for the species, as well as opportunistic observations while driving or undertaking other survey types.
Survey results	Species was not observed in any survey period. Dry conditions likely to have affected growth and detectability. Assumed to occur and suitable potential habitat occurs in the proposal site.
Species polygon guidance and justification	Species polygons have been made based on survey guidelines (OEH, 2017). The standard 30 metre buffer for threatened plants has been increased to 150 metres based on individual species advice and consultation with BCD accountable officers. In addition, the species has been assumed to be present in associated PCTs observed in the proposal site where there are recent and known records in Segment 11 (Pilliga to Narrabri), where drought conditions have impacted species detectability.
Relevant IBRA subregions	Northern Basalts – known Liverpool Plains – known Pilliga – known Pilliga Outwash – known Lower Slopes – known



NARROMINE TO NARRABRI Flora Species Polygons - Spiny Peppercress - Segment 11 - Pilliga to Narrabri MAP 1 OF 1

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:80,000
Data Sources: Basemap layers: NSWSS;

LEGEND

The proposal

Spiny Peppercress *(Lepidium aschersonii)* species polygon

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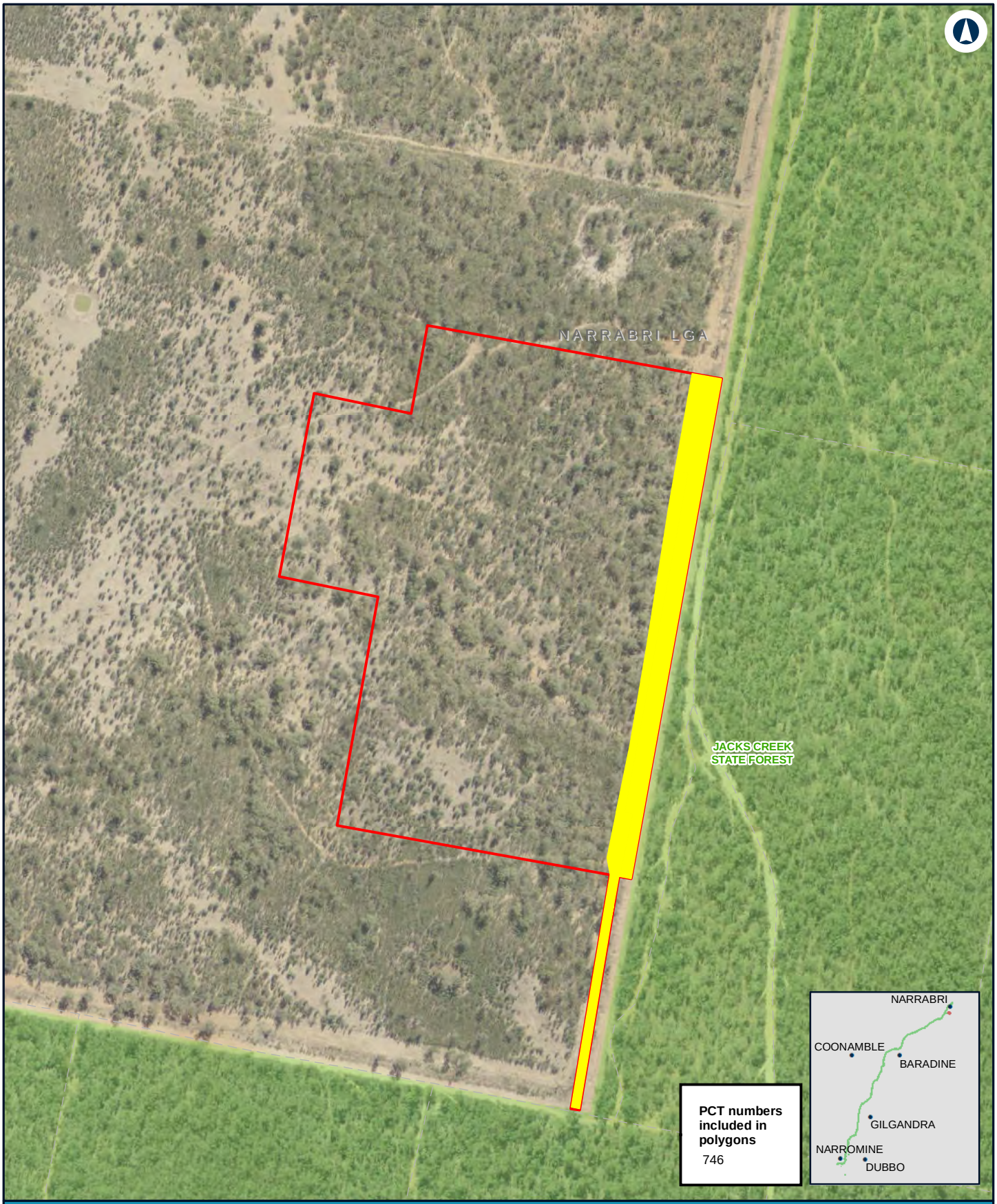
Table I6 *Tylophora linearis*

Tylophora linearis	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Endangered
Species polygon area	582.50 hectares
Breeding requirements	• Flowers in spring, with flowers recorded in November or May with fruiting probably 2 to 3 months later (OEH, 2019b)
Habitat requirements	• Grows in dry scrub and open forest. Recorded from low-altitude sedimentary flats in dry woodlands of Eucalyptus fibrosa, Eucalyptus sideroxylon, Eucalyptus albens, Callitris endlicheri, Callitris glaucophylla and Allocasuarina luehmannii (OEH, 2019b). • Also grows in association with Acacia hakeoides, Acacia lineata, Melaleuca uncinata, Myoporum species and Casuarina species (OEH, 2019b).
Habitat in the study area	Species habitat lies primarily within the confines of the Pilliga State Forest in the study area. It also extends further south of the forest. The study area within the Pilliga State Forest is characteristic of dry open forest which is suitable for this species. PCTs which reflect this species habitat requirements include: • 88 - Pilliga Box - White Cypress Pine- Buloke shrubby woodland in the Brigalow Belt South Bioregion • 141 - Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions. Brigalow Belt South Bioregion • 148 - Dirty Gum - Buloke - White cypress pine - ironbark shrubby woodland of the deep sandy soils on the Liverpool Plains Region of the Brigalow Belt South Bioregion • 255 - Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland • 397 - Poplar Box- White Cypress Pine shrub grass tall woodland of th Pilliga - Warialda region, Brigalow Belt South Bioregion • 398- Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion • 399 - Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Piliga - Goonoo sandstone forests, Brigalow Belt South Bioregion • 404 - Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga fores • 406 - White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests

Tylophora linearis	
	• 409 - Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregio • 414 - White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion • 444 - Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion • 469 - White Cypress Pine - Narrow-leaved Ironbark - Buloke grassy open forest of the Dubbo region, southern Brigalow Belt South Bioregion • 473 - Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion • 589 - White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion • 599 - Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South and Nandewar bioregion • 746 - Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion • 1384 - White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion PCT 88 extends to the south of the Pilliga State Forest within the study area, however the remaining vegetation communities are located within the Pilliga State Forest. Previous observations have been made within the locality primarily within the Pilliga State Forest, however previous observations have also been made to the south of the study area.
Known populations	Known from eight localities in the Dubbo, Mt Crow areas and 'Myall Park' near Glenmorgan in Queensland. Also conserved in Goobang National Park, Eura, Goonoo and Pilliga West State Forest and Coolbaggie Nature Reserve (Threatened Species Scientific Committee, 2008c). Majority of records occur in the central western region. Records from Goonoo, Pillaga West, Pillaga East, Bibblewindi, Cumbil and Eura State Forests, Coolbaggie NR, Goobang NP and Beni SCA. Also has been recorded Hiawatha State Forest near West Wyalong in the south and there are old records as far north as Crow Mountain near Barraba and near Glenmorgan in the western Darling Downs. (OEH, 2019b).
Survey requirements	Survey months: October to May Survey: Use flowers and fruit to locate and identify. Easily confused with other climbers when not in flower or fruit. General: Has the ability to resprout after fire unless fires are recurring. (OEH, 2019b)

Tylophora linearis	
Survey effort	Flora surveys were conducted in the following months in the study area: • September 2018: 5 days, two ecologists– rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, 4 ecologists– flora plot surveys and threatened flora searches • March 2019: 4 ecologists over 10 days- flora plot surveys and threatened flora searches • September 2019: 3 ecologists over 10 days- targeted flora searches and flora plot surveys. Surveys included targeted searches for the species, as well as opportunistic observations while driving or undertaking other survey types.
Survey results	Species was not observed in any survey period. Dry conditions likely to have affected growth and detectability. Assumed to occur and suitable potential habitat occurs in the proposal site.
Species polygon guidance and justification	Species polygons have been made based on survey guidelines (OEH, 2017). The standard 30 metre buffer for threatened plants has been increased to 150 metres based on individual species advice and consultation with BCD accountable officers. In addition, the species has been assumed to be present in associated PCTs observed in the proposal site where there are recent and known records in Segment 11 (Pilliga to Narrabri), where drought conditions have impacted species detectability.
Relevant IBRA subregions	Northern Basalts – predicted Liverpool Plains – known Pilliga – known Pilliga Outwash – known Castlereagh Barwon – predicted Inland Slopes – known



NARROMINE TO NARRABRI Flora Species Polygons -*Tylophora linearis* - Segment 7 Borrow Pit D MAP 1 OF 6

0 0.085 0.17 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:6,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- *Tylophora linearis* species polygon

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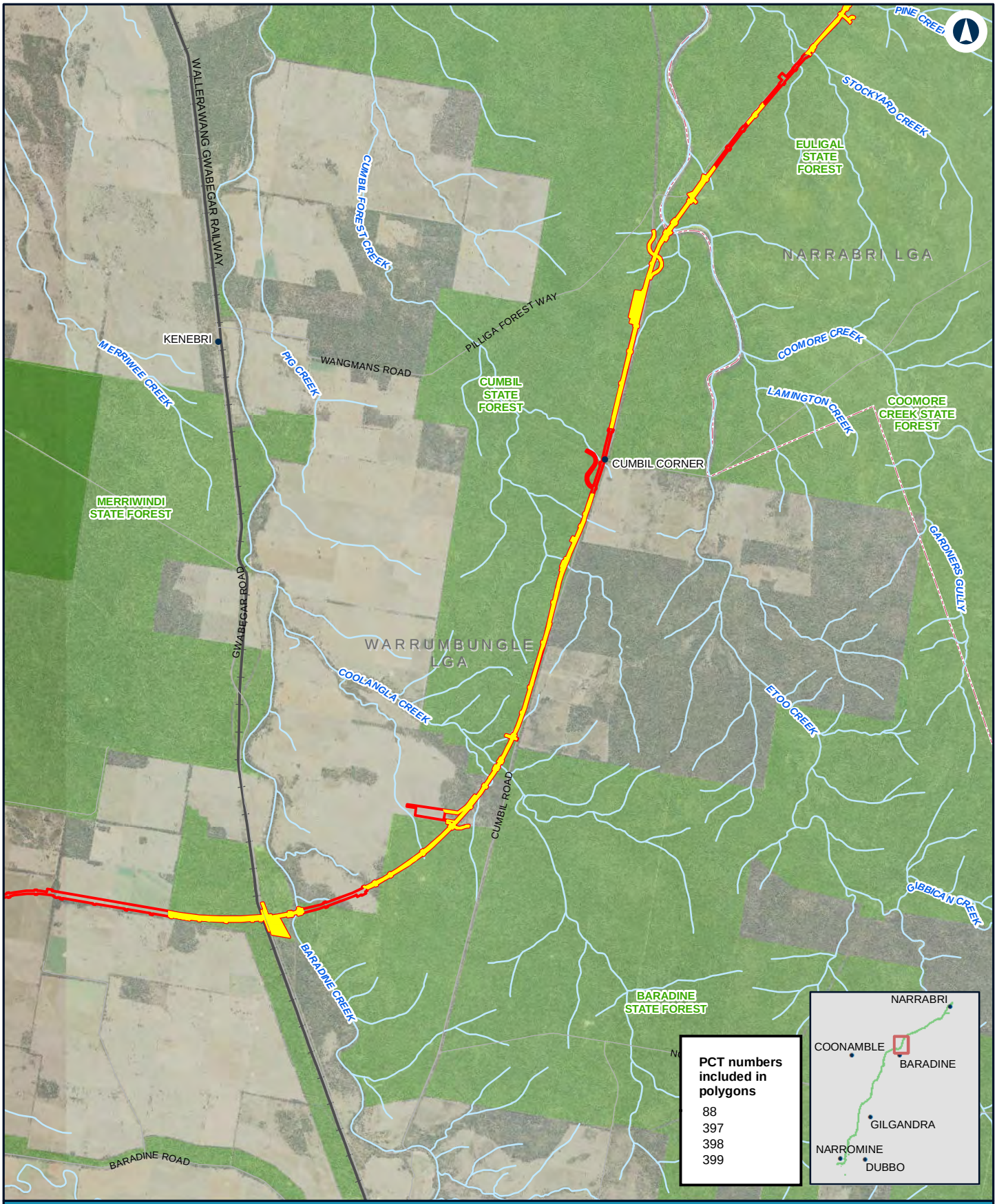

NARROMINE TO NARRABRI Flora Species Polygons -Tylophora linearis - Segment 10 Pilliga A MAP 2 OF 6

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- *Tylophora linearis* species polygon

INLAND RAIL ARTC

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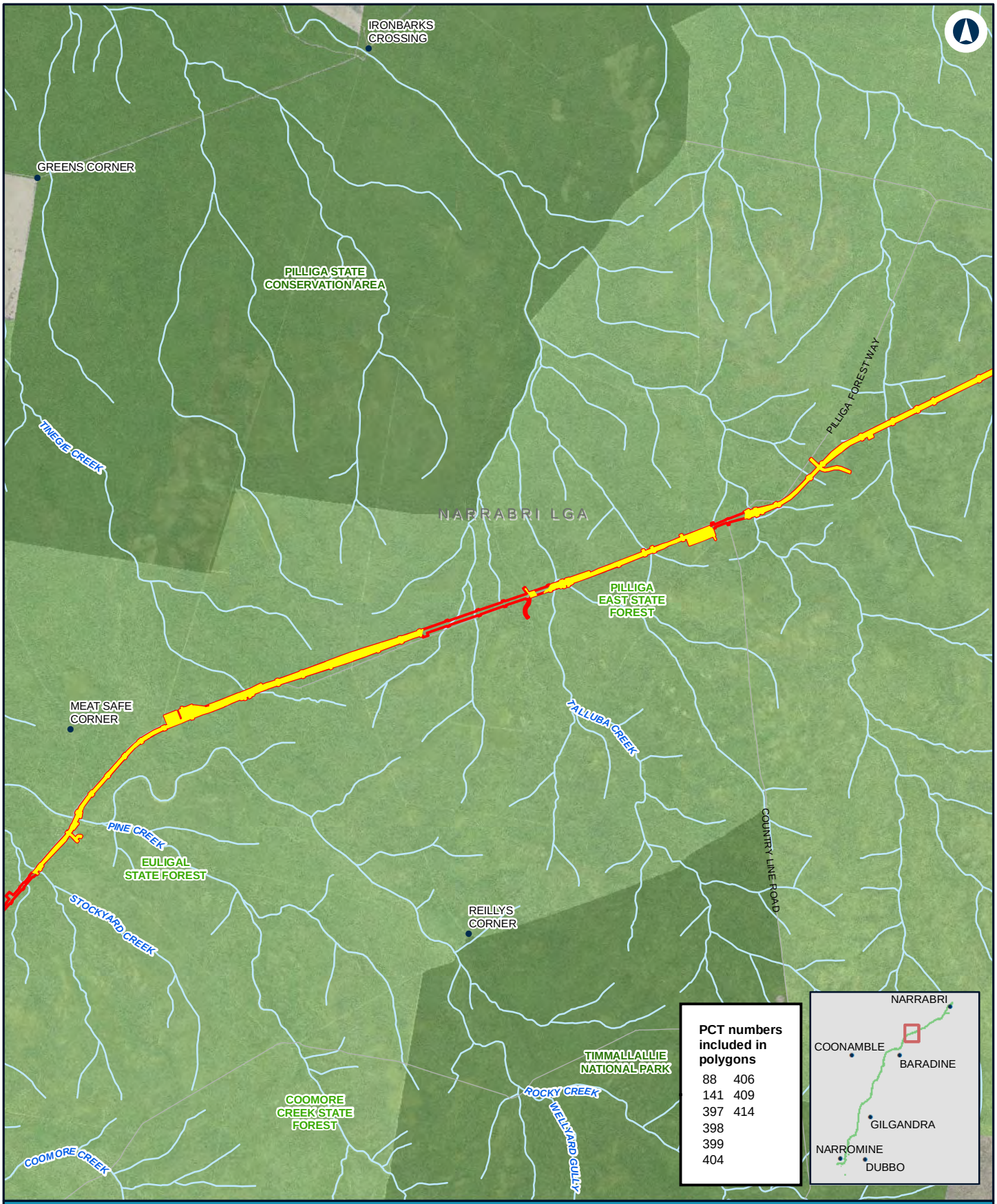

NARROMINE TO NARRABRI Flora Species Polygons -Tylophora linearis - Segment 10 Pilliga B MAP 3 OF 6

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- *Tylophora linearis* species polygon

INLAND RAIL ARTC

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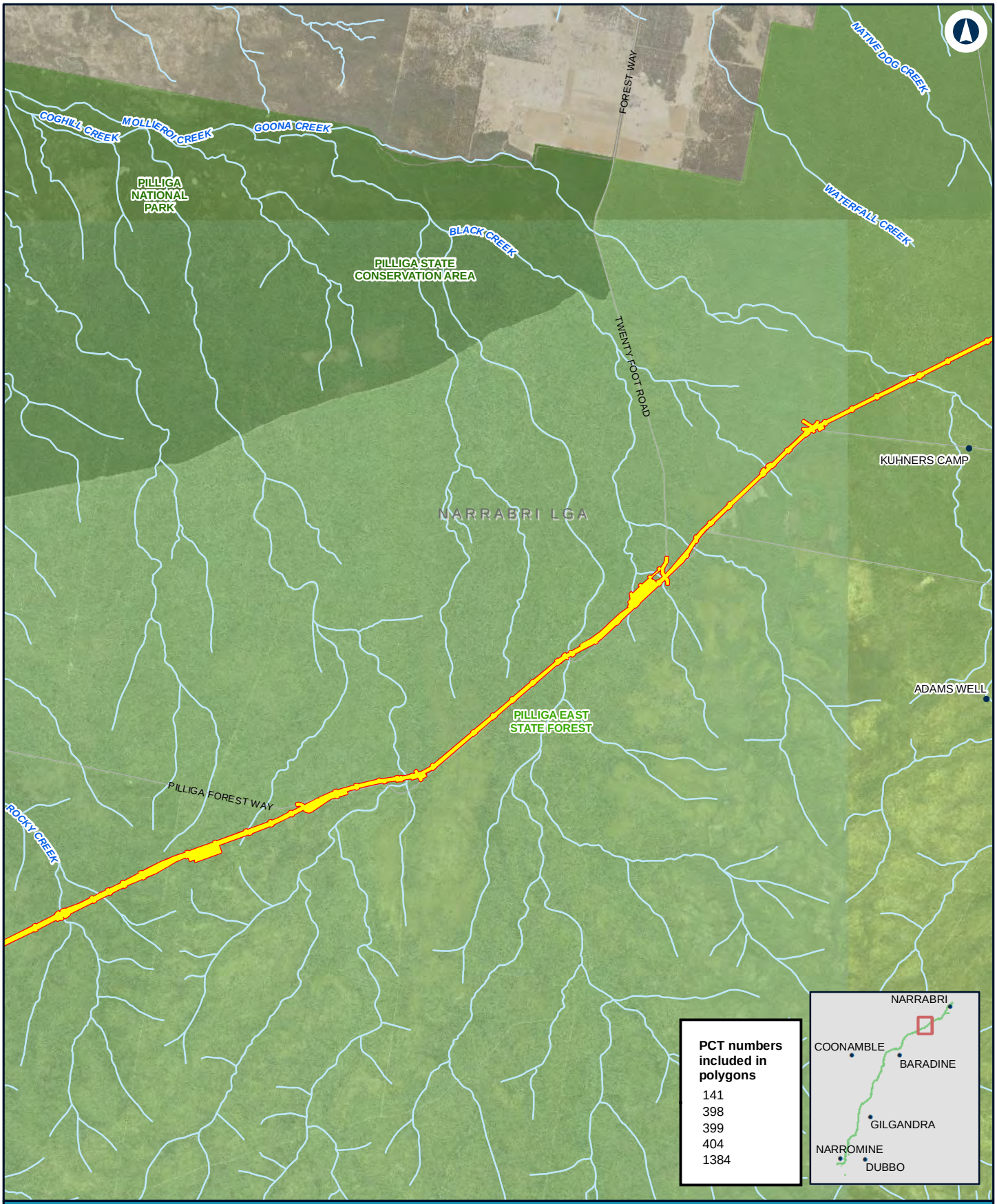

NARROMINE TO NARRABRI Flora Species Polygons -Tylophora linearis - Segment 10 Pilliga C MAP 4 OF 6

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS;

LEGEND

The proposal

Tylophora linearis species polygon

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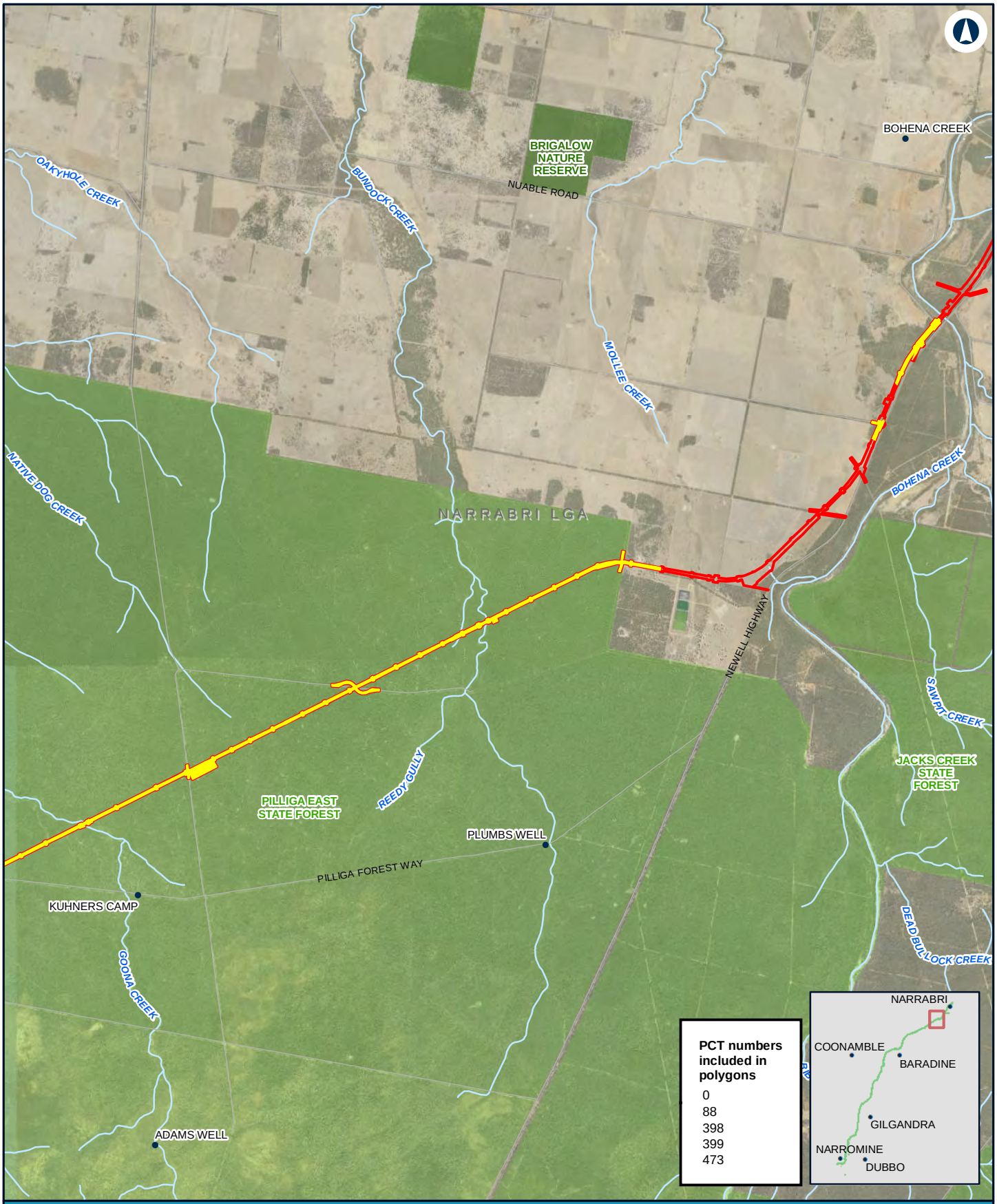

NARROMINE TO NARRABRI Flora Species Polygons -Tylophora linearis - Segment 10 Pilliga D MAP 5 OF 6

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- *Tylophora linearis* species polygon

INLAND RAIL ARTC

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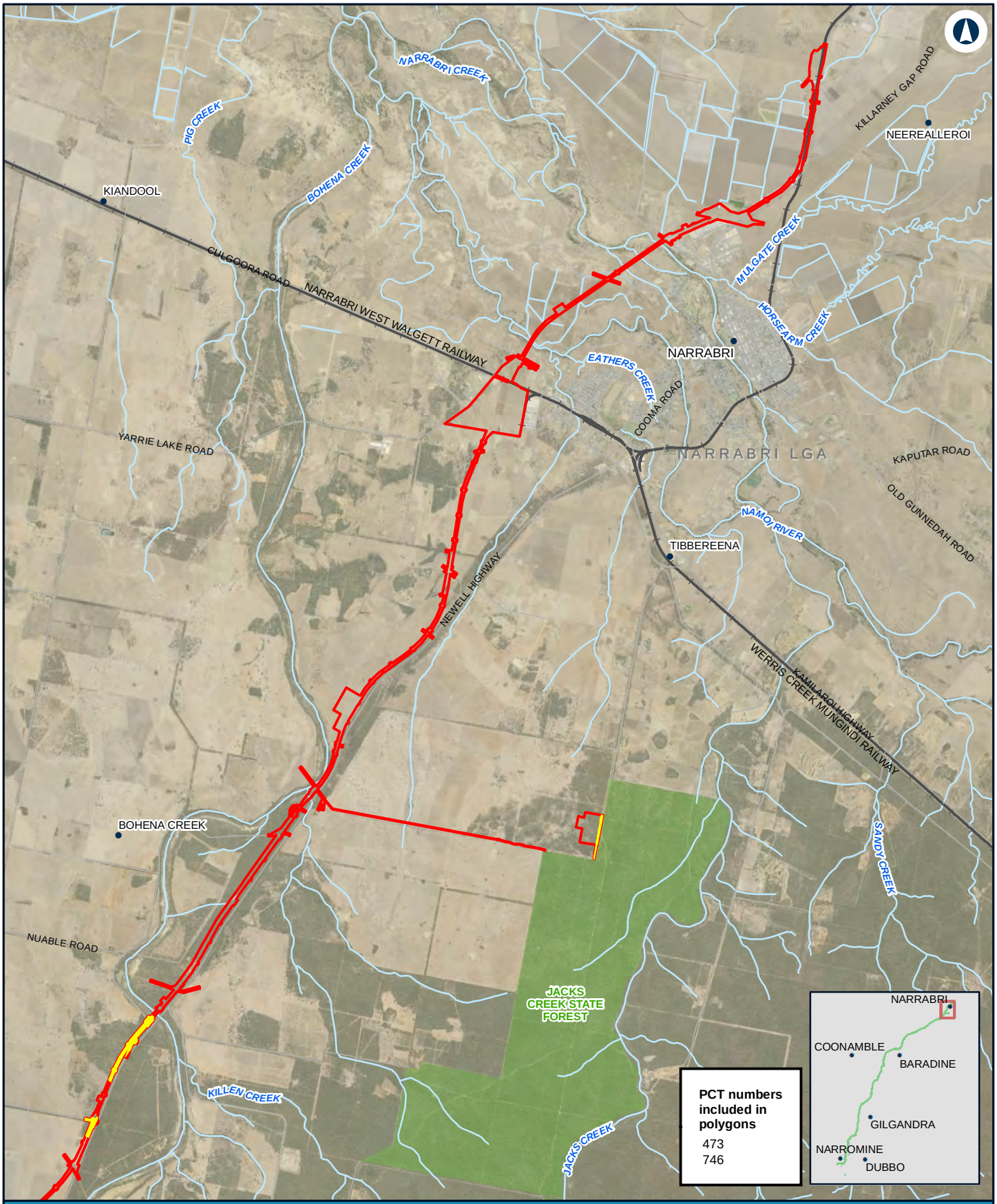

NARROMINE TO NARRABRI Flora Species Polygons -Tylophora linearis - Segment 11 Pilliga to Narrabri MAP 6 OF 6

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- *Tylophora linearis* species polygon

INLAND RAIL ARTC

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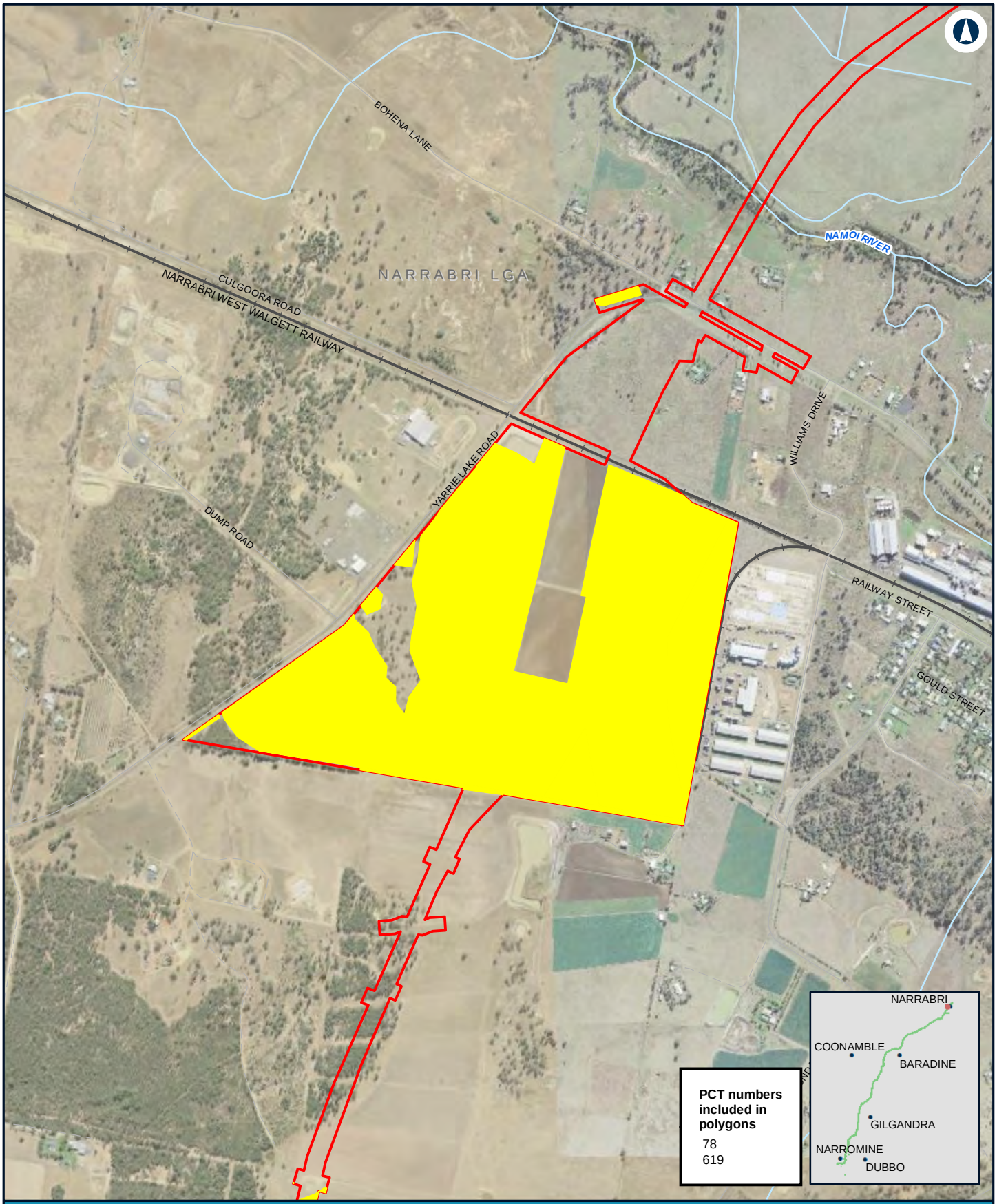
Table I7 *Lepidium monoplocoides* (Winged Peppercress)

Lepidium monoplocoides	(Winged Peppercress)
BC Act Status	Endangered
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Endangered
Species polygon area	194.29 hectares
Reproduction requirements	• Flowers from late winter to spring, or August to October. (OEH, 2020b)
Habitat requirements	• Associated with seasonally moist-waterlogged sites and heavily fertile soils (OEH, 2019b). • Predominant vegetation is generally an open woodland dominated by Allocasuarina luehmannii (Bulloak) and/or eucalypts, particularly Eucalyptus largiflorens (Black Box) or Eucalyptus populnea (Poplar Box). Field layer of surrounding woodland is dominated by tussock grasses (OEH, 2020b). • Occurs in periodically flooded and waterlogged habitats, does not tolerate grazing disturbance, and is commonly recorded in a wetland-grassland community comprising Eragrostis australasicus, Agrostis avenacea, Austrodanthonia duttoniana, Homopholis proluta, Myriophyllum crispatum, Utricularia dichotoma and Pycnosorus globosus, on waterlogged grey-brown clay. (Also recorded from a Maireana pyramidata shrubland) (OEH, 2020b). • Highly dependent on seasonal conditions with generally small concentrated sites and seasonal variation causing the number of plants to vary (OEH, 2020b).
Habitat in the study area	• 56 - Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW • 88 - Pilliga Box - White Cypress Pine- Buloke shrubby woodland in the Brigalow Belt South Bioregion • 244 - Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt) • 247 - Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion • 248 - Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW • 397 - Poplar Box- White Cypress Pine shrub grass tall woodland of th Pilliga - Warialda region, Brigalow Belt South Bioregion

Lepidium monoplocoides	**(Winged Peppercress)**
Known populations	Known from eight localities in the Dubbo, Mt Crow areas and 'Myall Park' near Glenmorgan in Queensland. Also conserved in Goobang National Park, Eura, Goonoo and Pilliga West State Forest and Coolbaggie Nature Reserve (Threatened Species Scientific Committee, 2008c). Majority of records occur in the central western region. Records from Goonoo, Pillaga West, Pillaga East, Bibblewindi, Cumbil and Eura State Forests, Coolbaggie NR, Goobang NP and Beni SCA. Also has been recorded Hiawatha State Forest near West Wyalong in the south and there are old records as far north as Crow Mountain near Barraba and near Glenmorgan in the western Darling Downs. (OEH, 2019b).
Survey requirements	Survey months: October to May Survey: Use flowers and fruit to locate and identify. Easily confused with other climbers when not in flower or fruit. General: Has the ability to resprout after fire unless fires are recurring. (OEH, 2019b)
Survey effort	Flora surveys were conducted in the following months in the study area: • September 2018: 5 days, two ecologists– rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, 4 ecologists– flora plot surveys and threatened flora searches • March 2019: 4 ecologists over 10 days- flora plot surveys and threatened flora searches • September 2019: 3 ecologists over 10 days- targeted flora searches and flora plot surveys. Surveys included targeted searches for the species, as well as opportunistic observations while driving or undertaking other survey types.
Survey results	Species was not observed in any survey period. Dry conditions likely to have affected growth and detectability. Assumed to occur and suitable potential habitat occurs in the proposal site.
Species polygon guidance and justification	Species polygons have been made based on survey guidelines (OEH, 2017). The standard 30 metre buffer for threatened plants has been increased to 150 metres based on individual species advice and consultation with BCD accountable officers. In addition, the species has been assumed to be present in associated PCTs observed in the proposal site where there are recent and known records in Segment 11 (Pilliga to Narrabri), where drought conditions have impacted species detectability.
Relevant IBRA subregions	Northern Basalts – predicted Liverpool Plains – known Pilliga – known Pilliga Outwash – known Castlereagh Barwon – predicted Inland Slopes – known



NARROMINE TO NARRABRI Flora Species Polygons -Winged Peppercress - Segment 3 Narrabri West multi-function compound MAP 1 OF 4

0 0.2 0.4 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 13/08/2020 Paper: A4
Author: JacobsGHD Scale: 1:15,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Winged Peppercress *(Lepidium monoplocoides)* species polygon

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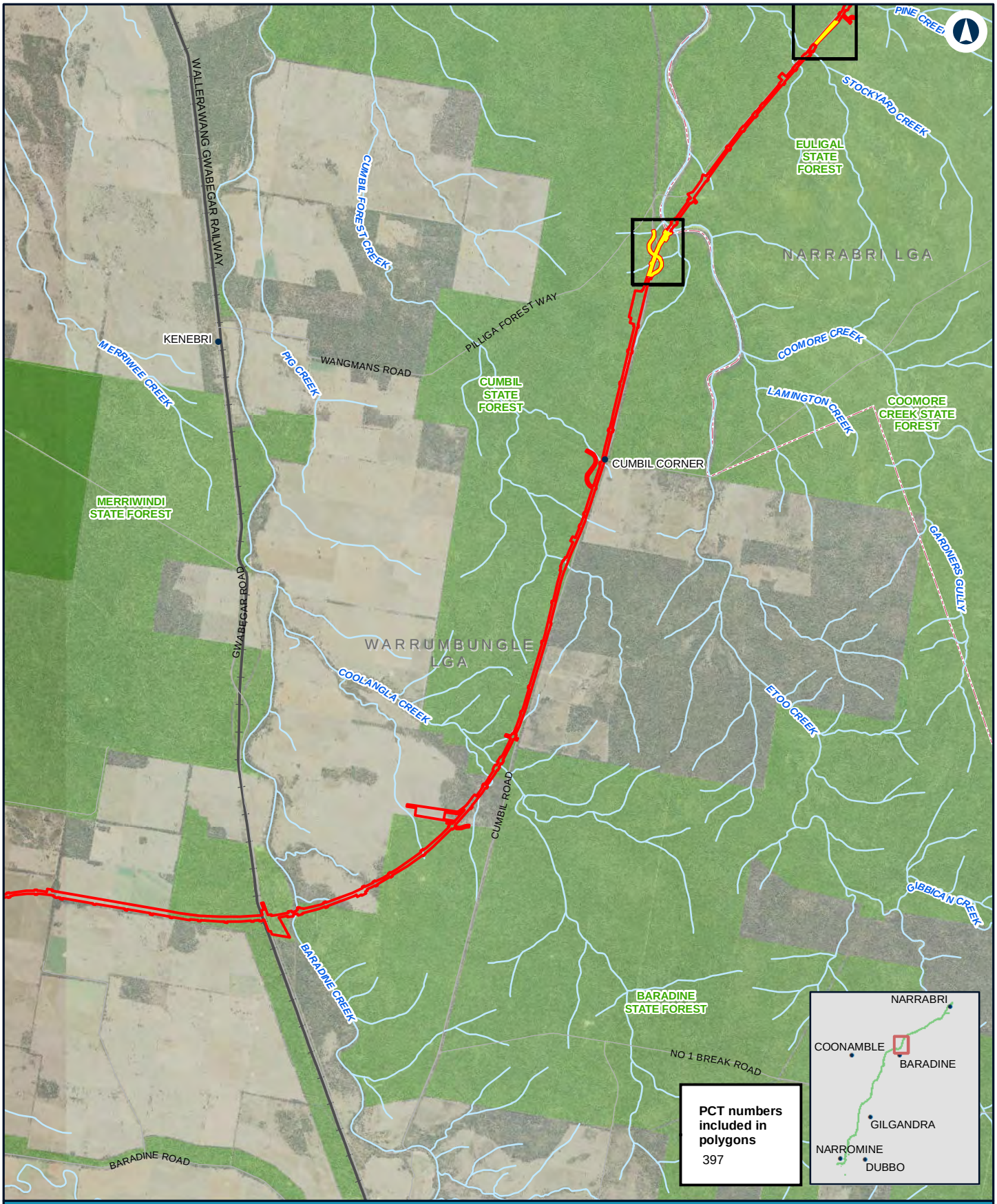

NARROMINE TO NARRABRI Flora Species Polygons -Winged Peppercress - Segment 10 Pilliga A MAP 2 OF 4

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 13/08/2020 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Winged Peppercress *(Lepidium monoplocoides)* species polygon

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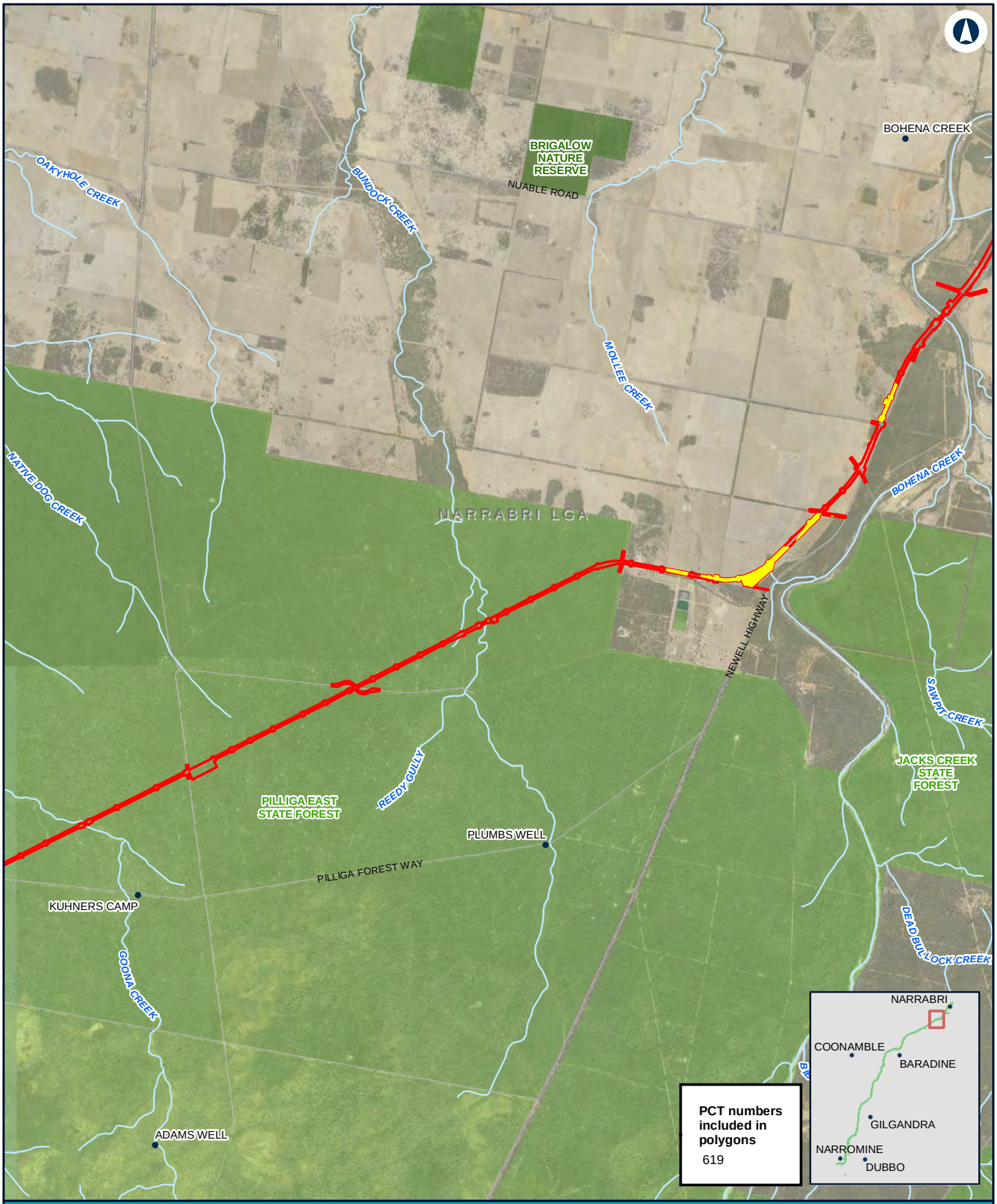

NARROMINE TO NARRABRI Flora Species Polygons -Winged Peppercress - Segment 10 Pilliga D MAP 3 OF 4

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 13/08/2020 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Winged Peppercress *(Lepidium monoplocoides)* species polygon

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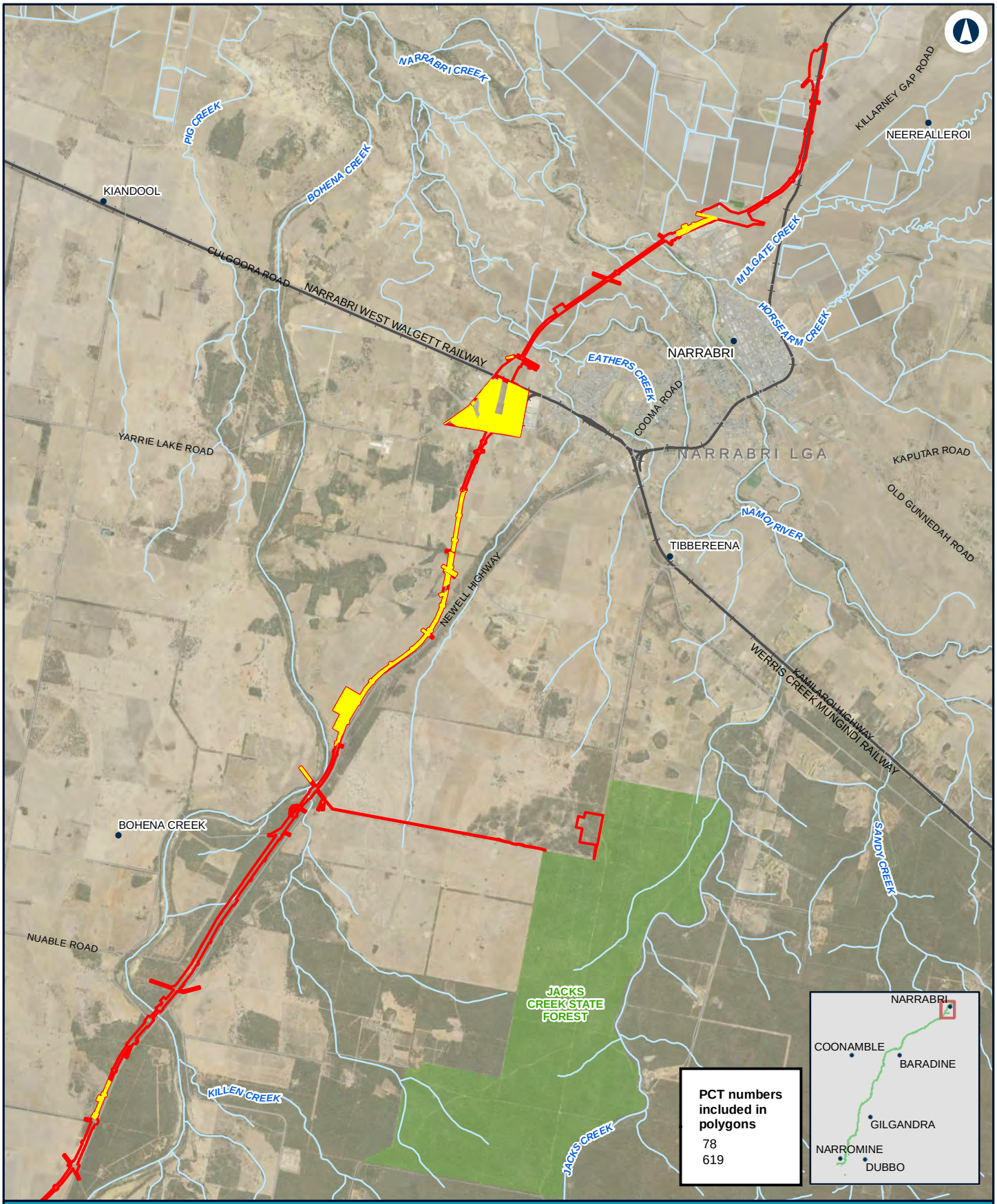

NARROMINE TO NARRABRI Flora Species Polygons -Winged Peppercress - Segment 11 Pilliga to Narrabri MAP 4 OF 4

0 1 2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 13/08/2020 Paper: A4
Author: JacobsGHD Scale: 1:100,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Winged Peppercress *(Lepidium monoplocoides)* species polygon

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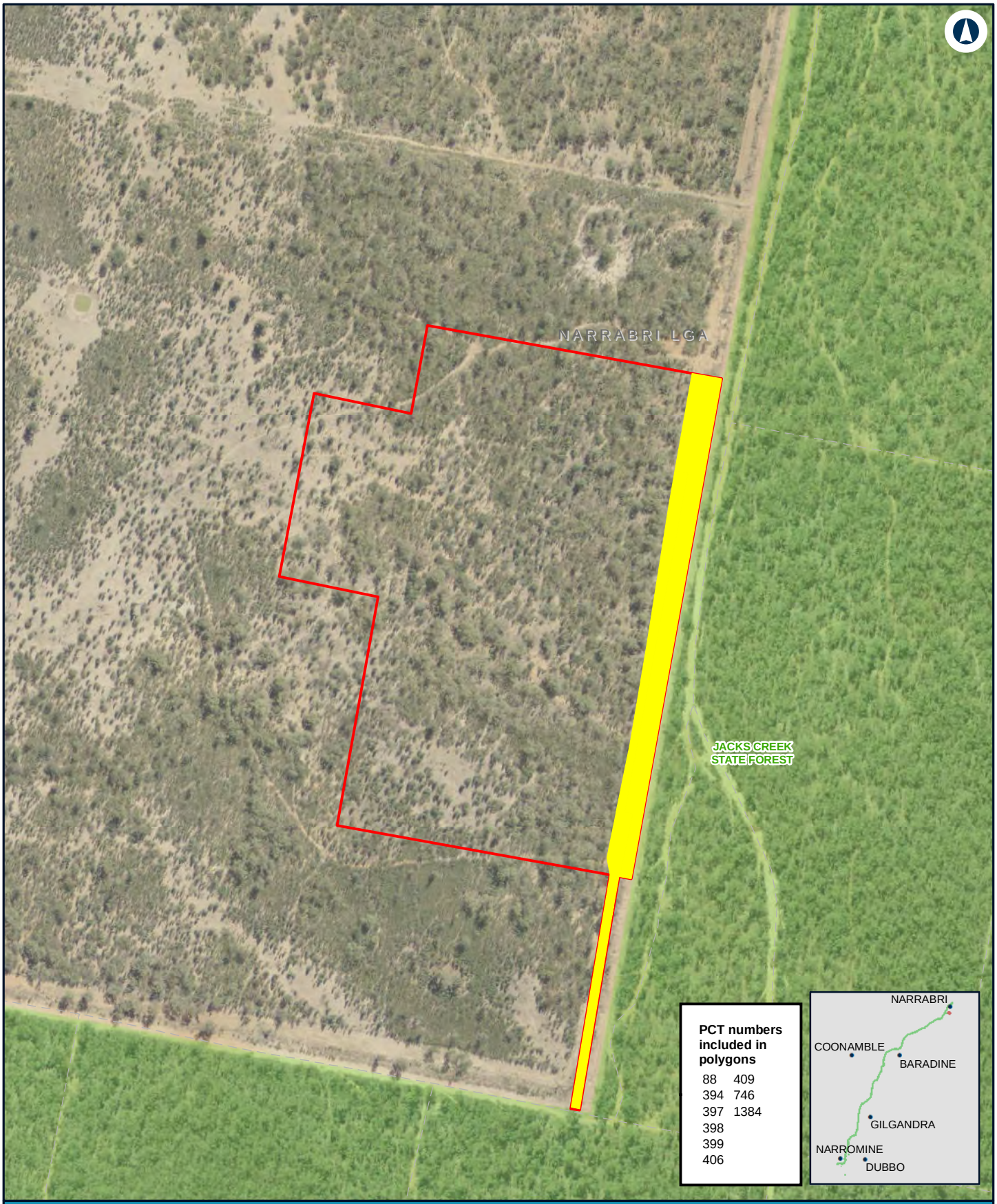
Table I8 *Native Milkwort*

Native Milkwort (*Polygala linariifolia*)	
BC Act Status	Endangered
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	565.86 hectares
Reproduction requirements	Small groups of flowers appear in spring-summer, and are bluish purple, yellowish or occasionally white. The flattened fruit capsule is a broad oblong with a narrow wing, and the seeds are black with white hairs. (OEH, 2020b)
Habitat requirements	• Sandy soils in dry eucalypt forest and woodland with a sparse understorey. The species has been recorded from the Inverell and Torrington districts growing in dark sandy loam on granite in shrubby forest of *Eucalyptus caleyi, Eucalyptus dealbata* and *Callitris*, and in yellow podsolic soil on granite in layered open forest • In the Pilliga area, this species has been recorded in Fuzzy Box woodland, White Cypress Pine-Bulloak - Ironbark woodland, Rough-barked Apple riparian forb-grass open forest, and Ironbark - Brown Bloodwood shrubby woodland. • Other associated species include Eucalyptus trachyphloia, Eucalyptus sphaerocarpa, Angophora floribunda, Angophora leiocarpa, Tristania suaveolens, Allocasuarina torulosa and Wahlenbergia species in the understorey. • Recent surveys in the Pilliga area observed significant declines in populations over autumn and winter, apparently the result of *P. linariifolia* increasing with the previous summer's high rainfall then declining under below-average conditions (OEH, 2020b).
Habitat in the study area	• 394 - Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions • 88- Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion • 399 - Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga – Goonoo sandstone forests, Brigalow Belt South Bioregion • 397 - Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion • 398 - Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion

Native Milkwort (*Polygala linariifolia*)	
	• 406 - White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests • 1384 - White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Known populations	North from Copeton Dam and the Warialda area to southern Queensland; also found on the NSW north coast near Casino and Kyogle, and there is an isolated population in far western NSW near Weebah Gate, west of Hungerford (OEH, 2020b).
Survey requirements	Survey months: October to February Native Milkwort is an annual or perennial herb about 20 cm high with a woody tap root and more-or-less upright branches. Its leaves are up to 3.5 cm long, variable in shape but usually oval, and often broader towards the tips. They have a short point at the tip and are dull in texture as they are sparsely covered in short hairs. Small groups of flowers appear in spring-summer, and are bluish purple, yellowish or occasionally white. The flattened fruit capsule is a broad oblong with a narrow wing, and the seeds are black with white hairs.
Survey effort	Flora surveys were conducted in the following months in the study area: • September 2018: 5 days, two ecologists– rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, 4 ecologists– flora plot surveys and threatened flora searches • March 2019: 4 ecologists over 10 days- flora plot surveys and threatened flora searches • September 2019: 3 ecologists over 10 days- targeted flora searches and flora plot surveys. Surveys included targeted searches for the species, as well as opportunistic observations while driving or undertaking other survey types.
Survey results	Species was not observed in any survey period. Dry conditions likely to have affected growth and detectability. Assumed to occur and suitable potential habitat occurs in the proposal site.
Species polygon guidance and justification	Species polygons have been made based on survey guidelines (OEH, 2017). The standard 30 metre buffer for threatened plants has been increased to 150 metres based on individual species advice and consultation with BCD accountable officers. In addition, the species has been assumed to be present in associated PCTs observed in the proposal site where there are recent and known records in Segment 10, where drought conditions have impacted species detectability.
Relevant IBRA subregions	Northern Basalts – known Northern Outwash – predicted Liverpool Plains – known Pilliga – known Pilliga Outwash – known



PCT numbers included in polygons

88	409
394	746
397	1384
398	
399	
406	

NARROMINE TO NARRABRI

Flora Species Polygons - Native Milkwort - Segment 7 Borrow Pit D

MAP 1 OF 2

0 0.085 0.17 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:6,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Native Milkwort *(Polygala linariifolia)* species polygon

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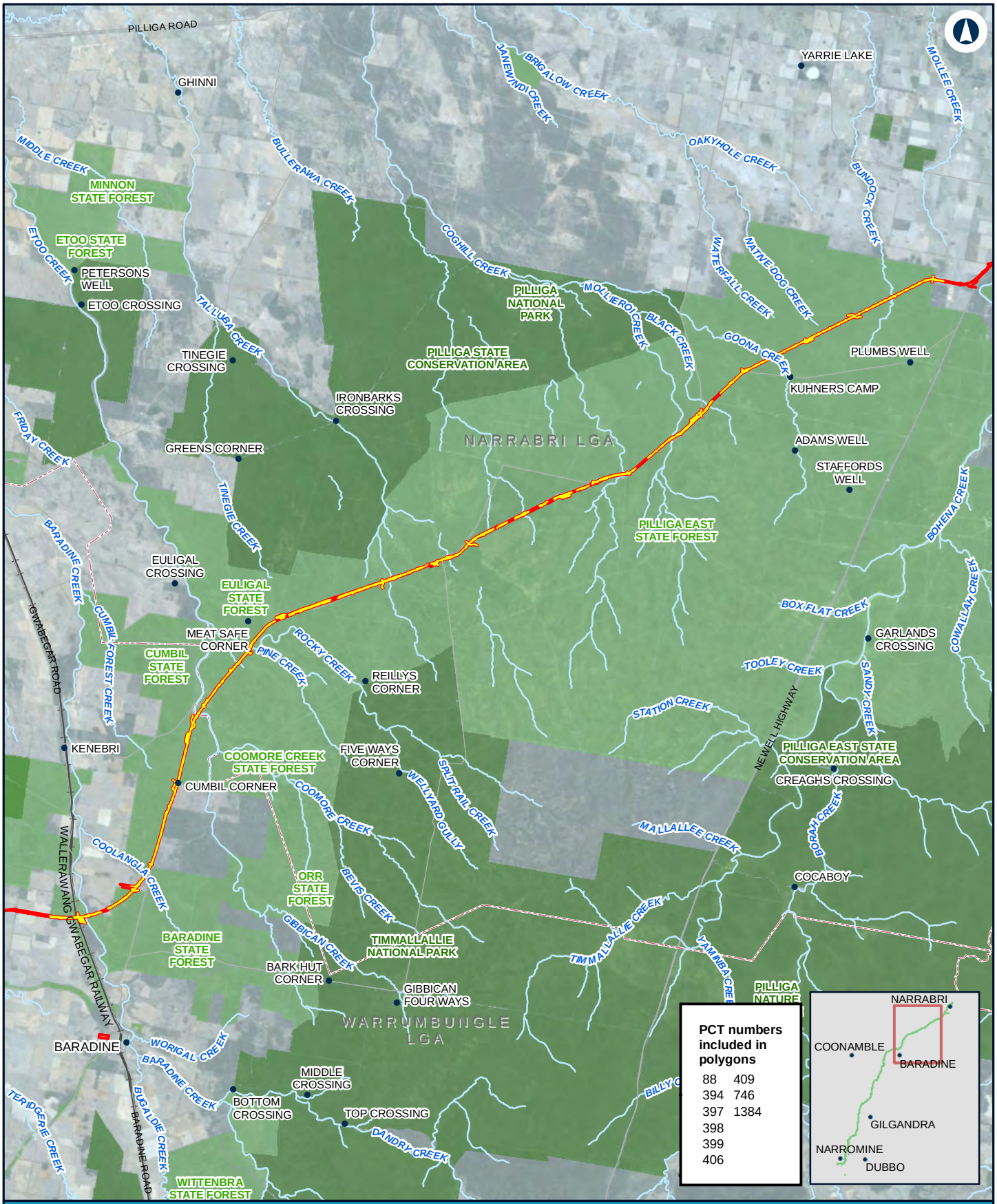

NARROMINE TO NARRABRI Flora Species Polygons - Native Milkwort - Segment 10 Pilliga MAP 2 OF 2

0 4.5 9 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:340,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Native Milkwort *(Polygala linariifolia)* species polygon

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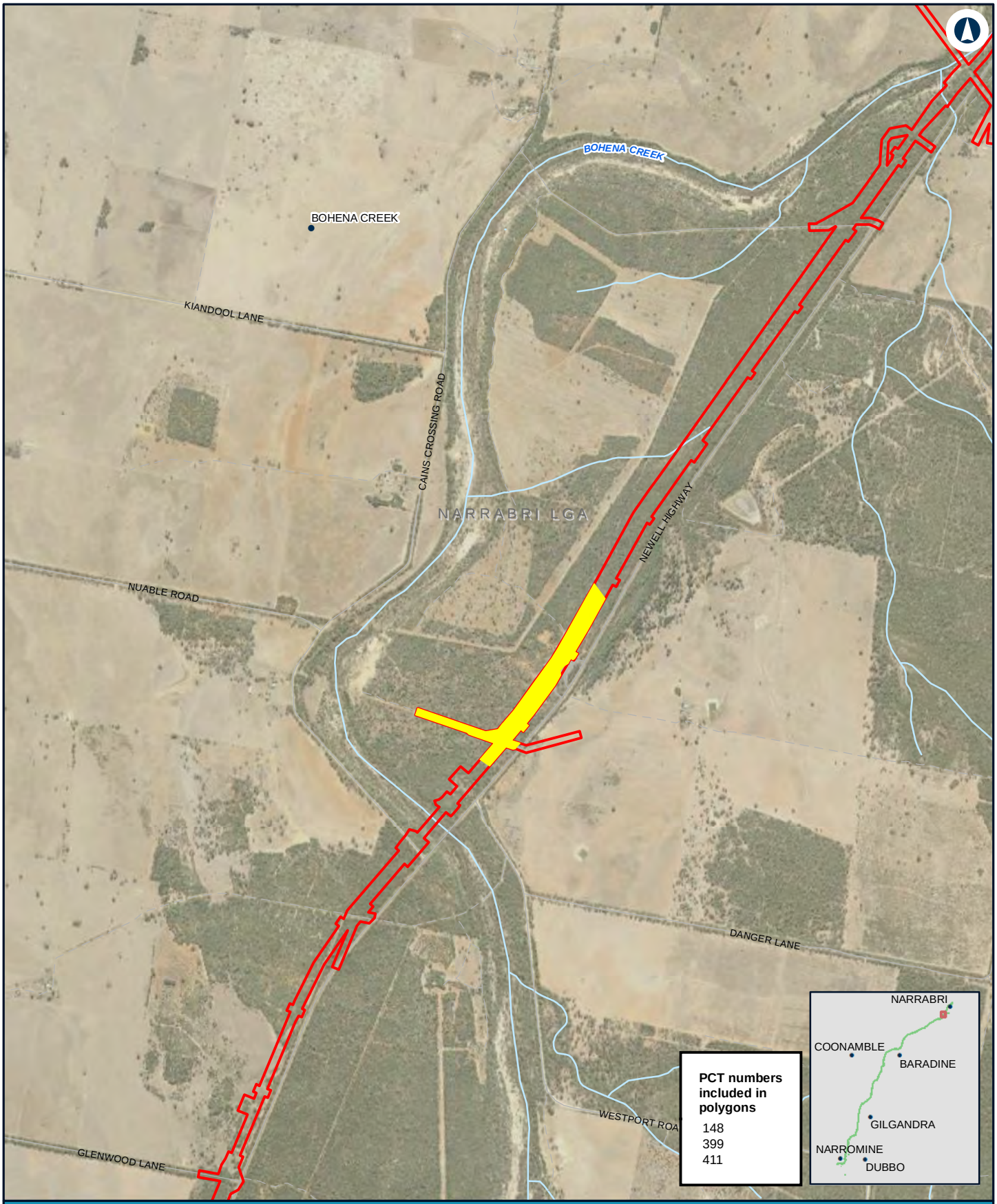
Table I9 Coolabah Bertya

Coolabah Bertya	*(Bertya oponnens)*
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Vulnerable
Species polygon area	4 plants
Reproduction requirements	The yellow-brown flowers appear during July and August and are followed by rounded seed capsules 8 - 9 mm long which contain two to three seeds. (OEH, 2020b)
Habitat requirements	• Flowering time is July and August, although seed formation can commence as early as July, especially in Jacks Creek State Forest. • The disturbance agents of fire and mechanical disturbance appear to trigger germination and/or suckering in Coolabah Bertya. The most appropriate time interval between disturbance events is not known. • Coolabah Bertya occurs in a range of habitats including stony mallee ridges and cypress pine forest on red soils. The wide variation in habitat type between the populations makes the identification of critical habitat very difficult. Consideration of disturbance regimes and grazing management are probably more important to the survival of populations in the long term. • Associated species at Jacks Creek State Forest include *Eucalyptus chloroclada, Callitris glaucophylla* and *Eucalyptus fibrosa*. • Each population of Coolabah Bertya has a slightly different age structure, ranging from senescent to a similar number of juveniles and adults (OEH, 2020b).
Habitat in the study area	Known from within the proposal site near Bohena Creek (Segment 11). Associted PCTs include: • 148 - Dirty Gum - Buloke - White cypress pine - ironbark shrubby woodland of the deep sandy soils on the Liverpool Plains Region of the Brigalow Belt South Bioregion • 399 - Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion • 411 - Buloke - White Cypress Pine woodland on outwash plains in the Piliga Scrub and Narrabri regions, Brigalow Belt South Bioregion

Coolabah Bertya	*(Bertya oponnens)*
Known populations	This plant is currently known from only four scattered sites in NSW: one from private property near Coolabah in western NSW and two to the south of Narrabri on the North West Slopes, including the largest population in Jacks Creek State Forest. The fourth population was known from private property near Cobar but this population has not been seen since 1982 and is possibly now extinct (OEH, 2020b).
Survey requirements	Survey months: All months. Coolabah Bertya is a slender shrub to 4 metres tall. It may be multi-stemmed or have a single trunk up to 70 - 90 mm in width. The branches and stems are densely covered with whitish to brown intertwined hairs. The thick leaves are smooth and dark green above and covered in velvety hairs below and are mostly arranged in pairs along the stems. The leaves measure 10 - 80 mm long by 5 - 25 mm wide and the margins are curved under. The yellow-brown flowers appear during July and August and are followed by rounded seed capsules 8 - 9 mm long which contain two to three seeds.
Survey effort	Flora surveys were conducted in the following months in the study area: • September 2018: 5 days, two ecologists– rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, 4 ecologists– flora plot surveys and threatened flora searches • March 2019: 4 ecologists over 10 days- flora plot surveys and threatened flora searches • September 2019: 3 ecologists over 10 days- targeted flora searches and flora plot surveys. Surveys included targeted searches for the species, as well as opportunistic observations while driving or undertaking other survey types.
Survey results	Species was not observed in any survey period. Dry conditions likely to have affected growth and detectability. Assumed to occur and suitable potential habitat occurs in the proposal site.
Species polygon guidance and justification	Species polygons have been made based on survey guidelines (OEH, 2017). The standard 30 metre buffer for threatened plants has been increased to 150 metres based on individual species advice and consultation with BCD accountable officers. In addition, the species has been assumed to be present in associated PCTs observed in the proposal site where there are recent and known records in Segment 11 (Pilliga to Narrabri), where drought conditions have impacted species detectability.
Relevant IBRA subregions	Pilliga – known Pilliga Outwash – known



NARROMINE TO NARRABRI

Flora Species Polygons - Coolabah Bertya Segment 11 Pilliga to Narrabri

MAP 1 OF 1

0 0.4 0.8 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:30,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Coolabah Bertya *(Bertya opponens)* species polygon

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Table I10 *Homopholis belsonii* (Belson's Panic)

Homopholis belsonii (Belson's Panic)	
BC Act Status	Endangered
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Vulnerable
Species polygon area	None
Breeding requirements	• Flowering occurs February–May (Sharp & Simon 2001) and possibly November–December as fruiting has been recorded in February (Leigh et al. 1984). • The exact viability time for seeds is not known. However, initial trials have indicated that it germinates readily without the need for a dormancy period (Menkins 1998; Trémont & Whalley 1993a). • Dispersal of seed occurs when the panicle dries after seed formation and breaks off in the wind. The wind causes the panicle to migrate forward in a continuous rolling motion until an obstacle is encountered (Menkins 1998). Menkins (1998) suggests that the seed is then discarded with the further drying of the panicle (DEE, 2020).
Habitat requirements	• Grows in dry woodland (eg Belah) often on poor soils, although sometimes found in basalt-enriched sites north of Warialda and in alluvial clay soils (OEH, 2019b). • Occurs at elevations from 200 metres to 520 metres ASL. (Threatened Species Scientific Committee, 2008) • Occurs in Brigalow Belt South Bioregion on rocky hills supporting Eucalyptus albens (White Box), in Geijera parviflora (Wilga) woodland, flat to gently undulating alluvial areas supporting Casuarina cristata (Belah) forest and soil and plant communities of Eucalyptus populnea (Poplar Box) (Threatened Species Scientific Committee, 2008). • Generally found among fallen timber at the base of trees or shrubs or along the bottom of netting fences (Threatened Species Scientific Committee, 2008d).
Habitat in the study area	Species habitat lies primarily in the south and north of the study area. The majority of grasslands, both disturbed, on road sides and grazed occur south and north of the Pilliga State Forest. Darker soils and clay loam soils occur within these areas (eSPADE, 2020).
Known populations	It occurs on the northwest slopes and plains of NSW, mostly between Wee Waa, Goondiwindi and Glen Innes. It also occurs in Queensland, mainly in the Brigalow Belt South bioregion. (OEH, 2019b)
Survey requirements	Survey months: December to April Use flowers to locate. Species grows under shrubs and trees and can be easily overlooked. May prefer slightly modified environments (OEH, 2019b).

***Homopholis belsonii* (Belson's Panic)**	
Survey effort	Flora surveys were conducted in the following months: • September 2018: 5 days, two ecologists– rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, 4 ecologists– flora plot surveys and threatened flora searches • March 2019: 4 ecologists over 10 days- flora plot surveys and threatened flora searches • September 2019: 3 ecologists over 10 days- targeted flora searches and flora plot surveys. Surveys included targeted searches for the species, as well as opportunistic observations while driving or undertaking other survey types.
Survey results	Species was not observed in any survey period.
Species polygon guidance	A species polygon is to be established by the location of the individual plant or group of plants, and a 30 metres buffer area around the outside of the individual plant or group of plants (OEH, 2017).
Species polygon guidance and justification	Species was not observed in any survey period. Consultation with BCD accountbale officer confirmed that the species is unlikey to occur in the proposal site and no species polygons are required for the proposal.
Relevant IBRA subregions	Northern Basalts – known Castlereagh Barwon – predicted

Table I11 *Dichanthium setosum* (Bluegrass)

Dichanthium setosum (Bluegrass)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Vulnerable
Species polygon area	None
Breeding requirements	• Flowering time is mostly in summer (OEH, 2019b) • A fire frequency of greater than five years has been recommended for the species (DEE, 2020)
Habitat requirements	• Associated with heavy basaltic black soils and red-brown loams with clay subsoil (OEH, 2019b). • Often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture. (Often collected from disturbed open grassy woodlands on the northern tablelands, where the habitat has been variously grazed, nutrient-enriched and water-enriched). It is open to question whether the species tolerates or is promoted by a certain amount of disturbance, or whether this is indicative of the threatening processes behind its depleted habitat (OEH, 2019b). • Associated species include Eucalyptus albens, Eucalyptus melanophloia, Eucalyptus melliodora, Eucalyptus viminalis, Myoporum debile, Aristida ramosa, Themeda triandra, Poa sieberiana, Bothriochloa ambigua, Medicago minima, Leptorhynchos squamatus, Lomandra aff. longifolia, Ajuga australis, Calotis hispidula and Austrodanthonia, Dichopogon, Brachyscome, Vittadinia, Wahlenbergia and Psoralea species (OEH, 2019b).
Habitat in the study area	Species habitat lies primarily in the south and north of the study area. The majority of grasslands, both disturbed, on road sides and grazed occur south and north of the Pilliga State Forest. Darker soils and clay loam soils occur within these areas (eSPADE, 2020). PCTs which reflect this species habitat requirements include: • 619- Derived Wire Grass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion • 599- Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion • 444- Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion • 250- Derived tussock grassland of the central western plains and lower slopes of NSW These vegetation communities are located within the study area north and south of the Pilliga State Forest. Previous observations have been made mostly within the wider locality of the study area.

***Dichanthium setosum* (Bluegrass)**	
Known populations	• Bluegrass occurs on the New England Tablelands, North West Slopes and Plains and the Central Western Slopes of NSW, extending to northern Queensland. It occurs widely on private property, including in the Inverell, Guyra, Armidale and Glen Innes areas (OEH, 2019b). • Distribution extends west to Narrabri (Ayers et al., 1996). • Bluegrass is locally common or found as scattered clumps in broader populations. The extensive distribution and wide environmental tolerances make predictions about suitable habitat difficult. (OEH, 2019b).
Survey requirements	Survey months: November to May Use seed-head to identify. Survey in November to May, 3 to 4 weeks after effective rainfall (OEH, 2019b)
Survey effort	Flora surveys were conducted in the following months: • September 2018: 5 days, two ecologists– rapid data surveys. Threatened flora searches (very low number of locations due to no access) • November 2018: 10 days, 4 ecologists– flora plot surveys and threatened flora searches • March 2019: 4 ecologists over 10 days- flora plot surveys and threatened flora searches • September 2019: 3 ecologists over 10 days- targeted flora searches and flora plot surveys. Surveys included targeted searches for the species, as well as opportunistic observations while driving or undertaking other survey types.
Survey results	Species was not observed in any survey period.
Species polygon guidance and justification	Species was not observed in any survey period. Consultation with BCD accountbale officer confirmed that the species is unlikey to occur in the proposal site and no species polygons are required for the proposal.
Relevant IBRA subregions	Northern Basalts – known Liverpool Plains – known Pilliga – known Pilliga Outwash – predicted Bogan Macquarie – predicted Inland Slopes – known

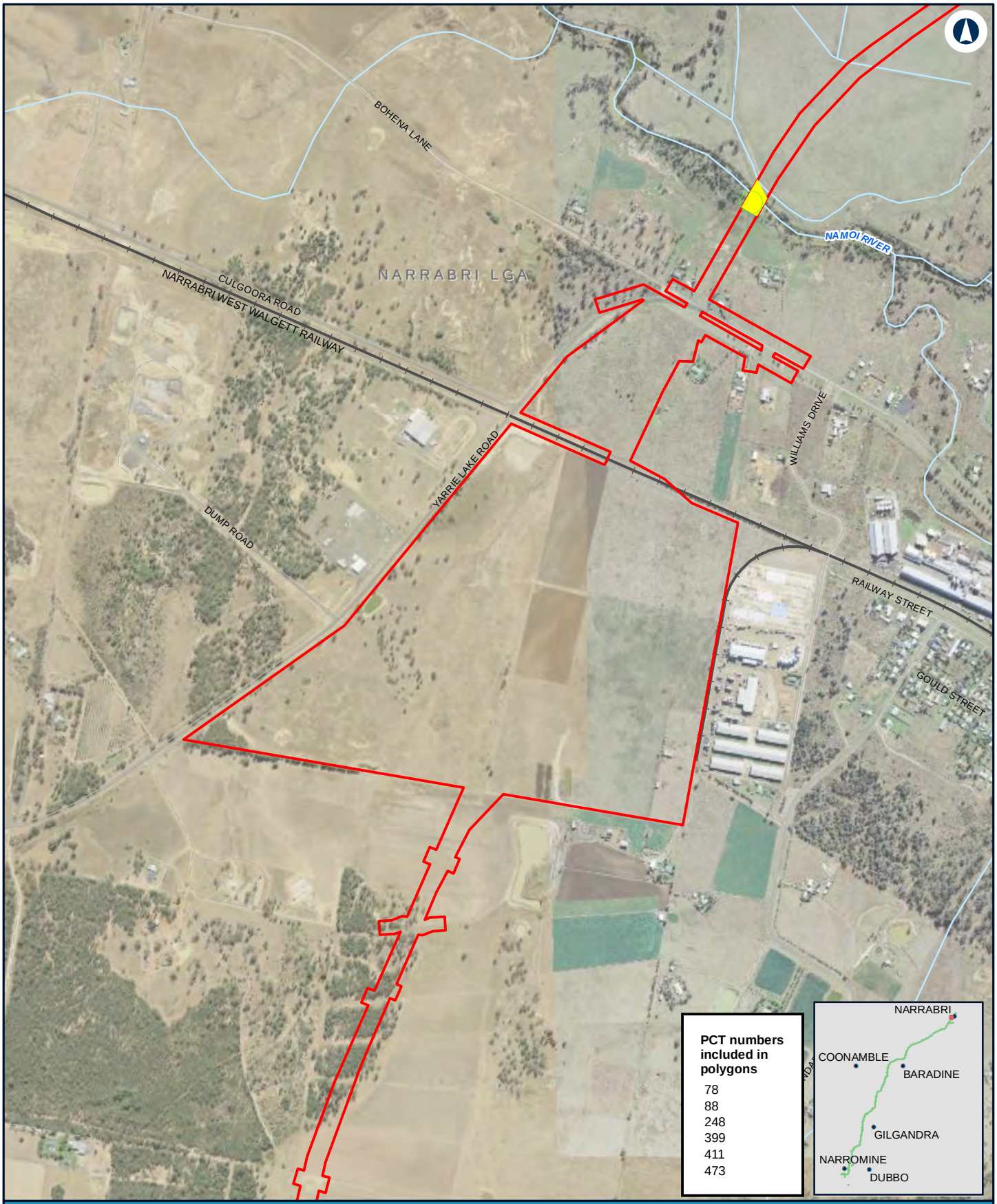
Table I12 Barking Owl

Barking Owl (*Ninox connivens*)	
BC Act Status	Vulnerable
Credit type	Species (breeding habitat only)
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	24.29 hectares
Breeding requirements	• Nesting generally occurs during mid-winter and spring. Laying tends to occur in August, and fledging in November (EES 2019b). • Living or dead trees with hollows greater than 20 cm diameter and greater than 4m above the ground (EES 2019b) • Nest trees are usually located near watercourses or wetlands (Higgins 1999). • OEH (2019c) notes that breeding can be identified by suitable habitat AND 1. Presence of male and female or 2. Calling to each other (duetting) or 3. Find nest or 4. Existing breeding habitat identified.
Habitat requirements	• Inhabits eucalypt woodlands, open forest, swamp woodlands, and, especially in inland areas, timber along watercourses. Roosts along creek lines in dense, tall understorey foliage (eg in Acacia and Casuarina), or dense eucalypt canopy (EES 2019b). • Requires very large permanent territories in most habitats due to sparse prey densities. Territories range from 30 to 200 hectares (EES 2019b). • Preferentially hunts small arboreal mammals such as Squirrel Gliders and Common Ringtail Possums, but when loss of tree hollows decreases these prey populations the owl becomes more reliant on birds, invertebrates and terrestrial mammals such as rodents and rabbits. Can catch bats and moths on the wing, but typically hunts by sallying from a tall perch (EES 2019b). • In the Pilliga, diet biomass comprises 56 per cent birds, 29 per cent Sugar Gliders, with the remainder comprising other mammals and insects (Stanton 2011). Insects are likely to be an important seasonal diet item and occupy a large proportion of foraging effort (Stanton 2011).
Habitat in the study area	• The main area of habitat for the Barking Owl in the proposal site is associated with the western and northern sections of the Pilliga. Potential breeding habitat is present along creek lines that are crossed by the proposal in this area. Large, hollow-bearing River Red Gums and Blakely's Red Gums are present in these locations. • Potenial breeding and foraging habitat is also present along the Namoi River, Castlereagh River and Macquarie River. • Based on the distribution of records (EES 2019a), the Barking Owl is less likely to occur in small woodland patches or creek lines in agricultural land.

Barking Owl (*Ninox connivens*)	
Known populations	**Pilliga forests** • Surveys in 2001 demonstrated that the Pilliga Forest supported the largest Barking Owl population in southern Australia (EES 2019b). The population was found to occur in the western and northern parts of the Pilliga Forest, and this distribution correlated with the distribution of the Pilliga outwash geology formation and negatively correlated with the occurrence of wildfires that typically affect areas underlain by the Pilliga Sandstone (Milledge 2004; Soderquist 2009). The location of the Barking Owl population in this area is likely linked to the more productive land associated with the Pilliga outwash (Stanton 2011). • Debus (2002) recorded two pairs of Barking Owls in the Pilliga 5 kilometres apart in State Forest, on intermittently flowing creeks within extensive woodland. A fifth bird in the Pilliga was on the edge of the forest, near intermittent and permanent creeks on well-wooded private land, 4 kilometres from one of the pairs. • Forestry Corp provided the locations of three known nest trees that occur near the alignment in the Pilliga area. At one of these trees (Rocky Creek), a Barn Owl was observed. Known nest trees also occur at Etoo Creek and Baradine Creek • The species has been recorded in various State Forests of the Pilliga: Yarrigan, Pilliga West and Cumbil/Euligal (E. M. Date in Debus 1997a); Cumbil/Euligal and Pilliga East (R. Kavanagh, C. Turbill, D. Paull, pers. comm.). Breeding was recorded in Cumbil and Euligal State Forests in 1997 and 1998 (R. Kavanagh in Debus 2001) • Pilliga Scrub: well-wooded private land on Baradine Creek adjoining Merriwindi SE Kenebri (one survey point); Cumbil SF, Kenebri (two survey points). Overnight camp within 1 kilometres of Baradine Ck point. Both owl species previously reported in Pilliga Scrub (in 1990-96: Debus and Rose 1994; Debus 1997a). Masked Owl recorded at Baradine Creek site; pair of Barking Owls recorded at each of the Cumbil SF sites (Etoo Creek near Aloes Well, and Cumbil Forest Creek). Also incidental record of a Barking Owl near the Baradine Creek site (Debus 2001). **Other areas** • NPWS (2003) notes that the Barking Owl has previously been recorded in the Narromine, Gilgandra, Coonamble and Coonabarabran and Narrabri local government areas. Records from the last 20 years show most records are from the western Pilliga, other large forested areas, and along large rivers such as the Namoi River, Castlereagh River and Macquarie River. Few records are from cleared agricultural land (EES 2019a). • The survey results of Debus (2001), particularly for the Pilliga forests, suggest that on the western slopes of NSW large areas of forest on public land are likely to support populations of both Barking and Masked Owls, whereas small fragments on private land are unlikely to support either species.
Survey requirements	Survey months: May - December Because disturbance reduces the pair's foraging time, and can pull the female off her eggs even on cold nights, recordings should not be broadcast unnecessarily nor during the nesting season (EES 2019b).

Barking Owl (*Ninox connivens*)	
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists – habitat assessments – no Pilliga surveys) • November 2018 (10 days, two ecologists – habitat assessments, 8 nights of nocturnal surveys along the alignment) – no targeted Pilliga surveys other than driving on one day along Pilliga Forest Way) • March 2019 (10 days, four zoologists – diurnal surveys – trapping and bird surveys in the Pilliga) • March 2019 (5 nights, two zoologists – nocturnal surveys in the Pilliga, including call playback) • August 2019 (5 days, two zoologists – diurnal and nocturnal surveys, 1 night in the Pilliga) • Late September-early October 2019 (6 days, two ecologists. 2 days, 2 nights in the Pilliga). Diurnal surveys included habitat assessments and searches for signs of nesting at large hollow-bearing trees along creek lines (eg whitewash, feathers, owl pellets). Nocturnal surveys were conducted at various locations along the alignment in November 2018, August 2019 and September/October 2019 and included spotlighting and call playback for the Barking Owl. Targeted nocturnal surveys were conducted in March in the Pilliga and included spotlighting and call playback for the Barking Owl. Call playback was limited during winter to limit possible disruption of nesting. Four known nest tree locations in the vicinity of the alignment were provided by Forestry Corp in March 2019. One was outside the alignment (about 1 kilometres north), and two appeared to be within a few metres of each other. The nest trees in close proximity to the alignment were inspected during diurnal surveys for signs of occupation. At one of these locations a Barn Owl was observed, and may be using the hollow previously used by the Barking Owl.
Survey results	No Barking Owls were heard or observed during surveys. Feathers collected were identified by the Australian Museum as Boobook. Other owls recorded included the Southern Boobook (*Ninox novaeseelandiae*) at various locations (Macquarie River at Narromine, Ewenmar Creek near Collie Road, Kickabil Creek at Gilmours Road, Leeches Creek Road south-west of Gilgandra, and various locations in the Pilliga), and the Eastern Barn Owl (*Tyto javanica*) in the Pilliga and north of Narrabri in agricultural land.
Species polygon guidance	Breeding can be identified by suitable habitat AND 1. presence of male and female or 2. calling to each other (duetting) or 3. find nest or 4. existing breeding habitat identified. Uses paddock trees to extend foraging area from intact woodland (EES 2020). Where a breeding site has been identified in accordance with the BAM the species polygon should be established by providing a circular buffer with a 100m radius around the nest tree. The purpose of the buffer is to minimise disturbance/avoid clearing, for a development application, or to conserve and improve habitat, for a biodiversity stewardship agreement, within the area essential for breeding. This includes habitat suitable for male roosts, feeding/grooming perches and fledgling requirements. It does not account for foraging habitat. The shape of the buffer can be modified where evidence provided in the Biodiversity Assessment Report indicates an alternative shape would better meet the species needs in the context of the assessment site. For example, extant vegetation is linear and the nest tree is already located near the edge of the wooded area (EES 2020).

Barking Owl (*Ninox connivens*)	
Species polygon justification	Yes – assumed present Three known breeding sites were identified in close proximity to the alignment in the Pilliga forests by Forestry Corp. Additional breeding locations may also be impacted. Given the difficulty in identifying nest trees along the entire alignment given access restrictions, and the importance of the Pilliga Barking Owl population, a number of 'breeding sites' have been mapped for the purposes of calculating species credits. These have been positioned in areas of suitable riparian habitat with large hollow-bearing trees, habitat for prey species and near previously recorded nest tree locations. Breeding sites have been located at the following locations: • Macquarie River • Castlereagh River • Bohena Creek • Namoi River • Narrabri Creek • One per length of PCT 399 (Red Gum - Rough-barked Apple sandy creek woodland) in the Pilliga and Pilliga-Narrabri BDAR zones. This PCT occurs along creek lines in the Pilliga, contains large hollow-bearing trees, and is the PCT with which the known nest sites are associated. A 100 metres buffer has been included around each of the indicative nest trees. All other habitat for the species is captured in the ecosystem credits for the relevant PCTs.
Relevant IBRA subregions	Northern Basalts – known Liverpool Plains – known Pilliga – known Pilliga Outwash – known Castlereagh Barwon – known Bogan Macquarie – known Inland Slopes - known



NARROMINE TO NARRABRI

Fauna Species Polygons - Barking Owl - Segment 3 Narrabri West multi-function compound

MAP 1 OF 5

0 0.2 0.4 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:15,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Barking Owl indicative nest tree
- Barking Owl species polygon

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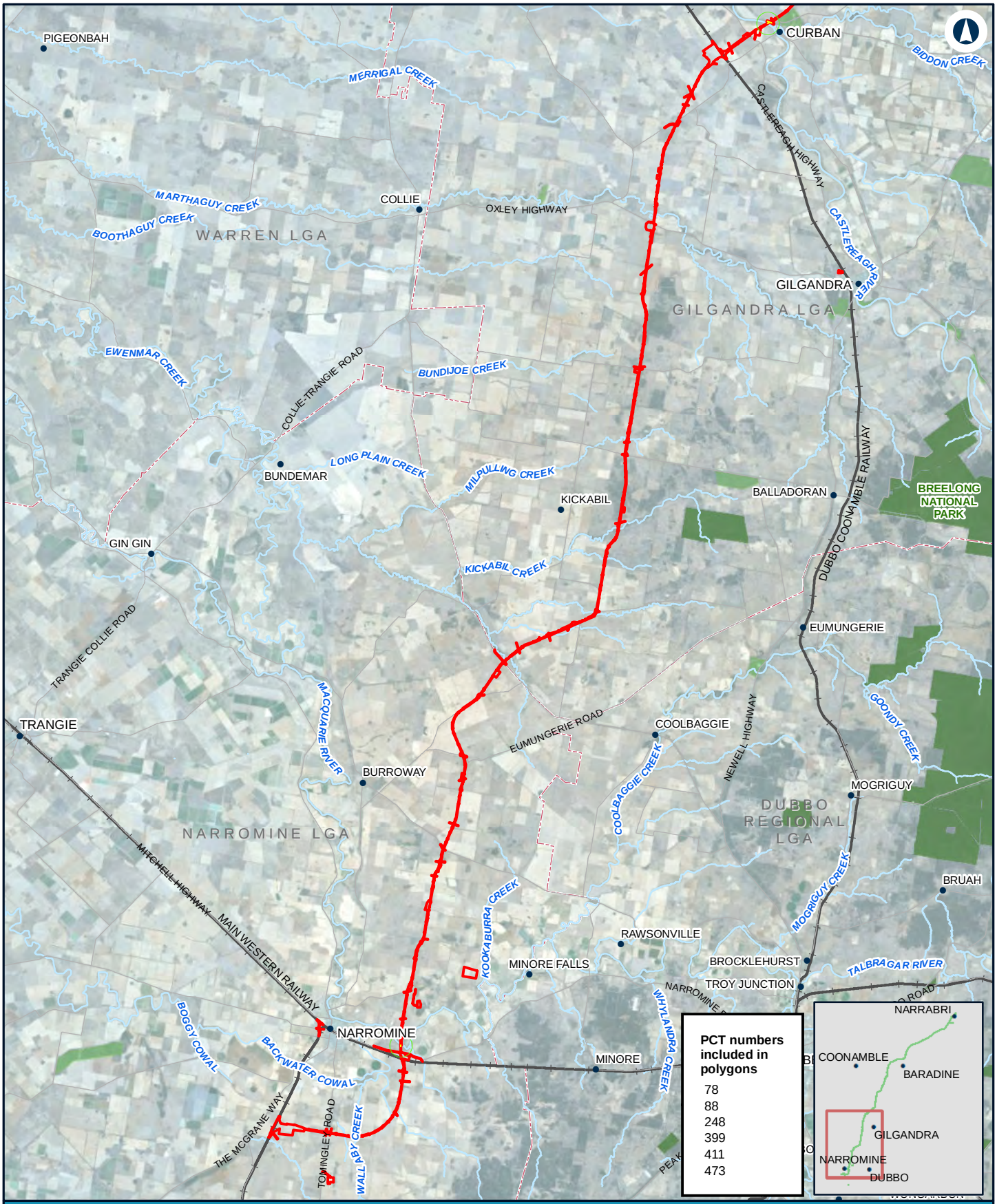

NARROMINE TO NARRABRI | Fauna Species Polygons - Barking Owl - Segment 8 Narromine to Curban | MAP 2 OF 5

0 5.5 11 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:400,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Barking Owl indicative nest tree
- Barking Owl species polygon

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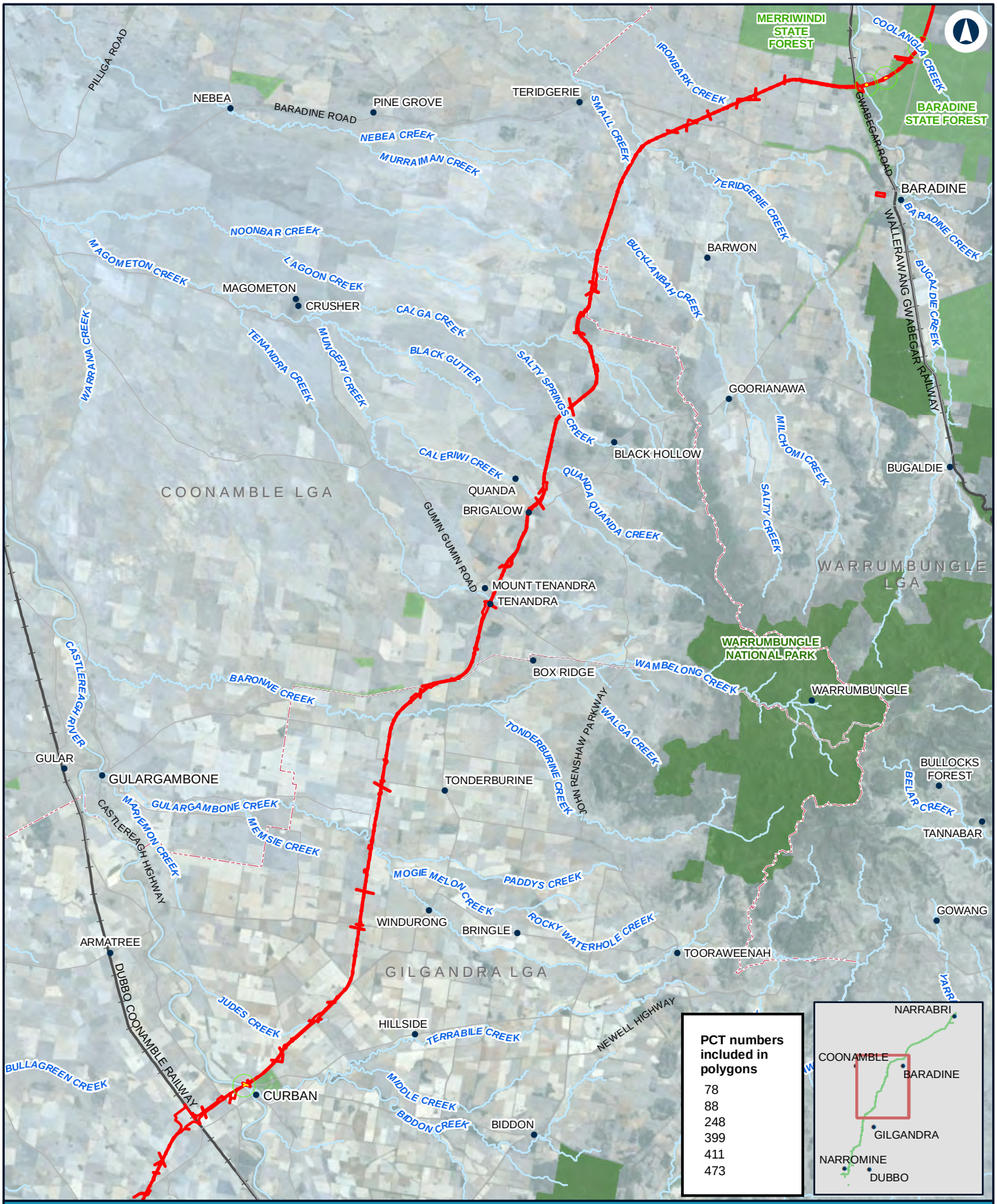

NARROMINE TO NARRABRI | Fauna Species Polygons - Barking Owl - Segment 9 Curban to Pilliga | MAP 3 OF 5

0 5 10 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:375,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Barking Owl indicative nest tree
- Barking Owl species polygon

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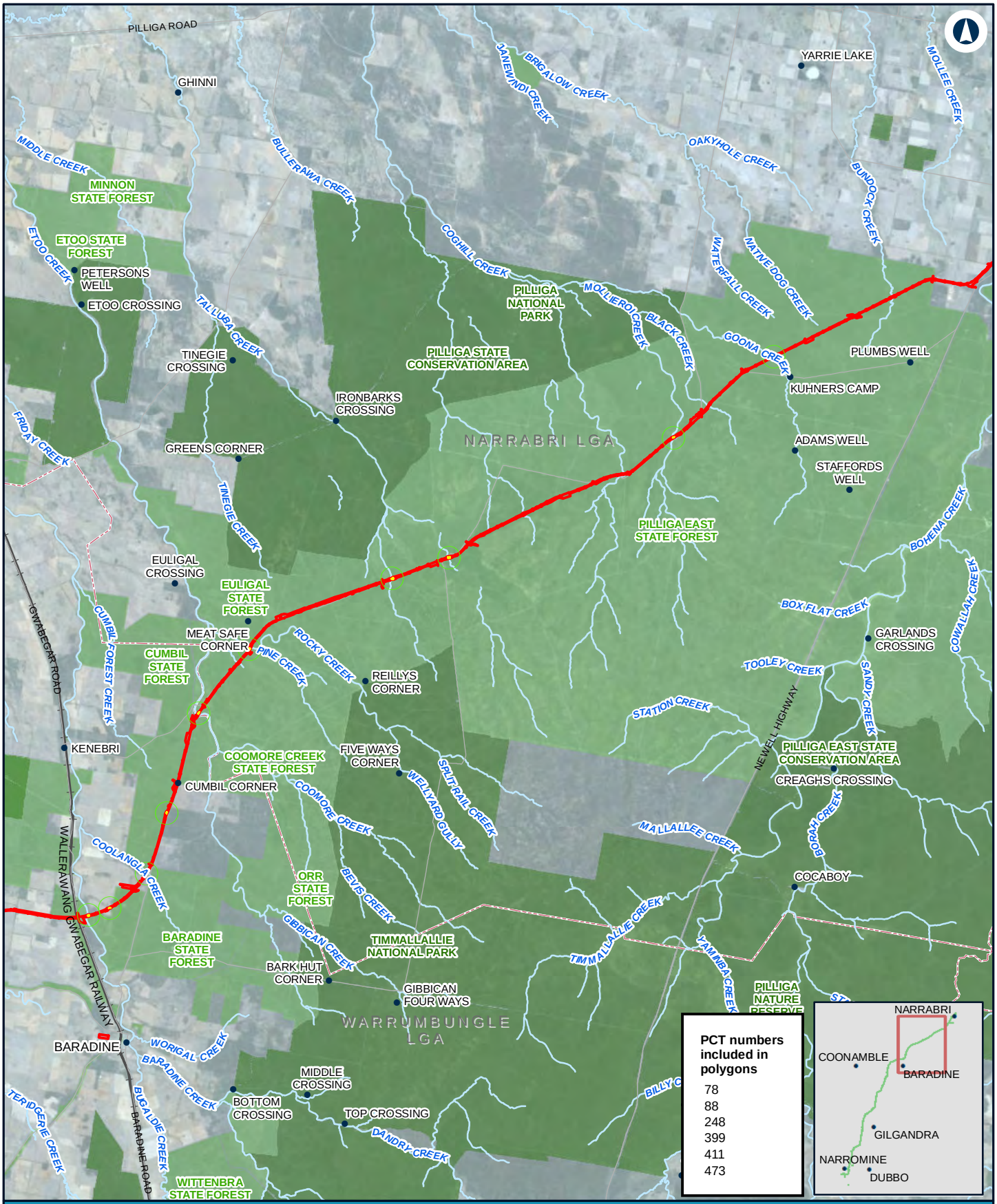

NARROMINE TO NARRABRI | Fauna Species Polygons - Barking Owl - Segment 10 Pilliga | MAP 4 OF 5

0 4.5 9 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:340,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Barking Owl indicative nest tree
- Barking Owl species polygon

INLAND RAIL ARTC

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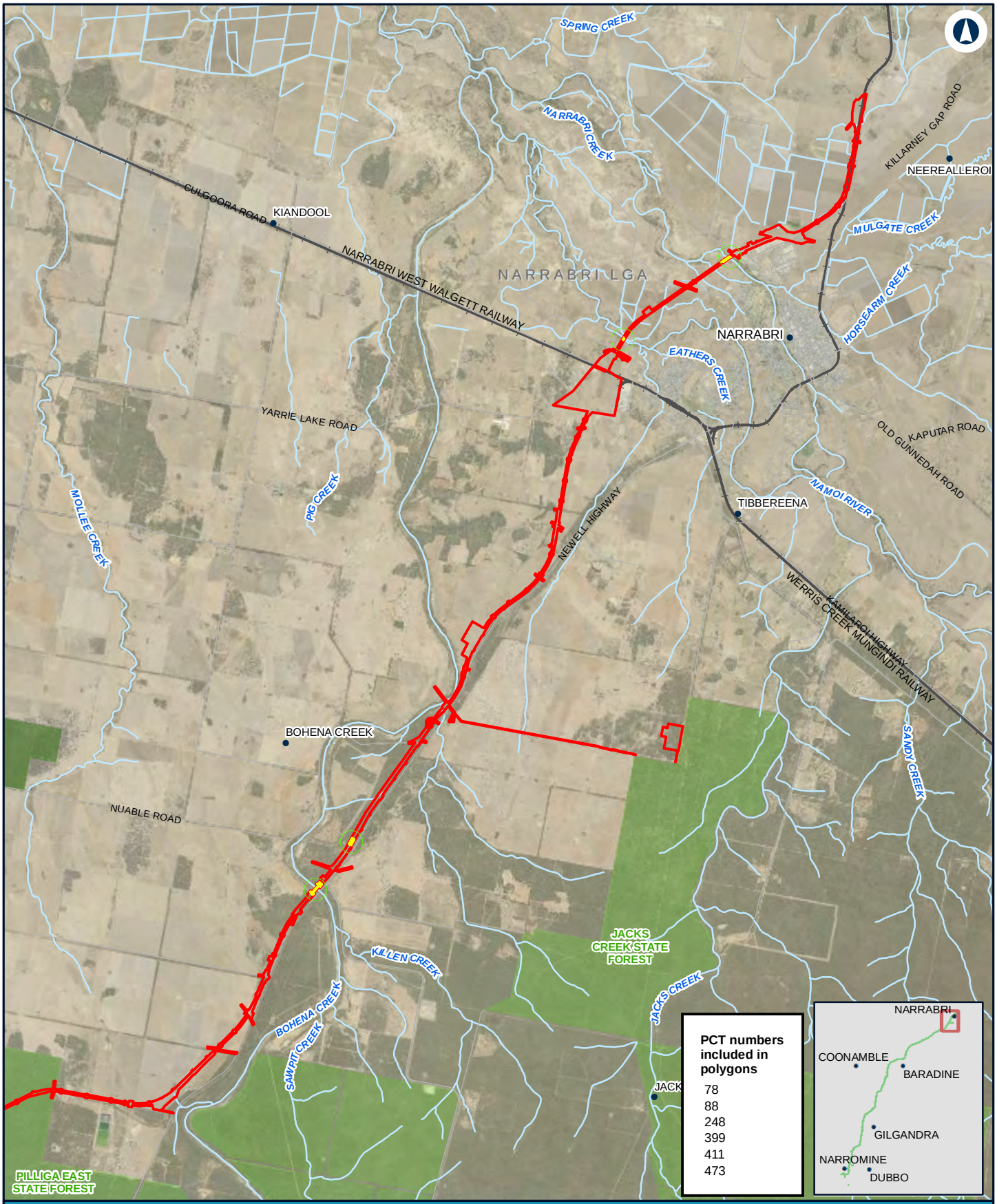

NARROMINE TO NARRABRI

Fauna Species Polygons - Barking Owl - Segment 11 Pilliga to Narrabri

MAP 5 OF 5

0 1.5 3 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:122,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Barking Owl indicative nest tree
- Barking Owl species polygon

INLAND RAIL ARTC

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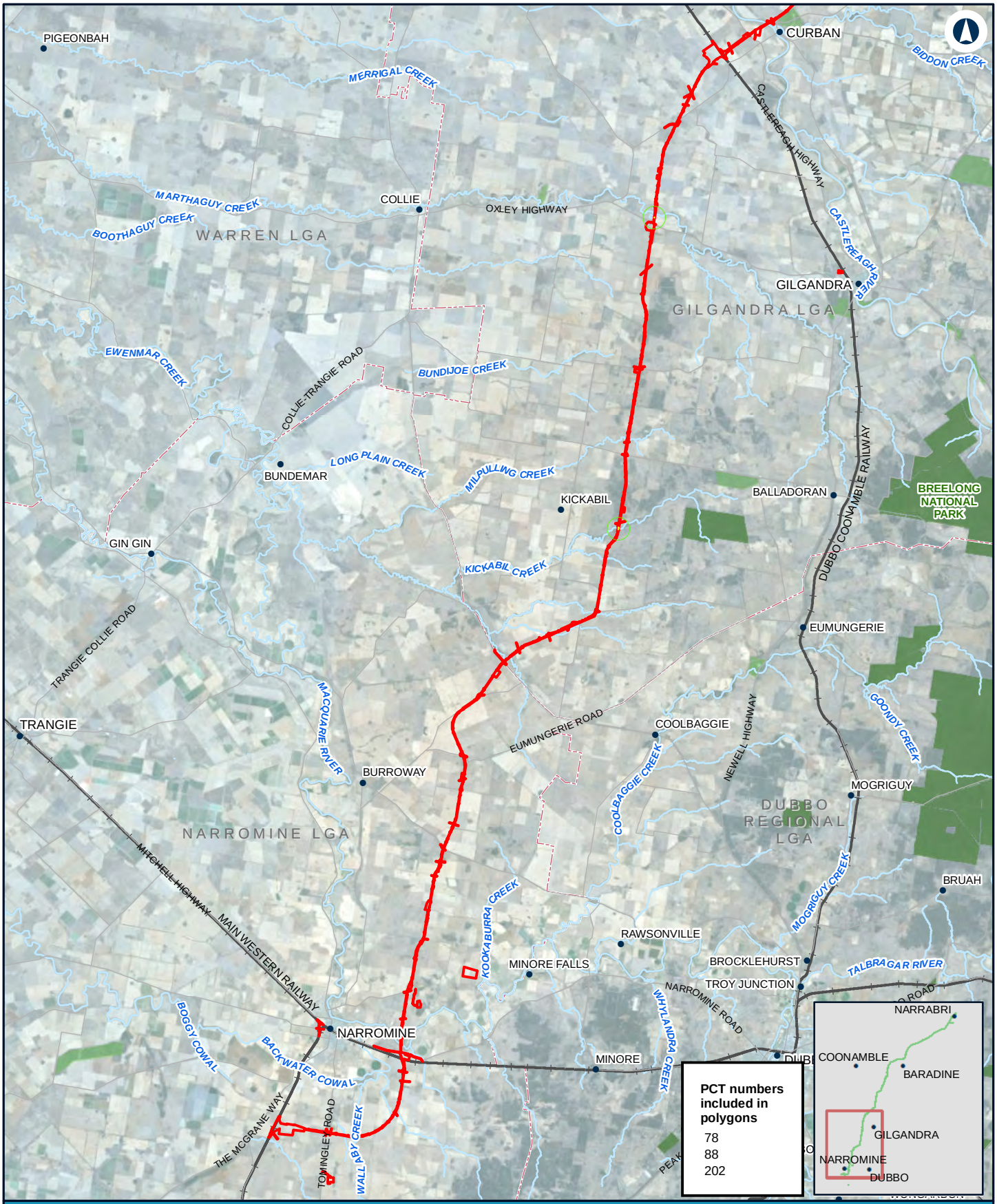
Table I13 Masked Owl

Masked Owl (*Tyto novaehollandiae*)	
BC Act Status	Vulnerable
Credit type	Species (breeding habitat only)
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	7.25 hectares
Breeding requirements	• Nesting occurs in old hollow eucalypts, live or dead but commonly live, in a variety of topographic positions from gully to upper slope, with hollows greater than 40 cm wide and greater than 100 cm deep; there is no relationship with distance to streams (DEC 2006). • Hollow entrances are at least 3 metres above ground, in trees of at least 90 cm diameter at breast height. The pair is faithful to a traditional nesting hollow, but may also use alternative hollows in the breeding territory in different years. ((DEC 2006, Data from Schodde and Mason 1980, Kavanagh 1996, Kavanagh 2002, Kavanagh and Murray 1996, Mooney 1997, Higgins 1999). • Laying is irregular and unpredictable, occurring from late summer to spring but mostly March to July (DEC 2006).
Habitat requirements	• Habitat for this species is widespread throughout the dry eucalypt forests of the tablelands, western slopes and the undulating wet-dry forests of the coast. Optimal habitat includes an open understorey and a mosaic of sparse (grassy) and dense (shrubby) ground cover on gentle terrain (Kavanagh et al. 1995, Kavanagh 1997). • Roosting occurs in hollows in live or occasionally dead eucalypts; dense foliage in gullies; and caves or recesses in cliffs. Hollow sites can be in a variety of topographic positions, from gully to upper slope, and are also used as nest sites or have similar characteristics to those used for nesting (DEC 2006). • the Masked Owl is a specialist predator of terrestrial mammals, particularly native rodents (DEC 2006, Kavanagh 2002). Small dasyurids are also important prey in forests; introduced rodents and rabbits are important in disturbed areas. The diet is supplemented by bandicoots, arboreal mammals (Sugar Glider, Common Ringtail Possum), and some birds (DEC 2006).
Habitat in the study area	• The main area of habitat for the Masked Owl in the proposal site is the Pilliga. Potential breeding habitat is present along creek lines that are crossed by the proposal in this area where large, hollow-bearing River Red Gums and Blakely's Red Gums are present. Large, hollow-bearing trees are a limited resource in other forest types in the Pilliga due to logging and fire. • Potential habitat also occurs in large remnants elsewhere in the alignment, such as along major creeklines or rivers where there is good connectivity. • Small remnants are assumed to provide breeding habitat for this species.

Masked Owl (*Tyto novaehollandiae*)	
Known populations	• The Masked Owl lives in eucalypt forests and woodlands from the coast, where it is most abundant, to the western plains (Kavanagh 2002b). • Inland records for this species are sparse. Generally, the Masked Owl appears to be less common than the other two large owls in heavily-forested areas (DEC 2006). • Debus (2000) recorded the Masked Owl at only one or possibly two survey points (1-2 per cent) of 110 points surveyed on the NW slopes, with one additional opportunistic record. • Pilliga Scrub: well-wooded private land on Baradine Creek adjoining Merriwindi SE Kenebri (one survey point); Cumbil SF, Kenebri (two survey points). Overnight camp within 1 kilometres of Baradine Ck point. Both owl species previously reported in Pilliga Scrub (in 1990-96: Debus and Rose 1994; Debus 1997a). Masked Owl recorded at Baradine Creek site; pair of Barking Owls recorded at each of the Cumbil SF sites (Etoo Creek near Aloes Well, and Cumbil Forest Creek). Also incidental record of Barking Owl near the Baradine Creek site (Debus 2001). • The survey results of Debus (2001), particularly for the Pilliga forests, suggest that on the western slopes of NSW large areas of forest on public land are likely to support populations of both the Barking and Masked Owls, whereas small fragments on private land are unlikely to support either species. • Its decline in western regions has also been attributed to the collapse of native mammal populations in the inland. In wetter forests, the abundance of this species may have been reduced by intensive logging (Kavanagh and Bamkin 1995). • Intensive logging of wood-production forests has the potential for removing nest sites and roost sites for owls, and den sites for prey species, unless these trees can be identified and protected. Intensive logging and other silvicultural practices such as timber stand improvement, change the age structure of the forest by removing many of the older, hollow-bearing trees resulting in the development of much younger stands containing as few as 10 per cent of the original number of hollow trees (Gibbons and Lindenmayer 1997). • Occupancy by the Masked Owl appears to be greatly reduced in heavily logged forests (Kavanagh and Bamkin 1995, Kavanagh et al. 1995). • Few records of the Masked Owl are known from the region in the last 20 years. These include one from Pilliga East State Forest and two from Pilliga West State Forest, one from the Warrumbungles and one from near Coonabarabran and four from Goonoo Goonoo State Forest (EES 2019a) • Date et al (2002) notes that the Masked Owl is a declining species in the Pilliga Forests. • Debus (2000) recorded the Masked Owl at one site in the Pilliga (1 per cent of points), on a creek gorge on the boundary between well-wooded private land and State Forest.
Survey requirements	May – August (breeding)

Masked Owl (*Tyto novaehollandiae*)	
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists – habitat assessments – no Pilliga surveys) • November 2018 (10 days, two ecologists – habitat assessments, 8 nights of nocturnal surveys along the alignment) – no targeted Pilliga surveys other than driving on one day along Pilliga Forest Way) • March 2019 (10 days, four zoologists – diurnal surveys – trapping and bird surveys in the Pilliga) • March 2019 (5 nights, two zoologists – nocturnal surveys in the Pilliga, including call playback) • August 2019 (5 days, two zoologists – diurnal and nocturnal surveys, 1 night in the Pilliga) • Late September-early October 2019 (6 days, two ecologists. 2 days, 2 nights in the Pilliga). Diurnal surveys included habitat assessments and searches for signs of nesting at large hollow-bearing trees along creek lines (eg whitewash, feathers, owl pellets). Nocturnal surveys were conducted at various locations along the alignment in November 2018, August 2019 and September/October 2019 and included spotlighting and call playback for this species. Targeted nocturnal surveys were conducted in March in the Pilliga and included spotlighting and call playback for the Masked Owl. Call playback was limited during winter to minimise possible disruption of nesting.
Survey results	No Masked Owls were heard or observed during surveys. Feathers collected during surveys were identified by the Australian Museum as Southern Boobook. Other owls recorded included the Southern Boobook (*Ninox novaeseelandiae*) at various locations (Macquarie River at Narromine, Ewenmar Creek near Collie Road, Kickabil Creek at Gilmours Road, Leeches Creek Road south-west of Gilgandra, and various locations in the Pilliga), and the Eastern Barn Owl (*Tyto javanica*) in the Pilliga and north of Narrabri in agricultural land.
Species polygon guidance	Patch size selected is based on that fact that the species will use areas that are quite small, especially as foraging habitat but also as roosting habitat and occasionally as breeding habitat. Dead stags are especially popular for roosting/breeding habitat and are a limited resource due to natural attrition (EES 2020). Where a breeding site has been identified in accordance with the BAM the species polygon should be established by providing a circular buffer with a 100m radius around the nest tree. The purpose of the buffer is to minimise disturbance/avoid clearing, for a development application, or to conserve and improve habitat, for a biodiversity stewardship agreement, within the area essential for breeding. This includes habitat suitable for male roosts, feeding/grooming perches and fledgling requirements. It does not account for foraging habitat. The shape of the buffer can be modified where evidence provided in the Biodiversity Assessment Report indicates an alternative shape would better meet the species needs in the context of the assessment site. For example, extant vegetation is linear and the nest tree is already located near the edge of the wooded area (EES 2020).

Masked Owl (*Tyto novaehollandiae*)	
Species polygon justification	Yes – assumed present No Masked Owls were recorded during surveys. Debus (2001) noted recording the species near Baradine Creek The species is likely to occur in low densities in the Pilliga. In order to capture species credits for this species, five breeding polygons have been positioned in vegetation associated with the following watercourses located near open farmland: • Kickabil Creek • Bundijoe Creek • Gulargambone Creek • Baradine Creek • Bohena Creek A 100 metre buffer has been included around each of the indicative nest trees. All other habitat for the species is captured in the ecosystem credits for the relevant PCTs.
Relevant IBRA subregions	Northern Basalts – known Liverpool Plains – known Pilliga – known Pilliga Outwash – known Castlereagh Barwon – known Bogan Macquarie – known Inland Slopes - known



NARROMINE TO NARRABRI Fauns Species Polygons - Masked Owl - Segment 8 Narromine to Curban MAP 1 OF 4

0 5.5 11 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 13/08/2020 Paper: A4
Author: JacobsGHD Scale: 1:400,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Masked Owl indicative nest tree
- Masked Owl species polygon

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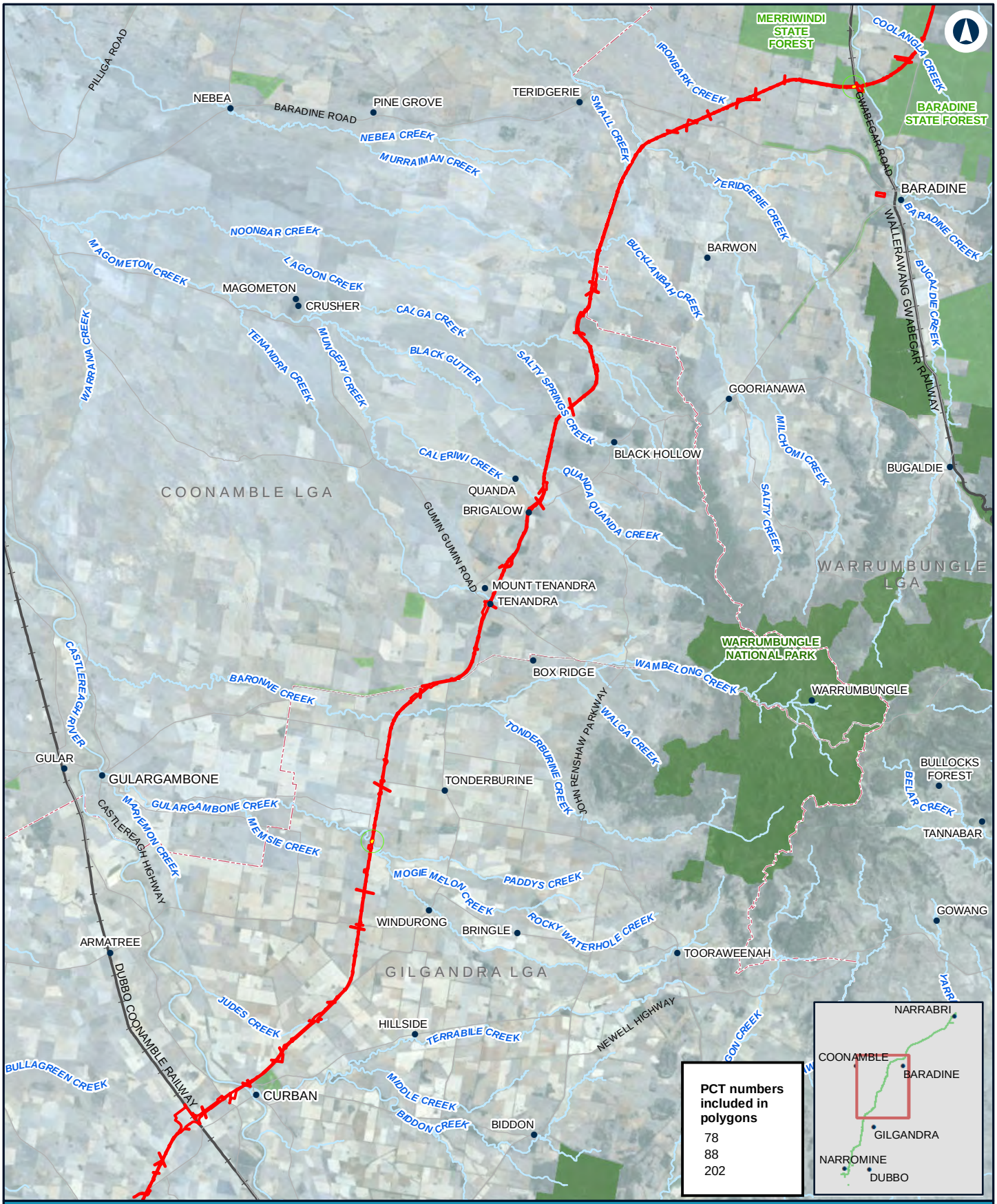

NARROMINE TO NARRABRI Fauns Species Polygons - Masked Owl - Segment 9 Curban to Pilliga MAP 2 OF 4

0 5 10 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 13/08/2020 Paper: A4
Author: JacobsGHD Scale: 1:375,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Masked Owl indicative nest tree
- Masked Owl species polygon

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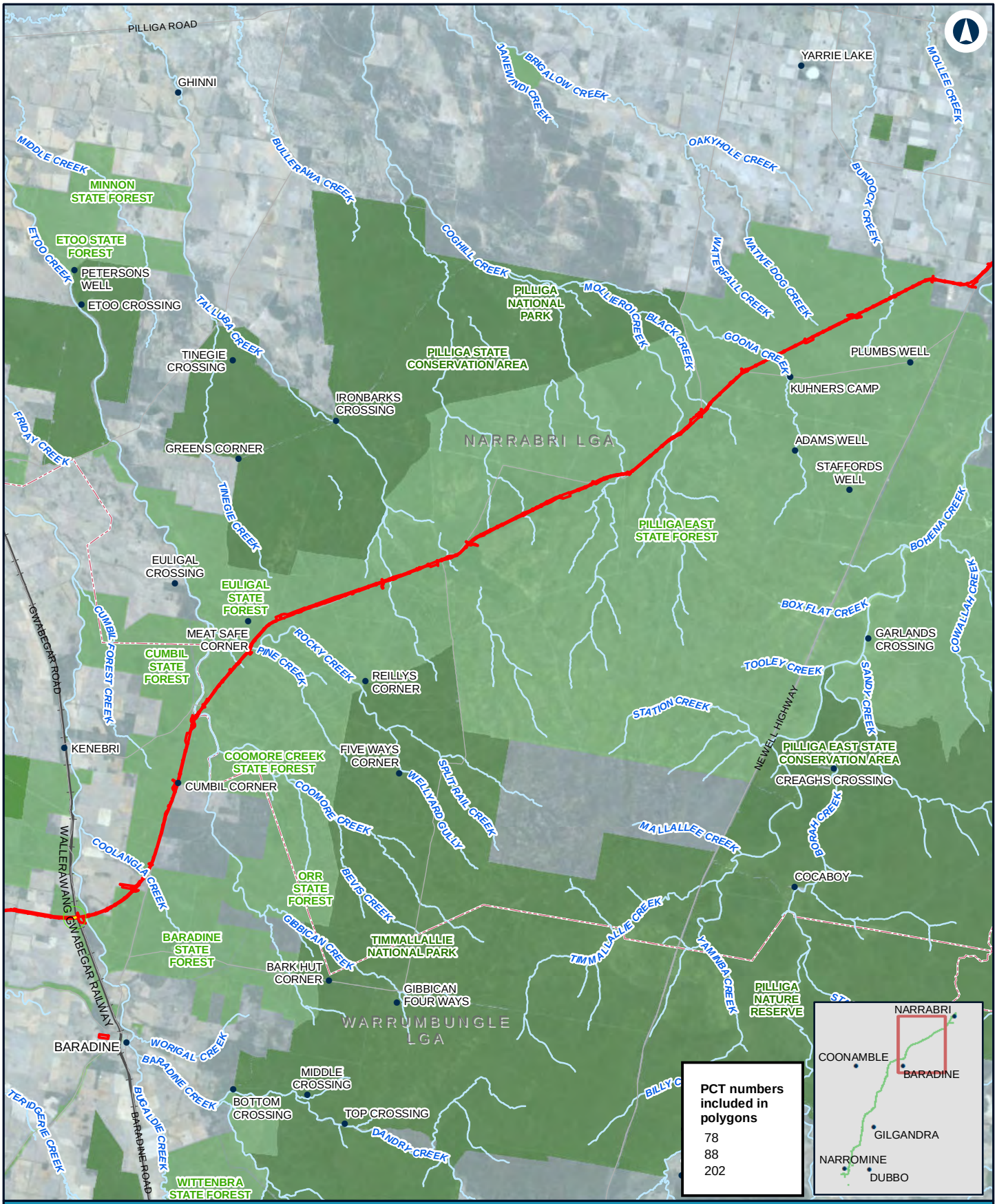

NARROMINE TO NARRABRI — Fauns Species Polygons - Masked Owl - Segment 10 Pilliga — MAP 3 OF 4

0 4.5 9 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 13/08/2020 Paper: A4
Author: JacobsGHD Scale: 1:340,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Masked Owl indicative nest tree
- Masked Owl species polygon

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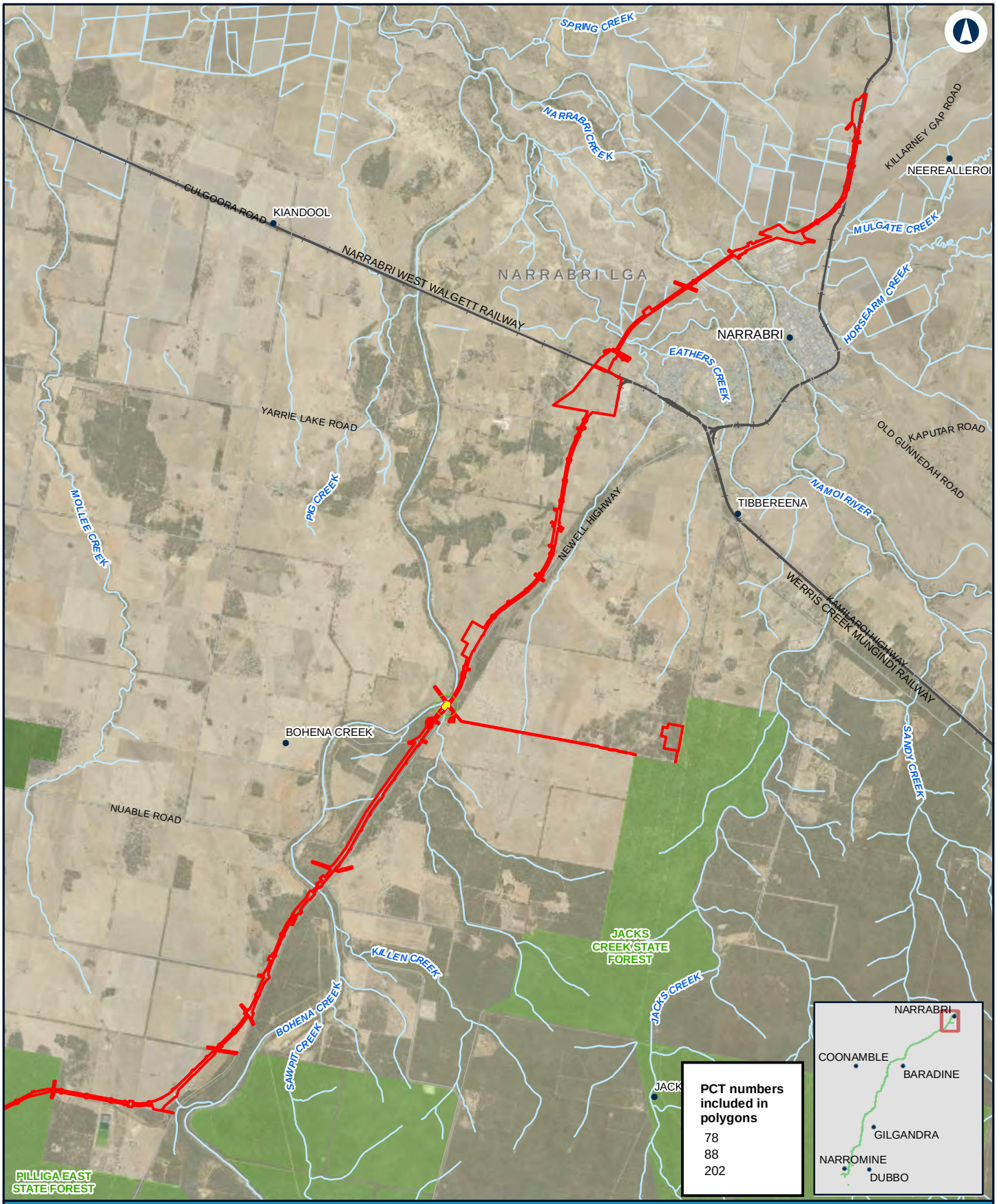

NARROMINE TO NARRABRI | Fauns Species Polygons - Masked Owl - Segment 11 Pilliga to Narrabri | MAP 4 OF 4

0 1.5 3 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 13/08/2020 Paper: A4
Author: JacobsGHD Scale: 1:122,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Masked Owl indicative nest tree
- Masked Owl species polygon

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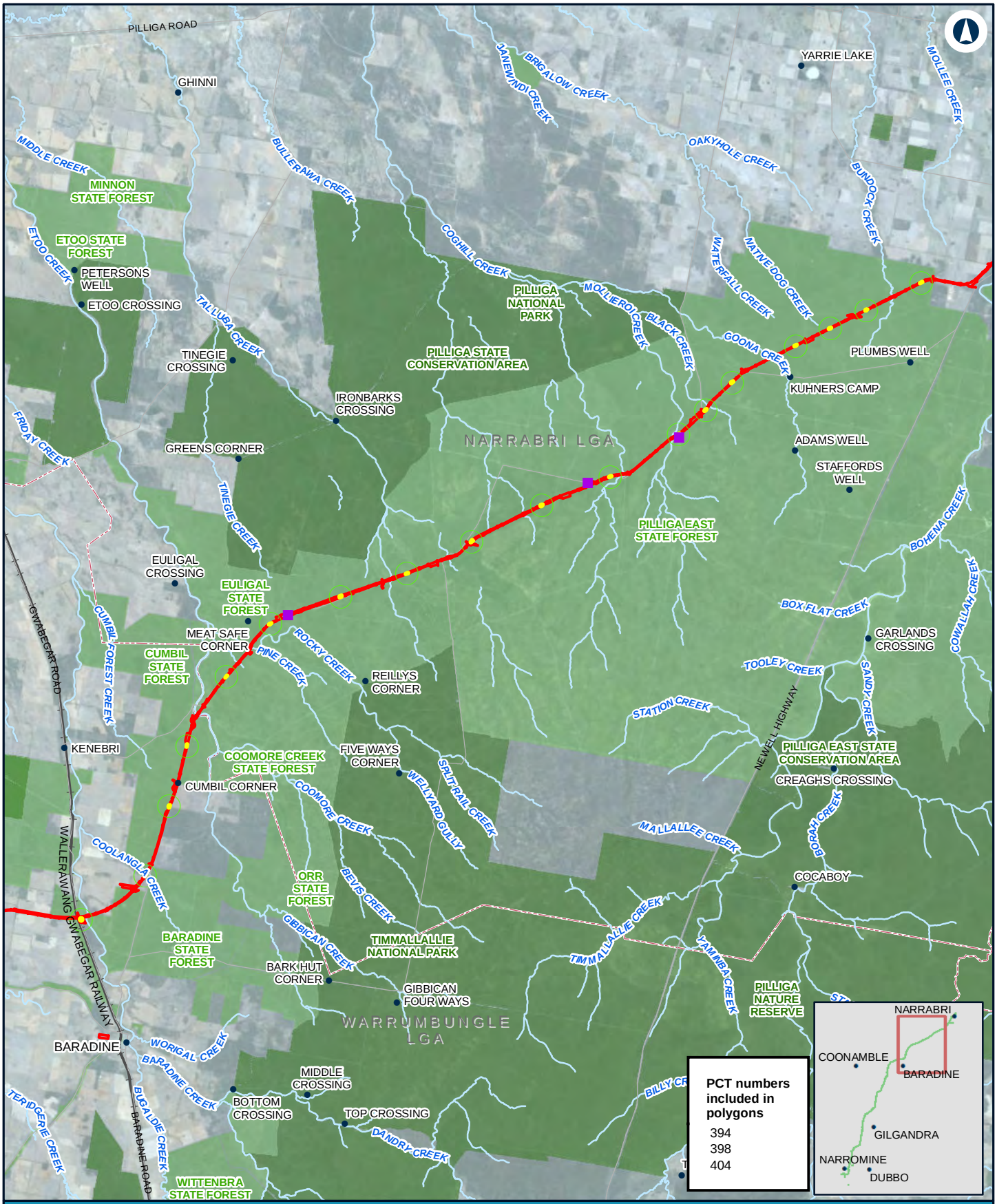
Table I14 Glossy Black-cockatoo

Glossy Black-cockatoo (*Calyptorhynchus lathami*)	
BC Act Status	Vulnerable
Credit type	Species (breeding habitat only) and ecosystem
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	30.55 hectares
Breeding requirements	• Prefers to nest in the hollows of large, old eucalypt trees. The birds tend to nest in the same areas as other nesting pairs, sometimes even sharing the same nest tree (EES 2019b). • Breeding hollows are about 26cm wide and up to 1.4m deep (NSW Scientific Committee 2008). • Living or dead tree with hollows greater than 15cm diameter and greater than 5m above ground (EES 2019b) • In NSW, breeding takes place from March to August (EES 2019b). • Breed throughout their range (EES 2019b). • The species may need larger patches and more intact landscapes for breeding (EES 2019b).
Habitat requirements	• Lives in coastal woodlands and drier forest areas, open inland woodlands, or timbered watercourses where its main food source, the casuarina (she-oak) is common. They prefer to live in rugged country, where extensive clearing has not taken place. Brigalow scrub or hilly rocky country containing casuarina species tend to be their preferred habitat in inland NSW (EES 2019b). • Feeds almost exclusively on the seeds of mature *Allocasuarina* and *Casuarina* trees (EES 2019b). • In inland locations, its key food species include *A. verticillata* (Drooping Sheoak) and *Casuarina cristata* (Belah); also *A. inophloia* (Stringybark Sheoak), *A. diminuta, A. gymnanthera*, and sometimes *A. leuhmannii* (Buloke) (NSW Scientific Committee 2008a). • Although the Glossy Black-Cockatoo is highly mobile and can disperse tens of kilometres, or commute up to 12 kilometres between the nest and feeding areas, most movements appear to be local (Higgins 1999). Commute distances are not well known for inland populations.
Habitat in the study area	• Large areas of foraging habitat are present in the Pilliga forests and associated vegetation to the north. • Pairs of Glossy Black-cockatoos would nest in hollow-bearing trees along creek lines in the Pilliga forests. • Limited habitat for the species is present in the remainder of the study area given the lack of extensive forested areas outside of the Pilliga.

Glossy Black-cockatoo (*Calyptorhynchus lathami*)	
Known populations	• Most of the Glossy Black-Cockatoo's population now exists in state forests and NSW National Park Estate. The species is data deficient for the purpose of assessing population recovery (if any) in NSW (NSW Scientific Committee 2008). • Populations are known from the Pilliga, Goonoo Forest and other larger forests in the wider region. Few records are known from predominantly cleared land (EES 2019a). • The Pilliga Forest Bird Watchers group regularly conduct surveys of the Glossy Black-cockatoo. A survey in 2014 recorded 231 individuals in the Pilliga. Higher numbers (200 individuals at one dam) had been recorded prior to that when the area was not in drought (ABC 2014). The report noted that 35 of the 80 dams in the Pilliga had water during the 2014 survey, and Glossy Black-cockatoos were observed at 15 dams (ABC 2014).
Survey requirements	Survey Months: March to August
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists - diurnal surveys – no Pilliga surveys) • November 2018 (10 days, two ecologists – diurnal/nocturnal surveys – no targeted Pilliga surveys other than driving on one day along Pilliga Forest Way) • March 2019 (10 days, four zoologists – diurnal bird surveys in the Pilliga) • March 2019 (5 days, two zoologists – afternoon/nocturnal surveys in the Pilliga) • August 2019 (5 days, two zoologists – diurnal surveys, 1 day in the Pilliga and day near Narrabri) • Late September-early October 2019 (6 days, two ecologists. 2 days, 2 nights in the Pilliga). All surveys included diurnal bird surveys, and included searches for chewed cones in areas of food trees and listening for calls. The March surveys included one week in the Pilliga forests, with six zoologists conducting surveys, and a second week with two zoologists in the northern Pilliga and Bohena Creek area. Five cameras were set in the Pilliga in late August 2019 and collected in late September 2019. One of these was set at a dam (Clay Foot Dam).
Survey results	Three pairs were observed flying overhead during surveys in the Pilliga and associated vegetation to the north in November 2018 and March 2019. Little water was observed in dams near the alignment during surveys. Water was present at Emu Tank in November 2018, but this dam was dry in March 2019. No water was observed in dams in Cumbil State Forest in March 2019. A small amount of water was present at the dam at Coxes Road near Rocky Creek in March 2019. Water was present at Clay Foot Dam in September 2019. A group of three individuals was recorded at this latter dam on the camera on one occasion, and two individuals on another occasion. No specific breeding habitat was identified in Bionet (EES 2020a) or Birdata (Birdllife Australia 2020) records.

Glossy Black-cockatoo (*Calyptorhynchus lathami*)	
Species polygon guidance	Note that the species may need larger patches and more intact landscapes for breeding (EES 2020). Where a breeding site has been identified in accordance with the BAM the species polygon should be established by providing a circular buffer of 100m around the nest tree. The purpose of the buffer is to minimise disturbance/avoid clearing, for a development application, or to conserve and improve habitat, for a biodiversity stewardship agreement, within the area essential for breeding. This includes habitat suitable for male roosts, feeding/grooming perches and fledgling requirements. It does not account for foraging habitat. The shape of the buffer can be modified where evidence provided in the Biodiversity Assessment Report indicates an alternative shape would better meet the species needs in the context of the assessment site. For example, extant vegetation is linear and the nest tree is already located near the edge of the wooded area (EES 2020).
Species polygon justification	Yes (surveyed). Five groups (generally pairs) were observed during field surveys, however no nest trees were recorded. Based on the results of the 2014 surveys by the Pilliga Forest Bird Watchers group, up to 115 pairs of Glossy Black-cockatoos are assumed to occur in the Pilliga forests. This species is known to breed along creek lines. The proposal crosses many large creek lines in the Pilliga forest. In order to calculate credits for the proposal, it is assumed that the proposal intersects with a number of nest trees of the species. These have been positioned every 5 kilometres through from Baradine to Bohena Creek (ie through the Pilliga), positioned within ironbark forest PCTs where possible. A 100 metre buffer has been included around these indicative nest trees. No breeding habitat is considered to be present in the remainder of the study area. All other habitat for the species is captured in the ecosystem credits for the relevant PCTs.
Relevant IBRA subregions	Northern Basalts – known Liverpool Plains – known Pilliga – known Pilliga Outwash – known Castlereagh Barwon – known Bogan Macquarie – known Inland Slopes - known



NARROMINE TO NARRABRI Fauna Species Polygons - Glossy Black Cockatoo - Segment 10 Pilliga MAP 1 OF 2

0 4.5 9 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:340,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Glossy Black Cockatoo GHD record
- Glossy Black Cockatoo indicative nest tree
- Glossy Black Cockatoo species polygon

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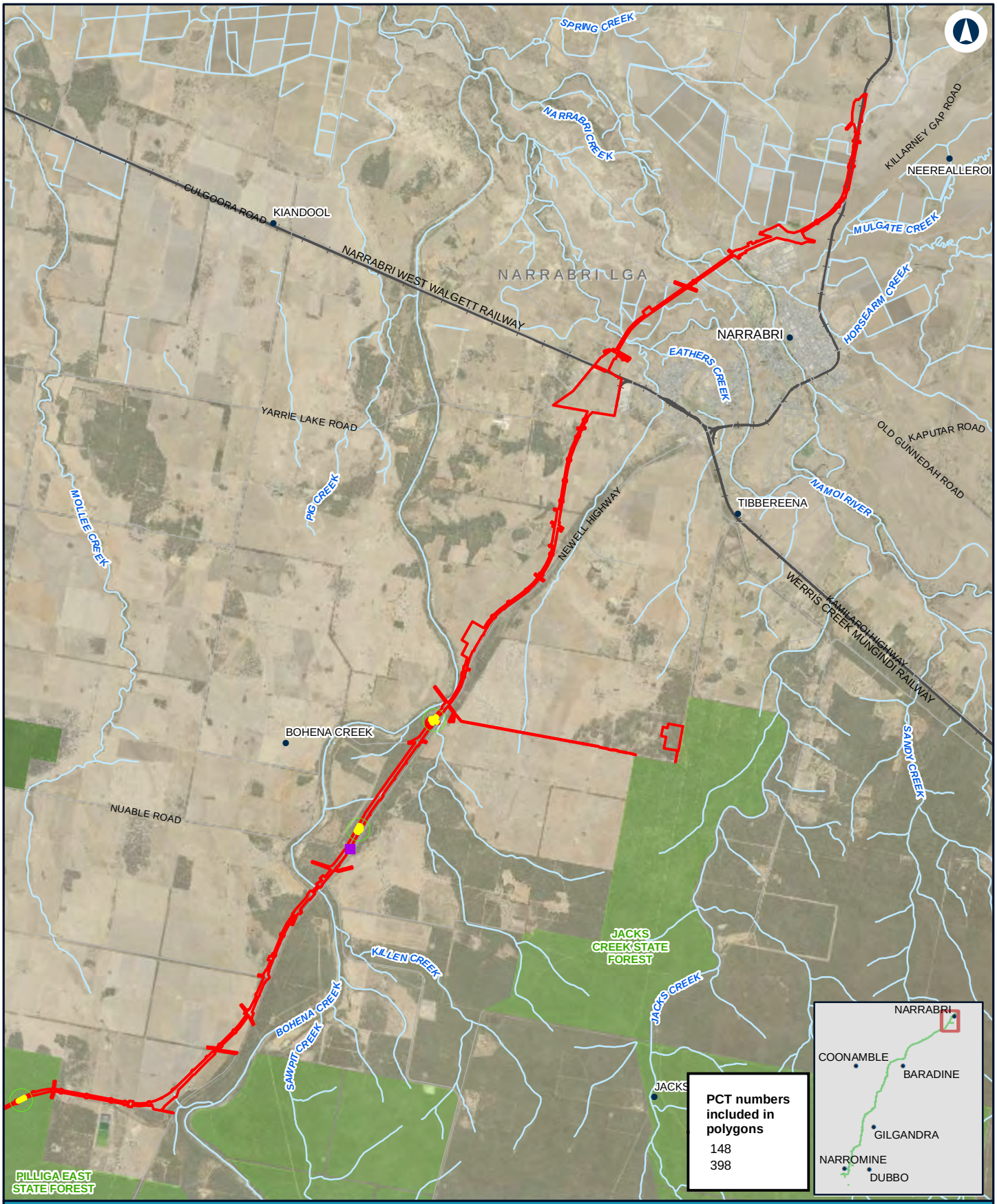

NARROMINE TO NARRABRI Fauna Species Polygons - Glossy Black Cockatoo - Segment 11 Pilliga to Narrabri MAP 2 OF 2

0 1.5 3 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:122,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Glossy Black Cockatoo GHD record
- Glossy Black Cockatoo indicative nest tree
- Glossy Black Cockatoo species polygon

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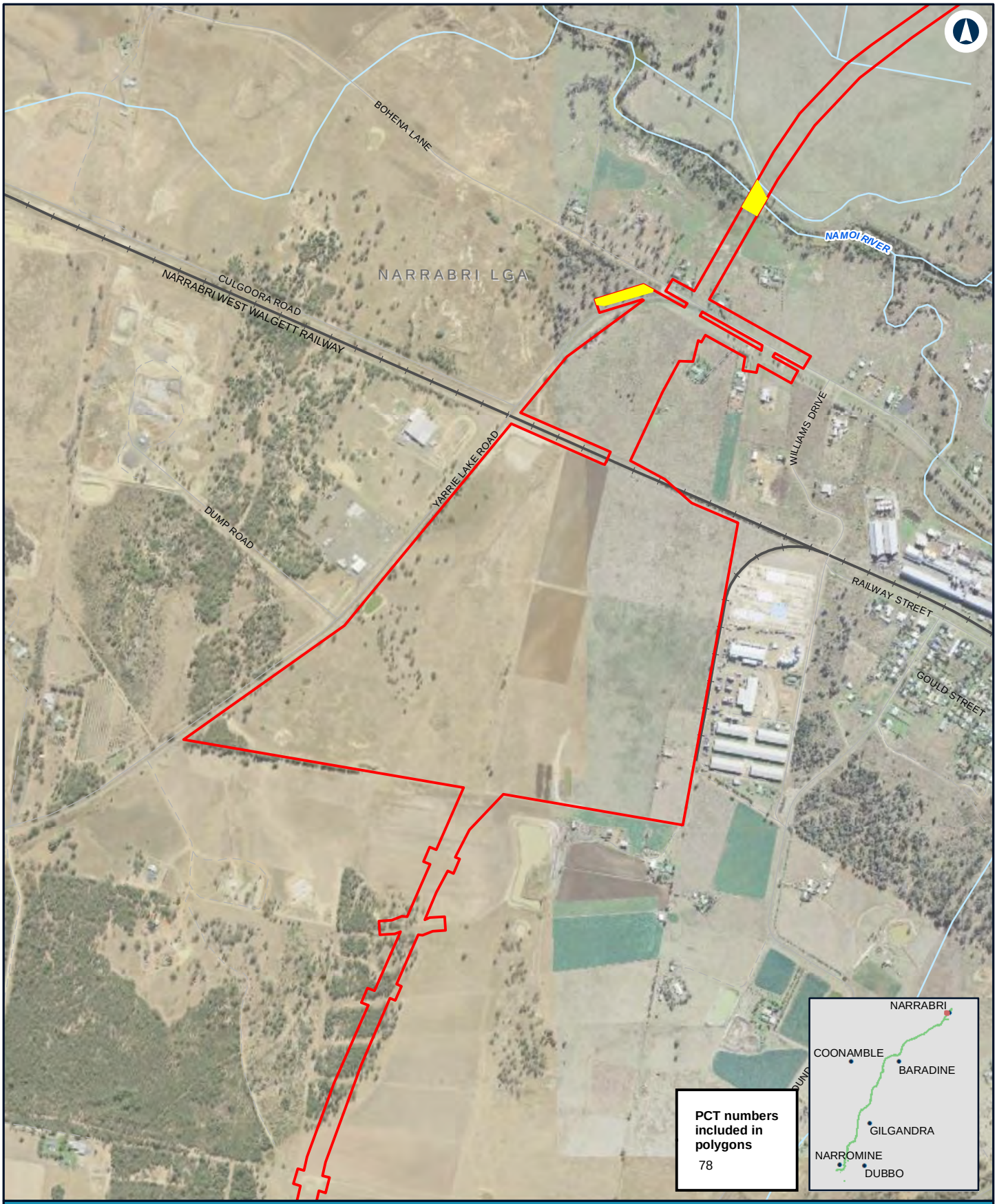
Table I15 Bush Stone-curlew

Bush Stone-curlew (*Burhinus grallarius*)	
BC Act Status	Endangered
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	337.29 hectares
Breeding requirements	• Nest on the ground in a scrape or small bare patch • Branches on the ground are essential for the bird's camouflage, and it is unlikely to attempt nesting without it (DEH 2005) • During the breeding season, nesting birds will search for food in the vicinity of the nest site, while at other times, birds may travel large distances (Birdlife 2020)
Habitat requirements	• Inhabits open forests and woodlands with a sparse grassy ground layer and fallen timber.
Habitat in the study area	• Large areas of potential foraging habitat are present in the Pilliga forests. • Limited habitat for the species is present in the remainder of the study area given the lack of extensive forested areas outside the Pilliga.
Known populations	• The Bush Stone-curlew is a declining bird of the Pilliga area (Date et al 2002). • There are few records of the species in the Pilliga in the last 20 years. Scattered records occur in the wider region (EES 2019a). • Birdlife Australia (2020) identifies forest edges in the Pilliga as important habitat for the Bush Stone-curlew.
Survey requirements	Survey Months: All months It may be easier to detect during breeding season, possibly calls all year, but it is unclear how well it responds to playback (EES 2020).
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists - diurnal surveys – no Pilliga surveys) • November 2018 (10 days, two ecologists – diurnal/nocturnal surveys – no targeted Pilliga surveys other than driving on one day along Pilliga Forest Way) • March 2019 (10 days, four zoologists – diurnal surveys – trapping and bird surveys in the Pilliga) • March 2019 (5 days, two zoologists – nocturnal surveys in the Pilliga) • August 2019 (5 days, two zoologists – diurnal and nocturnal surveys, 1 night in the Pilliga)

Bush Stone-curlew (*Burhinus grallarius*)		
	• Late September-early October 2019 (6 days, two ecologists. 2 days, 2 nights in the Pilliga). All surveys included diurnal bird surveys. Call playback and spotlighting for the Bush Stone-curlew was conducted during nocturnal surveys along the alignment. Cameras were set in the Pilliga during the March surveys, including two at a dam for five days (Coxes Road). Five cameras were set in the Pilliga in late August 2019 and collected in late September 2019. One of these was set at a dam (Clay Foot Dam).	
Survey results	No individuals were recorded during surveys. This is unsurprising given the low incidence of records in the locality over the last 20 years.	
Species polygon guidance	Species is mainly found in western slopes and plains and the Riverina, smaller numbers on Central and North Coast with increasing numbers in Tweed Valley. Occurs particularly where there is adequate fallen timber. The species was allocated to a species credit as experts determined that it cannot be predicted to occur at a site based on vegetation surrogates but can be detected reliably from survey (EES 2020).	
Species polygon justification	Yes (assumed present) Given the low incidence of this species, the species polygon has been created to include all relevant PCTs within 10 kilometres of all known records.	
Relevant PCTs	27	Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
	35	Brigalow - Belah open forsts / woodland on alluvial often gilgaied clay from piliga scrub to Gondiwindi, Brigalow Belt South Bioregion
	36	River Red Gum tall to very tall open forest/woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
	49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
	78	River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
	244	Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt)
	248	Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW

Bush Stone-curlew (*Burhinus grallarius*)		
	394	Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
	397	Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
	411	Buloke - White Cypress Pine woodland on outwash plains in the Piliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
	414	White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
	444	Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
	589	White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
	599	Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South and Nandewar bioregion
	1384	White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Relevant IBRA subregions	Northern Basalts – predicted Liverpool Plains – known Pilliga – known Pilliga Outwash – known Castlereagh Barwon – known Bogan Macquarie – known Inland Slopes - known	



NARROMINE TO NARRABRI

Fauna Species Polygons - Bush Stone Curlew Segment 3 Narrabri West multi-function compound MAP 1 OF 5

0 0.2 0.4 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 13/08/2020 Paper: A4
Author: JacobsGHD Scale: 1:15,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Bush Stone Curlew species polygon

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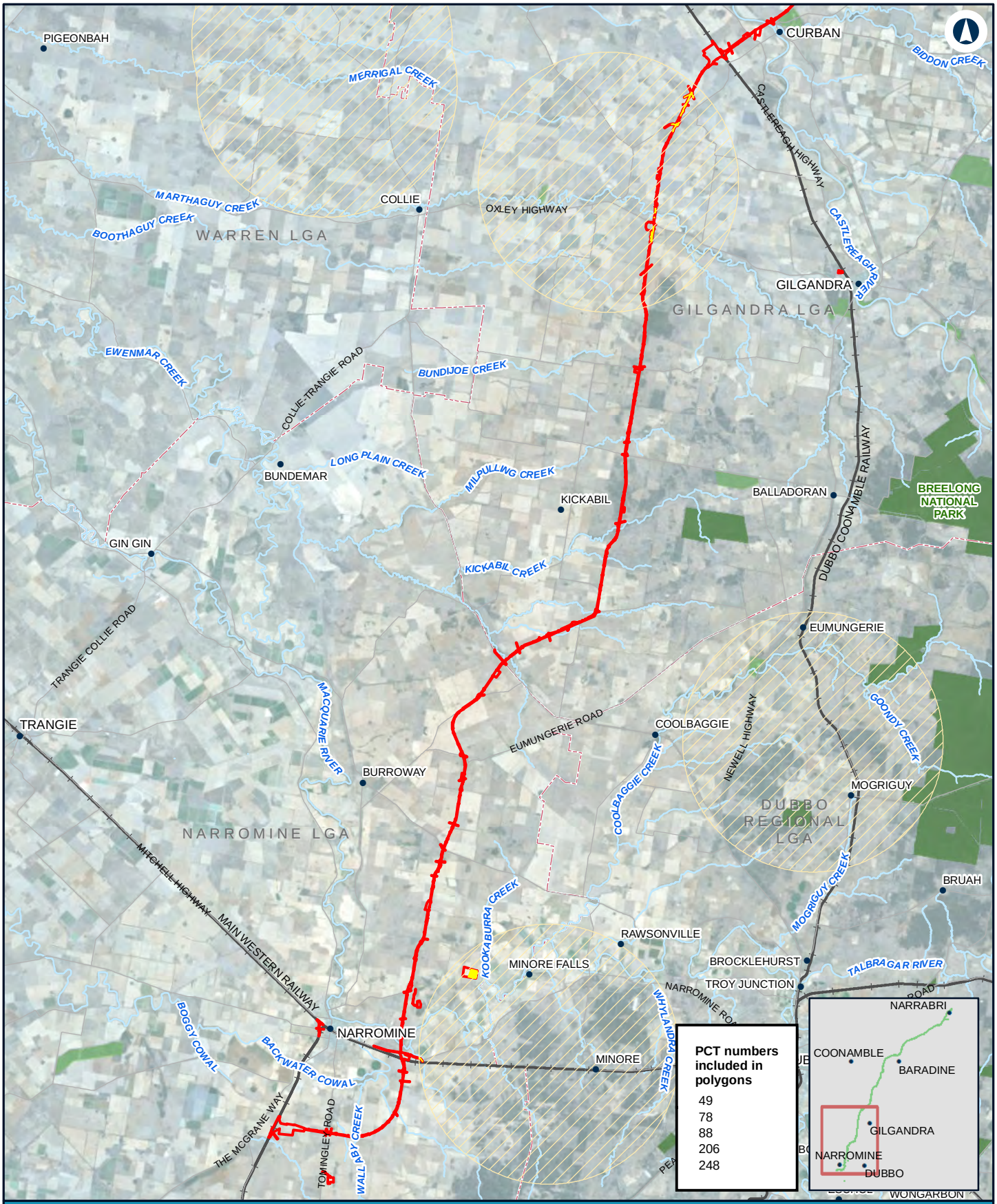

NARROMINE TO NARRABRI | Fauna Species Polygons - Bush Stone Curlew Segment 8 Narromine to Curban | MAP 2 OF 5

0 5.5 11 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 13/08/2020 Paper: A4
Author: JacobsGHD Scale: 1:400,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Bush Stone Curlew Bionet Record 10km Buffer
- Bush Stone Curlew species polygon

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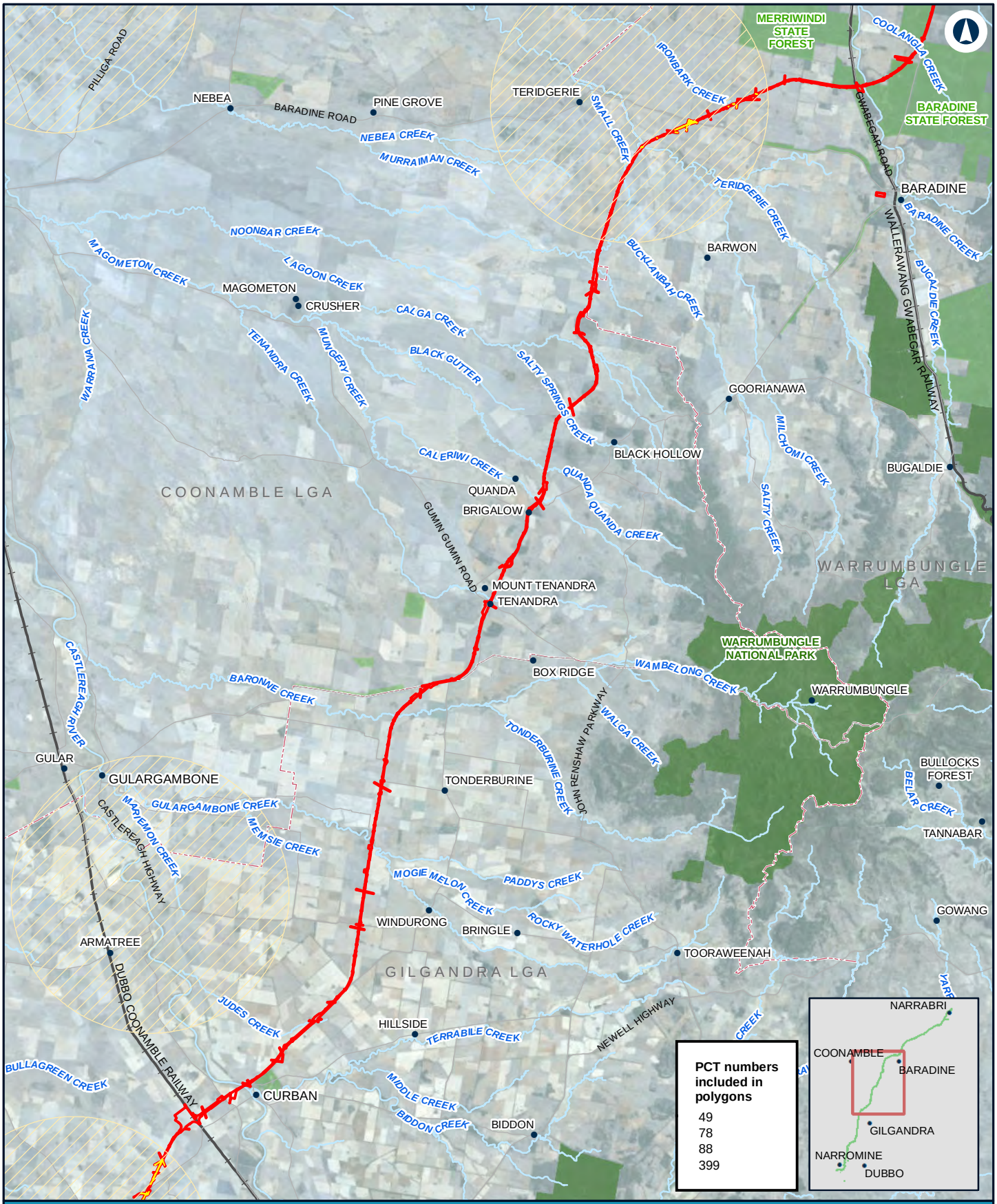

NARROMINE TO NARRABRI | Fauna Species Polygons - Bush Stone Curlew Segment 9 Curban to Pilliga | MAP 3 OF 5

0 5 10 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 13/08/2020 Paper: A4
Author: JacobsGHD Scale: 1:375,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Bush Stone Curlew Bionet Record 10km Buffer
- Bush Stone Curlew species polygon

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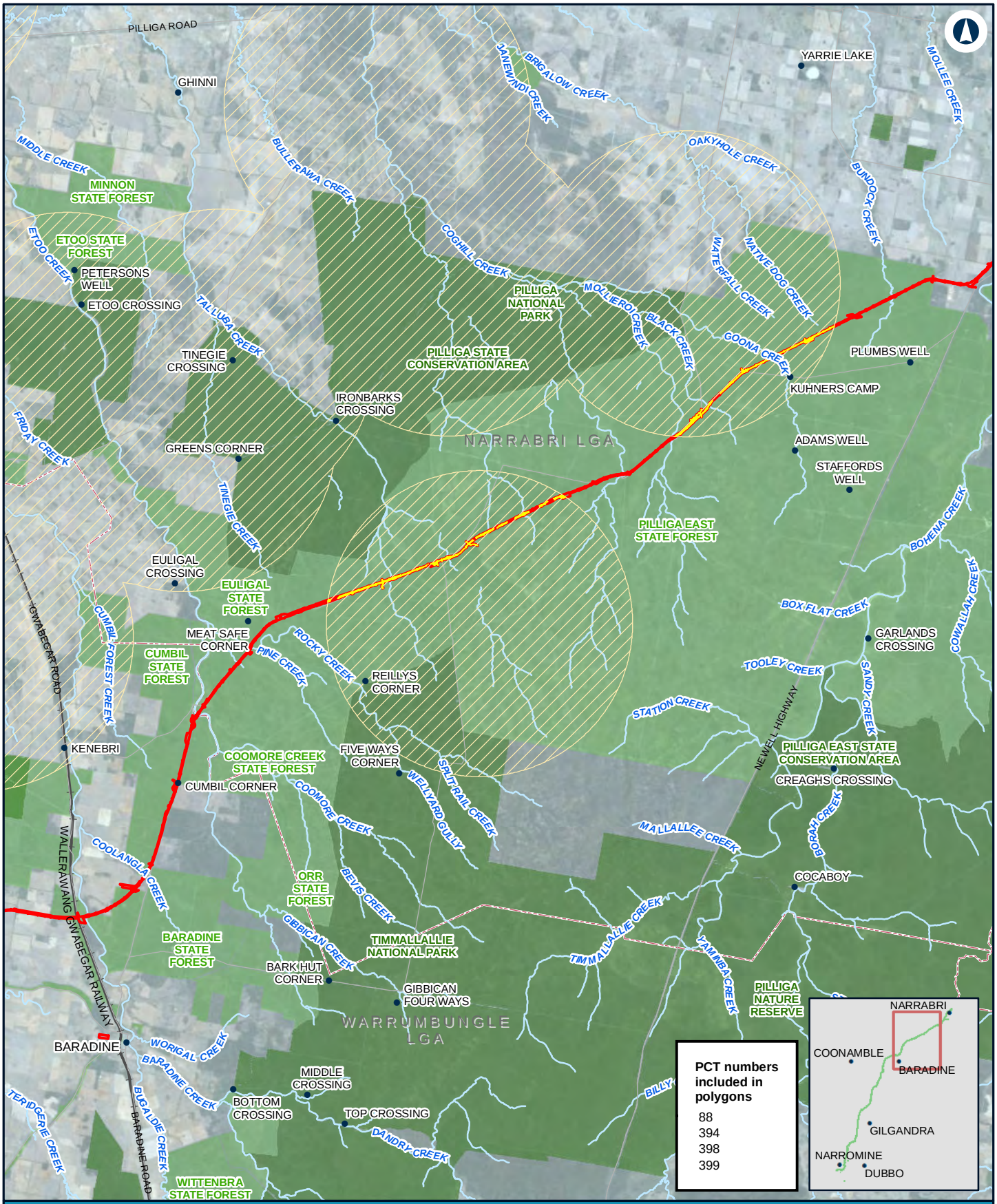

NARROMINE TO NARRABRI | Fauna Species Polygons - Bush Stone Curlew Segment 10 Pilliga | MAP 4 OF 5

0 4.5 9 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 13/08/2020 Paper: A4
Author: JacobsGHD Scale: 1:340,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Bush Stone Curlew Bionet Record 10km Buffer
- Bush Stone Curlew species polygon

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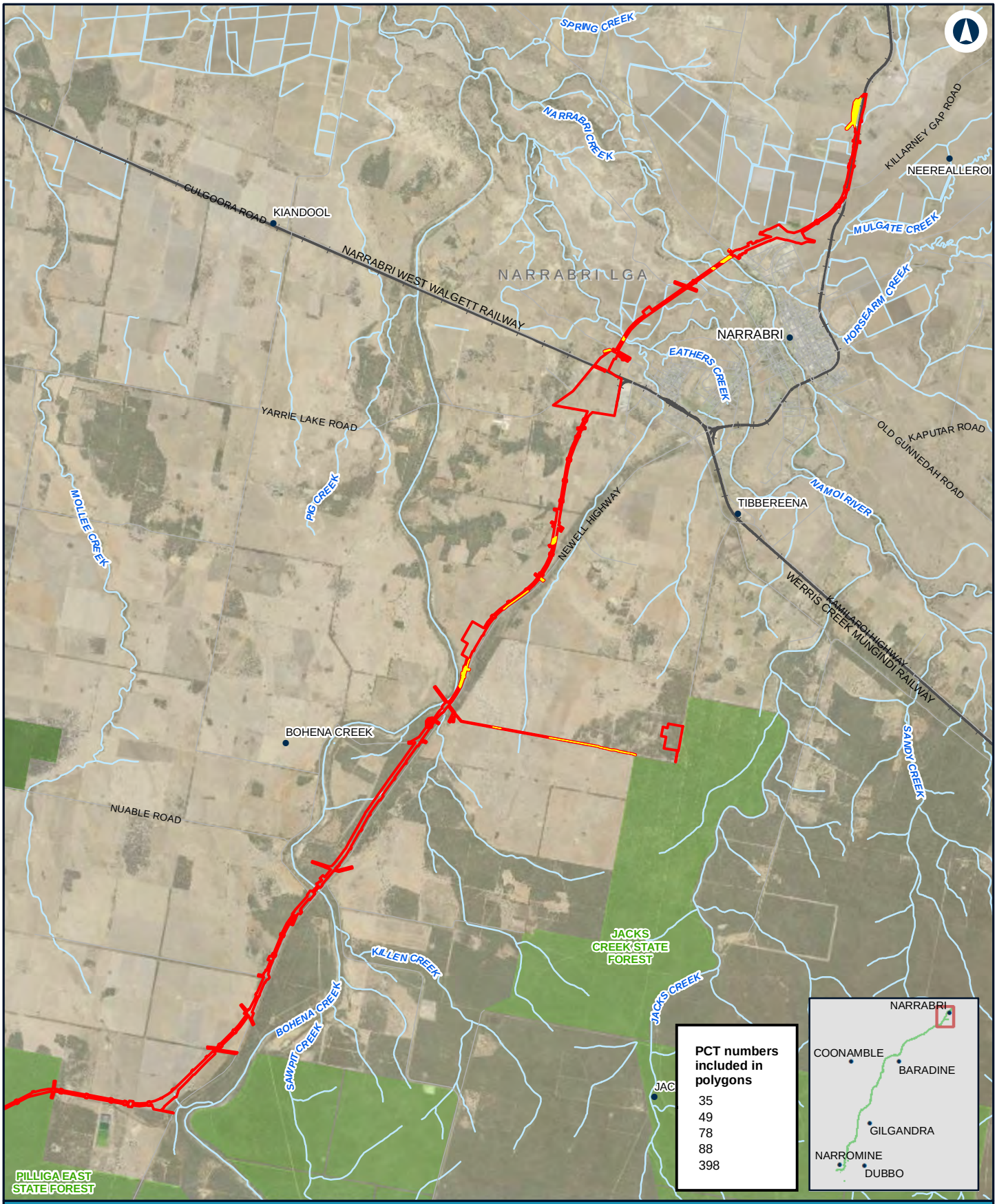

NARROMINE TO NARRABRI

Fauna Species Polygons - Bush Stone Curlew Segment 11 Pilliga to Narrabri

MAP 5 OF 5

0 1.5 3 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 13/08/2020 Paper: A4
Author: JacobsGHD Scale: 1:122,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Bush Stone Curlew species polygon

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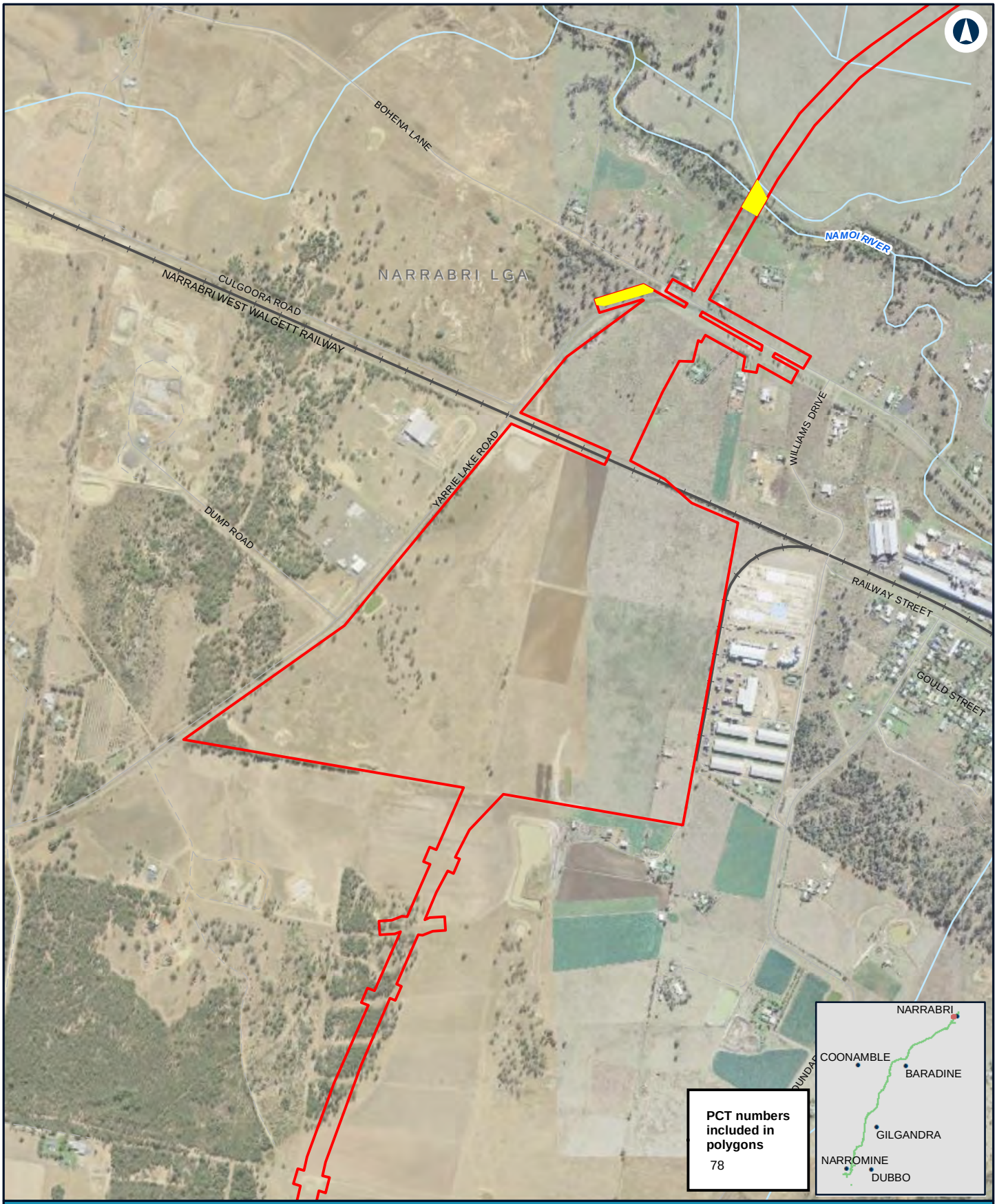
Table I16 Pale-headed Snake

Pale-headed Snake (*Hoplocephalus bitorquatus*)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	206.70 hectares
Breeding requirements	• In the wild, gravid females have been observed in January, although mating has been observed in captivity from September to May (Australian Museum 2019). • Females breed only every second or third year or less frequently (EES 2019b).
Habitat requirements	• Found mainly in dry eucalypt forests and woodlands, cypress forest and occasionally in rainforest or moist eucalypt forest, in drier environments, it appears to favour habitats close to riparian areas (EES 2019b). • A study of the species at the Namoi River recorded the species in woodland on riverbanks and adjacent river flats where River Red Gums (*E. camaldulensis*) were common, with extensive mature Coolabah/Black Box (*E. coolabah, E. largiflorens*) also occurring (Fitzgerald et al. 2010). • They are arboreal and rely heavily on old and dead standing trees with hollows and exfoliating bark for shelter sites, as it shelters during the day between loose bark and tree-trunks, or in hollow trunks and limbs of dead trees (EES 2019b). • Can spend weeks at a time hidden in tree hollows (EES 2019b). Radio-tracking of snakes on the Namoi River (Fitzgerald et al. 2010) found individuals were sedentary and moved only short distances (up to 134 metres in that study) • Its main prey is tree frogs although lizards and small mammals are also taken (EES 2019b). As such, the populations may tend to be associated with watercourses, billabongs and other flood-prone areas (Fitzgerald et al. 2010).
Habitat in the study area	• Could occur throughout the Pilliga but would be concentrated around creek lines where frogs (their main prey) occur. • Fitzgerald et. al (2010) showed that Pale-headed Snakes were not recorded >160m from the Namoi River.
Known populations	• Patchy and restricted distribution north of Baradine (EES 2019a) • Local records dominated by sightings in the Pilliga West State Conservation Area, Pilliga East State Forest, and riparian vegetation of the Namoi River near Pilliga, Wee Waa and Leard State Forest (EES 2019a). • Recent records of this species west of the Great Dividing Range in NSW include sites dominated by Narrow-leaved Ironbark (*E. crebra*) forest with cypress pine (*Callitris* spp.) Black Box (*E. largiflorens*) and Silver-leaf Ironbark (*E. melanophloia*) woodland and Coolabah (*E. coolabah*) (Fitzgerald et al. 2010). • No local records in close proximity to the study area between Narromine and Baradine (EES 2019a)

Pale-headed Snake (*Hoplocephalus bitorquatus*)	
Survey requirements	Survey Months: November to March Survey should be undertaken 1-2 days after rainfall and on humid nights (EES 2019b)
Survey effort	Fauna surveys were conducted in the following months in the Pilliga and Narrabri area • November (3 days, two ecologists –nocturnal spotlighting surveys at Narrabri Creek, Namoi River, BOhena Creek and other small creeks on private property near Narrabri • March (5 days, two zoologists – nocturnal spotlighting surveys and driving transects in the Pilliga). Surveys in March followed a weekend of heavy rain.
Survey results	One Pale-headed Snake was observed on Cumbil Road south of the alignment during surveys in March 2019. It was located near a tributary of Baradine Creek.
Species polygon guidance	Paddock tree use – 500 metres from moderate/good vegetation (EES 2020)
Species polygon justification	Yes (assumed surveyed) All riparian vegetation (PCT 399 and PCT 78) in the Pilliga and Narrabri areas is mapped as the species polygon for this species. A buffer of 500 metres either side of drainage lines in this area is also included for each watercourse in order to capture areas where these PCTs do not occur along drainage lines.
Relevant IBRA subregions	Northern Basalts – known Liverpool Plains – known Pilliga – known Pilliga Outwash – known Castlereagh Barwon – known Bogan Macquarie – predicted Inland Slopes - predicted



PCT numbers included in polygons

78

NARROMINE TO NARRABRI

Fauna Species Polygon - Pale Headed Snake - Segment 3 Narrabri West multi-function compound MAP 1 OF 3

0 0.2 0.4 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:15,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Pale Headed Snake species polygon

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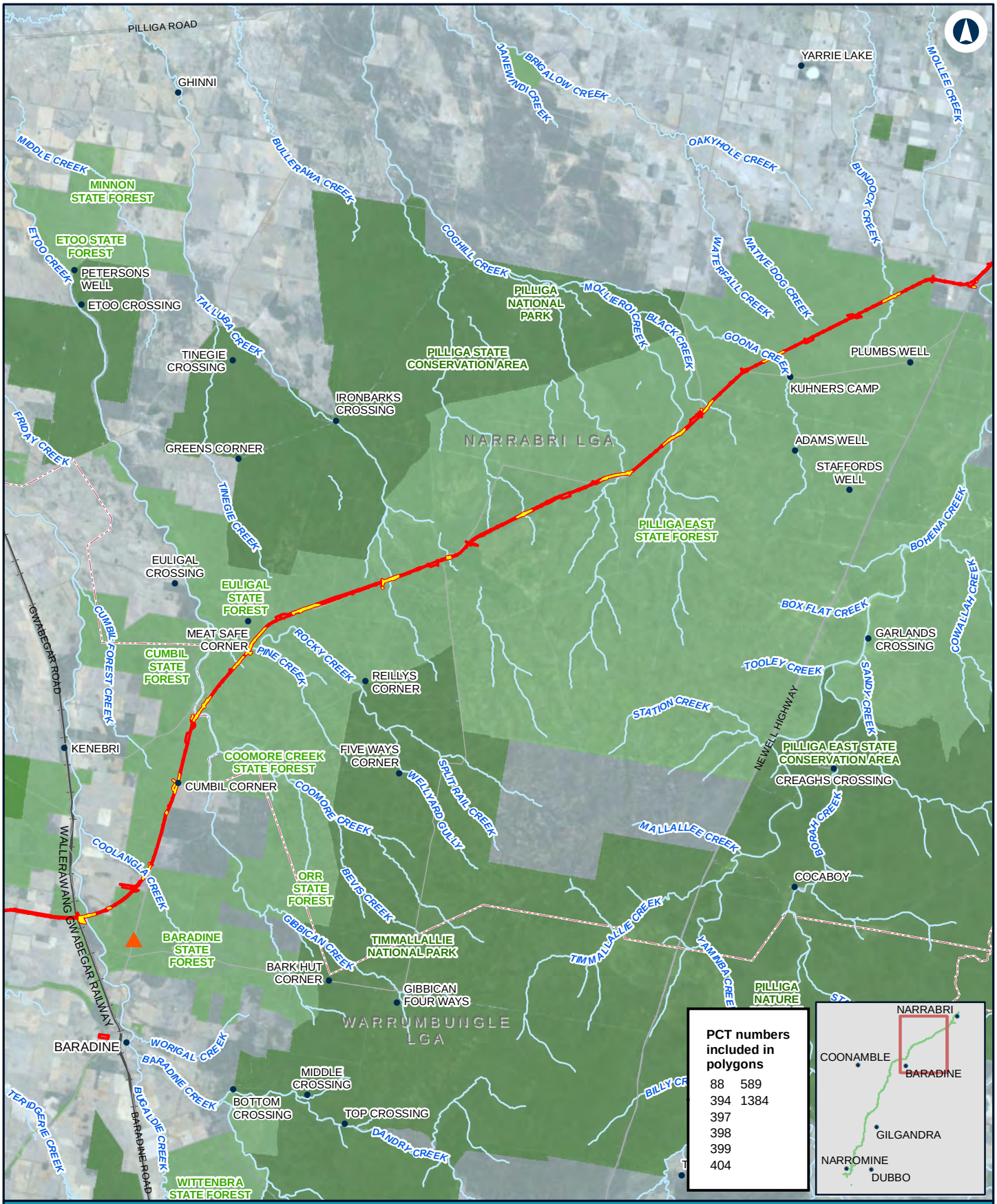

NARROMINE TO NARRABRI | Fauna Species Polygon - Pale Headed Snake - Segment 10 Pilliga | MAP 2 OF 3

0 4.5 9 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:340,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Pale-headed Snake GHD record
- Pale Headed Snake species polygon

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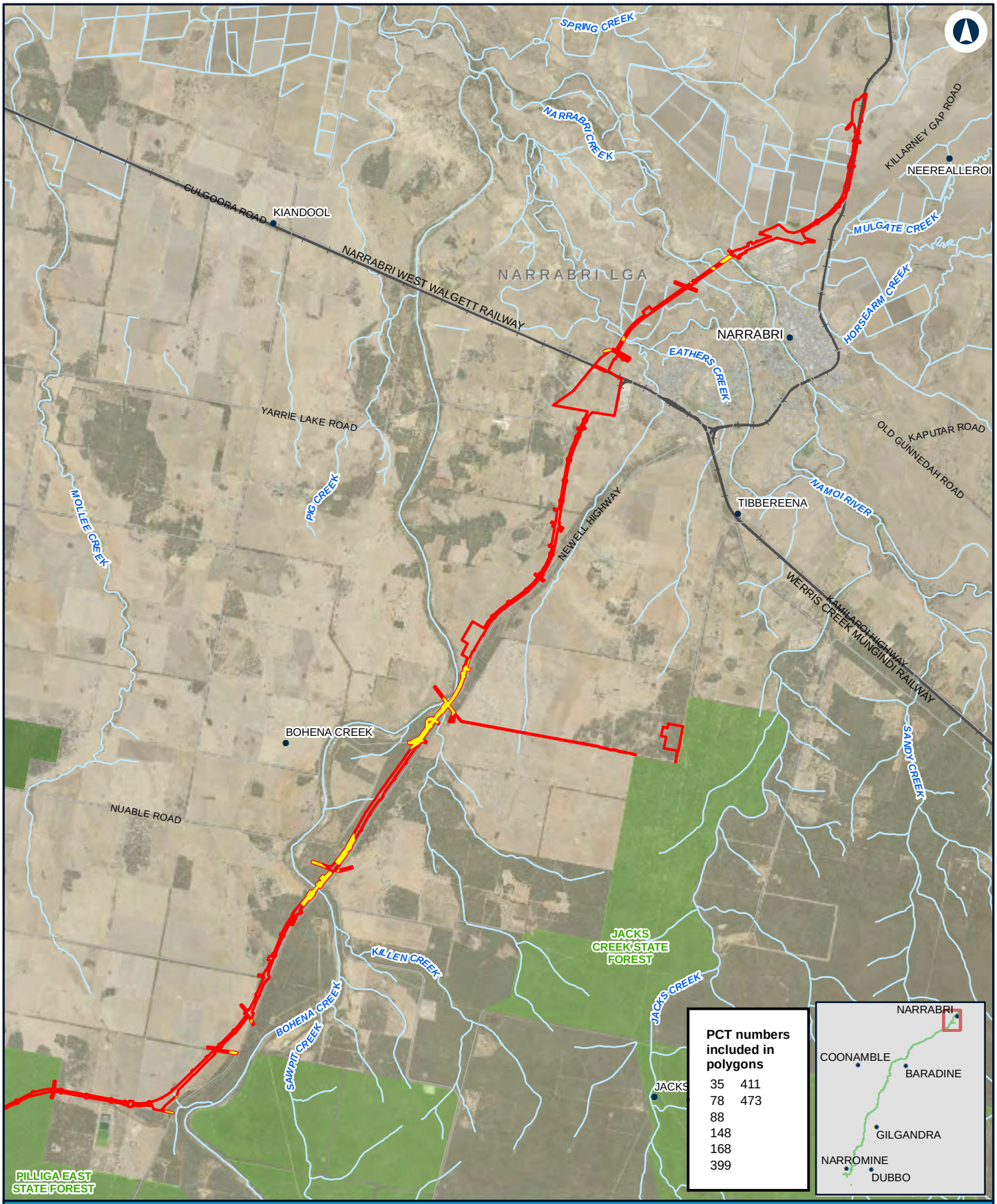

NARROMINE TO NARRABRI

Fauna Species Polygon - Pale Headed Snake - Segment 11 Pilliga to Narrabri

MAP 3 OF 3

0 1.5 3 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:122,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Pale Headed Snake species polygon

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Table I17 Koala

Koala (*Phascolarctos cinereus*)	
BC Act Status	Vulnerable
Credit type	Species and ecosystem
SAII entity/threshold	False
EPBC Act Status	Vulnerable
Species polygon area	718.26 hectares
Breeding requirements	• Koalas generally breed between September and February. Female koalas can breed from about 2 years of age (DECC 2008) • While female koalas can theoretically breed every year, this generally does not occur due to the metabolic pressures of lactation and the low nutrient status of their preferred food resources (DECC 2008). • Dispersal of juveniles (predominantly males) has been recorded in Queensland between June and December, with most dispersal of males commencing in July and August and that of females commencing between September and November prior to, and early in, the annual breeding season (Dique et al 2003). • In northern NSW, long-distance dispersal of up to 16.6 kilometres was recorded in around 20 per cent of the population, and the average dispersal distance was found to be 5.6 kilometres (Norman et al 2019).
Habitat requirements	• Koalas inhabit eucalypt woodlands and forests (EES 2019b) • Koalas feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species (EES 2019b). Koalas generally feed within trees of the *Eucalyptus* genus but local habitat studies across their extensive range have revealed they also feed within tree species from many other genera including *Corymbia, Angophora, Lophostemon, Melaleuca, Acacia, Allocasuarina* and *Callitris* (OEH 2018b). • Use of shelter trees for thermoregulatory purposes is another driver of Koala tree use, particularly in hotter and more arid locations and during periods of extreme temperatures (OEH 2018b). • In the Pilliga State Forest of central-western NSW, the average home range is 10–15 hectares (R. Kavanagh, State Forests NSW, pers. comm.; DECC 2008). • In the western slopes and plains of the State, River Red Gum (*Eucalyptus camaldulensis*) and Coolabah (*Eucalyptus coolabah*) are the primary feed tree (DECC 2008).

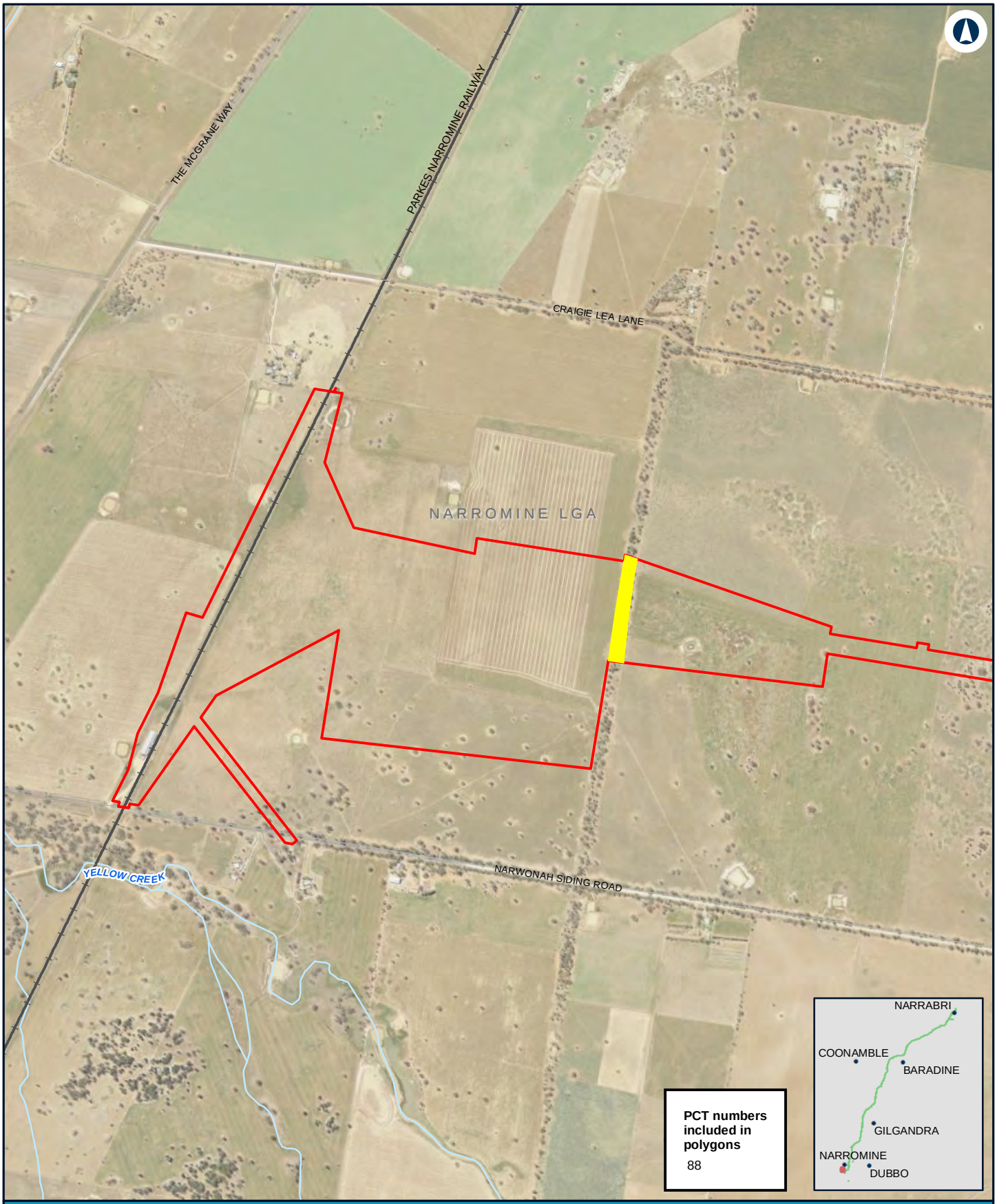
Koala (*Phascolarctos cinereus*)	
Habitat in the study area	• Habitat in the study area lies primarily within the Pilliga forests. There are large areas of foraging habitat primarily close to drainage lines with deeper soils and a lower occurrence of fire (Lunney et al. 2017). • Trees with documented high use (OEH 2018b) that are present in the proposal site include *Eucalyptus chloroclada* (Dirty Gum), *Eucalyptus blakelyi* (Blakely's Red Gum) and *Eucalyptus camaldulensis* (River Red Gum). Trees with documented high use in the Pilliga (OEH 2018b) that are present in the proposal site include *Eucalyptus pilligaensis* (Pilliga Box) and *Callitris glaucophylla* (White Cypress Pine). Trees with documented significant use in the Pilliga (OEH 2018b) comprises *Eucalyptus crebra* (Narrow-leaved Ironbark). • Linear habitat for this species also occurs along roadside TSRs and in woodland patches in agricultural land. • The Bohena Creek system is thought to be a vital route for the dispersal of the Koala in the Pilliga (ABC News 2014).
Known populations	**Pilliga** • Surveys of the Pilliga forests in the 1990s suggested that the forests were carrying the largest population of Koalas west of the Great Dividing Range in NSW, with the numbers estimated at approximately 15,000 (Kavanagh and Barrott, 2001). • A combined series of repeat surveys for Koalas within the Pilliga forests showed a decline of over 80 per cent in both the distribution and activity of Koalas within the forests (Lunney et al. 2017). • Although Koalas remain within the forests, they were found in the later surveys to be restricted to moister areas adjacent to creek lines (Kavanagh and Barrott, 2001). • Koalas are most common in the western half of the central Pilliga, fairly common in West Pilliga, and least common in the eastern and southern Pilliga (Kavanagh and Barrott, 2001). • Logistic regression analysis found that Koalas appear to persist better in areas of the Pilliga that are closer to mapped drainage lines with deep soils and high water-holding capacity. Sites with these characteristics tend to occur in the western part of the study area (Lunney et al 2017). • The Pilliga Area of Regional Koala Significance (ARKS) covers much of the alignment. It is mapped west from where Yarraman Road meets Pilliga Forest Way to the Baradine area, and also a small area near the Newell Highway. The majority of the ARKS is mapped as being of low functional habitat and low resilience. Most of the ARKS is mapped as having very high threat of impacts from wildfire, heat stress and climate change, high impact from dog attack, and moderate threat from fragmentation and vehicle strike (OEH 2019). • The recent decline of Koalas in the Pilliga is not likely to have been the result of a single short-lived catastrophic event (eg a single heatwave) reducing numbers, but is more likely to have been the result of ongoing disturbance (eg a prolonged drought), or a series of adverse events (eg a series of heatwaves or large-scale fires) (Lunney et al 2017).

Koala (*Phascolarctos cinereus*)	
	• Population contractions are likely to have occurred in the past in the Pilliga with Koala populations retreating to moister creek lines with either available free water or a higher moisture content in the leaves of their food trees. However, since the early 1900s, creeks within the Pilliga forests have sanded up as a result of land clearing within and on the periphery of the forests and from road building within the forests (Hesse and Humphreys, 2001). The scale of the disturbance in the Pilliga is such that disturbed channels appear to be 'normal' (Hesse and Humphreys, 2001). Habitats that would have once likely functioned as refugia for koalas during times of drought, are now highly disturbed and are unlikely to provide the required level of protection for the species in the region (Lunney, Predavec, Miller, Kavanagh, et al., 2016). • One local resident suggested that injury and infections from Tiger Pears may be a factor in the decline of the species in the Pilliga forest. This is further supported by radio-tracking studies by Kavanagh and Barrott (2001) which noted the death of two radio-tracked koalas due to septicaemia resulting from thorn-stick injuries from Tiger Pear and also scarring and infections on the feet off most animals. Tiger Pear was known to be common within a 10km radius of 'The Aloes' in the western portion of the Pilliga (Kavanagh and Barrott 2001) • Aloes Picnic Area, which occurs adjacent to Etoo Creek in the Pilliga Forest, is a known hotspot for Koalas (Baradine bird routes brochure, no date) • The Pilliga and Bohena Creek area have recent been mapped as part of the Pilliga Area of Regional Koala Significance (ARKS). • Evidence provided to the recent inquiry in Koala popualtions in NSW noted that the Pilliga Koala population was 'completely unviable' or already extinct (Legislative Council Portfolio Committee 7 2020). **Other locations** • Large numbers of records in Breeza, Gunnedah and vegetation associated with the Melville range to the east (EES 2019a). • Patchy and isolated records between Narromine and Gilgandra (EES 2019a)
Survey requirements	Survey Months: All year
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists - diurnal surveys including habitat assessments – no Pilliga surveys) • November 2018 (10 days, two ecologists – diurnal surveys including scat searches and searches for Koalas/nocturnal surveys including spotlighting and call playback– no targeted Pilliga surveys other than driving on one day along Pilliga Forest Way) • March 2019 (10 days, four zoologists – diurnal surveys – scat searches and searches for Koalas in the Pilliga) • March 2019 (5 days, two zoologists – nocturnal surveys in the Pilliga, including spotlighting and call playback) • August 2019 (5 days, two zoologists – diurnal scat searches and nocturnal spotlighting and call playback surveys, 1 night in the Pilliga)

Koala (*Phascolarctos cinereus*)			
	• Late September-early October 2019 (6 days including scat searches, two ecologists. 2 days, 2 nights in the Pilliga including scat searches, call playback and spotlighting).		
Survey results	Koala scats were recorded during the surveys at Etoo Creek and at Coolangala Creek. No individuals were recorded during any of the surveys.		
Species polygon guidance	The Koala is a dual credit species, with species credits required for areas of 'important habitat'. 'Important' habitat is defined by the density of Koalas and quality of habitat determined by on-site survey (EES 2019b). Other potential habitat for this species is captured in ecosystem credits.		
Species polygon justification	Yes (surveyed) The Pilliga and Bohena Creek area are mapped as part of the Pilliga Area of Regional Koala Significance (ARKS). Within this area, the Koala is more likely to occur along drainage lines. Scats were located at two creeks in the south-western portion of the Pilliga, near Baradine, within the Pilliga ARKS. The species polygon for the Koala comprises: • all relevant PCTs within the ARKS • All relevant PCTs within 10 kilometres of a known record elsewhere along the alignment. All other habitat for the species is captured in the ecosystem credits for the relevant PCTs.		
Relevant PCTs	35	Brigalow - Belah open forsts / woodland on alluvial often gilgaied clay from piliga scrub to Gondiwindi, Brigalow Belt South Bioregion	Segment 10
	36	River Red Gum tall to very tall open forest/woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion	Segment 8,11
	56	Poplar Box - Belah woodland on clay-loam soils on aluvial plains on north central NSW	Segment 8
	78	River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	Segment 7, 8, 9, 11
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	Segment 1, 6, 8, 9, 10, 11
	141	Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion	Segment 10
	148	Dirty Gum - Buloke - White cypress pine - ironbark shrubby woodland of the deep sandy soils on the Liverpool Plains Region of the Brigalow Belt South Bioregion	Segment 3, 11

Koala (*Phascolarctos cinereus*)		
185	Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland	Segment 4, 8
202	Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South and Nandewar Bioregion (including Pilliga)	Segment 8
244	Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt)	Segment 8, 9
248	Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW	Segment 8
255	Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland	Segment 5, 6, 8
256	Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion	Segment 10
394	Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions	Segment 8, 10
397	Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion	Segment 9, 10
398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion	Segment 7, 10, 11
399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion	Segment 9, 10, 11
404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests	Segment 10
406	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests	Segment 10
409	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests	Segment 10
411	Buloke - White Cypress Pine woodland on outwash plains in the Piliga Scrub and Narrabri regions, Brigalow Belt South Bioregion	Segment 11
414	White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion	Segment 10

Koala (*Phascolarctos cinereus*)			
	435	White Box – White Cypress Pine shrub grass hills woodland in the Brigalow Belt South bioregion and Nandewar bioregion	Segment 9
	444	Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion	Segment 9
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion	Segment 11
	589	White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion	Segment 8, 9, 10
	746	Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion	Segment 7, 11
	1384	White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion	Segment 10
Relevant IBRA subregions	Northern Basalts – known Liverpool Plains – known Pilliga – known Pilliga Outwash – known Castlereagh Barwon – known Bogan Macquarie – known Inland Slopes - known		



NARROMINE TO NARRABRI | Fauna Species Polygons - Koala - Segment 1 Narromine South multi-function compound | MAP 1 OF 9

0 0.25 0.5 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:20,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Koala species polygon

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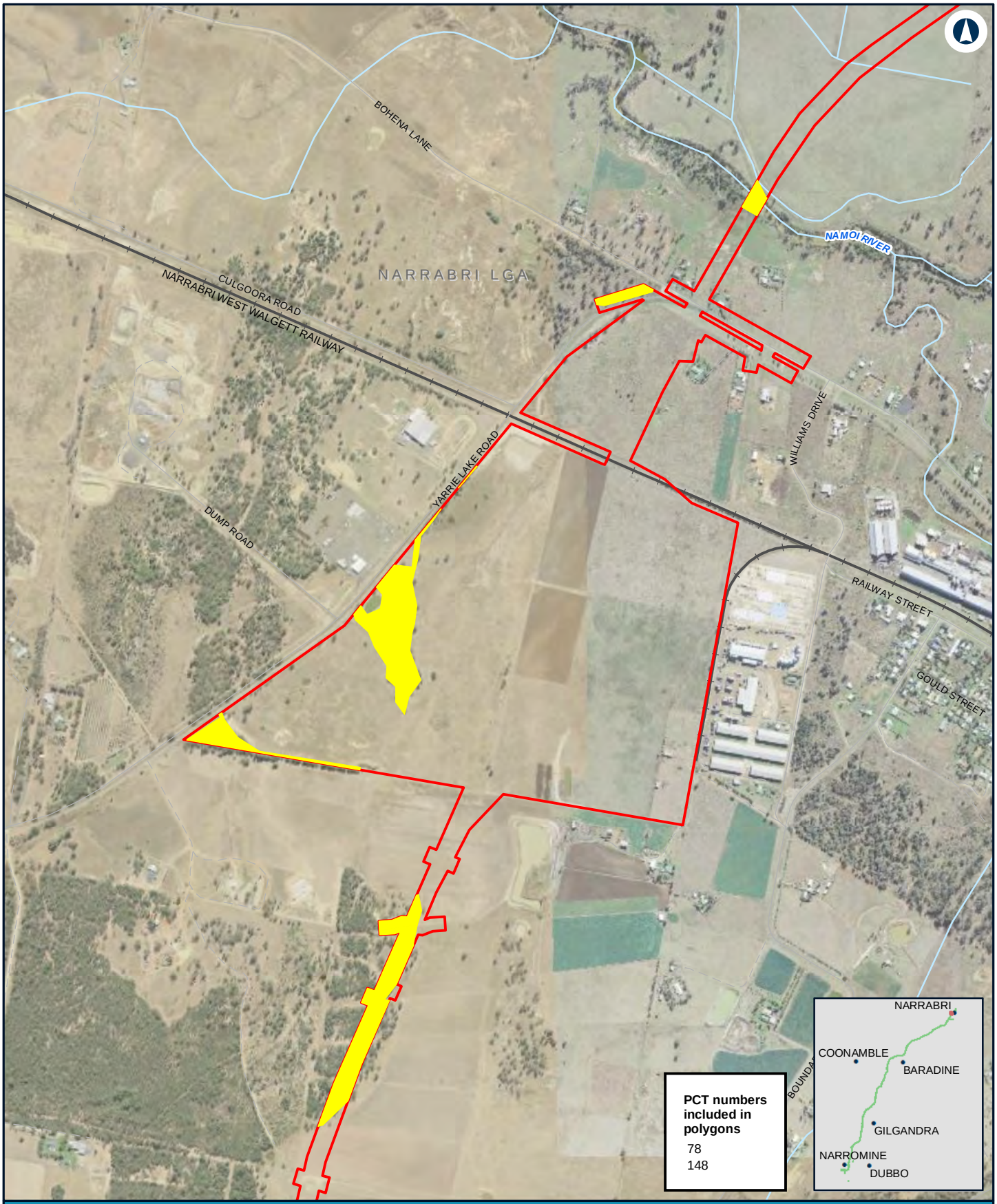

NARROMINE TO NARRABRI Fauna Species Polygons - Koala - Segment 3 Narrabri West multi-function compound MAP 2 OF 9

0 0.2 0.4 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:15,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Koala species polygon

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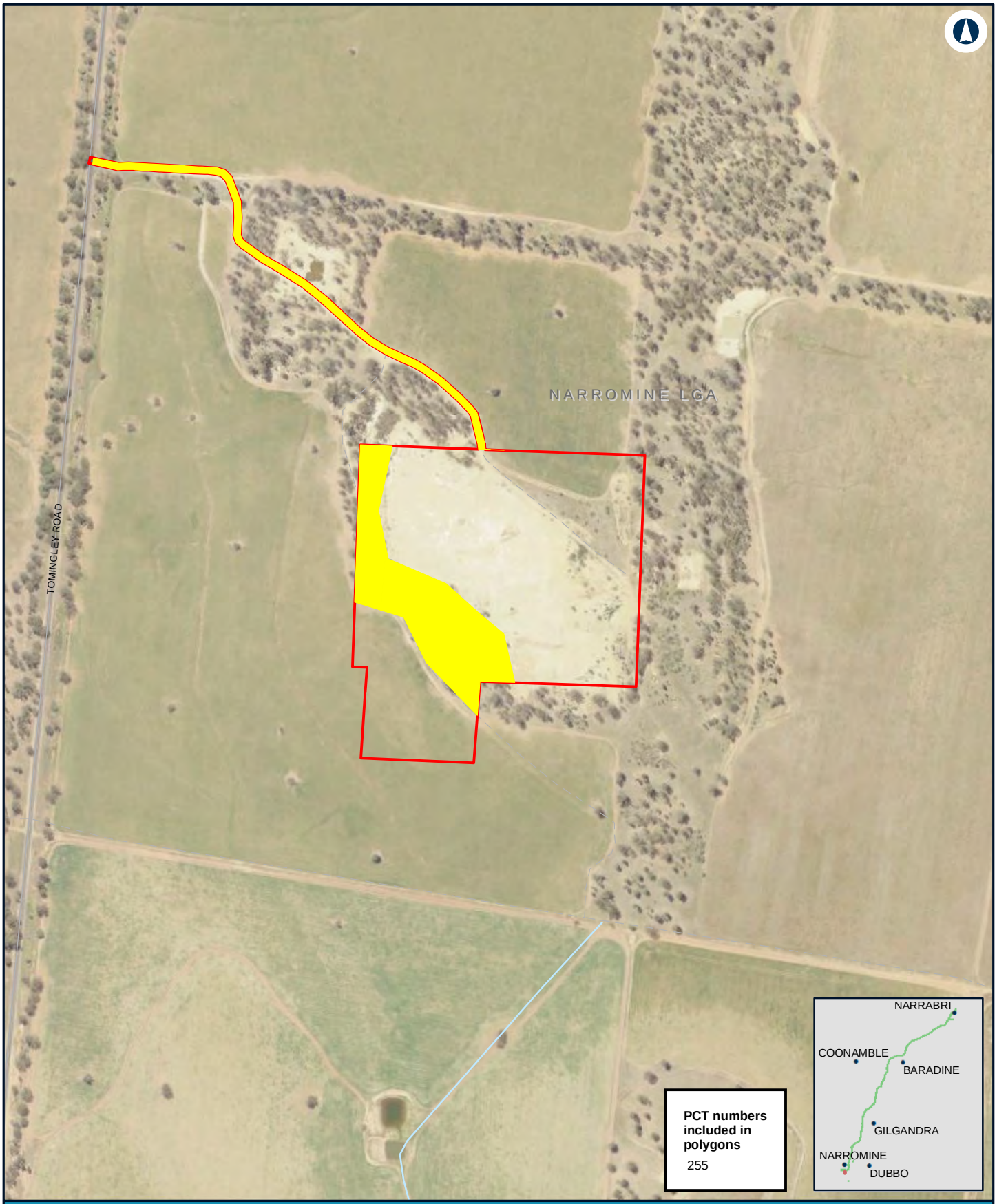

NARROMINE TO NARRABRI

Fauna Species Polygons - Koala - Segment 5 Borrow Pit B

MAP 3 OF 9

0 0.1 0.2 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:8,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Koala species polygon

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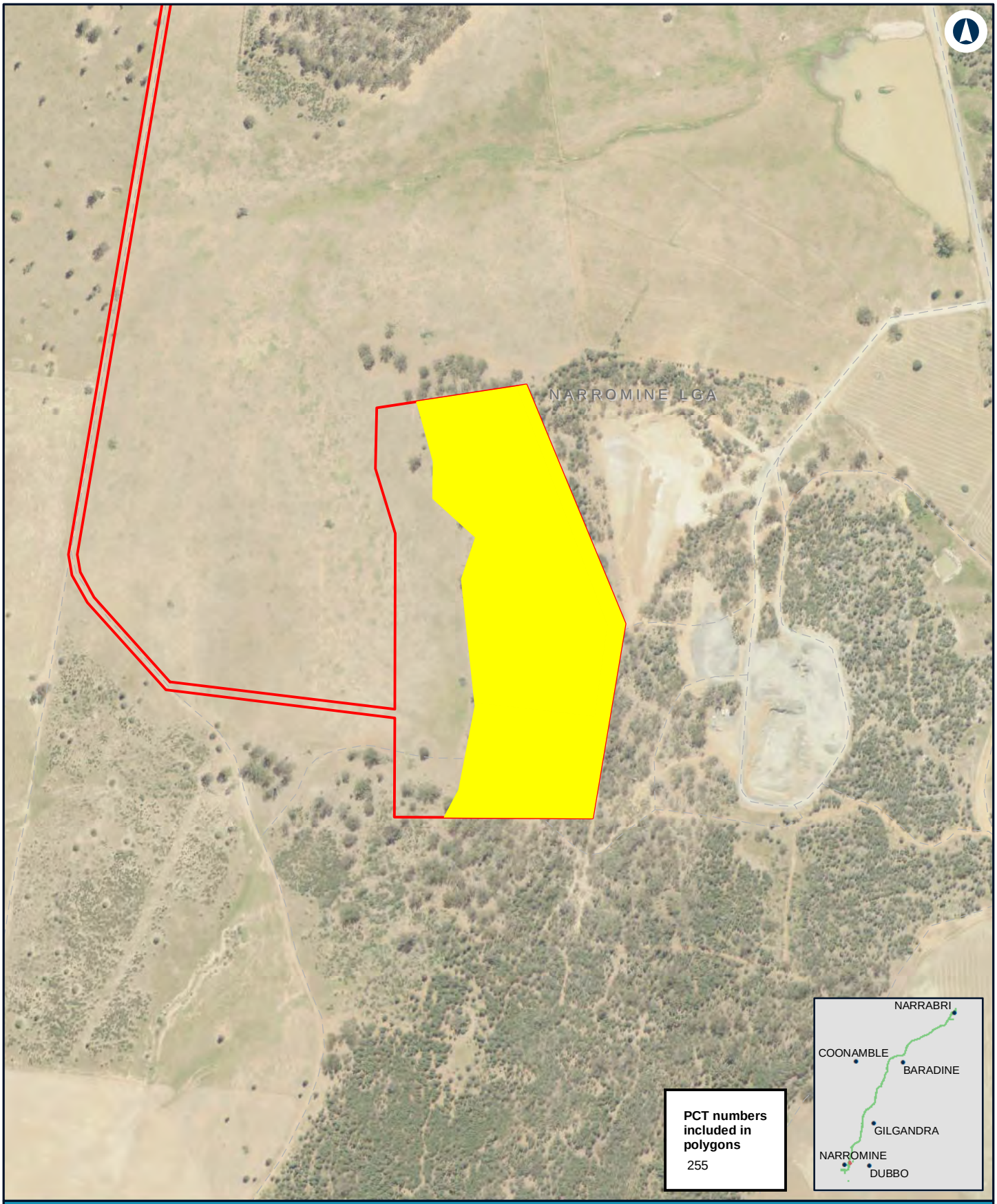

PCT numbers included in polygons

255

NARROMINE TO NARRABRI

Fauna Species Polygons - Koala - Segment 6 Borrow Pit C

MAP 4 OF 9

0 0.085 0.17 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:6,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Koala species polygon

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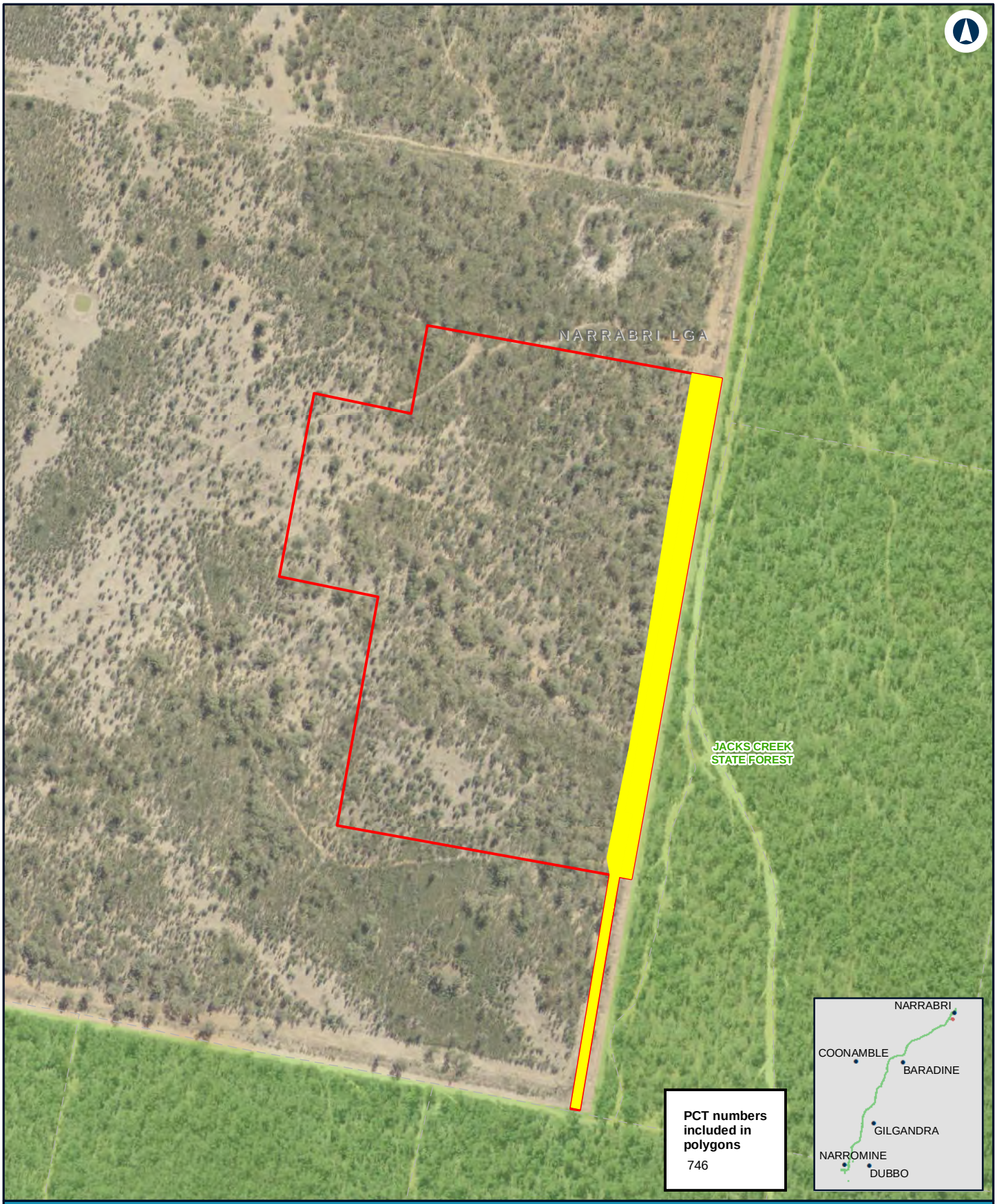

PCT numbers included in polygons

746

NARROMINE TO NARRABRI

Fauna Species Polygons - Koala - Segment 7 Borrow Pit D

MAP 5 OF 9

0 0.085 0.17 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:6,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Koala species polygon

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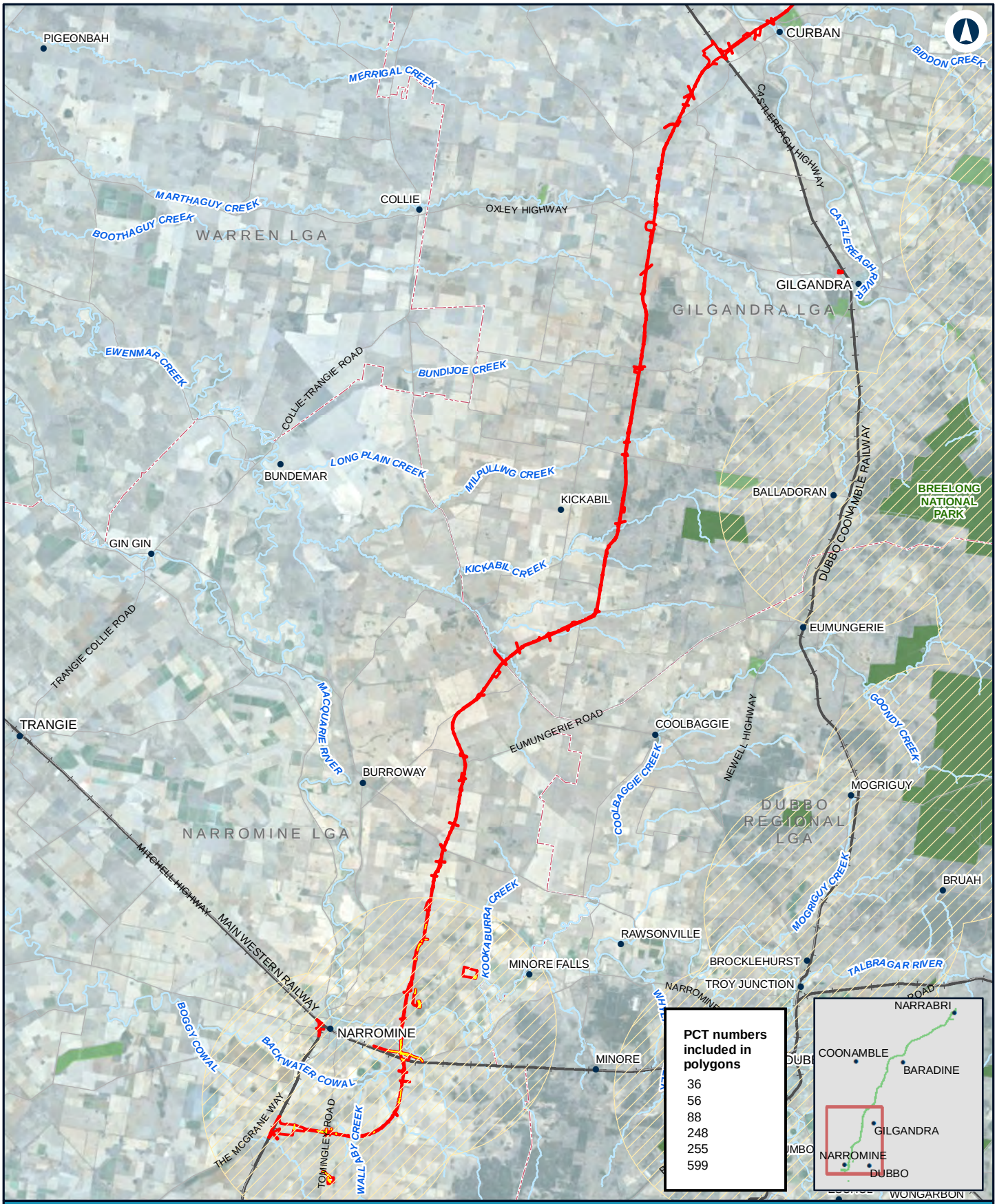

NARROMINE TO NARRABRI | Fauna Species Polygons - Koala - Segment 8 Narromine to Curban | MAP 6 OF 9

0 5.5 11 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:400,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Koala species polygon
- Koala Bionet Records 10km Buffer

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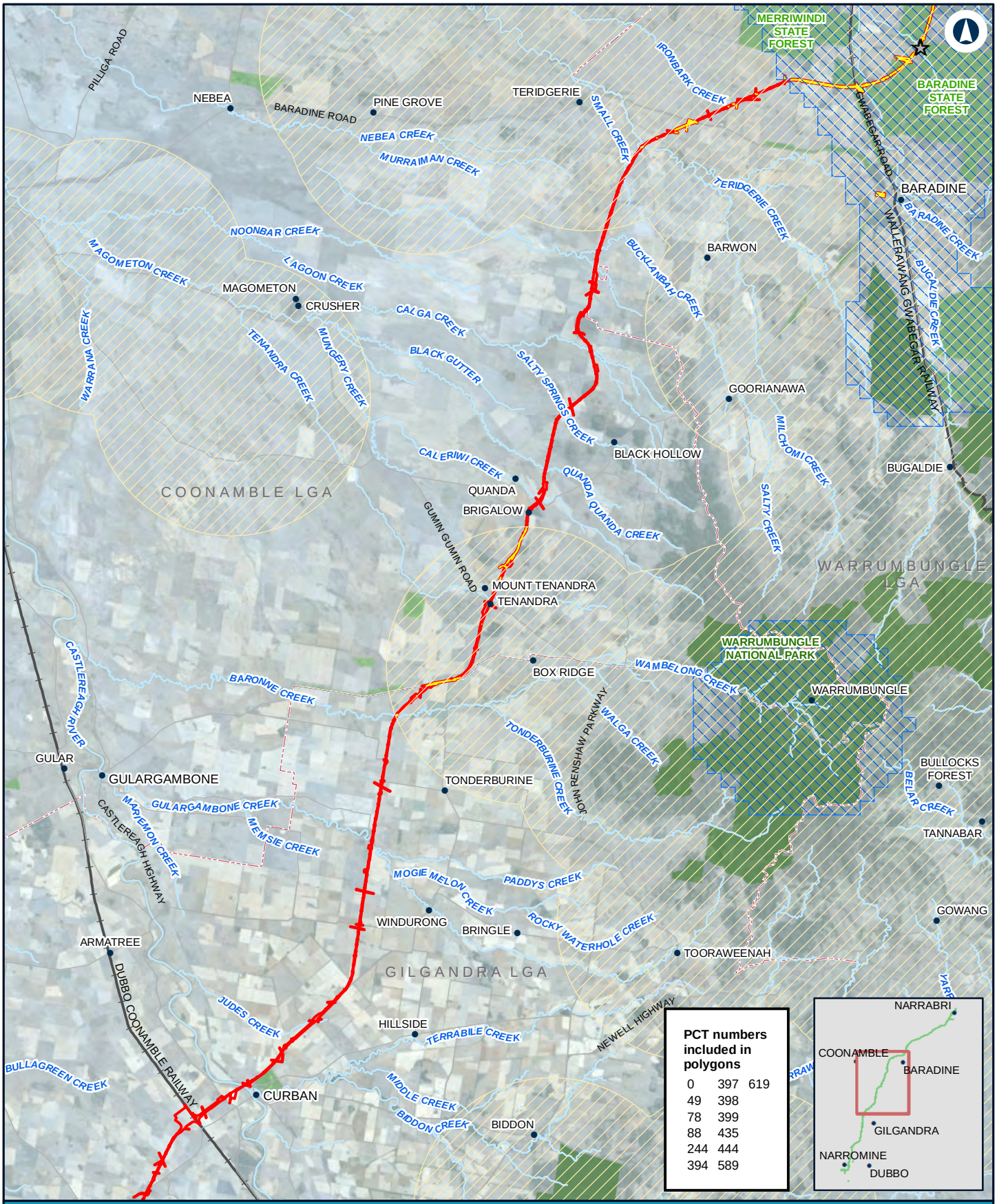

NARROMINE TO NARRABRI Fauna Species Polygons - Koala - Segment 9 Curban to Pilliga MAP 7 OF 9

0 5 10 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:375,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Koala (scats/scratches) GHD record
- Koala species polygon
- Koala Bionet Records 10km Buffer
- Area of Regional Koala Significance

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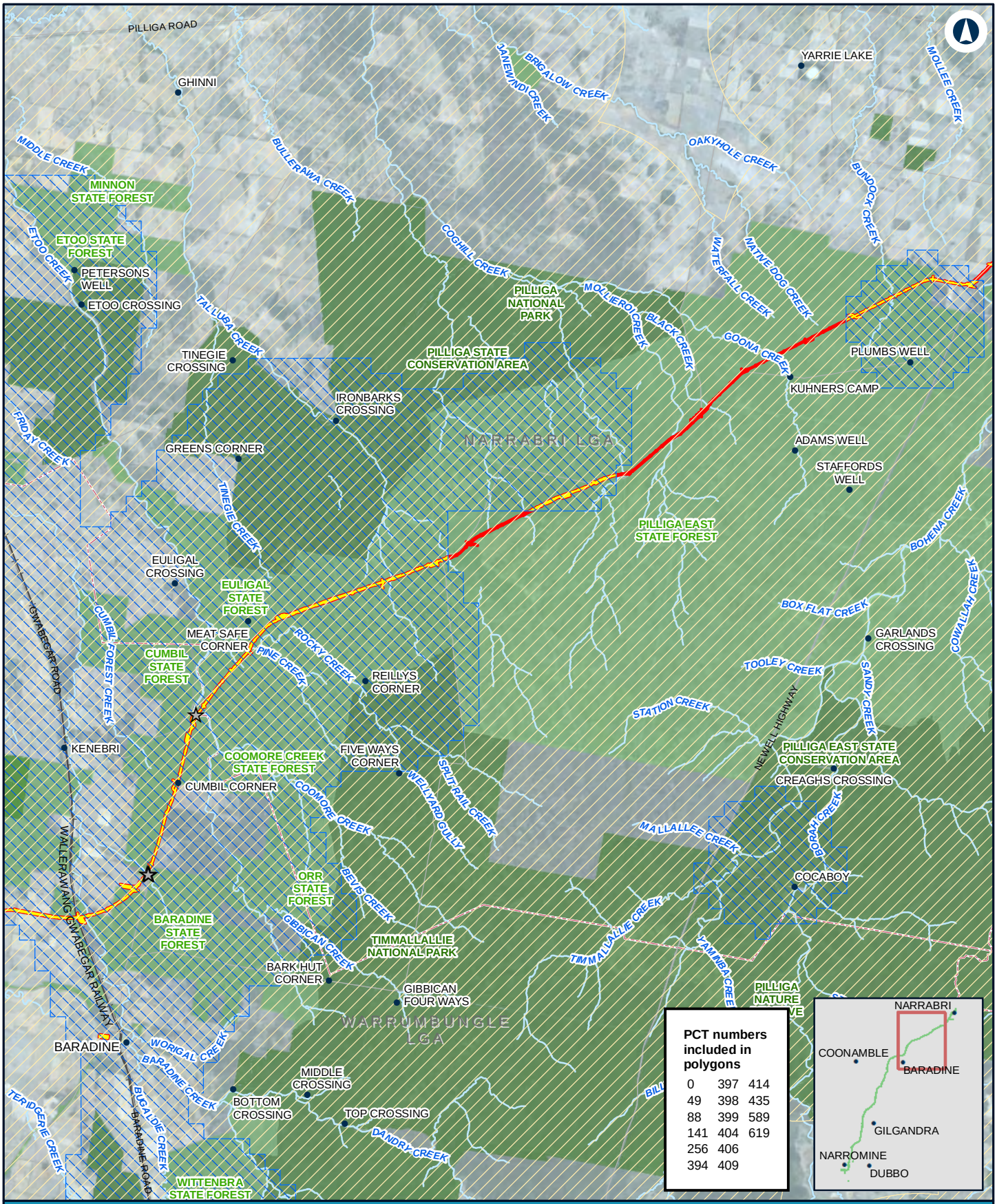

NARROMINE TO NARRABRI | Fauna Species Polygons - Koala - Segment 10 Pilliga | MAP 8 OF 9

0 4.5 9 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:340,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Koala (scats/scratches) GHD record
- Koala species polygon
- Koala Bionet Records 10km Buffer
- Area of Regional Koala Significance

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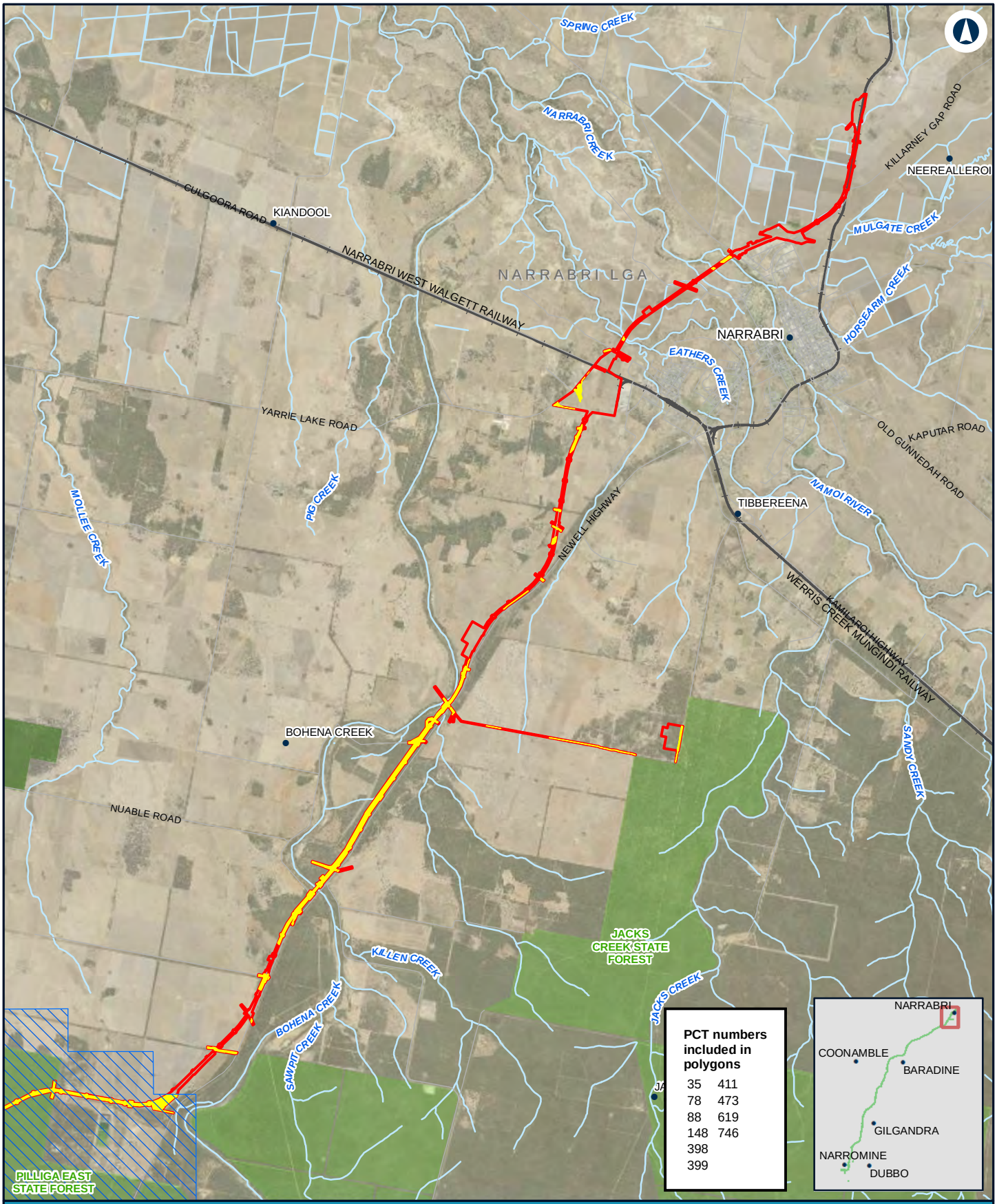

NARROMINE TO NARRABRI | Fauna Species Polygons - Koala - Segment 11 Pilliga to Narrabri | MAP 9 OF 9

0 1.5 3 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:122,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Koala species polygon
- Area of Regional Koala Significance

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Table I18 Squirrel Glider

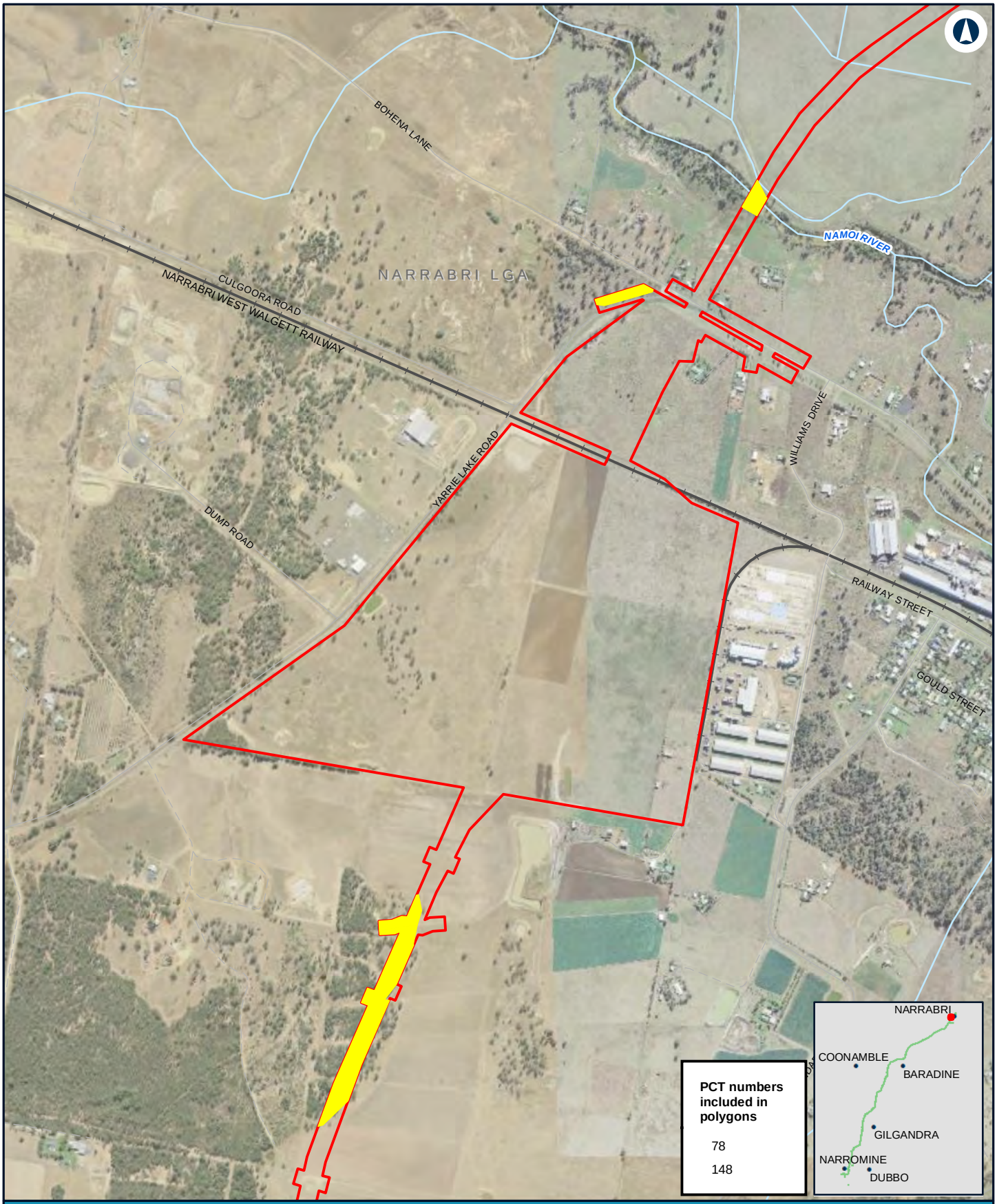
Squirrel Glider (*Petaurus norfolcensis*)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	688.30 hectares
Breeding requirements	• In south eastern Australia breeding usually begins in August with each female producing two young. • Relies on large old trees with abundant hollows for breeding and nesting (EES 2019b) • Preferred hollows are those with a large cavity that can house multiple gliders in a large nest, yet with a small entrance that protects the group from predators like goannas (NSW Scientific Committee 2008b).
Habitat requirements	• Inhabits mature or old growth Box, Box-Ironbark (*Eucalyptus paniculata*), (*Eucalyptus molucanna*) woodlands and River Red Gum forest west of the Great Dividing Range (EES 2019b). • Important habitat components appear to be a sufficient density of hollow-bearing trees and a high floristic diversity, including the presence of smooth-barked and winter/spring flowering tree species and a good winter supply of nectar (Menkhorst et al. 1988; Sharpe and Goldingay 1998, NSW Scientific Committee 2008b) • Box-Ironbark with an Acacia understorey is likely to be a key habitat for inland NSW populations of the Squirrel Glider, as in parts of Victoria (Traill & Lill 1997). • Habitat degradation in remnants is continuing through loss of key shelter and dietary resources, ie tree hollows and Acacia or floriferous shrubs. Tree hollows are currently less abundant in forests managed for timber than in linear roadside fragments, and there is a net loss of large hollow trees, without adequate recruitment. The species is subject to cumulative loss of den sites from harvesting of forests or woodlands (NSW Scientific Committee 2008b) • Declines of the large possums in inland NSW are associated with a 70 per cent reduction in box-ironbark habitat, a 90 per cent reduction in the proportion of large trees with hollows, and loss of a shrubby understorey in remnant habitat (Kerle 2004), and fox predation and loss of ironbarks and hollows in the Pilliga forests (Paull & Kerle 2004).
Habitat in the study area	The Pilliga Forest provides a large areas of foraging, breeding and denning habitat for this species. The Squirrel Glider would den in ironbarks and also along creeklines where there is an abundance of large hollow-bearing River Red Gums. Shrubby areas with acacias and other myrtaceous plants would provide foraging habitat.

Squirrel Glider (*Petaurus norfolcensis*)	
Known populations	• The Squirrel Glider is sparsely distributed along the east coast and immediate inland districts from western Victoria to north Queensland. The species is found inland as far as the Grampians in Victoria and the Pilliga and the Coonabarabran areas of NSW (NPWS 1999). • Records in the locality are mostly restricted to areas set aside for conservation including Goulburn River National Park, Warrumbungle National Park, Pilliga Forest and Mount Kaputar National Park (EES 2019b) • The species also occurs in larger woodland patches in the region (EES 2019a). • In the Pilliga forests, scattered records are present, and the lack of records are likely to due in part to the poor detectability of the species. • In a study of possums in the Pilliga forests, only two Squirrel Gliders were recorded out of 26 sites in 1993/1994, and four individuals at 21 sites in 19998/2000. Individuals were recorded in *Eucalyptus pilligaensis* (3), *E. crebra* (3) and *Angophora floribunda* (1) (Paull and Kerle 2004). Higher numbers of Sugar Gliders were recorded in the 1999/2000 surveys (25 individuals) compared to the earlier surveys (8 individuals). • Squirrels occur at lower densities than Sugar Gliders where the two co-exist (Suckling 1995). • Surveys in the Pilliga have demonstrated a continuing decline of possum populations, with observations of Brush-tailed Possums and Ringtail Possums dropping substantially (Kerle 2004). The Squirrel Glider may be going through a similar decline due to the reduction in availability of den habitat (NSW Scientific Committee 2008). • Squirrel Gliders are susceptible to predation by foxes (Suckling 1995). Brush-tailed Possums were found to be the favoured prey of foxes in the Pilliga in the 1993/4 survey (Paull and Date 1999). Problems posed by foxes are likely to be exacerbated by increased distances between suitable feed and den trees. Goannas and owls may also rely more heavily on possums in a habitat where resources have been compromised (Paull and Kerle 2004).
Survey requirements	Survey Months: January to December Survey year round but sites with bi-pinnate acacia, autumn winter flowering trees and shrubs such as *Eucalyptus robusta* and *Banksia* spp. (*integrifolia* etc) should be subject to a more retracted survey period of between March-August. Relies on large old trees with hollows for breeding and nesting. These trees are also critical for movement and typically need to be closely-connected (ie no more than 50 metres apart) (EES 2019b).

Squirrel Glider (*Petaurus norfolcensis*)	
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists - diurnal habitat assessments surveys only) • November 2018 (10 days, two ecologists – diurnal habitat assessments and 8 nights of nocturnal surveys including spotlighting along the alignment – no targeted Pilliga surveys other than driving on one day along Pilliga Forest Way) • March 2019 (10 days, four zoologists – diurnal surveys – trapping in the Pilliga (week one) and Gilgandra and Bohena Creek areas (week 2)) • March 2019 (5 days, two zoologists – nocturnal surveys in the Pilliga, including call playback) • August 2019 (5 days, two zoologists – diurnal and nocturnal surveys, 1 night in the Pilliga) • Late September-early October 2019 (6 days, two ecologists. 2 days, 2 nights in the Pilliga). The March surveys included one week in the Pilliga forests, with six zoologists conducting surveys, and a second week with two zoologists in the Bohena Creek and northern Pilliga. Trap effort consisted of 9 trap lines in the Pilliga and Bohena Creek areas containing 10 tree-mounted Elliott traps, trapped for four nights each (total of 360 trap-nights). Trapping was also conducted south-west of Gilgandra, and comprised two trap lines of 10 tree-mounted Elliott traps, trapped for four nights (total of 80 trap-nights). Five nights of spotlighting surveys were conducted in the Pilliga in March 2019. Spotlighting was conducted at various locations along the alignment in November 2018 for eight nights and August 2019 for five nights, the latter targeting major creeklines and the Pilliga on ove evening. Spotlighting was also conducted in the Pilliga on two nights in September/October 2019.
Survey results	A family of Squirrel Gliders were observed at a hollow in an ironbark during nocturnal surveys on two occasions in the same tree during the March 2019 surveys in the Pilliga. No individuals were trapped during surveys. No Brush-tailed Possums were observed in the Pilliga except near Baradine at Baradine Creek and north of the Pilliga at Bohena Creek. No Common Ringtail Possums were recorded.
Species polygon guidance	The TSPD identifies a number of PCTs that are Squirrel Glider habitat. The Squirrel Glider is a full species credit species.
Species polygon justification	Yes (surveyed) Squirrel Gliders were recorded at one location in Pilliga East State Forest during surveys. Prevailing drought conditions are likely to have contributed to the lack of trap success. The species polygon for the Squirrel Glider incorporates all known and potential Squirrel Glider habitat in the Pilliga forests and north to Narrabri. No Squirrel Glider habitat is mapped elsewhere in the alignment given the lack of records, and patchiness of potential habitat.

Squirrel Glider (*Petaurus norfolcensis*)			
Relevant PCTs	78	River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	Segment 11
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	Segment 10
	148	Dirty Gum - Buloke - White cypress pine - ironbark shrubby woodland of the deep sandy soils on the Liverpool Plains Region of the Brigalow Belt South Bioregion	Segment 11
	256	Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion	Segment 10
	394	Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions	Segment 10
	397	Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion	Segment 10
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion	Segment 10
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion	Segment 10
	404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests	Segment 10
	409	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests	Segment 10
	411	Buloke - White Cypress Pine woodland on outwash plains in the Piliga Scrub and Narrabri regions, Brigalow Belt South Bioregion	Segment 11
	414	White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion	Segment 10
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion	Segment 11
	589	White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion	Segment 10

Squirrel Glider (*Petaurus norfolcensis*)			
	746	Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion	Segment 11
	1384	White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion	Segment 10
Relevant IBRA subregions	Northern Basalts – known Liverpool Plains – known Pilliga – known Pilliga Outwash – known Inland Slopes – known		



NARROMINE TO NARRABRI Fauna Species Polygons - Squirrel Glider - Segment 3 Narrabri West multi-function compound MAP 1 OF 4

0 0.2 0.4 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:7,163,937
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Squirrel Glider species polygon

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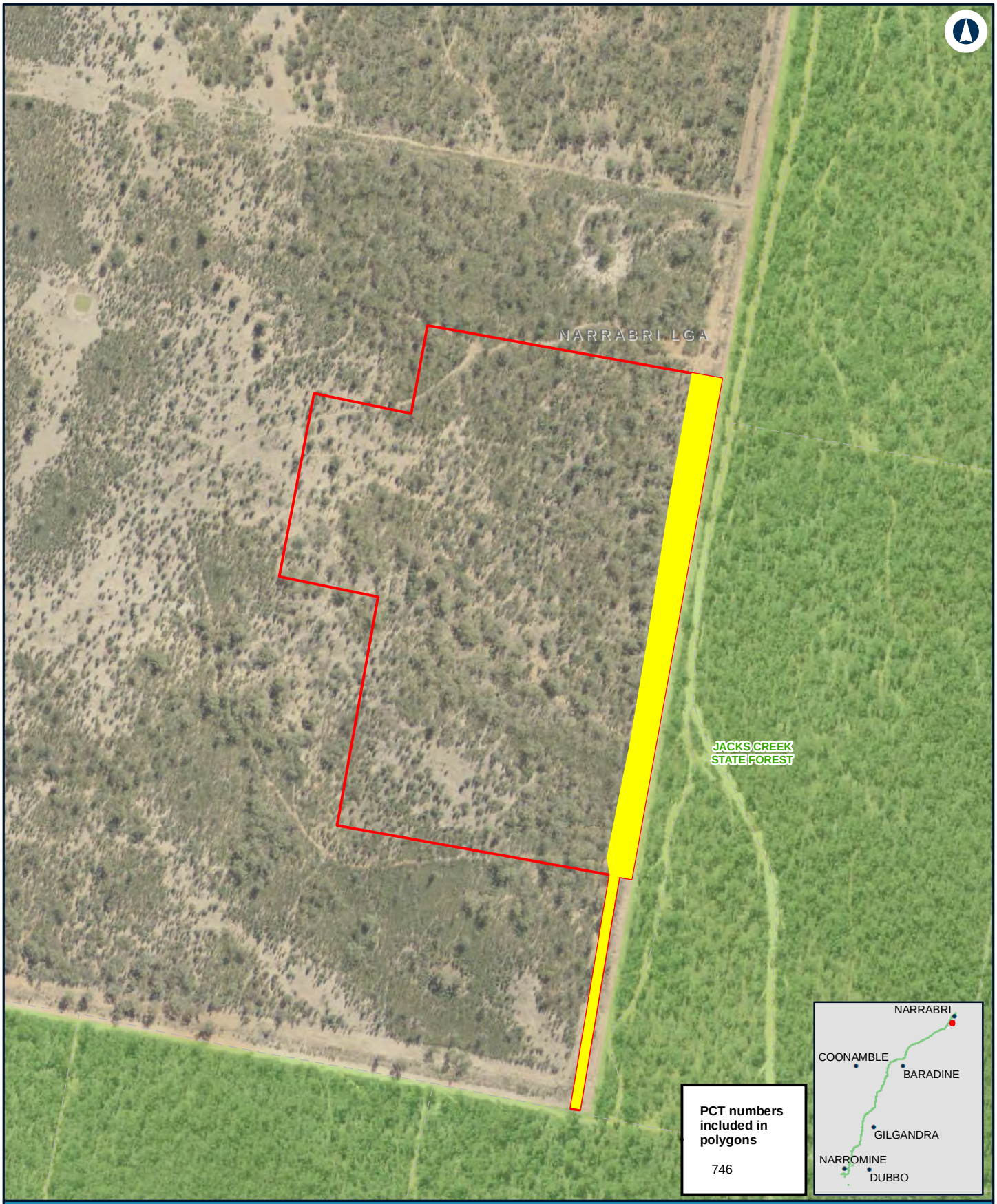

PCT numbers included in polygons

746

NARROMINE TO NARRABRI

Fauna Species Polygons - Squirrel Glider - Segment 7 Borrow Pit D

MAP 2 OF 4

0 0.085 0.17 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:7,163,937
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Squirrel Glider species polygon

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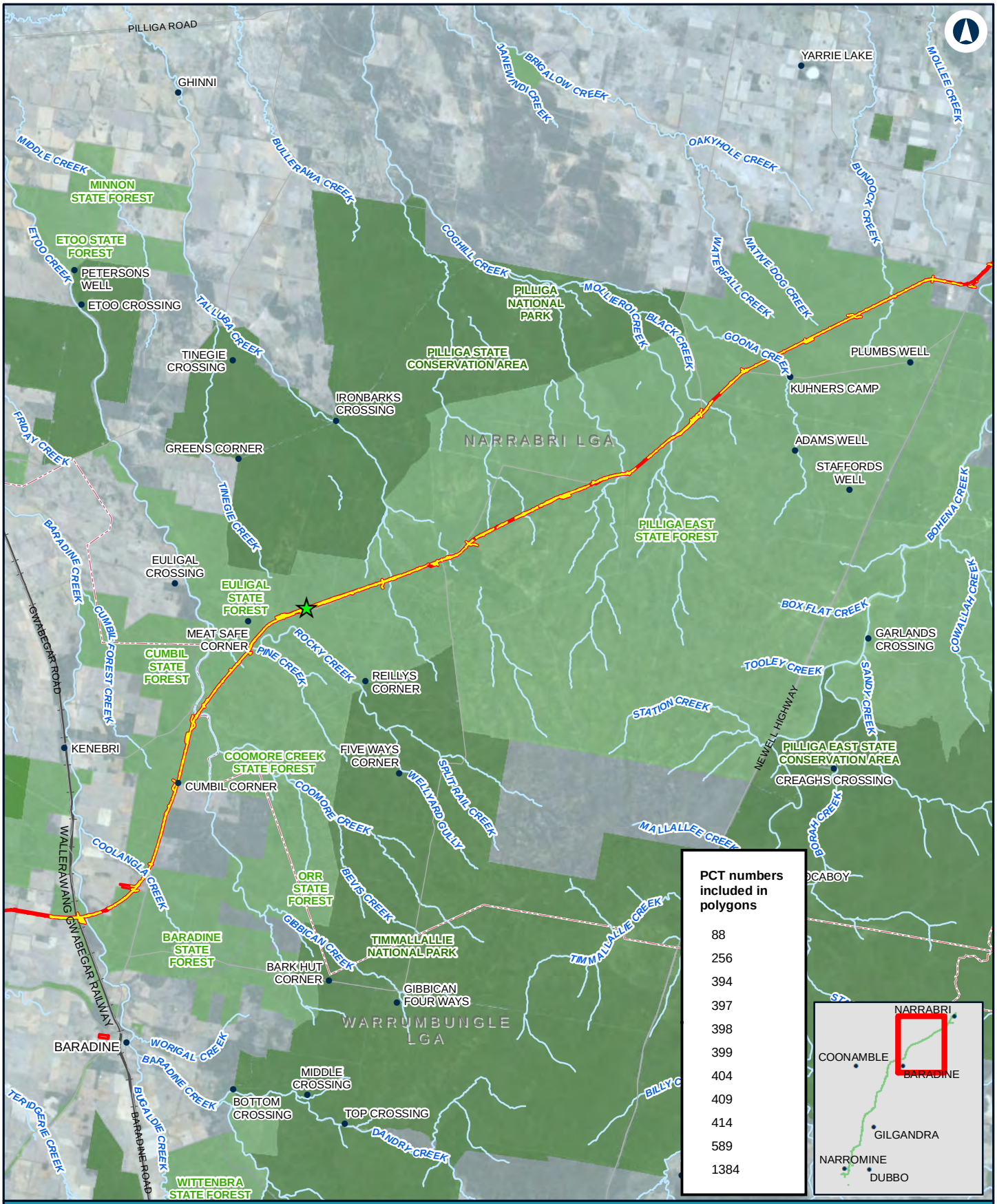

NARROMINE TO NARRABRI | Fauna Species Polygons - Squirrel Glider - Segment 10 Pilliga | MAP 3 OF 4

0 4.5 9 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:7,163,937
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Squirrel glider GHD record
- Squirrel Glider species polygon

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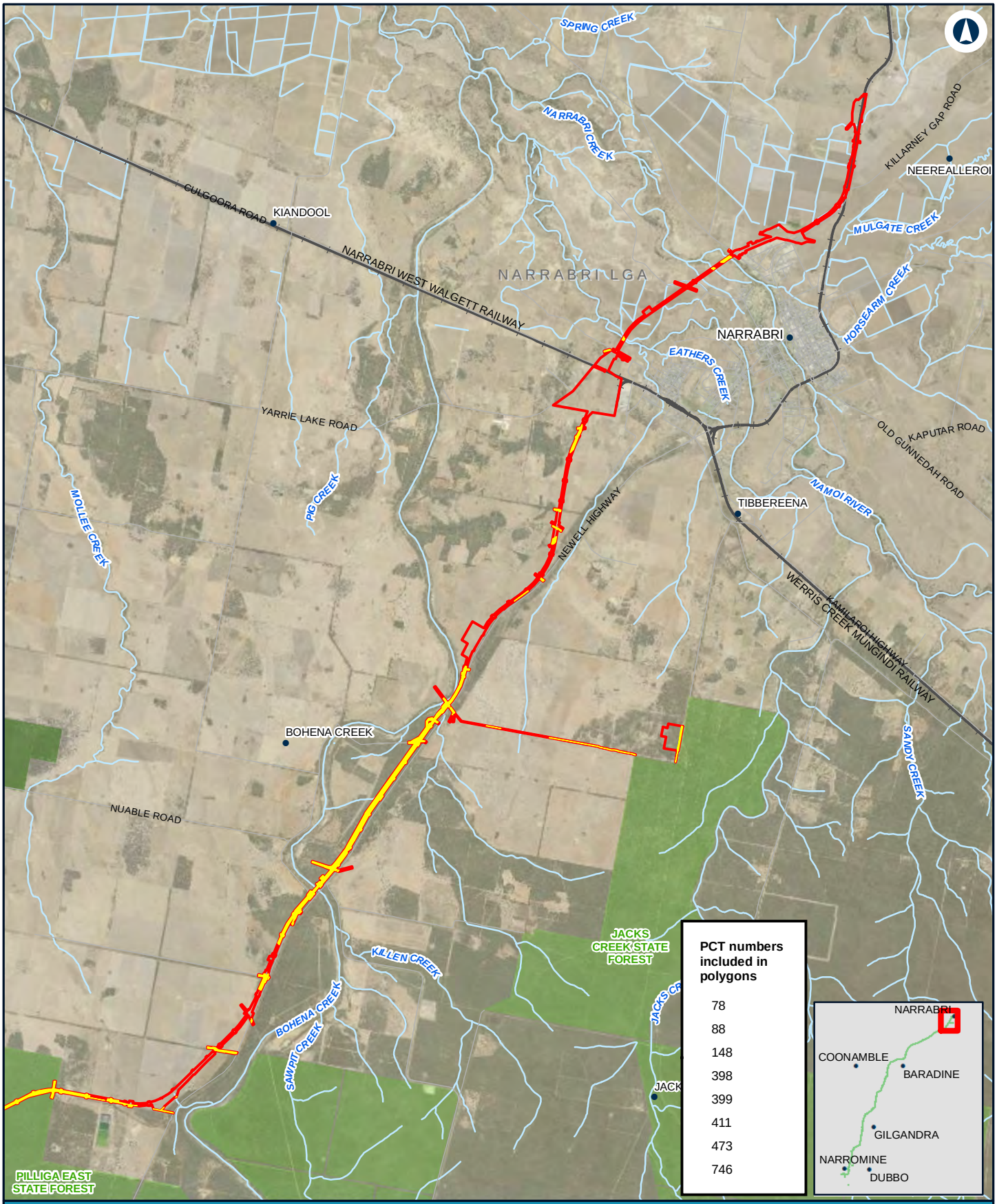

NARROMINE TO NARRABRI

Fauna Species Polygons - Squirrel Glider - Segment 11 Pilliga to Narrabri

MAP 4 OF 4

0 1.5 3 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:7,163,937
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Squirrel Glider species polygon

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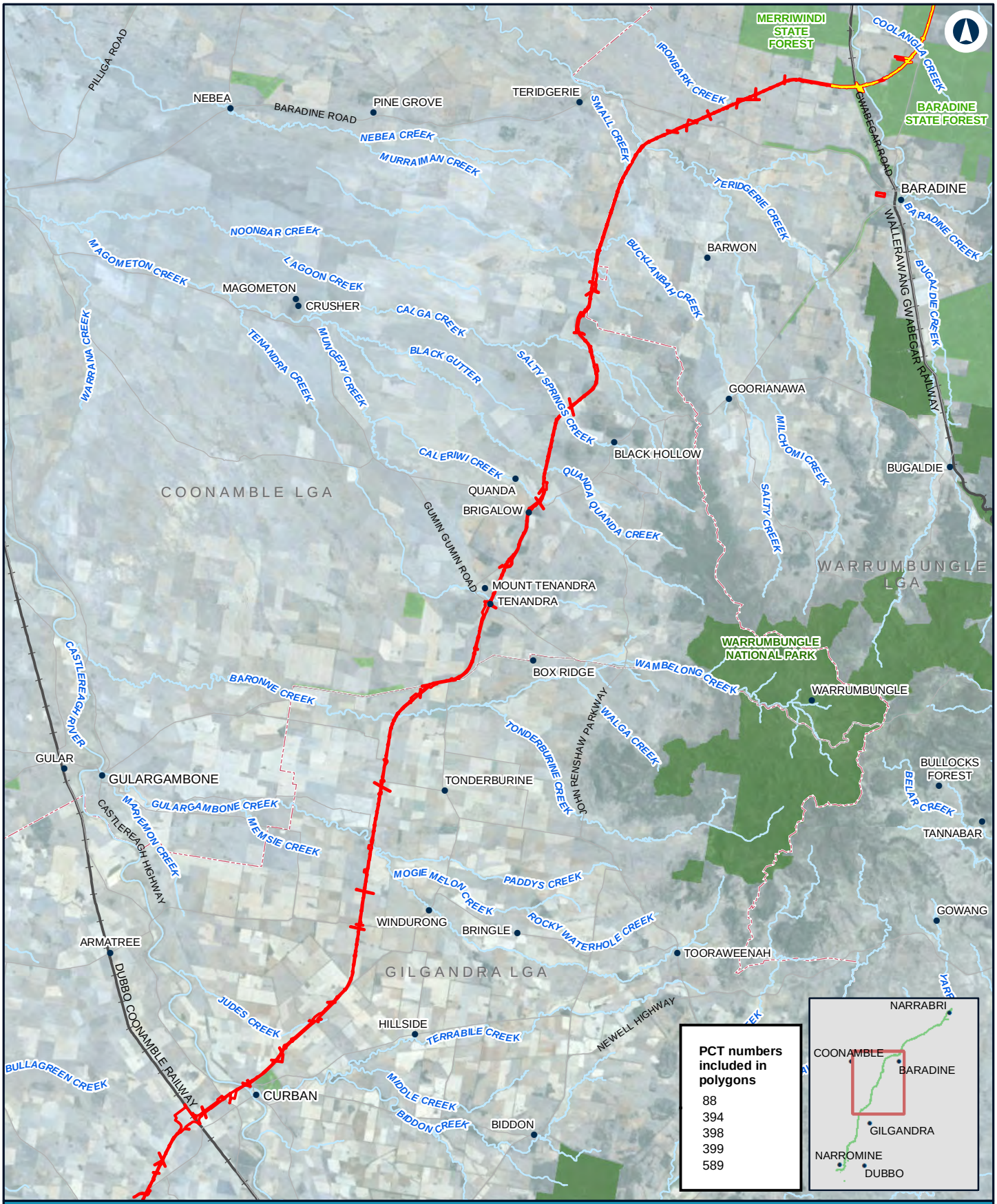
Table I19 Eastern Pygmy-possum

Eastern Pygmy-possum (*Cercartetus nanus*)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	707 hectares
Breeding requirements	• Appear to be mainly solitary, each individual using several nests (EES 2019b) • Young can be born whenever food sources are available, however most births occur between late spring and early autumn (EES 2019b) • Shelters and breeds in tree hollows, rotten stumps, holes in the ground, abandoned bird-nests, Ringtail Possum (*Pseudocheirus peregrinus*) dreys or thickets of vegetation, (eg grass-tree skirts); tree hollows are favoured but spherical nests have been found under the bark of eucalypts and in shredded bark in tree forks (EES 2019b)
Habitat requirements	• Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred (EES 2019b). • Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes; an important pollinator of heathland plants such as banksias; soft fruits are eaten when flowers are unavailable (EES 2019b) • Frequently spends time in torpor especially in winter, with body curled, ears folded and internal temperature close to the surroundings. (EES 2019b) • Home ranges of Eastern Pygmy-possums in logged forests have been found to comprise a mosaic of disturbed and undisturbed areas, and possums did not avoid logged habitat in their home ranges, indicating that logging did not significantly influence habitat selection. Possums are likely not sensitive to selective logging and burning because nectar-producing plants are adapted to fire disturbance and because a variety of den sites were used, most commonly in tree hollows and fallen logs, which were commonly left as logging residue (Law et al 2013).
Habitat in the study area	Heathy woodland within the Pilliga and areas of open woodland with a dense shrub layer, particularly in the north-east end of Pilliga Forest Way. PCTs likely to include populations of these species in the study area comprise: • PCT 141 Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion • PCT 404 Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests • PCT 414 White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion • PCT 88 Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion

Eastern Pygmy-possum (*Cercartetus nanus*)	
Known populations	• Although the Eastern Pygmy-possum is broadly distributed, recent studies have shown that within this range the species appears to be patchily distributed and its overall abundance is low. • There are records within the Pilliga area, Goonoo State Forest, and Warrumbungles National Park (EES 2019b).
Survey requirements	Survey Months: October to March Known to be difficult to trap. Despite a large number of intensive trapping programs undertaken in the eastern forests and woodlands of NSW, only a small number of captures (154) resulted from a total trapping effort of 315,000 Elliott trap-nights and 57,000 pitfall trap-nights (Bowen and Goldingay 2000).
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists - diurnal surveys only) • November 2018 (10 days, two ecologists – diurnal/nocturnal surveys along the alignment – no targeted Pilliga surveys other than driving on one day along Pilliga Forest Way) • March 2019 (10 days, four zoologists – diurnal surveys – trapping in the Pilliga (week one) and Gilgandra and Bohena Creek areas (week 2)) • March 2019 (5 days, two zoologists – nocturnal surveys in the Pilliga, including call playback) • August 2019 (5 days, two zoologists – diurnal and nocturnal surveys, 1 night in the Pilliga) • Late September-early October 2019 (6 days, two ecologists. 2 days, 2 nights in the Pilliga). The March surveys included one week in the Pilliga forests, with six zoologists conducting surveys, and a second week with two zoologists in the Bohena Creek and northern Pilliga. Trap effort consisted of 9 trap lines in the Pilliga and Bohena Creek areas containing 10 Elliott A traps trapped for four nights (360 trap nights) and a pitfall line with 5 buckets at each site trapped for four nights each (180 trap nights). Five nights of spotlighting surveys were conducted in the Pilliga during March, one night in August and two nights in September/October 2019. Cameras were left for a period of 5-10 days in the March surveys at various locations in the Pilliga, including Trap site 1, 3, 4, Coxes Road dams, Curbo Creek and Emu Dam, as well as the Bohena Creek area. Five cameras were left for four weeks between late August and late September 2019 in the Pilliga. Locations included Kuenes Bore, Talluba Creek, heath vegetation, Clay Foot Dam and Cumbil Creek.
Survey results	The Eastern Pygmy Possum was not recorded during surveys. Prevailing drought conditions are likely to have contributed to the lack of trap success.
Species polygon guidance	The TSPD identifies a number of PCTs that are Eastern Pygmy-possum habitat. The Eastern Pygmy-possum is a full species credit species.

Eastern Pygmy-possum (*Cercartetus nanus*)			
Species polygon justification	Yes (assumed present) The species polygon for the Eastern Pygmy-possum incorporates all potential Eastern Pygmy-possum habitat in the Pilliga forests, comprising those PCTs with which the species is known to be associated with. No Eastern Pygmy-possum habitat is mapped elsewhere in the alignment given the lack of records, and patchiness of potential habitat.		
Relevant PCTs	78	River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	Segment 11
	88	Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	Segment 10
	141	Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion	Segment 10
	148	Dirty Gum - Buloke - White cypress pine - ironbark shrubby woodland of the deep sandy soils on the Liverpool Plains Region of the Brigalow Belt South Bioregion	Segment 11
	256	Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion	Segment 10
	394	Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions	Segment 10
	397	Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion	Segment 10
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion	Segment 10
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion	Segment 10
	404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests	Segment 10
	409	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests	Segment 10
	411	Buloke - White Cypress Pine woodland on outwash plains in the Piliga Scrub and Narrabri regions, Brigalow Belt South Bioregion	Segment 11

Eastern Pygmy-possum (*Cercartetus nanus*)			
	414	White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion	Segment 10
	473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion	Segment 11
	589	White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion	Segment 10
	746	Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion	Segment 11
	1384	White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion	Segment 10
Relevant IBRA subregions	Northern Basalts – predicted Liverpool Plains – known Pilliga – known Pilliga Outwash – known Inland Slopes - predicted		



NARROMINE TO NARRABRI Fauna Species Polygons - Eastern Pygmy Possum - Segment 9 Curban to Pilliga MAP 1 OF 3

0 5 10 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:375,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Eastern Pygmy Possum species polygon

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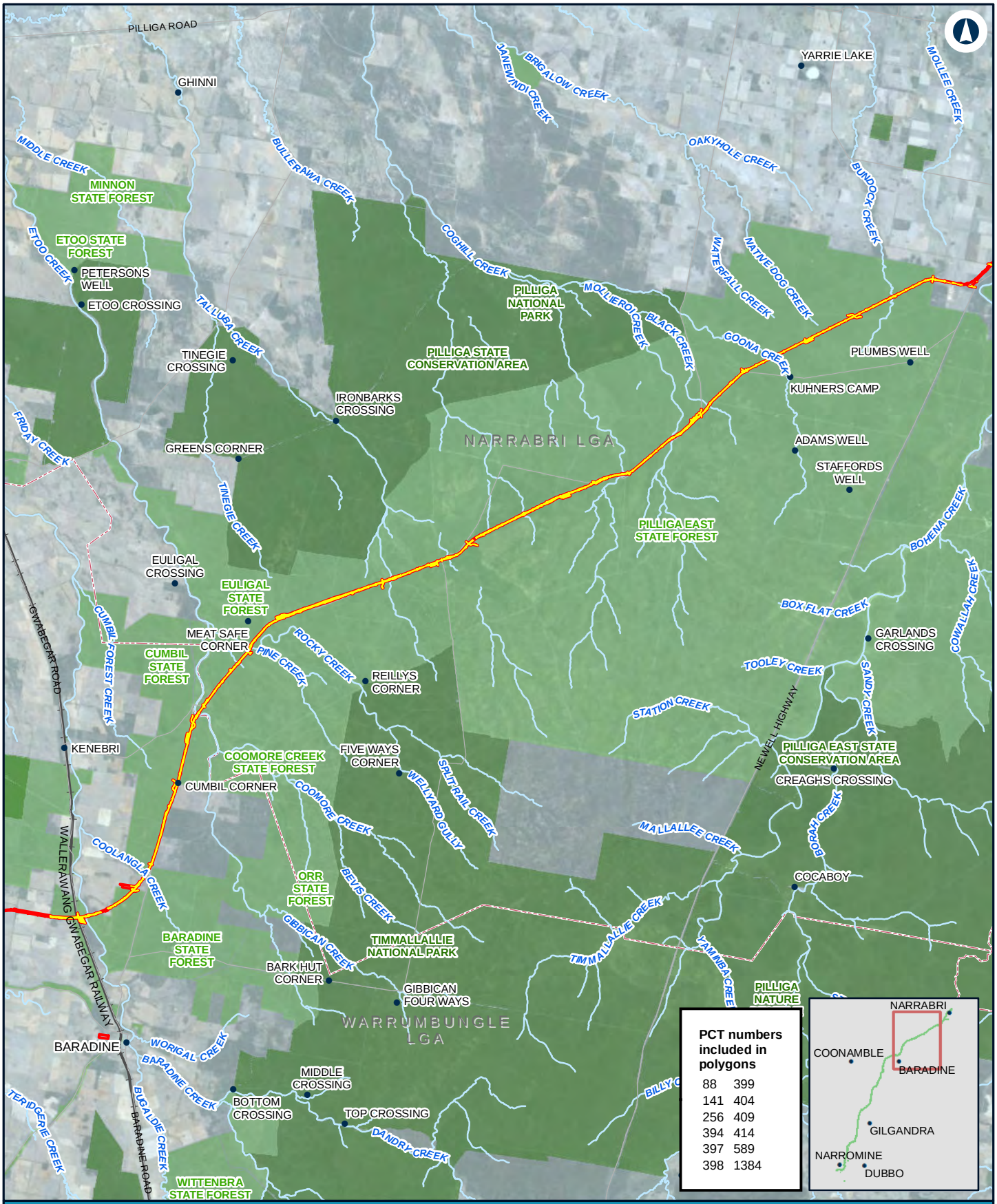

NARROMINE TO NARRABRI Fauna Species Polygons - Eastern Pygmy Possum - Segment 10 Pilliga MAP 2 OF 3

0 4.5 9 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:340,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Eastern Pygmy Possum species polygon

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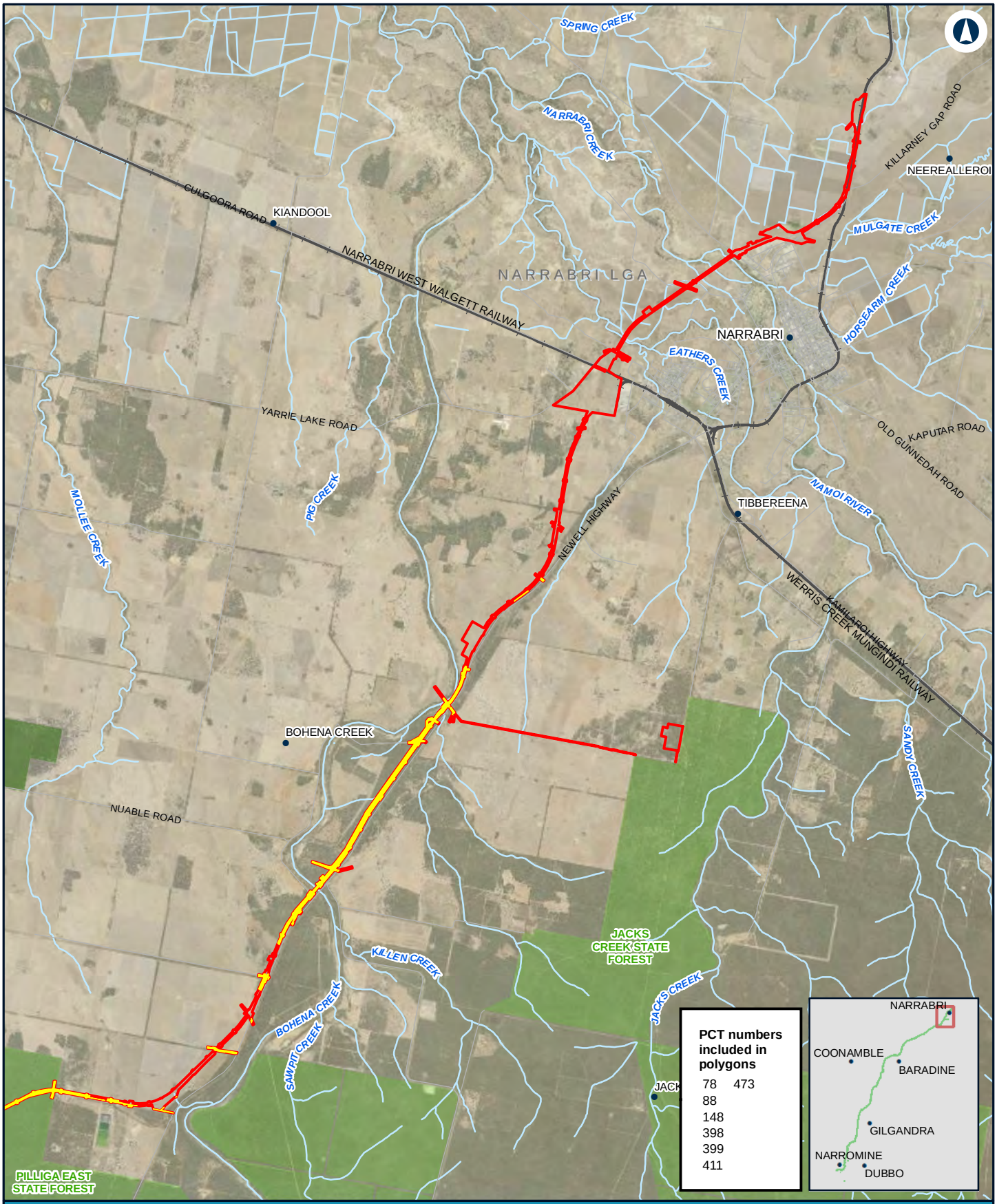

NARROMINE TO NARRABRI | Fauna Species Polygons - Eastern Pygmy Possum - Segment 11 Pilliga to Narrabri | MAP 3 OF 3

0 1.5 3 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:122,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Eastern Pygmy Possum species polygon

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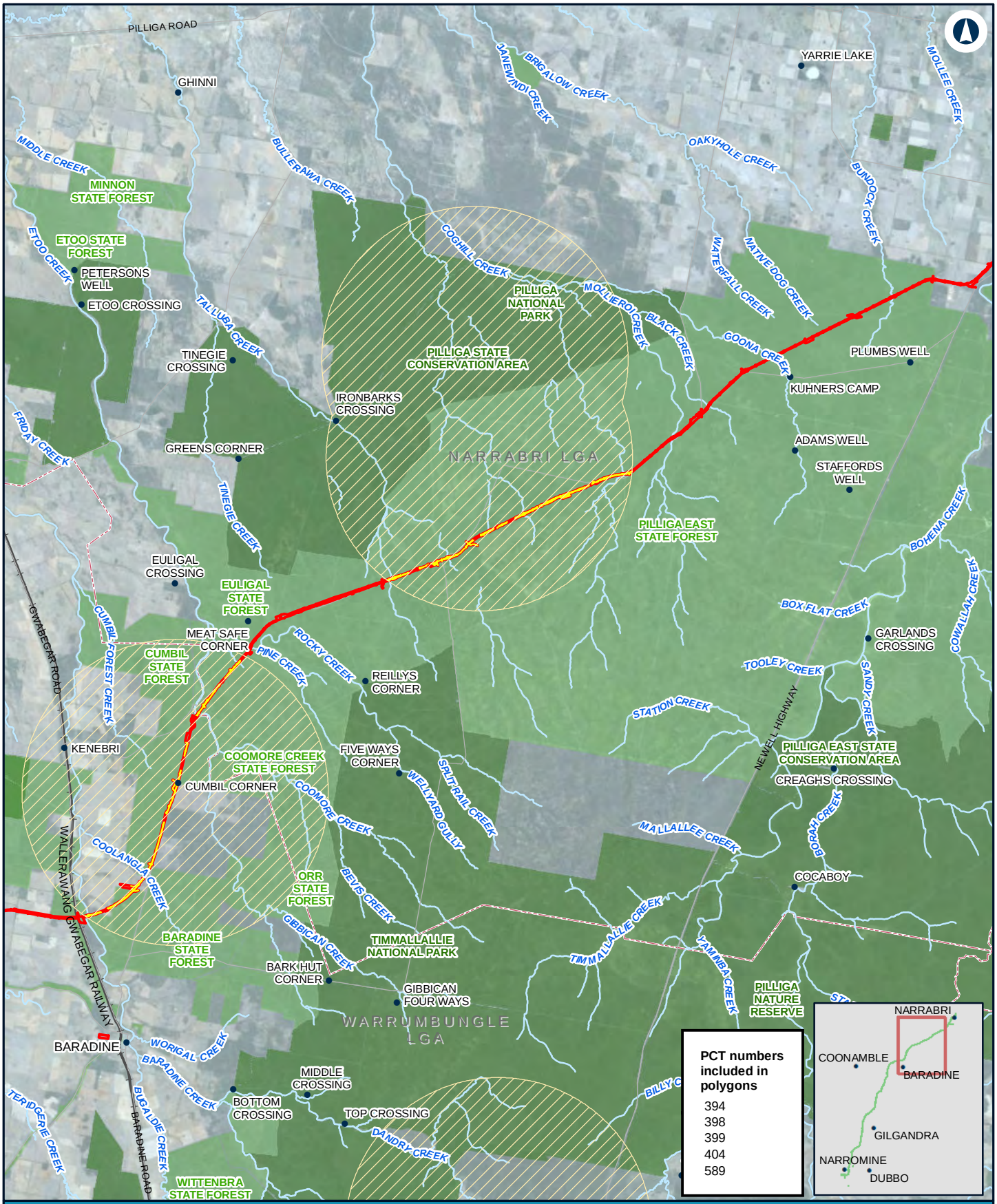
Table I20 Rufous Bettong

Rufous Bettong (*Aepyprymnus rufescens*)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	244.35 hectares
Breeding requirements	• Rufous Bettongs may be solitary or live in pairs, and are capable of breeding at any time of year. • They have a 24 day gestation period, giving birth to a single young which is carried in the mothers pouch. • The young become independent at 31 weeks of age and reach sexual maturity at 8-9 months old. • This reproduction cycle enables the Rufous Bettong to produce up to three young in a single year. (Department of Environment and Science 2011)
Habitat requirements	• Rufous Bettongs inhabit a variety of forests from tall, moist eucalypt forest to open woodland, with a tussock grass understorey. A dense cover of tall native grasses is the preferred shelter (EES 2019b). • Shelter during the day in cone-shaped nests constructed of grass in a shallow depression at the base of a tussock or fallen log (EES 2019b) • Diet includes grasses, herbs, seeds, flowers, roots, tubers, fungi and occasionally insects (EES 2019b).
Habitat in the study area	Potential habitat for this species is present in the Pilliga area.
Known populations	• It has largely vanished from inland areas of NSW (EES 2019b). • The Rufous Bettong is known from throughout the north-west slopes from historic and database records, though not positively identified for over 50 years from the study area (Paull and Date 1999) • There are sporadic, unconfirmed records from the Pilliga and Torrington districts (EES 2019b, Paull and Date 1999).
Survey requirements	Survey Months: All year The species can be readily surveyed using cameras.

Rufous Bettong (*Aepyprymnus rufescens*)			
Survey effort	Fauna surveys were conducted in the following months along the alignment: • November (10 days, two ecologists – diurnal/nocturnal surveys along the alignment but not including the Pilliga) • March (5 days, two zoologists – nocturnal surveys including spotlighting in the Pilliga). • August 2019 (5 days, two zoologists – diurnal and nocturnal surveys including spotlighting, 1 night in the Pilliga) • Late September-early October 2019 (6 days, two ecologists. 2 days, 2 nights in the Pilliga including spotlighting). Cameras were left for a period of 5-10 days in the March surveys at various locations in the Pilliga, including Trap site 1, 3, 4, Coxes Road dams, Curbo Creek and Emu Dam, as well as the Bohena Creek area. Five cameras were left for four weeks between late August and late September 2019 in the Pilliga. Locations included Kuenes Bore, Talluba Creek, heath vegetation, Clay Foot Dam and Cumbil Creek.		
Survey results	No bettongs were recorded during surveys. This is not surprising given the low incidence of records of this species in the last 20 years.		
Species polygon guidance	None		
Species polygon justification	Yes – assumed present A species polygon has been created for all PCTs in the Pilliga that this species has been associated with.		
Relevant PCTs	394	Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions	Segment 10
	398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion	Segment 10
	399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion	Segment 10
	404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests	Segment 10
	409	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests	Segment 10
	414	White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion	Segment 10
	589	White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion	Segment 10

Rufous Bettong (*Aepyprymnus rufescens*)	
Relevant IBRA subregions	Northern Basalts – predicted Liverpool Plains – known Pilliga – known Pilliga Outwash – known



NARROMINE TO NARRABRI Fauna Species Polygon - Rufous Bettong - Segment 10 Pilliga MAP 1 OF 1

0 4.5 9 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:340,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Rufous Bettong species polygon

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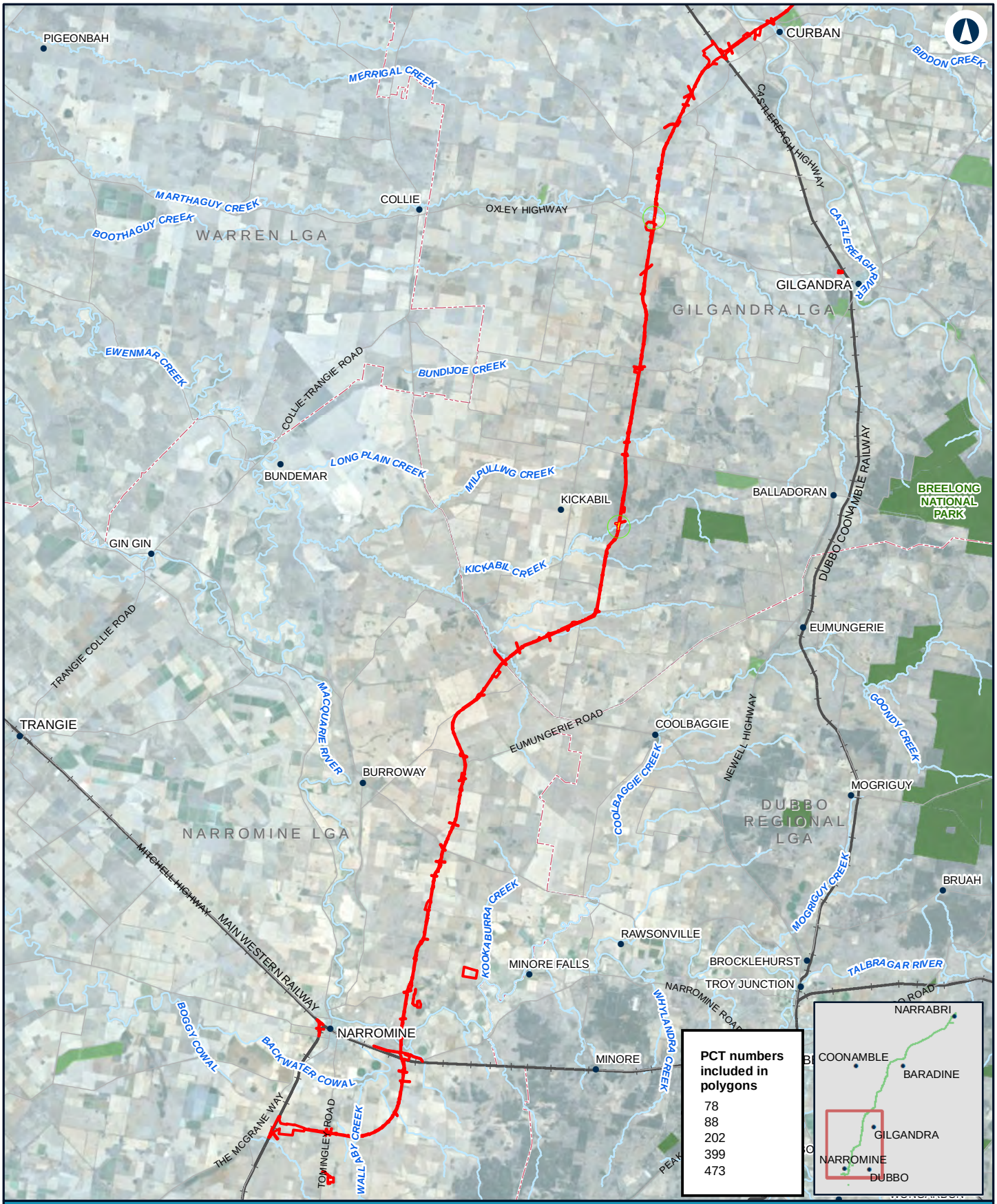
Table I21 Little Eagle

Little Eagle (*Hieraaetus morphnoides*)	
BC Act Status	Vulnerable
Credit type	Species and Ecosystem
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	15.9 hectares
Breeding requirements	• Paddock trees can provide important breeding (OEH 2019) • Nesting can also occur in tall living trees in patches of eucalyptus woodland of at least 25ha (Debus et al. 2007) • The nest is an open bowl of twigs and branches, lined with green leaves. The female mainly broods the young and feeds the young small pieces of food bill to bill. The male hunts for food for the young. The male will incubate while the female eats the food he has brought for her.
Habitat requirements	• Occupies open eucalypt forest, woodland or open woodland. *Allocasuarina* or *Acacia* woodlands and riparian woodlands of interior NSW are also used. • Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. • Lays two or three eggs during spring, and young fledge in early summer • Preys on birds, reptiles and mammals, occasionally adding large insects and carrion
Habitat in the study area	• Large areas of potential habitat are present in the Pilliga Forests and other woodland patches in the study area. • No nest trees of this species were recorded during surveys. • One very large raptor nest was observed in the study area at a property north of Narromine. This nest tree was pointed out by the landowner, who had observed Wedge-tailed Eagles use the nest over a number of years. Large raptor nests were also observed at a property north of Narrabri by the ecology team that were being used by Whistling Kites. No other large raptor nests suitable for use by the Little Eagle were observed in the study area. Most stick nests observed were of a size used by ravens and magpies.
Known populations	Records throughout the locality within larger tracts of native vegetation, riparian corridors and cleared lands (OEH 2019)
Survey requirements	Survey Months: August to October (breeding)

Little Eagle (*Hieraaetus morphnoides*)	
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September (5 days, two ecologists - diurnal surveys) • November (10 days, two ecologists – diurnal/nocturnal surveys along the alignment but not including the Pilliga) • March (10 days, four zoologists – diurnal surveys/trapping in the Pilliga and Gilgandra area) • August 2019 (five days – two ecologists – diurnal/nocturnal surveys) • September/October 2019 (six days – two ecologists – diurnal/nocturnal surveys) Surveys included diurnal bird surveys and searches for nest trees in woodland patches and paddock trees. Incidental observations of raptors were also made while driving along the alignment between survey sites.
Survey results	No individuals were recorded during the many field surveys in the study area, however it is likely that the species would occur. Prevailing drought conditions are likely to have contributed to the lack of observations. No specific breeding habitat was identified in Bionet (EES 2020a) or Birdata (Birdllife Australia 2020) records.
Species polygon guidance	Breeding habitat is live (occasionally dead) large old trees within suitable vegetation AND the presence of a male and female; or female with nesting material; or an individual on a large stick nest in the top half of the tree canopy (EES 2020). Where a breeding site has been identified in accordance with the BAM the species polygon should be established by providing a circular buffer of 300m around the nest tree. The purpose of the buffer is to minimise disturbance/avoid clearing, for a development application, or to conserve and improve habitat, for a biodiversity stewardship agreement, within the area essential for breeding. This includes habitat suitable for feeding/grooming perches and fledgling requirements. It does not account for foraging habitat. Little Eagles are less likely than urban-adapted raptors to readily cross urban or peri-urban spaces to hunt. The 300m buffer is in accordance with the ACT offset guidelines for this species (EES 2020).
Species polygon justification	Yes (assumed present) No Little Eagles were recorded during any of the field surveys. Few large raptor nests were observed. EES (2019a) and Birdata (2020) records suggest that occasional individuals would occur in the study area. A number of ‘breeding sites’ have been mapped for the purposes of calculating species credits. These have been positioned in vegetation associated with the at the following watercourses: • Kickabil Creek • Bundijoe Creek • Gulargambone Creek • Baradine Creek • Bohena Creek. All other habitat for the species is captured in the ecosystem credits for the relevant PCTs.

Little Eagle (*Hieraaetus morphnoides*)	
Relevant IBRA subregions	Northern Basalts – known Liverpool Plains – known Pilliga – known Pilliga Outwash – known Castlereagh Barwon – known Bogan Macquarie – known Inland Slopes – known



NARROMINE TO NARRABRI | Fauna Species Polygons - Little Eagle - Segment 8 Narromine to Curban | MAP 1 OF 4

0 5.5 11 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:400,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Little Eagle indicative nest tree
- Little Eagle species polygon

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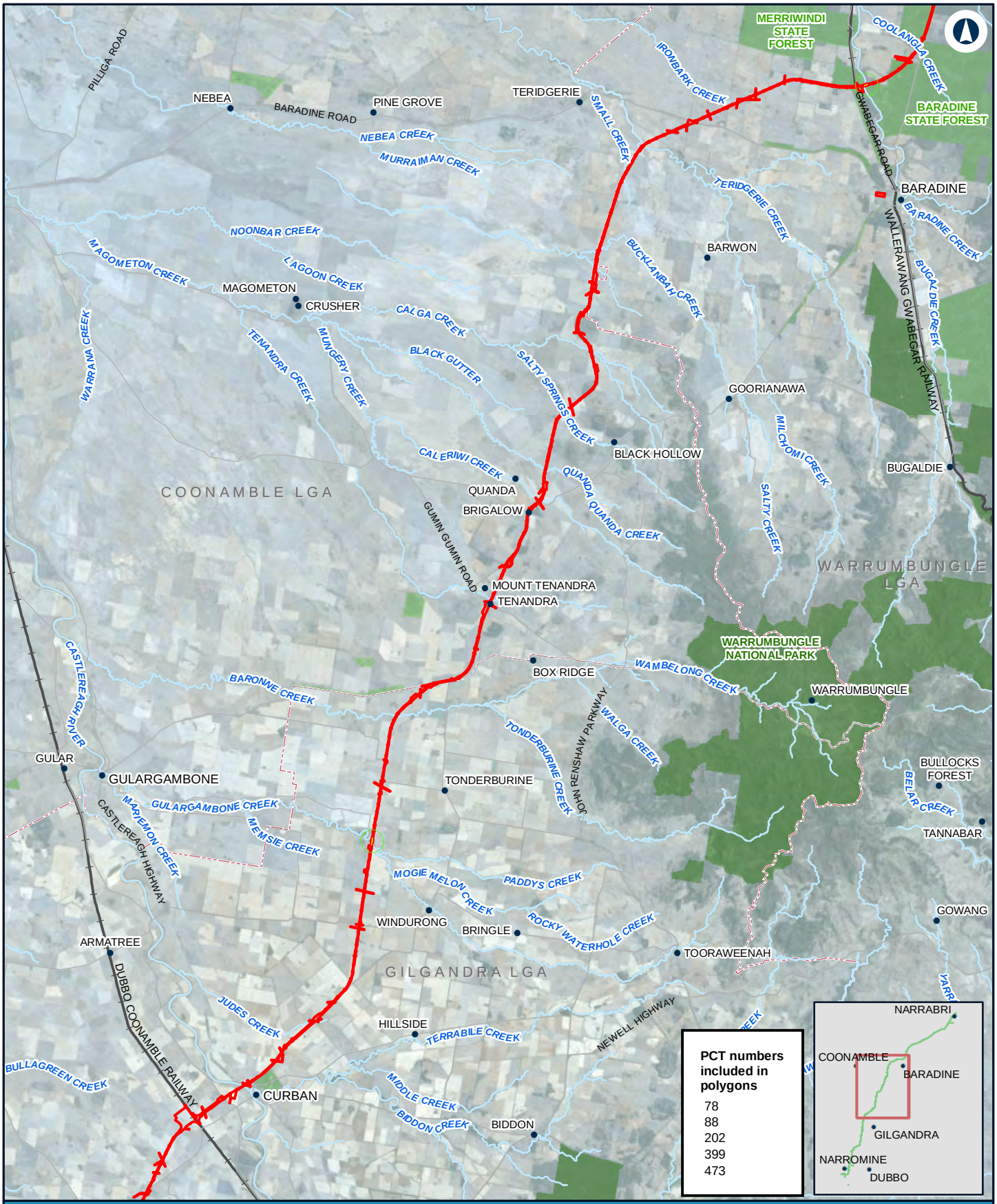

NARROMINE TO NARRABRI Fauna Species Polygons - Little Eagle - Segment 9 Curban to Pilliga MAP 2 OF 4

0 5 10 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:375,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Little Eagle indicative nest tree
- Little Eagle species polygon

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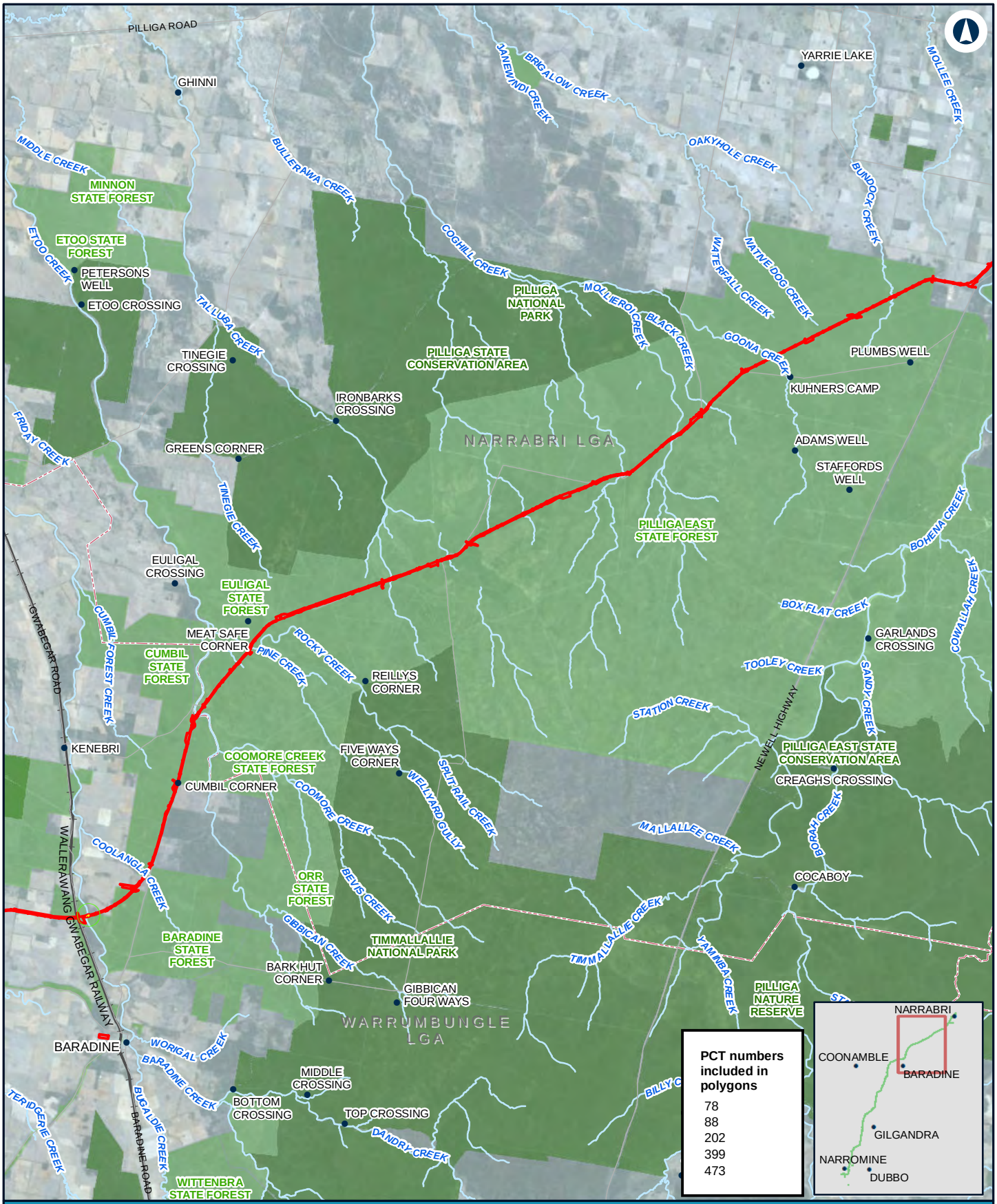

NARROMINE TO NARRABRI Fauna Species Polygons - Little Eagle - Segment 10 Pilliga MAP 3 OF 4

0 4.5 9 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:340,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Little Eagle indicative nest tree
- Little Eagle species polygon

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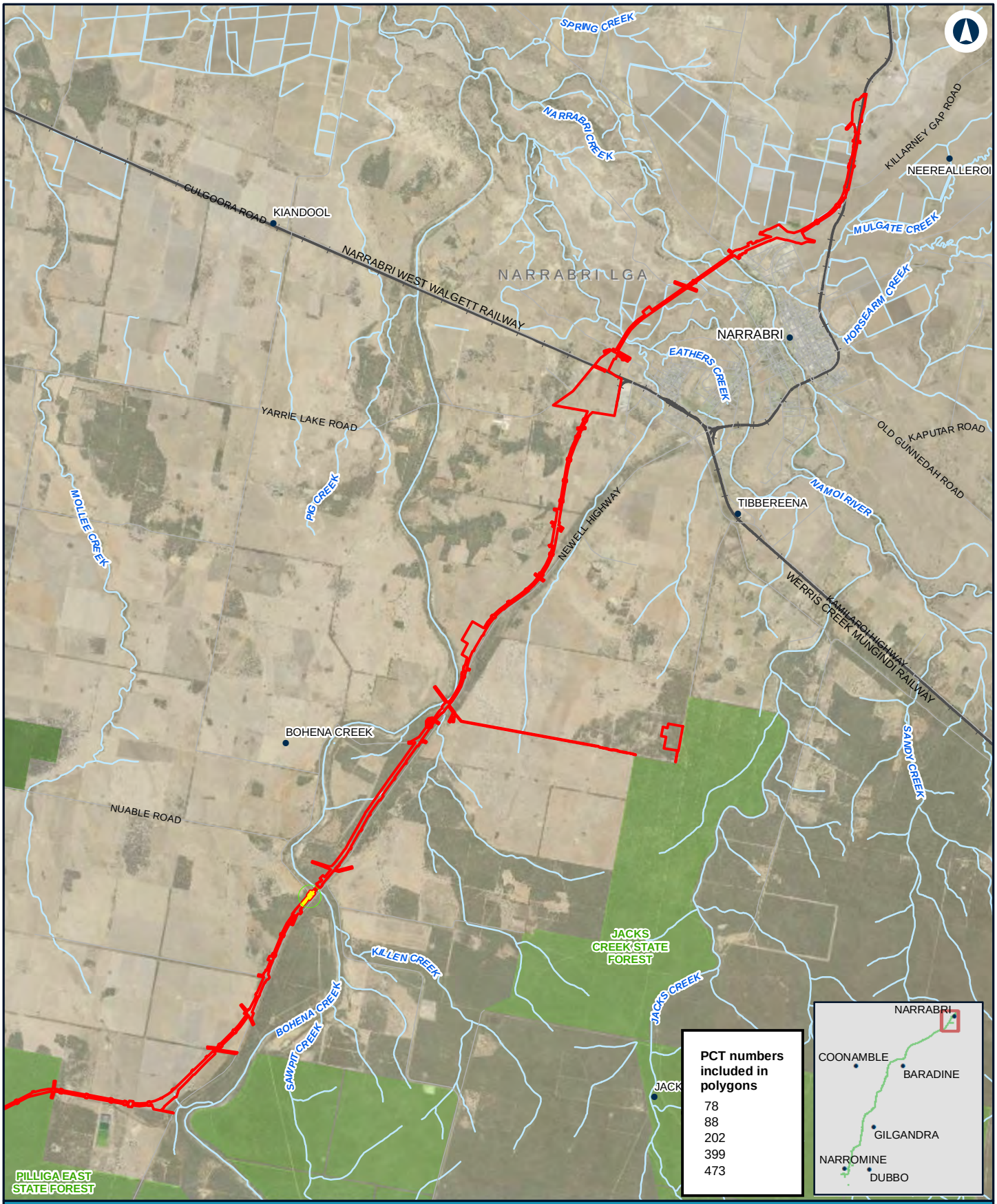

NARROMINE TO NARRABRI | Fauna Species Polygons - Little Eagle - Segment 11 Pilliga to Narrabri | MAP 4 OF 4

0 1.5 3 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:122,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Little Eagle indicative nest tree
- Little Eagle species polygon

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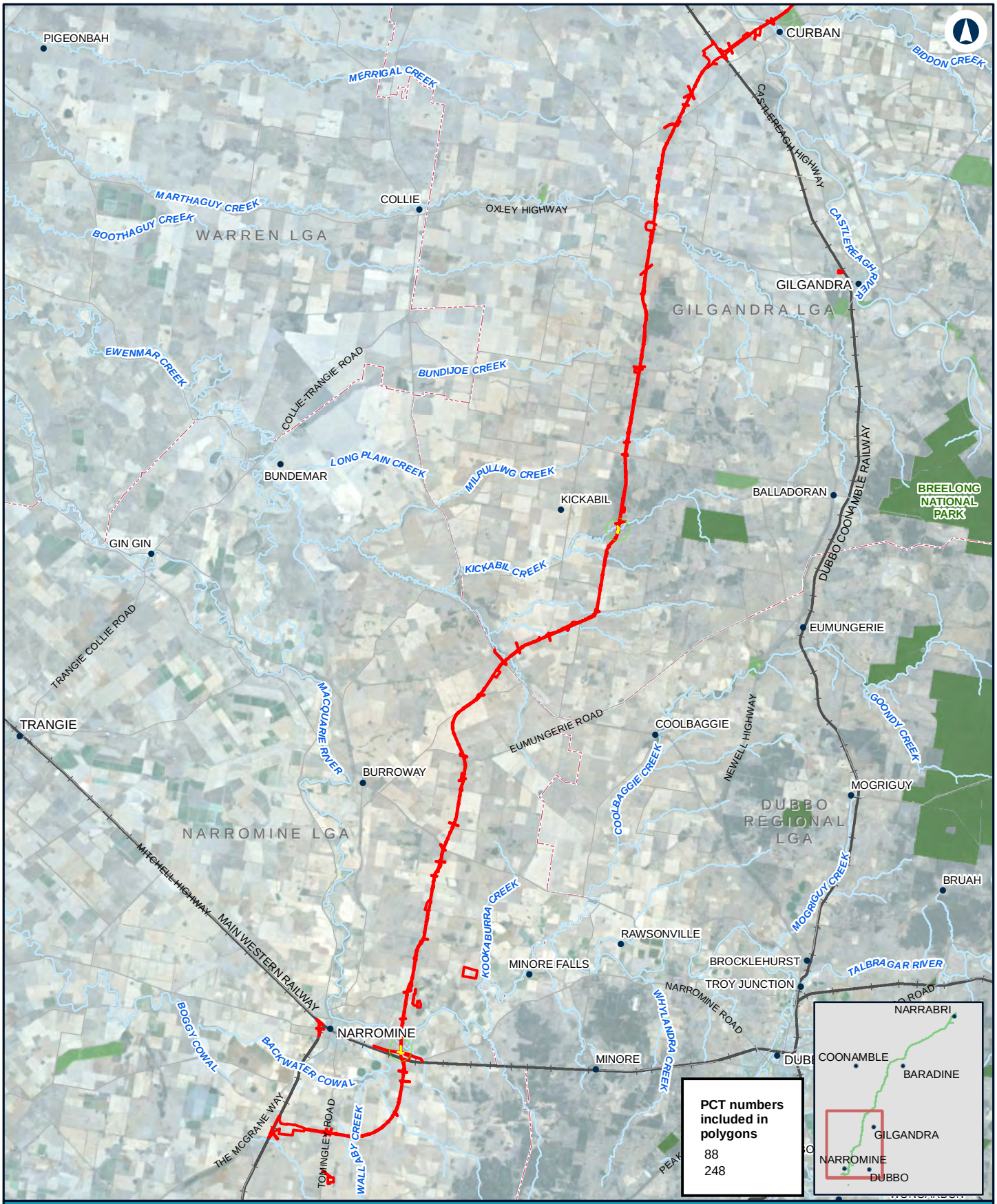
Table I22 Square-tailed kite

Square-tailed Kite (*Lophoictinia isura*)	
BC Act Status	Vulnerable
Credit type	Species and Ecosystem
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	35.09 hectares
Breeding requirements	• Breeding is from July to February, with nest sites generally located along or near watercourses, in a fork or on large horizontal limbs. (OEH 2019) • Pairs nest solitarily, and the nest is a platform of sticks lined with green leaves and placed 8-34 metres above the ground in the fork of a living tree within forest or woodland (Debus 1998). The clutch size is 2 or 3 eggs, usually 3. The incubation period is probably about 40 days, and the nestling period is about 59-65 days (Debus op cit.). The young are dependent upon the adults for about one to two months after fledging. • The laying season is from July to December (Debus 1998).
Habitat requirements	• Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. (OEH 2019) • In arid north-western NSW, has been observed in stony country with a ground cover of chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland. (OEH 2019) • Is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy, picking most prey items from the outer foliage (OEH 2019) • Appears to occupy large hunting ranges of more than 100 km^2 (OEH 2019)
Habitat in the study area	• Large areas of potential habitat are present in the Pilliga Forests and other woodland patches in the study area. • No nest trees of this species were recorded during surveys. • One very large raptor nest was observed in the study area at a property north of Narromine. This nest tree was pointed out by the landowner, who had observed Wedge-tailed Eagles use the nest over a number of years. Large raptor nests were also observed at a property north of Narrabri by the ecology team that were being used by Whistling Kites. No other large raptor nests suitable for use by the Square-tailed Kite were observed in the study area. Most stick nests observed were of a size used by ravens and magpies.

Square-tailed Kite (*Lophoictinia isura*)	
Known populations	• In NSW, scattered records of the species throughout the state indicate that the species is a regular resident in the north, north-east and along the major west-flowing river systems. • Garnett and Crowley (2000) estimated that the total population is unlikely to exceed 10,000 adults. • It is also categorized as a species of "Least Concern" by BirdLife International, based on the probability that its population has not declined more than 30 per cent in 10 years or three generations. • Local records concentrated around the Pilliga Forests, Leards Forest, Goran State Forest, Goulburn River National Park and Goonoo Forests.
Survey requirements	Survey Months: September to January (breeding)
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September (5 days, two ecologists - diurnal bird surveys and nest searches along the alignment) • November (10 days, two ecologists – diurnal bird surveys and nest searches along the alignment but not including the Pilliga) • March (10 days, four zoologists – diurnal bird surveys and nest searches in the Pilliga and Gilgandra area) • August 2019 (five days – two ecologists – diurnal bird surveys and nest searches along the alignment) • September/October 2019 (six days – two ecologists – diurnal bird surveys and nest searches along the alignment) Surveys included diurnal bird surveys and searches for nest trees in woodland patches and paddock trees. Incidental observations of raptors were also made while driving along the alignment between survey sites.
Survey results	No individuals were recorded during the many field surveys in the study area, however it is likely the species would occur. No specific breeding habitat was identified in Bionet (EES 2020a) or Birdata (Birdllife Australia 2020) records.
Species polygon guidance	The species is allocated to dual credit because they tend to be sensitive to disturbance around nests. It will be difficult to identify a Kite nest (there are lots of comparable sized stick nests built by other species), especially given Kites have large territories and other stick nesters will undoubtedly also be nesting where Kites might be recorded. Kites will need be in attendance to confirm breeding sites.

Square-tailed Kite (*Lophoictinia isura*)	
Species polygon justification	Yes (assumed present) No Square-tailed Kites were recorded during any of the field surveys. Few large raptor nests were observed. EES (2019a) and Birdata (2020) records suggest that occasional individuals would occur in the study area. A number of 'breeding sites' have been mapped for the purposes of calculating species credits. These have been positioned in vegetation at the following watercourses: • Kickabil Creek • Baradine Creek • Pilliga (two creeks) • Bohena Creek. A 300 metre buffer has been included around the indicative nest trees. All other habitat for the species is captured in the ecosystem credits for the relevant PCTs.
Relevant IBRA subregions	Northern Basalts – known Liverpool Plains – known Pilliga – known Pilliga Outwash – known Castlereagh Barwon – known Bogan Macquarie – known Inland Slopes – known



NARROMINE TO NARRABRI Fauna Species Polygons - Square-tailed Kite - Segment 8 Narromine to Curban MAP 1 OF 4

0 5.5 11 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:400,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Square-tailed Kite indicative nest tree
- Square-tailed Kite species polygon

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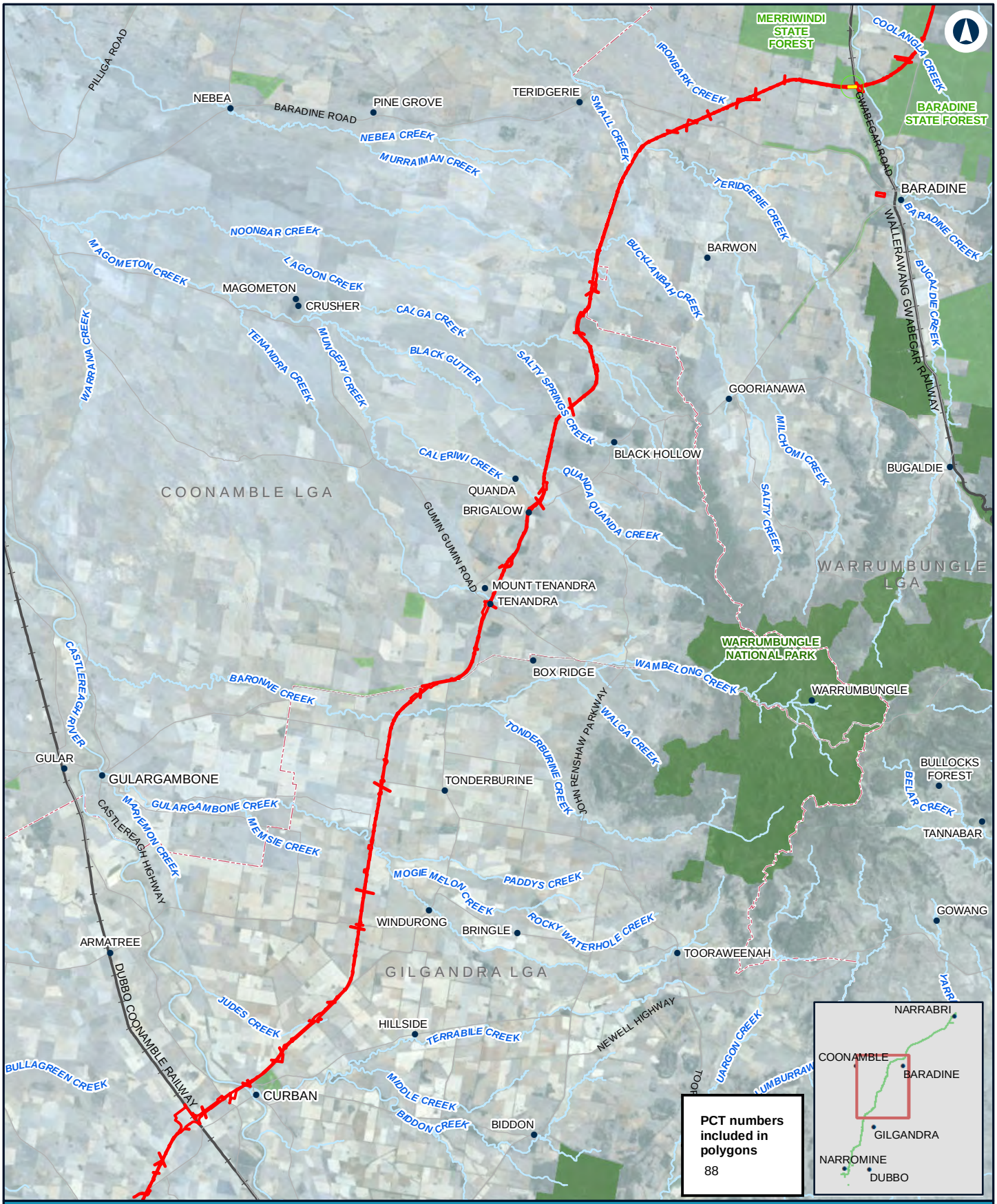

NARROMINE TO NARRABRI Fauna Species Polygons - Square-tailed Kite - Segment 9 Curban to Pilliga MAP 2 OF 4

0 5 10 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:375,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Square-tailed Kite indicative nest tree
- Square-tailed Kite species polygon

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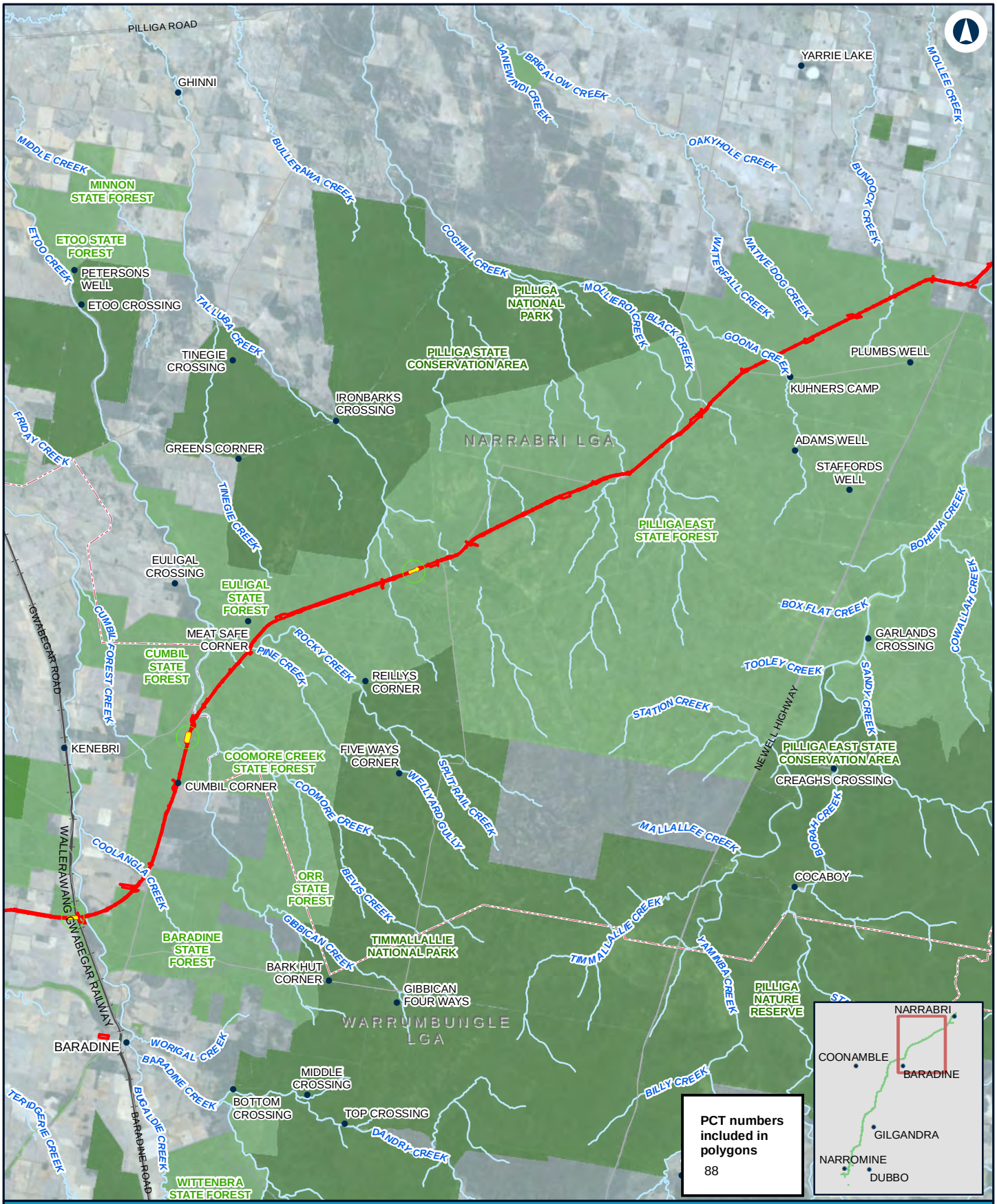

NARROMINE TO NARRABRI Fauna Species Polygons - Square-tailed Kite - Segment 10 Pilliga MAP 3 OF 4

0 4.5 9 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
Author: JacobsGHD Scale: 1:340,000
Data Sources: Basemap layers: NSWSS;

LEGEND

- The proposal
- Square-tailed Kite indicative nest tree
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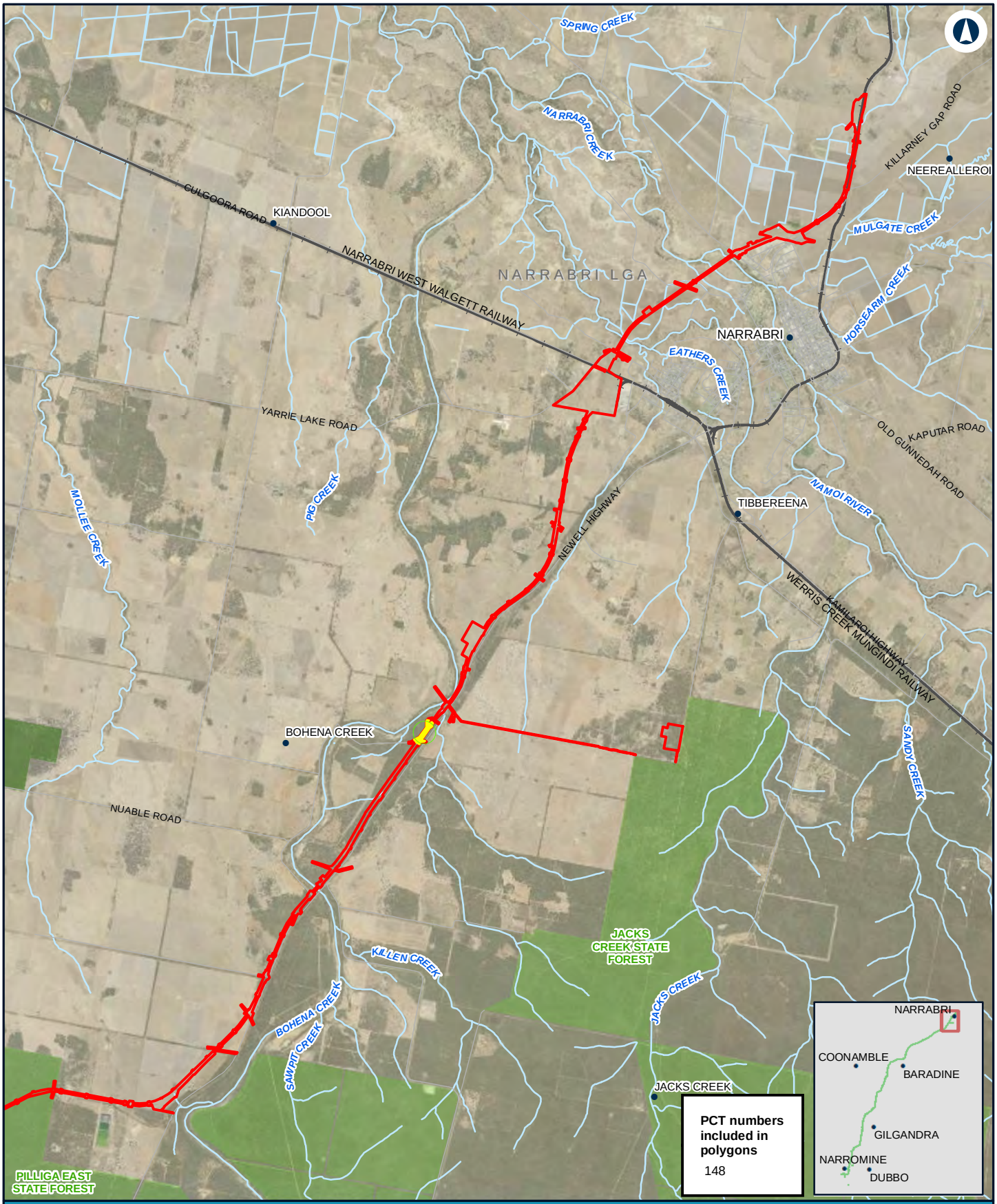

NARROMINE TO NARRABRI Fauna Species Polygons - Square-tailed Kite - Segment 11 Pilliga to Narrabri MAP 4 OF 4

0 1.5 3 Km

Coordinate System: GDA 1994 MGA Zone 55

Date: 31/07/2020 Paper: A4
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LEGEND

- The proposal
- Square-tailed Kite indicative nest tree
- Square-tailed Kite species polygon

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Table I23 Pink-tailed Worm-lizard

Pink-tailed Worm-lizrad (*Aprasia parapulchella*)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Vulnerable
Species polygon area	None
Breeding requirements	• The Pink-tailed Legless Lizard is commonly found beneath small, partially-embedded rocks and appear to spend considerable time in burrows below these rocks; the burrows have been constructed by and are often still inhabited by small black ants and termites (EES 2019b).
Habitat requirements	• The Pink-tailed Legless Lizard inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by Kangaroo Grass (*Themeda australis*). Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks (EES 2019b). • The species tends not to occur where there is a cover of trees or tall shrubs (Osborne and Jones 1995). • Pasture improvement or intensive livestock grazing is known to result in lower abundance of the species (Osborne and Jones 1995).
Habitat in the study area	• Rocky woodland habitat is present at Borrow Pit A. This site is located within the Inland Slopes Bioregion, where there are other records of the species. • Topographic relief is low, potentially suitable habitat is patchy, and there is minimal connectivity to better quality potential habitat located to the east.
Known populations	• This species was thought to be confined to the Canberra region, however the species has more recently been recorded near Bathurst and Bendigo, indicating a wider distribution. • A disjunct small population at Gunnedah is known and is very vulnerable to bush rock removal, feral predation and housing subdivision (EES 2020). • Borrow Pit A is located in the Inner Slopes IBRA subregion, a subregion where this species is known to occur. There are no known records near this borrow pit.
Survey requirements	Sep-Nov Survey in spring, avoiding hot days in November.
Survey effort	Fauna surveys were conducted on one day at Borrow Pit A in September 2019

Pink-tailed Worm-lizrad (*Aprasia parapulchella*)			
Survey results	No individuals were recorded during surveys.		
Species polygon guidance	None		
Species polygon justification	No (surveyed) No species polygon has been prepared for this species. Borrow Pit A is located at the western edge of the potential range of the species. Nearest records are located at West Wyalong and Bathurst. The site has low topographic relief, limited outcropping of rock, and minimal connectivity with better areas of potential habitat located to the east of the site. No suitable rocky habitat on hillsides is located in the Liverpool Plains area (Narrabri). There are no local records in this region. No suitable habitat is therefore considered to be present in the proposal site.		
Relevant PCTs	185	Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland	Segment 4
	619	Derived Wire Grass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion	Segment 4
Relevant IBRA subregions	Liverpool Plains – known Pilliga – predicted Inland Slopes – known		

Table I24 Large-eared Pied Bat

Large-eared Pied Bat (*Chalinolobus dwyeri*)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	True. Any impact on breeding habitat identified for this species is a potential serious and irreversible impact.
EPBC Act Status	Vulnerable
Species polygon area	None
Breeding requirements	• The structure of maternity roosts appears to be very specific (arch caves with dome roofs) (DERM 2011) • Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January. They remain loyal to the same cave over many years.
Habitat requirements	• Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (Petrochelidon ariel), frequenting low to mid-elevation dry open forest and woodland close to these features. • Almost all records of the species are within several kilometres of cliff lines or rocky terrain, in fertile wooded valley habitat • This species has been recorded foraging in a range of vegetation types, including dry and wet sclerophyll forest, grassy woodland, Callitris dominated forest, tall open eucalypt forest with a rainforest sub-canopy, sub-alpine woodland and sandstone outcrop country (DERM 2011) • The relatively short, broad wing combined with the low weight per unit area of wing indicates manoeuvrable flight. This species probably forages for small, flying insects below the forest canopy. • It is presumed to have undergone large declines in numbers (based on known loss of available habitat) (Pennay, 2010).
Habitat in the study area	The Large-eared Pied Bat would forage in the Pilliga, particularly where forested habitat is in close proximity to sandstone outcrops. No sandstone outcrops suitable for breeding are located within 2 kilometres of the alignment.
Known populations	• There are no definitive data on total population numbers, however it is known to occur in small populations (around 50 individuals) (Hoye, 2005) • Three communal maternity roosts are known from caves in the Pilliga Sandstone region (Pennay 2008) • A known roost of this species is located in sandstone outcrops in Pilliga Nature Reserve, about 35 kilometres to the east of Baradine • Anabat surveys of six sites in the Pilliga by Law et al (2011) recorded only one call of this species over 920 hours of sampling. No individuals were trapped.

Large-eared Pied Bat (*Chalinolobus dwyeri*)	
Survey requirements	Survey Months: November to January • Survey methods: Harp trap (or mist net) placed in areas of potential breeding habitat on the subject land. The survey may use harp traps or a combination of harp traps and mist nets. Age, sex and reproductive status of captured bats must be assessed and recorded. • Acoustic detectors may be used; however, this method does not allow for reproductive status to be identified. If acoustic detectors are the only survey method used and the target species is detected, breeding must be assumed and a species polygon mapped. • Radio tracking or 'other' (roost) searches are optional methods that may be used to pinpoint the breeding site and refine the species polygon when recommended survey confirms the presence of breeding habitat. However, these methods cannot be used to demonstrate the species is absent from the subject land (OEH 2018).
Survey effort	Targeted bat surveys were undertaken over two survey periods at different sites for the proposal. Anabat surveys comprised the following: 1 – November 2018 at sites within the Narrabri, Gilgandra and Narromine areas (10 sites for 20 survey nights – 200 anabat nights) 2 – March 2019 at sites within the Pilliga State Forest (3 sites for 12 survey nights – 36 anabat nights). GHD also conducted Anabat surveys on two nights at a property north of Narrabri for a separate project in March 2018. Harp netting comprised 8 trap nights in the Pilliga and 4 trap nights near Gilgandra in March 2019, and resulted in many microbat captures: • 4 nights at Trap site 1 (two harp nets set beside each other on Coolangala Creek) • 4 nights at Trap site 6 (two harp nets set beside each other on Rocky Creek) • 4 nights at the trap site south of Gilgandra (two harp nets set beside each other along a track in woodland in agricultural land). Harp netting was also undertaken in November 2018 surveys, however due to access and work hour constraints, harp nets were only set between dusk and 11pm, and there were no captures during this period: • 1 evening at the Narrabri Creek (two harp nets set beside each other beside Narrabri Creek) • 1 evening at Bohena Creek (two harp nets set beside each other on a tributary of Bohena Creek) • 1 evening at a dam south of Narrabri and 1 evening on a dry creek in woodland on the same property • 1 evening at the Castlereagh River (two harp nets set beside each other on the forested bank)
Survey results	During the March 2019 surveys in the Pilliga for the proposal, probable calls of this species were recorded at Coolangala Creek (Trap site 1). No other evidence of this species was recorded along the alignment.

Large-eared Pied Bat (*Chalinolobus dwyeri*)	
Species polygon guidance	All habitat on the subject land where the subject land is within 2km of caves, scarps, cliffs, rock overhangs and disused mines. Note: any impact on breeding habitat identified for this species is a potential serious and irreversible impact. Use high resolution aerial imagery and topographic maps to identify potential roost habitat features on the subject land when it is within 2km caves, scarps, cliffs etc. Species polygon boundary should align with PCTs on the subject land to which the species is associated that are within 2km of identified potential roost habitat features.
Species polygon justification	Not a candidate species. No species polygon has been mapped for this species. No caves, scarps, cliffs, mines or tunnels are present in or near the proposal site. Known roost habitat is located over 35 kilometres from the proposal site.
Relevant IBRA subregions	Northern Basalts – known Liverpool Plains – known Pilliga – known Inland Slopes – known

Table I25 Eastern Cave Bat

Eastern Cave Bat (*Vespadelus troughtoni*)	
BC Act Status	Vulnerable
Credit type	Species
SAII entity/threshold	True. Any impact on breeding habitat identified for this species is a potential serious and irreversible impact.
EPBC Act Status	Not listed
Species polygon area	None
Breeding requirements	• Very little is known about the biology of this uncommon species. (OEH 2019) • Births occur mid to late November in NSW (Churchill 2008) • Young have been observed left alone at the roost, clustered in groups while the females foraged (Churchill 2008) • Females have been observed shifting roosts with their young every few days (Churchill 2008)
Habitat requirements	• A cave-roosting species that is usually found in dry open forest and woodland, near cliffs or rocky overhangs; has been recorded roosting in disused mine workings, occasionally in colonies of up to 500 individuals. (OEH 2019). • Occasionally found along cliff-lines in wet eucalypt forest and rainforest. (OEH 2019) • Little is understood of its feeding or breeding requirements or behaviour. (OEH 2019) • Roost fidelity is low (Churchill 2008) • They roost near the entrance in reasonably well-lit areas, often in small avons or domes in the roofs of canes as well as cracks and crevices (Churchill 2008) • Roost microclimate stability appears to be of low importance in maternity roost selection (Churchill 2008)
Habitat in the study area	• The Eastern Cave Bat would forage in the Pilliga, particularly where forested habitat is in close proximity to sandstone outcrops. • No sandstone outcrops suitable for breeding are located within 2 kilometres of the alignment.
Known populations	• The Eastern Cave Bat is found in a broad band on both sides of the Great Dividing Range from Cape York to Kempsey, with records from the New England Tablelands and the upper north coast of NSW. The western limit appears to be the Warrumbungle Range, and there is a single record from southern NSW, east of the ACT. • Concentrated number of records in the locality around the Pilliga Forests, Goulburn River National park, Warrumbungle's National park and around Boggabri and the Namoi River (OEH 2019). • A known roost of this species is located in sandstone outcrops in Pilliga Nature Reserve, about 35 kilometres to the east of Baradine.

Eastern Cave Bat (*Vespadelus troughtoni*)	
	• Anabat surveys of six sites in the Pilliga by Law et al (2011) recorded only 6 calls of this species over 920 hours of sampling. No individuals were trapped.
Survey requirements	Survey Months: November to January • Survey methods: Harp trap (or mist net) placed in areas of potential breeding habitat on the subject land. The survey may use harp traps or a combination of harp traps and mist nets. Age, sex and reproductive status of captured bats must be assessed and recorded. • Acoustic detectors may be used; however, this method does not allow for reproductive status to be identified. If acoustic detectors are the only survey method used and the target species is detected, breeding must be assumed and a species polygon mapped. • Radio tracking or 'other' (roost) searches are optional methods that may be used to pinpoint the breeding site and refine the species polygon when recommended survey confirms the presence of breeding habitat. However, these methods cannot be used to demonstrate the species is absent from the subject land (OEH 2018).
Survey effort	Targeted bat surveys were undertaken over two survey periods at different sites. Anabat surveys comprised the following: 1 – November 2018 at sites within the Narrabri, Gilgandra and Narromine areas (10 sites for 20 survey nights – 200 anabat nights) 2 – March 2019 at sites within the Pilliga State Forest (3 sites for 12 survey nights – 36 anabat nights). Harp netting comprised 8 trap nights in the Pilliga and 4 trap nights near Gilgandra in March 2019, and resulted in many captures: • 4 nights at Trap site 1 (two harp nets set beside each other on Coolangala Creek) • 4 nights at Trap site 6 (two harp nets set beside each other on Rocky Creek) • 4 nights at the trap site south of Gilgandra (two harp nets set beside each other along a track in woodland in agricultural land). Harp netting was also undertaken in November 2018 surveys, however due to access and work hour constraints, harp nets were only set between dusk and 11pm, and there were no captures during this period: • 1 evening at the Narrabri Creek (two harp nets set beside each other beside Narrabri Creek) • 1 evening at Bohena Creek (two harp nets set beside each other on a tributary of Bohena Creek) • 1 evening at a dam south of Narrabri and 1 evening on a dry creek in woodland on the same property • 1 evening at the Castlereagh River (two harp nets set beside each other on the forested bank)
Survey results	During the March 2019 surveys in the Pilliga for the proposal, no definite or probable calls of this species were recorded. The species group *Vespadelus troughtoni / V. vulturnus/ Chalinolobus morio* was recorded at Narrabri Creek and at a property south of Narrabri in the November surveys, however overlap of call characteristics make it too difficult to distinguish between species and make a definite identification. No breeding habitat is located within 2 kilometres of these locations.

Eastern Cave Bat (*Vespadelus troughtoni*)	
Species polygon guidance	All habitat on the subject land where the subject land is within 2km of caves, scarps, cliffs, rock overhangs and disused mines. Note: any breeding habitat identified for this species is a potential serious and irreversible impact. Use high resolution aerial imagery and topographic maps to identify potential roost habitat features on the subject land when it is within 2km caves, scarps, cliffs etc. Species polygon boundary should align with PCTs on the subject land to which the species is associated that are within 2km of identified potential roost habitat features.
Species polygon justification	Not a candidate species No species polygon has been mapped for this species. No definite or probable calls attributable to this species were recorded during surveys. No caves, scarps, cliffs, mines or tunnels are present in or near the proposal site. Known roost habitat is located over 35 kilometres from the proposal site. Given the lack of breeding habitat in or near the study area, surveys conducted are considered sufficient for this species.
Relevant IBRA subregions	Northern Basalts – known Liverpool Plains – known Pilliga – known Pilliga Outwash – known

Table I26 Black-breasted Buzzard

Black-breasted Buzzard (*Hamirostra melanosternon*)	
BC Act Status	Vulnerable
Credit type	Species and Ecosystem
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	None
Breeding requirements	• Breeds from August to October near water in a tall tree. The stick nest is large and flat and lined with green leaves (EES 2019b). • The species is known to breed in sites with cropping, but also requires retained vegetation (TBDC).
Habitat requirements	• Lives in a range of inland habitats, especially along timbered watercourses which is the preferred breeding habitat (EES 2019b) • Also hunts over grasslands and sparsely timbered woodlands (EES 2019b).
Habitat in the study area	• Large areas of potential habitat are present in the Pilliga Forests and other woodland patches in the study area. • No nest trees of this species were recorded during surveys. • One very large raptor nest was observed in the study area at a property north of Narromine. This nest tree was pointed out by the landowner, who had observed Wedge-tailed Eagles use the nest over a number of years. Large raptor nests were also observed at a property north of Narrabri by the ecology team that were being used by Whistling Kites. No other large raptor nests suitable for use by the Black-breasted Buzzard were observed in the study area. Most stick nests observed were of a size used by ravens and magpies.
Known populations	• There are no records of this species along or near the alignment. There is one record in the Pilliga, about 40km from the alignment.
Survey requirements	Survey Months: September to November (breeding)
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September (5 days, two ecologists - diurnal bird surveys and nest tree searches along the alignment, not including the PIlliga) • November (10 days, two ecologists – diurnal bird surveys and nest tree searches along the alignment but not including the Pilliga) • March (10 days, four zoologists – diurnal bird surveys and nest tree searches in the Pilliga and Gilgandra area) • August 2019 (five days – two ecologists – diurnal bird surveys and nest tree searches along the alignment) • September/October 2019 (five days – two ecologists – diurnal bird surveys and nest tree searches along the alignment)

Black-breasted Buzzard (*Hamirostra melanosternon*)	
	Surveys included diurnal bird surveys and searches for nest trees in woodland patches and paddock trees. Incidental observations of raptors were also made while driving along the alignment between survey sites.
Survey results	No individuals recorded during surveys.
Species polygon guidance	No information provided. Polygon requirements taken to be 300m buffer around a nest tree as per the other raptor species.
Species polygon justification	Not a candidate species Given the lack of evidence during field surveys, location of the proposal away from the species' core area, and limited number of records in the region, breeding habitat for the species is not considered to be affected by the proposal and no species polygon has been created. Any individuals that occur in the study area are likely to be non-breeding vagrants. This conclusion was confirmed by the BCD accountable officer.
Relevant IBRA subregions	Liverpool Plains – known Pilliga – known Pilliga Outwash – predicted Castlereagh Barwon – predicted Bogan Macquarie – known Inland Slopes – known

Table I27 Major Mitchell's Cockatoo

Major Mitchells Cockatoo (*Lophochroa leadbeateri*)	
BC Act Status	Vulnerable
Credit type	Species and Ecosystem
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	None
Breeding requirements	• The Major Mitchells Cockatoo is a monogamous species and forms life-long pair bonds. The same nest is often used year after year. Pairs are very territorial and must nest at least one kilometre from other breeding pairs • Juveniles join their parents to form small groups that remain together for some time after the young reach independence • Juveniles reach sexual maturity at 3 to 4 years • Live to be 50 to 60 years old in the wild (del Hoyo, et al., 1997)
Habitat requirements	• Major Mitchell cockatoos are found across inland Australia, in a wide variety of arid and semi-arid environments from forest to mallee scrub. Their main requirements are fresh surface water and trees that have large hollows for nesting. • Inhabits a wide range of treed and treeless inland habitats, always within easy reach of water. • Feeds mostly on the ground, especially on the seeds of native and exotic melons and on the seeds of species of saltbush, wattles and cypress pines. • Normally found in pairs or small groups, though flocks of hundreds may be found where food is abundant. • Nesting, in tree hollows, occurs throughout the second half of the year; nests are at least 1 kilometres apart, with no more than one pair every 30 square kilometres. (OEH 2019)
Habitat in the study area	• May forage in the study area (not including the Pilliga) when conditions suitable.
Known populations	• The species is considered to be extinct in the Pilliga area (Date et al 2002).
Survey requirements	Survey Months: September to December

Major Mitchells Cockatoo (*Lophochroa leadbeateri*)	
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists - diurnal bird surveys – no Pilliga surveys) • November 2018 (10 days, two ecologists – diurnal bird surveys – no targeted Pilliga surveys other than driving on one day along Pilliga Forest Way) • March 2019 (10 days, four zoologists – diurnal bird surveys – trapping and bird surveys in the Pilliga) • August 2019 (5 days, two zoologists – diurnal bird surveys, 1 night in the Pilliga) • Late September-early October 2019 (6 days, two ecologists – diurnal bird surveys, 2 days in the Pilliga). Surveys included diurnal bird surveys, and searches for nest trees. Incidental observations of birds were also made while driving along the alignment between survey sites.
Survey results	No individuals were recorded in the study area or surrounds during field surveys
Species polygon guidance	None. Assumed to be 100 metres around each nest tree as per other large cockatoos. Living or dead tree with hollows greater than 10cm diameter
Species polygon justification	Not a candidate species Given the lack of evidence during field surveys, the fact the species is extinct from the Pilliga area, and limited number of records in the region, the breeding habitat for the species is not considered to be affected by the proposal and no species polygon has been created. Any individuals that occur in the study area are likely to be non-breeding vagrants. This conclusion was confirmed by the BCD accountable officer.
Relevant IBRA subregions	Pilliga – known Pilliga Outwash – predicted Castlereagh Barwon – known Bogan Macquarie – known Inland Slopes – known

Table I28 Superb Parrot

Superb Parrot (*Polytelis swainsoni*)	
BC Act Status	Vulnerable
Credit type	Species (breeding habitat only) and ecosystem
SAII entity/threshold	False
EPBC Act Status	Vulnerable
Species polygon area	None
Breeding requirements	• The breeding range of the Superb Parrot is divided into three main areas: the first, along the Murray and Edward Rivers; the second, along the Murrumbidgee River; and the third, in a triangle bounded by Molong, Yass and Young (DEE 2019a). • Superb Parrots breed in either River Red Gum forests and woodlands or box woodlands (Webster 1998) • In the Riverina Region of NSW and adjacent areas of Victoria, the Superb Parrot usually breeds in forests dominated by large mature River Red Gums (*Eucalyptus camaldulensis*), typically close to watercourses, though nests are also occasionally located in Blakely's Red Gum (E. blakelyi), Grey Box (E. microcarpa), Red Box (E. polyanthemos) and Inland Red Box (E. intertexta) (Webster 1988) • There is a positive correlation between the locations of Superb Parrot nest sites and the occurrence of extensive tracts of suitable foraging habitat (Webster 1988) • Nest sites are always within 10 kilometres of areas of suitable foraging habitat, and usually near a watercourse (DEE 2019a).
Habitat requirements	• The Superb Parrot mainly inhabits forests and woodlands dominated by eucalypts, especially River Red Gums (*Eucalyptus camaldulensis*) and box eucalypts. The species also seasonally occurs in box-pine (*Callitris*) and Boree (*Acacia pendula*) woodlands (DEE 2019a). • The Superb Parrot feeds mainly on the ground, on the seeds of grasses as well as cereal crops and spilt grain. They also eat the seed-pods of many understorey species of wattles, and flowers and fruits of eucalypts, berries of mistletoe and lerps (EES 2019a). • At least part of the population of the Superb Parrot undertakes regular seasonal movements, vacating the breeding area after the conclusion of the breeding season, and then returning in spring, while others remain in the breeding areas throughout the year. • In central NSW, movements are said to occur when eucalypts flower, and when food becomes scarce due to drought and birds seek alternative sources of food (Higgins 1999).

Superb Parrot (*Polytelis swainsoni*)	
Habitat in the study area	• River Red Gum and Blakelys Red Gums occur along the major rivers and watercourses in the study area. • Box Gum and Callitris woodland occurs in much of the study area, and can comprise extensive patches of vegetation and small roadside remnants. • The recovery plan for the species maps the southern portion of the study area (south-west of Mount Tendandra) as where the species is likely to occur, while the northern portion is mapped as where the species may occur. No areas mapped as 'breeding likely to occur' are located in the study area, however there are scattered records of birds breeding outside these mapped areas (Baker-Gabb 2011).
Known populations	• The Superb Parrot mainly inhabits the Riverina, the South-west Slope and Southern Tableland Regions. Its range extends north to around Narrabri and Wee Waa (DEE 2019a). • Birds breeding in the SW slopes are mainly absent during winter, when they migrate north to the region of the upper Namoi and Gwydir Rivers (DEE 2019a).
Survey requirements	Survey Months: September - November The Superb Parrot can be surveyed using area searches or transect surveys of suitable habitat, preferably in the early to mid-morning and evening. Vehicle-based transects are appropriate in areas where most habitat is restricted to roadside remnants. It can be detected by sight, usually while in flight, or by its distinctive call (Manning et al. 2004).
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists - diurnal bird surveys along the alignment except the Pilliga) • November 2018 (10 days, two ecologists – diurnal bird surveys along the alignment) • September/October 2019 (6 days, two ecologists – diurnal bird surveys along the alignment) Surveys included area searches for birds, as well as opportunistic observations while driving or undertaking other survey types (eg flora surveys).
Survey results	Four individuals were observed flying into roadside Box – Callitris woodland north-east of Gilgandra. A large patch of remnant vegetation is located on private property to the east of this location.

Superb Parrot (*Polytelis swainsoni*)	
Species polygon guidance	Breeding habitat can be identified by the presence of habitat features and observed nest OR two or more birds seen on site (EEC 2020). Where a breeding site has been identified in accordance with the BAM the species polygon should be established by providing a circular buffer of 100m around the nest tree. The purpose of the buffer is to minimise disturbance/avoid clearing, for a development application, or to conserve and improve habitat, for a biodiversity stewardship agreement, within the area essential for breeding. This includes habitat suitable for fledgling requirements. It does not account for foraging habitat. The shape of the buffer can be modified where evidence provided in the Biodiversity Assessment Report indicates an alternative shape would better meet the species needs in the context of the assessment site. For example, extant vegetation is linear and the nest tree is already located near the edge of the wooded area (EEC 2020).
Species polygon justification	Not a candidate species Given the location of the proposal outside the breeding range of the species, breeding habitat for the species is not considered to be affected by the proposal and no species polygon has been created. Any individuals that occur in the study area are likely to be non-breeding individuals. This conclusion was confirmed by the BCD accountable officer.
Relevant IBRA subregions	Liverpool Plains – known Pilliga – known Pilliga Outwash – known Castlereagh Barwon – known Bogan Macquarie – known Inland Slopes – known

Table I29 Australian Bustard

Australian Bustard (*Ardeotis australis*)	
BC Act Status	Endangered
Credit type	Species
SAII entity/threshold	False
EPBC Act Status	Not listed
Species polygon area	None
Breeding requirements	• Little is known about longevity or population processes • Australian Bustards breed once a year • They most commonly occur in small groups of 2-6 individuals, but can also be solitary or in small family groups • The Australian bustard has been recorded to exhibit an exploded lek system • After mating, females nest and rear their young, with no further input from the male (Ziembicki 2009) • Breeds on bare ground on low sandy ridges or stony rises in ecotones between grassland and protective shrubland cover; roosts on ground among shrubs and long grasses or under trees
Habitat requirements	• Mainly inhabits tussock and hummock grasslands, though prefers tussock grasses to hummock grasses; also occurs in low shrublands and low open grassy woodlands; occasionally seen in pastoral and cropping country, golf courses and near dams • Forages on insects, young birds, lizards, mice, leaves, seeds and fruit • Dispersive, with irregular widespread movements over long distances; movements are thought to be in response to habitat and climatic conditions; known to converge on areas with high mice numbers and in recently burnt areas
Habitat in the study area	May occur on cleared land within pastoral and cropping farms within the study area on occasion. Limited potential habitat within the Pilliga given the scarcity of tussock grasslands and low shrubland.
Known populations	• In NSW, they are mainly found in the north-west corner and less often recorded in the lower western and central west plains regions. Occasional vagrants are still seen as far east as the western slopes and Riverine plain. • The species is considered to be extinct in the Pilliga area (Date et al 2002). • Nearest records are located near Moree and the Macquarie Marshes (EES 2019a).
Survey requirements	Survey Months: All months

Australian Bustard (*Ardeotis australis*)	
Survey effort	Fauna surveys were conducted along the alignment in the following periods: • September 2018 (5 days, two ecologists - diurnal bird surveys – no Pilliga surveys) • November 2018 (10 days, two ecologists – diurnal bird surveys – no targeted Pilliga surveys other than driving on one day along Pilliga Forest Way) • March 2019 (5 days, six zoologists – diurnal bird surveys in the Pilliga) • March 2019 (5 days, two zoologists – diurnal bird surveys in the Narrabri and north Pilliga) • March 2019 (5 days, two zoologists – diurnal bird surveys in the Gilgandra area) • August 2019 (5 days, two zoologists – diurnal bird surveys along the alignment) • Late September-early October 2019 (6 days, two ecologists. diurnal bird surveys along the alignment).
Survey results	No individuals were recorded during surveys.
Species polygon guidance	All relevant PCTs
Species polygon justification	No (surveyed) Given the lack of evidence during field surveys, and lack of records in the region, the species is not considered to be affected by the proposal and no species polygon has been created. Any individuals that occur in the study area are likely to be non-breeding vagrants.
Relevant IBRA subregions	Northern Basalts – predicted Liverpool Plains – known Pilliga – predicted Pilliga Outwash – predicted Castlereagh Barwon – known Bogan Macquarie – known Inland Slopes – known

Table I30 Regent Honeyeater

Regent Honeyeater (*Anthochaera phrygia*)	
BC Act Status	Critically Endangered
Credit type	Species and Ecosystem
SAII entity/threshold	True
EPBC Act Status	Critically Endangered
Species polygon area	None
Breeding requirements	• There are only three known key breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. In NSW the distribution is very patchy and mainly confined to the two main breeding areas and surrounding fragmented woodlands. In some years flocks converge on flowering coastal woodlands and forests. (OEH 2019). • Regent Honeyeaters start breeding in August and chicks can be produced through to January.
Habitat requirements	• The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak • Non-breeding flocks are seen foraging in flowering coastal Swamp Mahogany and Spotted Gum forests, particularly on the central coast and occasionally on the upper north coast. Birds are occasionally seen on the south coast • In the last 10 years Regent Honeyeaters have been recorded in urban areas around Albury where woodlands tree species such as Mugga Ironbark and Yellow Box were planted 20 years ago • The Regent Honeyeater is a generalist forager, although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar. • Key eucalypt species include Mugga Ironbark, Yellow Box, White Box and Swamp Mahogany. Flowering of associated species such as Thin-leaved Stringybark Eucalyptus eugenioides and other Stringybark species, and Broad-leaved Ironbark E. fibrosa can also contribute important nectar flows at times. Nectar and fruit from the mistletoes Amyema miquelii, A. pendula and A. cambagei are also utilised. • When nectar is scarce lerp and honeydew can comprise a large proportion of the diet. Insects make up about 15 per cent of the total diet and are important components of the diet of nestlings
Habitat in the study area	• No important habitat for the Regent Honeyeater occurs in the proposal site. • The Pilliga Forests contain the following key eucalypt species: Yellow Box, White Box, Mugga Ironbark, Red Ironbark. • Road-side reserves and TSRs contain large number of Box-Gum woodland also containing these species. • Patchy distribution of Mistletoes recorded in Pilliga Forests
Known populations	• The nearest breeding area is in Bundarra-Barraba region north of Tamworth/Gunnedah.

Regent Honeyeater (*Anthochaera phrygia*)	
	• The Baradine/Yearinan Creek in the central Pilliga (south-east of the proposal site) is noted as being important habitat for the Regent Honeyeater (Birdlife International 2020).
Survey requirements	Area searches in suitable habitat, preferably in the morning but other times may also be appropriate. Detection by call is possible when birds are most vocal (outside the breeding season). Otherwise, detection is by sighting. Targeted searches of woodland patches with heavily flowering trees is useful, especially around waterpoints such as dams and creeklines. Also check among flocks of other blossom nomads such as lorikeets and other honeyeaters. Broadcast surveys immediately before and during the breeding season may also be useful (DEWHA 2010).
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists - diurnal bird surveys along the alignment – no Pilliga surveys) • March 2019 (5 days, six zoologists – diurnal bird surveys in the Pilliga) • March 2019 (5 days, two zoologists – diurnal bird surveys in the Narrabri and north Pilliga) • March 2019 (5 days, two zoologists – diurnal bird surveys in the Gilgandra area) • August 2019 (5 days, two zoologists – diurnal bird surveys along the alignment, 1 day in the Pilliga) • Late September-early October 2019 (6 days, two ecologists. diurnal bird surveys along the alignment). All surveys included area searches for diurnal birds in woodland and riparian areas.
Survey results	No individuals were recorded during surveys.
Species polygon guidance	Mapped important habitat
Species polygon justification	Not a candidate species No species polygon is required as no important habitat for the species was identified by OEH in the study area (email correspondence January 2019, EES 2020).
Relevant IBRA subregions	Northern Basalts – predicted Liverpool Plains – known Pilliga – known Inland Slopes – known

Table I31 Swift Parrot

Swift Parrot (*Lathamus discolor*)	
BC Act Status	Critically Endangered
Credit type	Species and Ecosystem
SAII entity/threshold	True
EPBC Act Status	Critically Endangered
Species polygon area	None
Breeding requirements	• The Swift Parrot only breeds in Tasmania, arriving in August to nest in hollows in old trees of a range of eucalypt species. Nest sites in eastern Tasmanian are usually located near the coast in dry forests on upper slopes and ridge tops. While on the mainland, they are nomadic, spending weeks or months at some sites and only a few hours at others, determined by the supply of nectar (Parks 2010) • After the breeding season, in February and March, the entire population flies north. They disperse throughout Victoria and NSW where they are semi nomadic, foraging on flowering eucalypts and lerps (Parks 2010)
Habitat requirements	• Migrates to the Australian south-east mainland between February and October (EES 2019b) • On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations (EES 2019b) • Favoured feed trees include winter flowering species such as Red Bloodwood *C. gummifera*, Forest Red Gum *E. tereticornis*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens* (EES 2019b) • Commonly used lerp infested trees include Inland Grey Box *E. microcarpa*, Grey Box *E. moluccana*, Blackbutt *E. pilularis*, and Yellow Box *E. melliodora* • Return to some foraging sites on a cyclic basis depending on food availability (EES 2019b) • Following winter they return to Tasmania where they breed from September to January, nesting in old trees with hollows and feeding in forests dominated by Tasmanian Blue Gum *Eucalyptus globulus* (EES 2019b)
Habitat in the study area	• Foraging is limited to areas containing flowering Red Bloodwood, Mugga Ironbark and White Box. • Lerp-infested trees in the study area include Grey Box and Yellow Box. • Would not breed in the study area.
Known populations	• Patchy distribution of records in the locality • Local records around Dubbo, Ulan, Gunnedah, Warrumbungle's National Park and Mt Kaputar National Park. • No important habitat for the species has been mapped by OEH in the study area (email correspondence January 2019).

Swift Parrot (*Lathamus discolor*)	
Survey requirements	Surveys on the mainland should be conducted between March and July. Area searches or transect surveys of suitable habitat, preferably in the early morning and afternoon when birds are most active and vocal. Detection by sighting or call. Slow-moving vehicle transects also effective in expansive areas, detecting loud, distinctive 'clinking' call that can be heard over noise of engine. Targeted surveys of patches of heavily flowering eucalypts may be useful (DEWHA 2010).
Survey effort	Fauna surveys were conducted in the following months along the alignment: • September 2018 (5 days, two ecologists - diurnal bird surveys along the alignment – no Pilliga surveys) • March 2019 (5 days, six zoologists – diurnal bird surveys in the Pilliga) • March 2019 (5 days, two zoologists – diurnal bird surveys in the Narrabri and north Pilliga) • March 2019 (5 days, two zoologists – diurnal bird surveys in the Gilgandra area) • August 2019 (5 days, two zoologists – diurnal bird surveys along the alignment, 1 day in the Pilliga) • Late September-early October 2019 (6 days, two ecologists. diurnal bird surveys along the alignment). All surveys included area searches for diurnal birds in woodland and riparian areas.
Survey results	No individuals were recorded during surveys for the proposal.
Species polygon guidance	Mapped important habitat
Species polygon justification	Not a candidate species No species polygon is required as no important habitat for the species has been mapped by OEH in the study area (email correspondence January 2019).
Relevant IBRA subregions	Northern Basalts – predicted Liverpool Plains – known Pilliga – known Pilliga Outwash – predicted Inland Slopes – known

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TECHNICAL REPORT 1

Biodiversity development assessment report

Appendix J Fauna connectivity measures

NARROMINE TO NARRABRI ENVIRONMENTAL IMPACT STATEMENT

Bridges

ProjChainage	Bridge N0	Bridge Length (m)	Fauna connectivity	Key threatened species	Other fauna
560.872	250-BR560872	238	Yes		general fauna (macropods, echidnas, small birds, reptiles etc)
561.2379	250-BR561237	43	Yes		small terrestrial fauna (lizards etc)
561.4667	250-BR561466	42.9	Yes		small terrestrial fauna (lizards etc)
561.6651	250-BR561665	42.9	Yes		small terrestrial fauna (lizards etc)
561.8386	250-BR561838	148	Yes		small terrestrial fauna (lizards etc)
562.3446	250-BR562344	1170	Yes	Koalas	possums, general fauna
565.5928	250-BR565592	14	Yes		general fauna (macropods, echidnas, small birds, reptiles etc)
595.2392	250-BR595239	321.8	Yes	Koalas	possums, general fauna
602.6638	250-BR602663	332	Yes		general fauna (macropods, echidnas, small birds, reptiles etc)
607.1455	250-BR607145	88	Yes		general fauna (macropods, echidnas, small birds, reptiles etc)
607.3239	250-BR607323	28.8	Yes		general fauna (macropods, echidnas, small birds, reptiles etc)
608.9298	250-BR608929	112.8	Yes		general fauna (macropods, echidnas, small birds, reptiles etc)
609.7156	250-BR609715	253	Yes	Koalas	possums, general fauna
612.1102	250-BR612110	74.6	Yes	Koalas	possums, general fauna
616.6801	250-BR616680	120.5	Yes		general fauna (macropods, echidnas, small birds, reptiles etc)
618.4459	250-BR618445	62.7	Yes		general fauna (macropods, echidnas, small birds, reptiles etc)
620.3008	250-BR620300	34.7	Yes		general fauna (macropods, echidnas, small birds, reptiles etc)
623.1468	250-BR623146	182	Yes	Koalas	possums, general fauna
633.6779	250-BR633677	1150	Yes	Koalas	possums, general fauna
643.0005	250-BR643000	42.2	Yes		general fauna (macropods, echidnas, small birds, reptiles etc)
651.7284	250-BR651728	608	Yes	Koalas	possums, general fauna
652.5204	250-BR652520	207	Yes		general fauna (macropods, echidnas, small birds, reptiles etc)
661.2753	250-BR661275	84.7	Yes		general fauna (macropods, echidnas, small birds, reptiles etc)
673.0826	250-BR673082	414	Yes	Koalas	possums, general fauna
681.404	250-BR681404	140.5	Yes		general fauna (macropods, echidnas, small birds, reptiles etc)

ProjChainage	Bridge N0	Bridge Length (m)	Fauna connectivity	Key threatened species	Other fauna
682.2421	250-BR682242	112.1	Yes		general fauna (macropods, echidnas, small birds, reptiles etc)
682.6019	250-BR682601	99.4	Yes		general fauna (macropods, echidnas, small birds, reptiles etc)
700.017883	250-BR700017	183.017	Yes	Koalas	possums, general fauna
701.8901	250-BR701890	56	Yes	Koalas	possums, general fauna
701.9815	250-BR701981	41.6	Yes		general fauna (macropods, echidnas, small birds, reptiles etc)
702.305847	250-BR702305	143.86	Yes		general fauna (macropods, echidnas, small birds, reptiles etc)
704.5885	250-BR704588	56.2	Yes		general fauna (macropods, echidnas, small birds, reptiles etc)
705.358459	250-BR705358	14.039	Yes		general fauna (macropods, echidnas, small birds, reptiles etc)
705.407776	250-BR705407	14.038	Yes		general fauna (macropods, echidnas, small birds, reptiles etc)
705.4601	250-BR705460	60	Yes		general fauna (macropods, echidnas, small birds, reptiles etc)
705.7353	250-BR705735	82.2	Yes		general fauna (macropods, echidnas, small birds, reptiles etc)
707.183105	250-BR707183	14.039	Yes		general fauna (macropods, echidnas, small birds, reptiles etc)
709.2666	250-BR709266	25.8	Yes		general fauna (macropods, echidnas, small birds, reptiles etc)
714.593	250-BR714593	158.4	Yes		general fauna (macropods, echidnas, small birds, reptiles etc)
716.029358	250-BR716029	14.038	Yes		general fauna (macropods, echidnas, small birds, reptiles etc)
722.2884	250-BR722288	138.1	Yes		general fauna (macropods, echidnas, small birds, reptiles etc)
730.462585	250-BR730462	183.655	Yes	Koalas	possums, general fauna
747.7682	250-BR747768	241.9	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)
749.2793	250-BR749279	43.7	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)
752.7127	250-BR752712	69	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)
756.787495	250-BR756787	45.3	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)

ProjChainage	Bridge N0	Bridge Length (m)	Fauna connectivity	Key threatened species	Other fauna
763.460495	250-BR763460	344.3	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)
767.941995	250-BR767941	75.083	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)
769.143796	250-BR769143	113.8	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)
773.373396	250-BR773373	55.4	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)
779.635095	250-BR779635	57	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)
779.828595	250-BR779828	70.4	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)
781.523395	250-BR781523	84.2	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)
783.652995	250-BR783652	114.9	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)
786.808595	250-BR786808	82.3	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)
789.380495	250-BR789380	188.4	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)
796.414195	250-BR796414	181.5	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)
800.445396	250-BR800445	91	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)

ProjChainage	Bridge N0	Bridge Length (m)	Fauna connectivity	Key threatened species	Other fauna
805.743195	250-BR805743	41.4	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)
809.114895	250-BR809114	55.3	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)
817.058595	250-BR817058	27.7	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)
817.258796	250-BR817258	28.7	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)
817.325296	250-BR817325	204.5	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)
817.573395	250-BR817573	27.9	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)
817.650995	250-BR817650	137.1	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)
828.222644	250-BR828222	1329.051	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)
834.450396	250-BR834450	42.2	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)
834.541095	250-BR834541	41.4	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)
834.764196	250-BR834764	758	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)
835.640495	250-BR835640	55.3	Yes	Koala, Pale-headed Snake, Black-striped Wallaby, Eastern Pygmy-possum, Pilliga Mouse, microbats, birds, etc	general fauna (macropods, echidnas, small birds, reptiles etc)

ProjChainage	Bridge N0	Bridge Length (m)	Fauna connectivity	Key threatened species	Other fauna
843.613396	250-BR843613	91.9	Yes		small terrestrial fauna (lizards etc)
844.116595	250-BR844116	3941	Yes	Pale-headed Snake, Five-clawed Worm-skink, general fauna	general fauna (macropods, echidnas, small birds, reptiles etc)
848.406995	250-BR848406	42.2	Yes		small terrestrial fauna (lizards etc)

Drainage culverts in the Pilliga to Bohena Creek area

Chainage	Culvert N0	Cells	Cell Length (m)	Total Length (m)	Fauna connectivity	Key threatened species	Other fauna
745.476	250-Clvrt745475	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
745.5851	250-Clvrt745585	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
745.7958	250-Clvrt745795	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
746.8546	250-Clvrt746854	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
747.38	250-Clvrt747380	1	2.4	2.686	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
752.193	250-Clvrt752192	2	2.4	5.371	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
752.48	250-Clvrt752479	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
753.1633	250-Clvrt753163	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
753.3286	250-Clvrt753328	4	2.4	10.62	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
753.3835	250-Clvrt753383	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
753.4822	250-Clvrt753482	4	2.4	10.62	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
753.6432	250-Clvrt753643	7	2.4	18.677	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
757.443	250-Clvrt757442	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
757.552	250-Clvrt757551	4	2.4	10.62	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
758.9686	250-Clvrt758968	4	2.4	10.62	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)

Chainage	Culvert N0	Cells	Cell Length (m)	Total Length (m)	Fauna connectivity	Key threatened species	Other fauna
759.4567	250-Clvrt759456	12	2.4	31.86	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
761.188	250-Clvrt761187	6	2.4	15.991	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
761.24	250-Clvrt761240	12	2.4	31.861	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
761.7869	250-Clvrt761786	4	2.4	10.62	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
762.8888	250-Clvrt762888	4	2.4	10.62	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
764.0184	250-Clvrt764018	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
764.068	250-Clvrt764067	2	2.4	5.371	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
764.79	250-Clvrt764789	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
764.8719	250-Clvrt764871	5	2.4	13.306	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
765.0073	250-Clvrt765007	2	2.4	5.371	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
765.045	250-Clvrt765044	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
765.1288	250-Clvrt765128	2	2.4	5.371	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
765.17	250-Clvrt765169	2	2.4	5.371	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
765.6081	250-Clvrt765608	4	2.4	10.62	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
765.6962	250-Clvrt765696	4	2.4	10.62	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
766.4113	250-Clvrt766411	2	2.4	5.371	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)

Chainage	Culvert N0	Cells	Cell Length (m)	Total Length (m)	Fauna connectivity	Key threatened species	Other fauna
767.5926	250-Clvrt767592	7	2.4	18.677	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
767.9149	250-Clvrt767914	4	2.4	10.62	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
769.4119	250-Clvrt769411	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
770.81	250-Clvrt770809	1	2.4	2.685	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
771.1	250-Clvrt771100	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
771.2354	250-Clvrt771235	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
772.0467	250-Clvrt772046	2	2.4	5.371	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
772.16	250-Clvrt772160	6	2.4	15.992	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
773.4518	250-Clvrt773451	6	2.4	15.991	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
773.536	250-Clvrt773535	6	2.4	15.992	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
773.6154	250-Clvrt773615	4	2.4	10.62	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
777.56	250-Clvrt777559	8	2.4	21.24	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
778.0244	250-Clvrt778024	8	2.4	21.24	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
778.5521	250-Clvrt778552	5	2.4	13.305	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
778.9739	250-Clvrt778973	1	2.4	2.685	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
779.0184	250-Clvrt779018	1	2.4	2.686	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)

Chainage	Culvert N0	Cells	Cell Length (m)	Total Length (m)	Fauna connectivity	Key threatened species	Other fauna
779.7364	250-Clvrt779736	6	2.4	15.991	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
779.7681	250-Clvrt779768	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
779.7989	250-Clvrt779798	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
782.94	250-Clvrt782940	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
783.0687	250-Clvrt783068	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
785.056	250-Clvrt785055	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
787.36	250-Clvrt787360	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
787.3826	250-Clvrt787382	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
787.4065	250-Clvrt787406	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
787.522	250-Clvrt787521	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
790.1312	250-Clvrt790131	6	2.4	15.991	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
790.24	250-Clvrt790240	6	2.4	15.992	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
790.3276	250-Clvrt790327	6	2.4	15.992	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
792.5731	250-Clvrt792573	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
793.4139	250-Clvrt793413	1	2.4	2.686	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
793.8336	250-Clvrt793833	2	2.4	5.371	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)

Chainage	Culvert N0	Cells	Cell Length (m)	Total Length (m)	Fauna connectivity	Key threatened species	Other fauna
794.2518	250-Clvrt794251	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
796.11	250-Clvrt796110	9	2.4	23.926	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
796.16	250-Clvrt796160	15	2.4	39.917	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
796.267	250-Clvrt796267	18	2.4	47.852	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
796.6342	250-Clvrt796634	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
796.6572	250-Clvrt796657	9	2.4	23.926	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
796.9	250-Clvrt796899	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
796.9263	250-Clvrt796926	2	2.4	5.371	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
800.3317	250-Clvrt800331	21	2.4	55.908	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
800.4014	250-Clvrt800401	4	2.4	10.62	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
800.5723	250-Clvrt800572	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
800.5923	250-Clvrt800592	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
800.6188	250-Clvrt800618	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
800.6639	250-Clvrt800663	10	2.4	26.611	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
800.77	250-Clvrt800770	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
800.86	250-Clvrt800860	15	2.4	39.917	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)

Chainage	Culvert N0	Cells	Cell Length (m)	Total Length (m)	Fauna connectivity	Key threatened species	Other fauna
800.9449	250-Clvrt800944	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
800.9834	250-Clvrt800983	7	2.4	18.677	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
801.0281	250-Clvrt801028	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
801.73	250-Clvrt801729	10	2.4	26.611	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
801.835	250-Clvrt801835	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
801.89	250-Clvrt801889	12	2.4	31.86	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
802.0466	250-Clvrt802046	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
802.1348	250-Clvrt802134	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
802.201	250-Clvrt802201	12	2.4	31.861	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
802.2972	250-Clvrt802297	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
802.4318	250-Clvrt802431	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
802.5348	250-Clvrt802534	20	2.4	53.222	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
803.2564	250-Clvrt803256	14	2.4	37.232	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
803.6533	250-Clvrt803653	10	2.4	26.611	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
803.7749	250-Clvrt803774	6	2.4	15.991	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
804.3187	250-Clvrt804318	6	2.4	15.991	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)

Chainage	Culvert N0	Cells	Cell Length (m)	Total Length (m)	Fauna connectivity	Key threatened species	Other fauna
804.8517	250-Clvrt804851	5	2.4	13.306	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
804.9647	250-Clvrt804964	4	2.4	10.62	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
805.8072	250-Clvrt805807	4	2.4	10.62	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
806.3639	250-Clvrt806363	4	2.4	10.62	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
806.6178	250-Clvrt806617	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
806.7	250-Clvrt806699	12	2.4	31.86	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
807.0246	250-Clvrt807024	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
807.0829	250-Clvrt807082	8	2.4	21.241	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
807.1514	250-Clvrt807151	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
807.667	250-Clvrt807667	12	2.4	31.86	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
808.22	250-Clvrt808220	12	2.4	31.86	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
808.3648	250-Clvrt808364	16	2.4	42.602	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
808.5041	250-Clvrt808504	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
808.8066	250-Clvrt808806	10	2.4	26.612	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
808.9065	250-Clvrt808906	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
808.9534	250-Clvrt808953	6	2.4	15.991	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)

Chainage	Culvert N0	Cells	Cell Length (m)	Total Length (m)	Fauna connectivity	Key threatened species	Other fauna
808.9965	250-Clvrt808996	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
809.0538	250-Clvrt809053	12	2.4	31.86	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
810.0383	250-Clvrt810038	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
810.6662	250-Clvrt810666	6	2.4	15.992	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
810.7541	250-Clvrt810754	7	2.4	18.677	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
811.09	250-Clvrt811089	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
811.1357	250-Clvrt811135	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
811.1822	250-Clvrt811182	6	2.4	15.991	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
811.2776	250-Clvrt811277	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
811.6916	250-Clvrt811691	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
811.7318	250-Clvrt811731	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
812.2157	250-Clvrt812215	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
812.2645	250-Clvrt812264	1	2.4	2.686	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
812.601	250-Clvrt812600	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
812.6456	250-Clvrt812645	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
812.69	250-Clvrt812690	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)

Chainage	Culvert N0	Cells	Cell Length (m)	Total Length (m)	Fauna connectivity	Key threatened species	Other fauna
814.04	250-Clvrt814039	3	2.4	7.935	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
814.13	250-Clvrt814130	6	2.4	15.991	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
814.1666	250-Clvrt814166	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
814.2016	250-Clvrt814201	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
814.24	250-Clvrt814240	8	2.4	21.241	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
814.9014	250-Clvrt814901	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
815.5485	250-Clvrt815548	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
817.1155	250-Clvrt817115	32	2.4	85.083	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
818.1771	250-Clvrt818177	6	2.4	15.991	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
819.6489	250-Clvrt819648	4	2.4	10.621	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
819.913	250-Clvrt819913	3	2.4	7.934	Yes	Koala, Black-striped Wallaby, Rufous Bettong, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
820.8912	250-Clvrt820891	4	2.4	10.62	Yes		general fauna (macropods, echidnas, reptiles etc)
820.9328	250-Clvrt820932	3	2.4	7.935	Yes		general fauna (macropods, echidnas, reptiles etc)
822.0654	250-Clvrt822065	8	2.4	21.241	Yes		general fauna (macropods, echidnas, reptiles etc)
822.2	250-Clvrt822199	4	2.4	10.62	Yes		general fauna (macropods, echidnas, reptiles etc)
824.8018	250-Clvrt824801	3	2.4	7.934	Yes		general fauna (macropods, echidnas, reptiles etc)

Chainage	Culvert N0	Cells	Cell Length (m)	Total Length (m)	Fauna connectivity	Key threatened species	Other fauna
825.12	250-Clvrt825119	3	2.4	7.934	Yes		general fauna (macropods, echidnas, reptiles etc)
825.4	250-Clvrt825399	3	2.4	7.934	Yes		general fauna (macropods, echidnas, reptiles etc)
825.9725	250-Clvrt825972	1	2.4	2.685	Yes		general fauna (macropods, echidnas, reptiles etc)
826.688	250-Clvrt826687	1	2.4	2.686	Yes	Koala, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
826.8965	250-Clvrt826896	1	2.4	2.686	Yes	Koala, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
827.8471	250-Clvrt827847	2	2.4	5.371	Yes	Koala, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
827.8716	250-Clvrt827871	2	2.4	5.371	Yes	Koala, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
829.9019	250-Clvrt829901	6	2.4	15.991	Yes	Koala, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
829.9319	250-Clvrt829931	6	2.4	15.992	Yes	Koala, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
829.9715	250-Clvrt829971	18	2.4	47.852	Yes	Koala, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
830.1058	250-Clvrt830105	9	2.4	23.925	Yes	Koala, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
830.2444	250-Clvrt830244	6	2.4	15.992	Yes	Koala, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
830.2863	250-Clvrt830286	6	2.4	15.991	Yes	Koala, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
830.3331	250-Clvrt830333	11	2.4	29.296	Yes	Koala, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
830.4144	250-Clvrt830414	6	2.4	15.992	Yes	Koala, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
830.4778	250-Clvrt830477	24	2.4	63.843	Yes	Koala, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)

Chainage	Culvert N0	Cells	Cell Length (m)	Total Length (m)	Fauna connectivity	Key threatened species	Other fauna
830.74	250-Clvrt830740	12	2.4	31.861	Yes	Koala, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
830.8921	250-Clvrt830892	12	2.4	31.86	Yes	Koala, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
831.67	250-Clvrt831669	3	2.4	7.935	Yes	Koala, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
832.1362	250-Clvrt832136	2	2.4	5.371	Yes	Koala, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
833.13	250-Clvrt833130	10	2.4	26.612	Yes	Koala, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
833.7549	250-Clvrt833754	3	2.4	7.934	Yes	Koala, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
833.8172	250-Clvrt833817	3	2.4	7.935	Yes	Koala, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)
833.89	250-Clvrt833889	3	2.4	7.935	Yes	Koala, Eastern Pygmy-possum, Pilliga Mouse	general fauna (macropods, echidnas, reptiles etc)

Suggested dedicated culvert locations (Pilliga Mouse)

PCT	Chainage	Length of patch	Number
PCT 141 broombush wattle very tall shrubland	Between ch 788.2-788.7	500 metres	multiple culverts (every 100 metres)
PCT 141 broombush wattle very tall shrubland	790.5	100m	one set
PCT 141 broombush wattle very tall shrubland	Between ch 797.4 - 798.4	1000 metres	multiple culverts (every 100 metres)
PCT 141 broombush wattle very tall shrubland	Between ch 904.1-904.8	700 metres	multiple culverts (every 100 metres)

Suggested Glider Poles and Barrier Poles locations

Pole type	Chainage	Waterway	Bridge number	PCT	Comment	Design
Barrier poles	747.7682	BARADINE	250-BR747768	399: Red Gum	wide creek, may be used for movement perpendicular to alignment	3 metres tall poles set every 2 metres or so along each side of bridge at main gap in veg along creek. Outside poles to also include launch platforms for gliders
Barrier poles	752.7127	COOLANGLA	250-BR752712	399: Red Gum	wide creek, may be used for movement perpendicular to alignment	3 metres tall poles set every 2 metres or so along each side of bridge at main gap in veg along creek. Outside poles to also include launch platforms for gliders
Barrier poles	763.460495	ETOO	250-BR763460	399: Red Gum	wide creek, may be used for movement perpendicular to alignment	3 metres tall poles set every 2 metres or so along each side of bridge at main gap in veg along creek. Outside poles to also include launch platforms for gliders
Barrier poles	769.143796	ROCKY	250-BR769143	399: Red Gum	wide creek, may be used for movement perpendicular to alignment	3 metres tall poles set every 2 metres or so along each side of bridge at main gap in veg along creek. Outside poles to also include launch platforms for gliders
Barrier poles	800.445396	MOLLIEROI	250-BR800445	399: Red Gum	wide creek, may be used for movement perpendicular to alignment	3 metres tall poles set every 2 metres or so along each side of bridge at main gap in veg along creek. Outside poles to also include launch platforms for gliders
Barrier poles	809.114895	GOONA	250-BR809114	399: Red Gum	wide creek, may be used for movement perpendicular to alignment	3 metres tall poles set every 2 metres or so along each side of bridge at main gap in veg along creek. Outside poles to also include launch platforms for gliders
Glider poles	750.5			398: Narrrow-leaved Ironbark	retain connectivity with small patch in NW of Baradine SF	set of 3 glider poles (telegraph poles with launch platforms) either side of rail line, exact location to be determined during detailed design and would depend on presence of suitable tall trees near poles
Glider poles	753			398: Narrrow-leaved Ironbark	retain connectivity within Baradine SF	set of 3 glider poles (telegraph poles with launch platforms) either side of rail line, exact location to be determined during detailed design and would depend on presence of suitable tall trees near poles
Glider poles	755.7			398: Narrrow-leaved Ironbark	retain connectivity within Cumbil SF between cleared farmland	set of 3 glider poles (telegraph poles with launch platforms) either side of rail line, exact location to be determined during detailed design and would depend on presence of suitable tall trees near poles
Glider poles	762			398: Narrrow-leaved Ironbark	retain connectivity across ironbark habitat in Cumbil SF	set of 3 glider poles (telegraph poles with launch platforms) either side of rail line, exact location to be determined during detailed design and would depend on presence of suitable tall trees near poles

Pole type	Chainage	Waterway	Bridge number	PCT	Comment	Design
Glider poles	765			394: Narrow-leaved ironbark	retain connectivity across ironbark habitat in Euligal SF	set of 3 glider poles (telegraph poles with launch platforms) either side of rail line, exact location to be determined during detailed design and would depend on presence of suitable tall trees near poles
Glider poles	774			88: Pilliga Box	known record, retain connectivity at this location	set of 3 glider poles (telegraph poles with launch platforms) either side of rail line, exact location to be determined during detailed design and would depend on presence of suitable tall trees near poles
Glider poles	778			394: Narrow-leaved ironbark	retain connectivity across ironbark habitat in Pilliga East SF	set of 3 glider poles (telegraph poles with launch platforms) either side of rail line, exact location to be determined during detailed design and would depend on presence of suitable tall trees near poles
Glider poles	784.5			398: Narrrow-leaved Ironbark	retain connectivity across ironbark habitat in Pilliga East SF	set of 3 glider poles (telegraph poles with launch platforms) either side of rail line, exact location to be determined during detailed design and would depend on presence of suitable tall trees near poles
Glider poles	789			398: Narrrow-leaved Ironbark	retain connectivity across ironbark habitat in Pilliga East SF	set of 3 glider poles (telegraph poles with launch platforms) either side of rail line, exact location to be determined during detailed design and would depend on presence of suitable tall trees near poles
Glider poles	793			404: Red Ironbark	retain connectivity across ironbark habitat in Pilliga East SF	set of 3 glider poles (telegraph poles with launch platforms) either side of rail line, exact location to be determined during detailed design and would depend on presence of suitable tall trees near poles
Glider poles	797			398: Narrrow-leaved Ironbark	retain connectivity to Lanes Mill Flora Reserve	set of 3 glider poles (telegraph poles with launch platforms) either side of rail line, exact location to be determined during detailed design and would depend on presence of suitable tall trees near poles
Glider poles	798.5			1384: White Cypress Pine	retain connectivity to Lanes Mill Flora Reserve	set of 3 glider poles (telegraph poles with launch platforms) either side of rail line, exact location to be determined during detailed design and would depend on presence of suitable tall trees near poles
Glider poles	802			398: Narrrow-leaved Ironbark	retain connectivity across ironbark habitat in Pilliga East SF	set of 3 glider poles (telegraph poles with launch platforms) either side of rail line, exact location to be determined during detailed design and would depend on presence of suitable tall trees near poles

Pole type	Chainage	Waterway	Bridge number	PCT	Comment	Design
Glider poles	806.5			398: Narrrow-leaved Ironbark	retain connectivity across ironbark habitat in Pilliga East SF	set of 3 glider poles (telegraph poles with launch platforms) either side of rail line, exact location to be determined during detailed design and would depend on presence of suitable tall trees near poles
Glider poles	810.5			398: Narrrow-leaved Ironbark	retain connectivity across ironbark habitat in Pilliga East SF	set of 3 glider poles (telegraph poles with launch platforms) either side of rail line, exact location to be determined during detailed design and would depend on presence of suitable tall trees near poles
Glider poles	816			398: Narrrow-leaved Ironbark	retain connectivity across ironbark habitat in Pilliga East SF	set of 3 glider poles (telegraph poles with launch platforms) either side of rail line, exact location to be determined during detailed design and would depend on presence of suitable tall trees near poles
Glider poles	819			398: Narrrow-leaved Ironbark	retain connectivity across ironbark habitat in Pilliga East SF	set of 3 glider poles (telegraph poles with launch platforms) either side of rail line, exact location to be determined during detailed design and would depend on presence of suitable tall trees near poles

Suggested lcoations where rope bridges should be slung under rail bridges (if heights permit)

ProjChainage	Bridge N0	Major crossings	Comment
562.3446	250-BR562344	Macquarie River	Rope bridge on both sides of river
595.2392	250-BR595239		One rope bridge if heights permit
609.7156	250-BR609715		One rope bridge if heights permit
633.6779	250-BR633677		One rope bridge if heights permit
651.7284	250-BR651728	Castlereagh River	Rope bridge on both sides of river
673.0826	250-BR673082		One rope bridge if heights permit
730.462585	250-BR730462		One rope bridge if heights permit
747.7682	250-BR747768	Baradine Creek	Rope bridge on both sides of river
749.2793	250-BR749279		One rope bridge if heights permit
752.7127	250-BR752712		One rope bridge if heights permit
756.787495	250-BR756787		One rope bridge if heights permit
763.460495	250-BR763460	Etoo Creek	Rope bridge on both sides of river
767.941995	250-BR767941		One rope bridge if heights permit
769.143796	250-BR769143		One rope bridge if heights permit
773.373396	250-BR773373		One rope bridge if heights permit
779.635095	250-BR779635		One rope bridge if heights permit
779.828595	250-BR779828		One rope bridge if heights permit
781.523395	250-BR781523		One rope bridge if heights permit
783.652995	250-BR783652		One rope bridge if heights permit
786.808595	250-BR786808		One rope bridge if heights permit
789.380495	250-BR789380		One rope bridge if heights permit
796.414195	250-BR796414		One rope bridge if heights permit
800.445396	250-BR800445		One rope bridge if heights permit
805.743195	250-BR805743		One rope bridge if heights permit
809.114895	250-BR809114		One rope bridge if heights permit

ProjChainage	Bridge N0	Major crossings	Comment
817.058595	250-BR817058		One rope bridge if heights permit
817.258796	250-BR817258		One rope bridge if heights permit
817.325296	250-BR817325		One rope bridge if heights permit
817.573395	250-BR817573		One rope bridge if heights permit
817.650995	250-BR817650		One rope bridge if heights permit
828.222644	250-BR828222	Bohena Creek	Rope bridge on both sides of river
834.450396	250-BR834450		One rope bridge if heights permit
834.541095	250-BR834541		One rope bridge if heights permit
834.764196	250-BR834764		One rope bridge if heights permit
835.640495	250-BR835640		One rope bridge if heights permit
843.613396	250-BR843613	Namoi River	Rope bridge on both sides of river
817.258796	250-BR817258	Narrabri Creek	One rope bridge on northern side of river

TECHNICAL REPORT 1

Biodiversity development assessment report

Appendix K Biodiversity credit calculations

NARROMINE TO NARRABRI ENVIRONMENTAL IMPACT STATEMENT

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BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id 00019514/BAAS18086/20/00019515	Proposal Name Inland Rail - Narromine to Narrabri - N2N - contruction footprint	BAM data last updated * 20/08/2020
Assessor Name	Assessor Number	BAM Data version * 30
Proponent Names	Report Created 28/08/2020	BAM Case Status Finalised
Assessment Revision 3	Assessment Type Major Projects	Date Finalised 27/08/2020

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions	Endangered Ecological Community	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	Endangered Ecological Community	202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
White Box Yellow Box Blakely's Red Gum Woodland	Endangered Ecological Community	599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion

White Box Yellow Box Blakely's Red Gum Woodland	Endangered Ecological Community	435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion

Nil

Additional Information for Approval

PCTs With Customized Benchmarks

No Changes

Predicted Threatened Species Not On Site

No Changes

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	Number of credits to be retired
27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	3.1	127.00
35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion	Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions	0.6	19.00

36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion	Not a TEC	5.1	115.00
49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Not a TEC	176.1	2843.00
55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.	Not a TEC	0.2	5.00
56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW	Not a TEC	19.5	564.00
78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	Not a TEC	26.2	585.00
88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	Not a TEC	277.8	5166.00
141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion	Not a TEC	29.5	425.00
145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion	Not a TEC	54.0	645.00
148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion	Not a TEC	45.0	1697.00
168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains	Not a TEC	8.6	286.00

185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion	Not a TEC	1.4	0.00
202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion	Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	3.6	179.00
206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Not a TEC	12.7	376.00
244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).	Not a TEC	31.8	677.00
247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion	Not a TEC	6.9	234.00
248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW	Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	14.7	470.00
250-Derived tussock grassland of the central western plains and lower slopes of NSW	Not a TEC	82.8	2845.00
255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion	Not a TEC	11.8	190.00

256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion	Not a TEC	0.3	4.00
394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions	Not a TEC	69.7	1159.00
397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion	Not a TEC	15.8	303.00
398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion	Not a TEC	369.8	8444.00
399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion	Not a TEC	53.7	1105.00
404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests	Not a TEC	23.1	544.00
406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests	Not a TEC	2.3	49.00
409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion	Not a TEC	0.8	15.00

411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion	Not a TEC	8.8	327.00
414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion	Not a TEC	7.3	153.00
435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion	White Box Yellow Box Blakely's Red Gum Woodland	6.1	305.00
436-Derived Kurrajong grassy open woodland / isolated trees in the Brigalow Belt South Bioregion and Nandewar Bioregion	Not a TEC	6.0	0.00
444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion	Not a TEC	1.1	37.00
473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion	Not a TEC	15.3	318.00
589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion	Not a TEC	1.2	27.00
599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion	White Box Yellow Box Blakely's Red Gum Woodland	2.2	64.00
619-Derived Wire Grass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion	Not a TEC	326.3	4067.00

746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion	Not a TEC	2.1	36.00
1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion	Not a TEC	8.8	415.00

27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	HBT	IBRA region
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions This includes PCT's: 26, 27, 37, 43, 49, 55, 145, 159, 1766	-	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	HBT	IBRA region

	Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions This includes PCT's: 35, 56, 87, 101, 244, 445, 629	-	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Inland Riverine Forests This includes PCT's: 9, 36, 78, 112, 249, 356, 362	Inland Riverine Forests >=50% and <70%	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Semi-arid Floodplain Grasslands This includes PCT's: 43, 49, 52, 214, 242	Semi-arid Floodplain Grasslands >=50% and <70%	No	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	North-west Floodplain Woodlands This includes PCT's: 55	North-west Floodplain Woodlands >=70% and <90%	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.

56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW

Like-for-like credit retirement options

Class	Trading group	HBT	IBRA region
Floodplain Transition Woodlands This includes PCT's: 56, 74, 76, 80, 81, 82, 237, 244, 248, 251, 628	Floodplain Transition Woodlands >=70% and <90%	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion

Like-for-like credit retirement options

Class	Trading group	HBT	IBRA region

	Inland Riverine Forests This includes PCT's: 9, 36, 78, 112, 249, 356, 362	Inland Riverine Forests >=50% and <70%	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Western Peneplain Woodlands This includes PCT's: 135, 145	Western Peneplain Woodlands >=70% and <90%	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion				
148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 148, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests >=50% and <70%	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region

	Riverine Chenopod Shrublands This includes PCT's: 157, 158, 159, 163, 165, 168, 195, 196, 211, 212, 216, 236, 254, 377, 466	Riverine Chenopod Shrublands <50%	No	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Inland Rocky Hill Woodlands This includes PCT's: 104, 106, 122, 175, 176, 177, 178, 180, 184, 185, 186, 188, 218, 239, 256, 257, 258, 292, 317, 318, 319, 328, 329, 332, 334, 357, 424, 427, 439	Inland Rocky Hill Woodlands <50%	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion	**Like-for-like credit retirement options**			
	Name of offset trading group	Trading group	HBT	IBRA region
	Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions This includes PCT's: 201, 202, 1384	-	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	North-west Alluvial Sand Woodlands This includes PCT's: 71, 206, 227, 376, 428	North-west Alluvial Sand Woodlands >=50% and <70%	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion				
244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Floodplain Transition Woodlands This includes PCT's: 56, 74, 76, 80, 81, 82, 237, 244, 248, 251, 628	Floodplain Transition Woodlands >=70% and <90%	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region

	Inland Floodplain Shrublands This includes PCT's: 17, 115, 161, 241, 247, 375	Inland Floodplain Shrublands >=50% and <70%	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW	**Like-for-like credit retirement options**			
	Name of offset trading group	Trading group	HBT	IBRA region
	Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions This includes PCT's: 76, 80, 81, 82, 101, 110, 237, 248	-	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

250-Derived tussock grassland of the central western plains and lower slopes of NSW	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Western Slopes Grasslands This includes PCT's: 102, 250, 320, 460, 484, 619, 633, 710, 796, 799, 1076, 1179, 1324, 1698	Western Slopes Grasslands <50%	No	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 217, 255, 273, 287, 330, 333, 341, 343, 346, 348, 358, 403, 455, 456, 472, 577, 581, 592, 617, 673, 676, 713, 940, 956, 1277, 1279, 1313, 1316, 1381, 1610, 1661, 1668, 1709	Western Slopes Dry Sclerophyll Forests >=50% and <70%	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion	
256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion	**Like-for-like credit retirement options**

Class	Trading group	HBT	IBRA region
Inland Rocky Hill Woodlands This includes PCT's: 104, 106, 122, 175, 176, 177, 178, 180, 184, 185, 186, 188, 218, 239, 256, 257, 258, 292, 317, 318, 319, 328, 329, 332, 334, 357, 424, 427, 439	Inland Rocky Hill Woodlands <50%	No	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions	**Like-for-like credit retirement options**

Class	Trading group	HBT	IBRA region

	North-west Slopes Dry Sclerophyll Woodlands This includes PCT's: 228, 380, 381, 382, 384, 385, 386, 389, 390, 391, 393, 394, 412, 413, 418, 429, 432, 435, 453, 506, 517, 527, 529, 543, 549, 555, 562, 563, 564, 573, 587, 588, 591, 594, 595, 596, 597, 598, 856, 1165, 1306, 1308, 1317, 1387, 1560, 1586, 1587, 1605, 1606, 1607, 1611, 1613	North-west Slopes Dry Sclerophyll Woodlands <50%	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion				
398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion	
399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion	**Like-for-like credit retirement options**

Class	Trading group	HBT	IBRA region

	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests

Like-for-like credit retirement options

Class	Trading group	HBT	IBRA region
Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests

Like-for-like credit retirement options

Class	Trading group	HBT	IBRA region
Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion

Like-for-like credit retirement options

Class	Trading group	HBT	IBRA region
Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region

	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	HBT	IBRA region
White Box Yellow Box Blakely's Red Gum Woodland This includes PCT's: 2, 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 506, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 840, 847, 851, 921, 1099, 1103, 1303, 1304, 1307, 1324, 1329, 1330, 1331, 1332, 1333, 1334, 1383, 1401, 1512, 1601, 1606, 1608, 1611, 1691, 1693, 1695, 1698	-	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

436-Derived Kurrajong grassy open woodland / isolated trees in the Brigalow Belt South Bioregion and Nandewar Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Western Slopes Grassy Woodlands This includes PCT's: 201, 202, 266, 267, 268, 272, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 301, 316, 326, 337, 347, 383, 395, 421, 426, 433, 434, 436, 437, 441, 444, 451, 461, 464, 483, 509, 511, 516, 544, 589, 590, 593, 599, 711, 847, 851, 955, 1303, 1304, 1315, 1329, 1383, 1401, 1609, 1687, 1693, 1695, 1767	Western Slopes Grassy Woodlands <50%	No	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region

	Western Slopes Grassy Woodlands This includes PCT's: 201, 202, 266, 267, 274, 275, 276, 277, 278, 280, 282, 283, 286, 301, 337, 383, 426, 433, 437, 441, 444, 483, 509, 516, 589, 590, 593, 599, 847, 955, 1303, 1304, 1315, 1329, 1383, 1695	Western Slopes Grassy Woodlands >=70% and <90%	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region

	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Western Slopes Grassy Woodlands This includes PCT's: 201, 202, 266, 267, 274, 275, 276, 277, 278, 280, 282, 283, 286, 301, 337, 383, 426, 433, 437, 441, 444, 483, 509, 516, 589, 590, 593, 599, 847, 955, 1303, 1304, 1315, 1329, 1383, 1695	Western Slopes Grassy Woodlands >=70% and <90%	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion	**Like-for-like credit retirement options**			
	Name of offset trading group	Trading group	HBT	IBRA region

	White Box Yellow Box Blakely's Red Gum Woodland This includes PCT's: 2, 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 506, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 840, 847, 851, 921, 1099, 1103, 1303, 1304, 1307, 1324, 1329, 1330, 1331, 1332, 1333, 1334, 1383, 1401, 1512, 1601, 1606, 1608, 1611, 1691, 1693, 1695, 1698	-	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
619-Derived Wire Grass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region

	Western Slopes Grasslands This includes PCT's: 102, 250, 320, 460, 484, 619, 633, 710, 796, 799, 1076, 1179, 1324, 1698	Western Slopes Grasslands <50%	No	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region

	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion	Like-for-like credit retirement options			
	Class	Trading group	HBT	IBRA region
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests >=70% and <90%	Yes	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

Species	Area	Credits
Aepyprymnus rufescens / Rufous Bettong	244.4	7109.00
Bertya opponens / Coolabah Bertya	4.0	8.00
Burhinus grallarius / Bush Stone-curlew	337.3	8992.00
Calyptorhynchus lathami / Glossy Black-Cockatoo	30.6	975.00
Cercartetus nanus / Eastern Pygmy-possum	707.0	20696.00
Commersonia procumbens / Commersonia procumbens	565.1	16431.00
Diuris tricolor / Pine Donkey Orchid	630.0	13639.00

Hieraaetus morphnoides / Little Eagle	15.9	376.00
Hoplocephalus bitorquatus / Pale-headed Snake	206.7	6128.00
Lepidium aschersonii / Spiny Peppercress	10.3	259.00
Lepidium monoplocoides / Winged Peppercress	194.3	3353.00
Lophoictinia isura / Square-tailed Kite	35.1	765.00
Ninox connivens / Barking Owl	24.3	687.00
Petaurus norfolcensis / Squirrel Glider	688.3	20483.00
Phascolarctos cinereus / Koala	718.2	20562.00
Polygala linariifolia / Native Milkwort	565.9	16258.00
Pterostylis cobarensis / Greenhood Orchid	193.1	5631.00
Swainsona murrayana / Slender Darling Pea	43.6	978.00
Tylophora linearis / Tylophora linearis	582.5	16902.00
Tyto novaehollandiae / Masked Owl	7.1	189.00

Aepyprymnus rufescens/ Rufous Bettong	394_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Aepyprymnus rufescens/Rufous Bettong	Any in NSW
	398_Derived	**Like-for-like credit retirement options**	

		Spp	IBRA region
		Aepyprymnus rufescens/Rufous Bettong	Any in NSW
	398_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Aepyprymnus rufescens/Rufous Bettong	Any in NSW
	399_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Aepyprymnus rufescens/Rufous Bettong	Any in NSW
	404_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Aepyprymnus rufescens/Rufous Bettong	Any in NSW

	589_Good	**Like-for-like credit retirement options**
		Spp / IBRA region
		Aepyprymnus rufescens/Rufous Bettong / Any in NSW
Bertya opponens/ Coolabah Bertya	399_Good	**Like-for-like credit retirement options**
		Spp / IBRA region
		Bertya opponens/Coolabah Bertya / Any in NSW
Burhinus grallarius/ Bush Stone-curlew	206_Good	**Like-for-like credit retirement options**
		Spp / IBRA region
		Burhinus grallarius/Bush Stone-curlew / Any in NSW

Burhinus grallarius/ Bush Stone-curlew	248_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Burhinus grallarius/Bush Stone-curlew	Any in NSW
	35_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Burhinus grallarius/Bush Stone-curlew	Any in NSW
	394_Fire_derived	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Burhinus grallarius/Bush Stone-curlew	Any in NSW
	394_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region

		Burhinus grallarius/Bush Stone-curlew	Any in NSW
	398_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Burhinus grallarius/Bush Stone-curlew	Any in NSW
	399_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Burhinus grallarius/Bush Stone-curlew	Any in NSW
	49_Derived	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Burhinus grallarius/Bush Stone-curlew	Any in NSW

	78_Good	**Like-for-like credit retirement options**
		Spp / IBRA region
		Burhinus grallarius/Bush Stone-curlew / Any in NSW
	88_Good	**Like-for-like credit retirement options**
		Spp / IBRA region
		Burhinus grallarius/Bush Stone-curlew / Any in NSW
Calyptorhynchus lathami/ Glossy Black-Cockatoo	148_Good	**Like-for-like credit retirement options**
		Spp / IBRA region
		Calyptorhynchus lathami/Glossy Black-Cockatoo / Any in NSW
	394_Good	**Like-for-like credit retirement options**
		Spp / IBRA region

		Calyptorhynchus lathami/Glossy Black-Cockatoo	Any in NSW
	398_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Calyptorhynchus lathami/Glossy Black-Cockatoo	Any in NSW
	404_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Calyptorhynchus lathami/Glossy Black-Cockatoo	Any in NSW
Cercartetus nanus/ Eastern Pygmy-possum	1384_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Cercartetus nanus/Eastern Pygmy-possum	Any in NSW

Cercartetus nanus/ Eastern Pygmy-possum	1384_Good	
	141_Good	**Like-for-like credit retirement options**
		Spp / IBRA region
		Cercartetus nanus/Eastern Pygmy-possum / Any in NSW
	148_Good	**Like-for-like credit retirement options**
		Spp / IBRA region
		Cercartetus nanus/Eastern Pygmy-possum / Any in NSW
	256_Good	**Like-for-like credit retirement options**
		Spp / IBRA region
		Cercartetus nanus/Eastern Pygmy-possum / Any in NSW
	394_Fire_derived	**Like-for-like credit retirement options**

		Spp	IBRA region
		Cercartetus nanus/Eastern Pygmy-possum	Any in NSW
	394_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Cercartetus nanus/Eastern Pygmy-possum	Any in NSW
	397_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Cercartetus nanus/Eastern Pygmy-possum	Any in NSW
	398_Derived	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Cercartetus nanus/Eastern Pygmy-possum	Any in NSW

398_Good	**Like-for-like credit retirement options**	
	Spp	IBRA region
	Cercartetus nanus/Eastern Pygmy-possum	Any in NSW
399_Good	**Like-for-like credit retirement options**	
	Spp	IBRA region
	Cercartetus nanus/Eastern Pygmy-possum	Any in NSW
404_Good	**Like-for-like credit retirement options**	
	Spp	IBRA region
	Cercartetus nanus/Eastern Pygmy-possum	Any in NSW
409_Good	**Like-for-like credit retirement options**	

		Spp	IBRA region
		Cercartetus nanus/Eastern Pygmy-possum	Any in NSW
	411_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Cercartetus nanus/Eastern Pygmy-possum	Any in NSW
	414_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Cercartetus nanus/Eastern Pygmy-possum	Any in NSW
	473_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Cercartetus nanus/Eastern Pygmy-possum	Any in NSW

589_Good	**Like-for-like credit retirement options**	
	Spp	IBRA region
	Cercartetus nanus/Eastern Pygmy-possum	Any in NSW
78_Good	**Like-for-like credit retirement options**	
	Spp	IBRA region
	Cercartetus nanus/Eastern Pygmy-possum	Any in NSW
88_Good	**Like-for-like credit retirement options**	
	Spp	IBRA region
	Cercartetus nanus/Eastern Pygmy-possum	Any in NSW

Commersonia procumbens/ Commersonia procumbens	1384_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Commersonia procumbens/Commersonia procumbens	Any in NSW
	141_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Commersonia procumbens/Commersonia procumbens	Any in NSW
	397_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Commersonia procumbens/Commersonia procumbens	Any in NSW
	398_Derived	**Like-for-like credit retirement options**	

		Spp	IBRA region
		Commersonia procumbens/Commersonia procumbens	Any in NSW
	398_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Commersonia procumbens/Commersonia procumbens	Any in NSW
	399_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Commersonia procumbens/Commersonia procumbens	Any in NSW
	404_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region

		Commersonia procumbens/Commersonia procumbens	Any in NSW
	406_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Commersonia procumbens/Commersonia procumbens	Any in NSW
	409_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Commersonia procumbens/Commersonia procumbens	Any in NSW
	414_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region

		Commersonia procumbens/Commersonia procumbens	Any in NSW
	88_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Commersonia procumbens/Commersonia procumbens	Any in NSW
Diuris tricolor/ Pine Donkey Orchid	1384_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Diuris tricolor/Pine Donkey Orchid	Any in NSW
	255_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Diuris tricolor/Pine Donkey Orchid	Any in NSW

Diuris tricolor/ Pine Donkey Orchid	255_Good	
	397_Good	**Like-for-like credit retirement options**
		Spp / IBRA region
		Diuris tricolor/Pine Donkey Orchid / Any in NSW
	398_Derived	**Like-for-like credit retirement options**
		Spp / IBRA region
		Diuris tricolor/Pine Donkey Orchid / Any in NSW
	398_Good	**Like-for-like credit retirement options**
		Spp / IBRA region
		Diuris tricolor/Pine Donkey Orchid / Any in NSW

Diuris tricolor/ Pine Donkey Orchid	399_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Diuris tricolor/Pine Donkey Orchid	Any in NSW
	404_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Diuris tricolor/Pine Donkey Orchid	Any in NSW
	409_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Diuris tricolor/Pine Donkey Orchid	Any in NSW
	414_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region

		Diuris tricolor/Pine Donkey Orchid	Any in NSW
	473_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Diuris tricolor/Pine Donkey Orchid	Any in NSW
	746_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Diuris tricolor/Pine Donkey Orchid	Any in NSW
	88_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Diuris tricolor/Pine Donkey Orchid	Any in NSW

Hieraaetus morphnoides/ Little Eagle	202_Good	**Like-for-like credit retirement options**
		Spp: **Hieraaetus morphnoides**/Little Eagle — IBRA region: Any in NSW
	399_Good	**Like-for-like credit retirement options**
		Spp: **Hieraaetus morphnoides**/Little Eagle — IBRA region: Any in NSW
	473_Good	**Like-for-like credit retirement options**
		Spp: **Hieraaetus morphnoides**/Little Eagle — IBRA region: Any in NSW

Hieraaetus morphnoides/ Little Eagle	78_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Hieraaetus morphnoides/Little Eagle	Any in NSW
	88_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Hieraaetus morphnoides/Little Eagle	Any in NSW
Hoplocephalus bitorquatus/ Pale-headed Snake	1384_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW
	148_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region

		Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW
	35_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW
	394_Fire_derived	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW
	394_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW

397_Good	**Like-for-like credit retirement options**	
	Spp	IBRA region
	Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW
398_Derived	**Like-for-like credit retirement options**	
	Spp	IBRA region
	Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW
398_Good	**Like-for-like credit retirement options**	
	Spp	IBRA region
	Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW
399_Good	**Like-for-like credit retirement options**	
	Spp	IBRA region

		Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW
	404_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW
	411_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW
	473_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW

	589_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW
	78_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW
	88_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW
Lepidium aschersonii/ Spiny Peppercress	35_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region

		Lepidium aschersonii/Spiny Peppercress	Any in NSW
	88_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Lepidium aschersonii/Spiny Peppercress	Any in NSW
Lepidium monoplocoides/ Winged Peppercress	397_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Lepidium monoplocoides/Winged Peppercress	Any in NSW
	619_Derived	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Lepidium monoplocoides/Winged Peppercress	Any in NSW

Lepidium monoplocoides/ Winged Peppercress	619_Derived	
	78_Good	**Like-for-like credit retirement options**
		Spp / IBRA region
		Lepidium monoplocoides/Winged Peppercress / Any in NSW
Lophoictinia isura/ Square-tailed Kite	148_Good	**Like-for-like credit retirement options**
		Spp / IBRA region
		Lophoictinia isura/Square-tailed Kite / Any in NSW
	248_Good	**Like-for-like credit retirement options**
		Spp / IBRA region
		Lophoictinia isura/Square-tailed Kite / Any in NSW
	88_Good	**Like-for-like credit retirement options**

		Spp	IBRA region
		Lophoictinia isura/Square-tailed Kite	Any in NSW
Ninox connivens/ Barking Owl	248_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Ninox connivens/Barking Owl	Any in NSW
	399_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Ninox connivens/Barking Owl	Any in NSW
	411_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Ninox connivens/Barking Owl	Any in NSW

Ninox connivens/ Barking Owl	411_Good	
	473_Good	**Like-for-like credit retirement options**
		Spp: IBRA region
		Ninox connivens/Barking Owl: Any in NSW
	78_Good	**Like-for-like credit retirement options**
		Spp: IBRA region
		Ninox connivens/Barking Owl: Any in NSW
	88_Good	**Like-for-like credit retirement options**
		Spp: IBRA region
		Ninox connivens/Barking Owl: Any in NSW

Petaurus norfolcensis/ Squirrel Glider	1384_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Petaurus norfolcensis/Squirrel Glider	Any in NSW
	148_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Petaurus norfolcensis/Squirrel Glider	Any in NSW
	256_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Petaurus norfolcensis/Squirrel Glider	Any in NSW
	394_Fire_derived	**Like-for-like credit retirement options**	
		Spp	IBRA region

		Petaurus norfolcensis/Squirrel Glider	Any in NSW
	394_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Petaurus norfolcensis/Squirrel Glider	Any in NSW
	397_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Petaurus norfolcensis/Squirrel Glider	Any in NSW
	398_Derived	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Petaurus norfolcensis/Squirrel Glider	Any in NSW

398_Good	**Like-for-like credit retirement options**	
	Spp	IBRA region
	Petaurus norfolcensis/Squirrel Glider	Any in NSW
399_Good	**Like-for-like credit retirement options**	
	Spp	IBRA region
	Petaurus norfolcensis/Squirrel Glider	Any in NSW
404_Good	**Like-for-like credit retirement options**	
	Spp	IBRA region
	Petaurus norfolcensis/Squirrel Glider	Any in NSW
409_Good	**Like-for-like credit retirement options**	
	Spp	IBRA region

		Petaurus norfolcensis/Squirrel Glider	Any in NSW
	411_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Petaurus norfolcensis/Squirrel Glider	Any in NSW
	414_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Petaurus norfolcensis/Squirrel Glider	Any in NSW
	473_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Petaurus norfolcensis/Squirrel Glider	Any in NSW

589_Good	**Like-for-like credit retirement options**	
	Spp	IBRA region
	Petaurus norfolcensis/Squirrel Glider	Any in NSW
746_Good	**Like-for-like credit retirement options**	
	Spp	IBRA region
	Petaurus norfolcensis/Squirrel Glider	Any in NSW
78_Good	**Like-for-like credit retirement options**	
	Spp	IBRA region
	Petaurus norfolcensis/Squirrel Glider	Any in NSW
88_Good	**Like-for-like credit retirement options**	
	Spp	IBRA region

		Petaurus norfolcensis/Squirrel Glider	Any in NSW
Phascolarctos cinereus/ Koala	141_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Phascolarctos cinereus/Koala	Any in NSW
	148_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Phascolarctos cinereus/Koala	Any in NSW
	244_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Phascolarctos cinereus/Koala	Any in NSW

Phascolarctos cinereus/ Koala	244_Good		
	248_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Phascolarctos cinereus/Koala	Any in NSW
	255_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Phascolarctos cinereus/Koala	Any in NSW
	256_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Phascolarctos cinereus/Koala	Any in NSW
	35_Good	**Like-for-like credit retirement options**	

		Spp	IBRA region
		Phascolarctos cinereus/Koala	Any in NSW
	36_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Phascolarctos cinereus/Koala	Any in NSW
	394_Fire_derived	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Phascolarctos cinereus/Koala	Any in NSW
	394_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Phascolarctos cinereus/Koala	Any in NSW

397_Good	**Like-for-like credit retirement options**	
	Spp	IBRA region
	Phascolarctos cinereus/Koala	Any in NSW
398_Derived	**Like-for-like credit retirement options**	
	Spp	IBRA region
	Phascolarctos cinereus/Koala	Any in NSW
398_Good	**Like-for-like credit retirement options**	
	Spp	IBRA region
	Phascolarctos cinereus/Koala	Any in NSW
399_Good	**Like-for-like credit retirement options**	

		Spp	IBRA region
		Phascolarctos cinereus/Koala	Any in NSW
	404_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Phascolarctos cinereus/Koala	Any in NSW
	406_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Phascolarctos cinereus/Koala	Any in NSW
	409_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Phascolarctos cinereus/Koala	Any in NSW

411_Good	**Like-for-like credit retirement options**	
	Spp	IBRA region
	Phascolarctos cinereus/Koala	Any in NSW
414_Good	**Like-for-like credit retirement options**	
	Spp	IBRA region
	Phascolarctos cinereus/Koala	Any in NSW
435_Good	**Like-for-like credit retirement options**	
	Spp	IBRA region
	Phascolarctos cinereus/Koala	Any in NSW

	444_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Phascolarctos cinereus/Koala	Any in NSW
	473_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Phascolarctos cinereus/Koala	Any in NSW
	56_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Phascolarctos cinereus/Koala	Any in NSW
	589_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region

		Phascolarctos cinereus/Koala	Any in NSW
	599_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Phascolarctos cinereus/Koala	Any in NSW
	746_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Phascolarctos cinereus/Koala	Any in NSW
	78_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Phascolarctos cinereus/Koala	Any in NSW

	88_Good	**Like-for-like credit retirement options**
		Spp / IBRA region
		Phascolarctos cinereus/Koala / Any in NSW
Polygala linariifolia/ Native Milkwort	1384_Good	**Like-for-like credit retirement options**
		Spp / IBRA region
		Polygala linariifolia/Native Milkwort / Any in NSW
	394_Fire_derived	**Like-for-like credit retirement options**
		Spp / IBRA region
		Polygala linariifolia/Native Milkwort / Any in NSW
	394_Good	**Like-for-like credit retirement options**
		Spp / IBRA region

		Polygala linariifolia/Native Milkwort	Any in NSW
	397_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Polygala linariifolia/Native Milkwort	Any in NSW
	398_Derived	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Polygala linariifolia/Native Milkwort	Any in NSW
	398_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Polygala linariifolia/Native Milkwort	Any in NSW

399_Good	**Like-for-like credit retirement options**	
	Spp	IBRA region
	Polygala linariifolia/Native Milkwort	Any in NSW
406_Good	**Like-for-like credit retirement options**	
	Spp	IBRA region
	Polygala linariifolia/Native Milkwort	Any in NSW
409_Good	**Like-for-like credit retirement options**	
	Spp	IBRA region
	Polygala linariifolia/Native Milkwort	Any in NSW
746_Good	**Like-for-like credit retirement options**	
	Spp	IBRA region

		Polygala linariifolia/Native Milkwort	Any in NSW
	88_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Polygala linariifolia/Native Milkwort	Any in NSW
Pterostylis cobarensis/ Greenhood Orchid	1384_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Pterostylis cobarensis/Greenhood Orchid	Any in NSW
	141_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Pterostylis cobarensis/Greenhood Orchid	Any in NSW

Pterostylis cobarensis/ Greenhood Orchid	141_Good	
	148_Good	**Like-for-like credit retirement options**
		Spp / IBRA region
		Pterostylis cobarensis/Greenhood Orchid / Any in NSW
	256_Good	**Like-for-like credit retirement options**
		Spp / IBRA region
		Pterostylis cobarensis/Greenhood Orchid / Any in NSW
	397_Good	**Like-for-like credit retirement options**
		Spp / IBRA region
		Pterostylis cobarensis/Greenhood Orchid / Any in NSW
	404_Good	**Like-for-like credit retirement options**

		Spp	IBRA region
		Pterostylis cobarensis/Greenhood Orchid	Any in NSW
	406_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Pterostylis cobarensis/Greenhood Orchid	Any in NSW
	746_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Pterostylis cobarensis/Greenhood Orchid	Any in NSW
	88_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Pterostylis cobarensis/Greenhood Orchid	Any in NSW

Swainsona murrayana/ Slender Darling Pea	244_Good	**Like-for-like credit retirement options**
		Spp / IBRA region
		Swainsona murrayana/Slender Darling Pea / Any in NSW
	27_Good	**Like-for-like credit retirement options**
		Spp / IBRA region
		Swainsona murrayana/Slender Darling Pea / Any in NSW
	35_Good	**Like-for-like credit retirement options**
		Spp / IBRA region
		Swainsona murrayana/Slender Darling Pea / Any in NSW

Swainsona murrayana/ Slender Darling Pea	414_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Swainsona murrayana/Slender Darling Pea	Any in NSW
	444_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Swainsona murrayana/Slender Darling Pea	Any in NSW
	49_Derived	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Swainsona murrayana/Slender Darling Pea	Any in NSW
Tylophora linearis/ Tylophora linearis	1384_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region

		Tylophora linearis/Tylophora linearis	Any in NSW
	141_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Tylophora linearis/Tylophora linearis	Any in NSW
	397_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Tylophora linearis/Tylophora linearis	Any in NSW
	398_Derived	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Tylophora linearis/Tylophora linearis	Any in NSW

	398_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Tylophora linearis/Tylophora linearis	Any in NSW
	399_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Tylophora linearis/Tylophora linearis	Any in NSW
	404_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Tylophora linearis/Tylophora linearis	Any in NSW
	406_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region

		Tylophora linearis/Tylophora linearis	Any in NSW
	409_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Tylophora linearis/Tylophora linearis	Any in NSW
	414_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Tylophora linearis/Tylophora linearis	Any in NSW
	473_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Tylophora linearis/Tylophora linearis	Any in NSW

	746_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Tylophora linearis/Tylophora linearis	Any in NSW
	88_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Tylophora linearis/Tylophora linearis	Any in NSW
Tyto novaehollandiae/ Masked Owl	202_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Tyto novaehollandiae/Masked Owl	Any in NSW
	78_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region

		Tyto novaehollandiae/Masked Owl	Any in NSW
	88_Good	**Like-for-like credit retirement options**	
		Spp	IBRA region
		Tyto novaehollandiae/Masked Owl	Any in NSW

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00019514/BAAS18086/20/00019515	Inland Rail - Narromine to Narrabri - N2N - contruction footprint	20/08/2020
Assessor Name	**Assessor Number**	**BAM Data version ***
		30
Proponent Name(s)	**Report Created**	**BAM Case Status**
	28/08/2020	Finalised
Assessment Revision	**Assessment Type**	**Date Finalised**
3	Major Projects	27/08/2020

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions	Endangered Ecological Community	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	Endangered Ecological Community	202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
White Box Yellow Box Blakely's Red Gum Woodland	Endangered Ecological Community	599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion

White Box Yellow Box Blakely's Red Gum Woodland	Endangered Ecological Community	435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion

Nil

Additional Information for Approval

PCTs With Customized Benchmarks

No Changes

Predicted Threatened Species Not On Site

No Changes

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	Number of credits to be retired
27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	3.1	127.00
35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion	Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions	0.6	19.00

36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion	Not a TEC	5.1	115.00
49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Not a TEC	176.1	2843.00
55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.	Not a TEC	0.2	5.00
56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW	Not a TEC	19.5	564.00
78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	Not a TEC	26.2	585.00
88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	Not a TEC	277.8	5166.00
141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion	Not a TEC	29.5	425.00
145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion	Not a TEC	54.0	645.00
148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion	Not a TEC	45.0	1697.00
168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains	Not a TEC	8.6	286.00

185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion	Not a TEC	1.4	0.00
202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion	Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions	3.6	179.00
206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Not a TEC	12.7	376.00
244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).	Not a TEC	31.8	677.00
247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion	Not a TEC	6.9	234.00
248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW	Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions	14.7	470.00
250-Derived tussock grassland of the central western plains and lower slopes of NSW	Not a TEC	82.8	2845.00
255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion	Not a TEC	11.8	190.00

256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion	Not a TEC	0.3	4.00
394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions	Not a TEC	69.7	1159.00
397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion	Not a TEC	15.8	303.00
398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion	Not a TEC	369.8	8444.00
399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion	Not a TEC	53.7	1105.00
404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests	Not a TEC	23.1	544.00
406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests	Not a TEC	2.3	49.00
409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion	Not a TEC	0.8	15.00

411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion	Not a TEC	8.8	327.00
414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion	Not a TEC	7.3	153.00
435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion	White Box Yellow Box Blakely's Red Gum Woodland	6.1	305.00
436-Derived Kurrajong grassy open woodland / isolated trees in the Brigalow Belt South Bioregion and Nandewar Bioregion	Not a TEC	6.0	0.00
444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion	Not a TEC	1.1	37.00
473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion	Not a TEC	15.3	318.00
589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion	Not a TEC	1.2	27.00
599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion	White Box Yellow Box Blakely's Red Gum Woodland	2.2	64.00
619-Derived Wire Grass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion	Not a TEC	326.3	4067.00

746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion	Not a TEC	2.1	36.00
1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion	Not a TEC	8.8	415.00

27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	HBT	IBRA region
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions This includes PCT's: 26, 27, 37, 43, 49, 55, 145, 159, 1766	-	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	HBT	IBRA region
Semi-arid Woodlands (Grassy sub-formation)	Tier 3 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Name of offset trading group	Trading group	HBT	IBRA region
	Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions This includes PCT's: 35, 56, 87, 101, 244, 445, 629	-	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region
	Semi-arid Woodlands (Grassy sub-formation)	Tier 2 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region

	Inland Riverine Forests This includes PCT's: 9, 36, 78, 112, 249, 356, 362	Inland Riverine Forests >=50% and <70%	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region
	Forested Wetlands	Tier 6 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Semi-arid Floodplain Grasslands This includes PCT's: 43, 49, 52, 214, 242	Semi-arid Floodplain Grasslands >=50% and <70%	No	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	**Variation options**			
	Formation	Trading group	HBT	IBRA region
	Grasslands	Tier 6 or higher	No	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	North-west Floodplain Woodlands This includes PCT's: 55	North-west Floodplain Woodlands >=70% and <90%	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region

	Semi-arid Woodlands (Grassy sub-formation)	Tier 4 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Floodplain Transition Woodlands This includes PCT's: 56, 74, 76, 80, 81, 82, 237, 244, 248, 251, 628	Floodplain Transition Woodlands >=70% and <90%	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region
	Grassy Woodlands	Tier 4 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Inland Riverine Forests This includes PCT's: 9, 36, 78, 112, 249, 356, 362	Inland Riverine Forests >=50% and <70%	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region
	Forested Wetlands	Tier 6 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region

	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 7 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion	**Variation options**			
	Formation	Trading group	HBT	IBRA region
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 7 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Western Peneplain Woodlands This includes PCT's: 135, 145	Western Peneplain Woodlands >=70% and <90%	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region

	Semi-arid Woodlands (Shrubby sub-formation)	Tier 4 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 148, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests >=50% and <70%	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 6 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Riverine Chenopod Shrublands This includes PCT's: 157, 158, 159, 163, 165, 168, 195, 196, 211, 212, 216, 236, 254, 377, 466	Riverine Chenopod Shrublands <50%	No	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region
	Arid Shrublands (Chenopod sub-formation)	Tier 7 or higher	No	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region

	Inland Rocky Hill Woodlands This includes PCT's: 104, 106, 122, 175, 176, 177, 178, 180, 184, 185, 186, 188, 218, 239, 256, 257, 258, 292, 317, 318, 319, 328, 329, 332, 334, 357, 424, 427, 439	Inland Rocky Hill Woodlands <50%	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region
	Semi-arid Woodlands (Shrubby sub-formation)	Tier 7 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion	**Like-for-like credit retirement options**			
	Name of offset trading group	Trading group	HBT	IBRA region
	Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions This includes PCT's: 201, 202, 1384	-	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion	**Variation options**			
	Formation	Trading group	HBT	IBRA region
	Grassy Woodlands	Tier 3 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	North-west Alluvial Sand Woodlands This includes PCT's: 71, 206, 227, 376, 428	North-west Alluvial Sand Woodlands >=50% and <70%	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region

	Semi-arid Woodlands (Shrubby sub-formation)	Tier 6 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Floodplain Transition Woodlands This includes PCT's: 56, 74, 76, 80, 81, 82, 237, 244, 248, 251, 628	Floodplain Transition Woodlands >=70% and <90%	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region
	Grassy Woodlands	Tier 4 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Inland Floodplain Shrublands This includes PCT's: 17, 115, 161, 241, 247, 375	Inland Floodplain Shrublands >=50% and <70%	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region
	Freshwater Wetlands	Tier 6 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW	**Like-for-like credit retirement options**			
	Name of offset trading group	Trading group	HBT	IBRA region

	Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions This includes PCT's: 76, 80, 81, 82, 101, 110, 237, 248	-	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region
	Grassy Woodlands	Tier 3 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
250-Derived tussock grassland of the central western plains and lower slopes of NSW	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Western Slopes Grasslands This includes PCT's: 102, 250, 320, 460, 484, 619, 633, 710, 796, 799, 1076, 1179, 1324, 1698	Western Slopes Grasslands <50%	No	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

250-Derived tussock grassland of the central western plains and lower slopes of NSW	**Variation options**			
	Formation	Trading group	HBT	IBRA region
	Grasslands	Tier 7 or higher	No	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 217, 255, 273, 287, 330, 333, 341, 343, 346, 348, 358, 403, 455, 456, 472, 577, 581, 592, 617, 673, 676, 713, 940, 956, 1277, 1279, 1313, 1316, 1381, 1610, 1661, 1668, 1709	Western Slopes Dry Sclerophyll Forests >=50% and <70%	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region

	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 6 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Inland Rocky Hill Woodlands This includes PCT's: 104, 106, 122, 175, 176, 177, 178, 180, 184, 185, 186, 188, 218, 239, 256, 257, 258, 292, 317, 318, 319, 328, 329, 332, 334, 357, 424, 427, 439	Inland Rocky Hill Woodlands <50%	No	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region
	Semi-arid Woodlands (Shrubby sub-formation)	Tier 7 or higher	No	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	North-west Slopes Dry Sclerophyll Woodlands This includes PCT's: 228, 380, 381, 382, 384, 385, 386, 389, 390, 391, 393, 394, 412, 413, 418, 429, 432, 435, 453, 506, 517, 527, 529, 543, 549, 555, 562, 563, 564, 573, 587, 588, 591, 594, 595, 596, 597, 598, 856, 1165, 1306, 1308, 1317, 1387, 1560, 1586, 1587, 1605, 1606, 1607, 1611, 1613	North-west Slopes Dry Sclerophyll Woodlands <50%	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 7 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region

	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 7 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region

	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 7 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region

	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 7 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region

	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 7 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests	**Variation options**			
	Formation	Trading group	HBT	IBRA region
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 7 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region

	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 7 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 88, 141, 148, 397, 411, 702, 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests <50%	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 7 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region

	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 7 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	HBT	IBRA region
White Box Yellow Box Blakely's Red Gum Woodland This includes PCT's: 2, 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 506, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 840, 847, 851, 921, 1099, 1103, 1303, 1304, 1307, 1324, 1329, 1330, 1331, 1332, 1333, 1334, 1383, 1401, 1512, 1601, 1606, 1608, 1611, 1691, 1693, 1695, 1698	-	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Variation options

Formation	Trading group	HBT	IBRA region

	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 3 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
436-Derived Kurrajong grassy open woodland / isolated trees in the Brigalow Belt South Bioregion and Nandewar Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Western Slopes Grassy Woodlands This includes PCT's: 201, 202, 266, 267, 268, 272, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 301, 316, 326, 337, 347, 383, 395, 421, 426, 433, 434, 436, 437, 441, 444, 451, 461, 464, 483, 509, 511, 516, 544, 589, 590, 593, 599, 711, 847, 851, 955, 1303, 1304, 1315, 1329, 1383, 1401, 1609, 1687, 1693, 1695, 1767	Western Slopes Grassy Woodlands <50%	No	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region
	Grassy Woodlands	Tier 7 or higher	No	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Western Slopes Grassy Woodlands This includes PCT's: 201, 202, 266, 267, 274, 275, 276, 277, 278, 280, 282, 283, 286, 301, 337, 383, 426, 433, 437, 441, 444, 483, 509, 516, 589, 590, 593, 599, 847, 955, 1303, 1304, 1315, 1329, 1383, 1695	Western Slopes Grassy Woodlands >=70% and <90%	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region
	Grassy Woodlands	Tier 4 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region

	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 7 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Western Slopes Grassy Woodlands This includes PCT's: 201, 202, 266, 267, 274, 275, 276, 277, 278, 280, 282, 283, 286, 301, 337, 383, 426, 433, 437, 441, 444, 483, 509, 516, 589, 590, 593, 599, 847, 955, 1303, 1304, 1315, 1329, 1383, 1695	Western Slopes Grassy Woodlands >=70% and <90%	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region
	Grassy Woodlands	Tier 4 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion	**Like-for-like credit retirement options**			
	Name of offset trading group	Trading group	HBT	IBRA region

	White Box Yellow Box Blakely's Red Gum Woodland This includes PCT's: 2, 74, 75, 83, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 506, 508, 509, 510, 511, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 840, 847, 851, 921, 1099, 1103, 1303, 1304, 1307, 1324, 1329, 1330, 1331, 1332, 1333, 1334, 1383, 1401, 1512, 1601, 1606, 1608, 1611, 1691, 1693, 1695, 1698	-	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region
	Grassy Woodlands	Tier 3 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

619-Derived Wire Grass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Western Slopes Grasslands This includes PCT's: 102, 250, 320, 460, 484, 619, 633, 710, 796, 799, 1076, 1179, 1324, 1698	Western Slopes Grasslands <50%	No	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region
	Grasslands	Tier 7 or higher	No	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region

	Western Slopes Dry Sclerophyll Forests This includes PCT's: 54, 110, 179, 217, 243, 255, 270, 273, 287, 291, 309, 321, 322, 323, 324, 325, 327, 330, 331, 333, 341, 343, 346, 348, 354, 358, 379, 387, 396, 398, 399, 401, 402, 403, 404, 405, 406, 407, 408, 409, 414, 415, 417, 419, 420, 423, 425, 430, 431, 440, 443, 449, 455, 456, 457, 459, 462, 463, 467, 468, 469, 470, 471, 472, 473, 476, 477, 478, 479, 480, 482, 515, 531, 532, 576, 577, 581, 592, 610, 617, 671, 673, 676, 712, 713, 714, 746, 863, 889, 940, 956, 1133, 1176, 1277, 1278, 1279, 1307, 1313, 1314, 1316, 1381, 1398, 1610, 1629, 1654, 1655, 1656, 1657, 1660, 1661, 1663, 1668, 1669, 1671, 1672, 1674, 1676, 1677, 1678, 1679, 1680, 1709, 1711, 1770, 1771	Western Slopes Dry Sclerophyll Forests <50%	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region
	Dry Sclerophyll Forests (Shrubby sub-formation)	Tier 7 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion	**Like-for-like credit retirement options**			
	Class	Trading group	HBT	IBRA region
	Pilliga Outwash Dry Sclerophyll Forests This includes PCT's: 1090, 1384	Pilliga Outwash Dry Sclerophyll Forests >=70% and <90%	Yes	Pilliga,Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Formation	Trading group	HBT	IBRA region
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 4 or higher	Yes (including artificial)	IBRA Region: Brigalow Belt South, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

Species	Area	Credits
Aepyprymnus rufescens / Rufous Bettong	244.4	7109.00
Bertya opponens / Coolabah Bertya	4.0	8.00
Burhinus grallarius / Bush Stone-curlew	337.3	8992.00

Calyptorhynchus lathami / Glossy Black-Cockatoo	30.6	975.00
Cercartetus nanus / Eastern Pygmy-possum	707.0	20696.00
Commersonia procumbens / Commersonia procumbens	565.1	16431.00
Diuris tricolor / Pine Donkey Orchid	630.0	13639.00
Hieraaetus morphnoides / Little Eagle	15.9	376.00
Hoplocephalus bitorquatus / Pale-headed Snake	206.7	6128.00
Lepidium aschersonii / Spiny Peppercress	10.3	259.00
Lepidium monoplocoides / Winged Peppercress	194.3	3353.00
Lophoictinia isura / Square-tailed Kite	35.1	765.00
Ninox connivens / Barking Owl	24.3	687.00
Petaurus norfolcensis / Squirrel Glider	688.3	20483.00
Phascolarctos cinereus / Koala	718.2	20562.00
Polygala linariifolia / Native Milkwort	565.9	16258.00
Pterostylis cobarensis / Greenhood Orchid	193.1	5631.00
Swainsona murrayana / Slender Darling Pea	43.6	978.00
Tylophora linearis / Tylophora linearis	582.5	16902.00
Tyto novaehollandiae / Masked Owl	7.1	189.00

Aepyprymnus rufescens/ Rufous Bettong	394_Good	**Like-for-like options**	
		Spp	IBRA region
		Aepyprymnus rufescens/Rufous Bettong	Any in NSW

Aepyprymnus rufescens/ Rufous Bettong	394_Good	**Variation options**		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	398_Derived	**Like-for-like options**		
		Spp	IBRA region	
		Aepyprymnus rufescens/Rufous Bettong	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	398_Good	**Like-for-like options**		
		Spp	IBRA region	
		Aepyprymnus rufescens/Rufous Bettong	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	399_Good	**Like-for-like options**		
		Spp	IBRA region	
		Aepyprymnus rufescens/Rufous Bettong	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	404_Good	**Like-for-like options**		
		Spp	IBRA region	
		Aepyprymnus rufescens/Rufous Bettong	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	589_Good	**Like-for-like options**		
		Spp	IBRA region	
		Aepyprymnus rufescens/Rufous Bettong	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Bertya opponens/ Coolabah Bertya	399_Good	**Like-for-like options**		
		Spp	IBRA region	
		Bertya opponens/Coolabah Bertya	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Burhinus grallarius/ Bush Stone-curlew	206_Good	**Like-for-like options**		
		Spp	IBRA region	
		Burhinus grallarius/Bush Stone-curlew	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Endangered	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	248_Good	**Like-for-like options**		
		Spp	IBRA region	
		Burhinus grallarius/Bush Stone-curlew	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing	IBRA region

			under Part 4 of the BC Act shown below	
		Fauna	Endangered	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	35_Good	**Like-for-like options**		
		Spp	IBRA region	
		Burhinus grallarius/Bush Stone-curlew	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Endangered	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	394_Fire_derived	**Like-for-like options**		
		Spp	IBRA region	
		Burhinus grallarius/Bush Stone-curlew	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Endangered	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	394_Good	**Like-for-like options**		
		Spp	IBRA region	
		Burhinus grallarius/Bush Stone-curlew	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Endangered	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	398_Good	**Like-for-like options**		
		Spp	IBRA region	
		Burhinus grallarius/Bush Stone-curlew	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Fauna	Endangered	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	399_Good	**Like-for-like options**		
		Spp	IBRA region	
		Burhinus grallarius/Bush Stone-curlew	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Endangered	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	49_Derived	**Like-for-like options**		
		Spp	IBRA region	
		Burhinus grallarius/Bush Stone-curlew	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Endangered	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	78_Good	**Like-for-like options**		
		Spp	IBRA region	
		Burhinus grallarius/Bush Stone-curlew	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Endangered	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	88_Good	**Like-for-like options**		
		Spp	IBRA region	
		Burhinus grallarius/Bush Stone-curlew	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Fauna	Endangered	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Calyptorhynchus lathami/ Glossy Black-Cockatoo	148_Good	**Like-for-like options**		
		Spp	IBRA region	
		Calyptorhynchus lathami/Glossy Black-Cockatoo	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	394_Good	**Like-for-like options**		
		Spp	IBRA region	
		Calyptorhynchus lathami/Glossy Black-Cockatoo	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	398_Good	**Like-for-like options**		
		Spp	IBRA region	
		Calyptorhynchus lathami/Glossy Black-Cockatoo	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	404_Good	**Like-for-like options**		
		Spp	IBRA region	
		Calyptorhynchus lathami/Glossy Black-Cockatoo	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Cercartetus nanus/ Eastern Pygmy-possum	1384_Good	**Like-for-like options**		
		Spp	IBRA region	
		Cercartetus nanus/Eastern Pygmy-possum	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	141_Good	**Like-for-like options**		
		Spp	IBRA region	
		Cercartetus nanus/Eastern Pygmy-possum	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	148_Good	**Like-for-like options**		
		Spp	IBRA region	
		Cercartetus nanus/Eastern Pygmy-possum	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	256_Good	**Like-for-like options**		
		Spp	IBRA region	
		Cercartetus nanus/Eastern Pygmy-possum	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	394_Fire_derived	**Like-for-like options**		
		Spp	IBRA region	
		Cercartetus nanus/Eastern Pygmy-possum	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	394_Good	**Like-for-like options**		
		Spp	IBRA region	
		Cercartetus nanus/Eastern Pygmy-possum	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	397_Good	**Like-for-like options**		
		Spp		IBRA region
		Cercartetus nanus/Eastern Pygmy-possum		Any in NSW
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	398_Derived	**Like-for-like options**		
		Spp		IBRA region
		Cercartetus nanus/Eastern Pygmy-possum		Any in NSW
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	398_Good	**Like-for-like options**		
		Spp	IBRA region	
		Cercartetus nanus/Eastern Pygmy-possum	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	399_Good	**Like-for-like options**		
		Spp	IBRA region	
		Cercartetus nanus/Eastern Pygmy-possum	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	404_Good	**Like-for-like options**		
		Spp	IBRA region	
		Cercartetus nanus/Eastern Pygmy-possum	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	409_Good	**Like-for-like options**		
		Spp	IBRA region	
		Cercartetus nanus/Eastern Pygmy-possum	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	411_Good	**Like-for-like options**		
		Spp	IBRA region	
		Cercartetus nanus/Eastern Pygmy-possum	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	414_Good	**Like-for-like options**		
		Spp	IBRA region	
		Cercartetus nanus/Eastern Pygmy-possum	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	473_Good	**Like-for-like options**		
		Spp	IBRA region	
		Cercartetus nanus/Eastern Pygmy-possum	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	589_Good	**Like-for-like options**		
		Spp	IBRA region	
		Cercartetus nanus/Eastern Pygmy-possum	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	78_Good	**Like-for-like options**		
		Spp	IBRA region	
		Cercartetus nanus/Eastern Pygmy-possum	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	88_Good	**Like-for-like options**		
		Spp	IBRA region	
		Cercartetus nanus/Eastern Pygmy-possum	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Commersonia procumbens/ Commersonia procumbens	1384_Good	**Like-for-like options**		
		Spp		IBRA region
		Commersonia procumbens/Commersonia procumbens		Any in NSW
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	141_Good	**Like-for-like options**		
		Spp		IBRA region
		Commersonia procumbens/Commersonia procumbens		Any in NSW

Commersonia procumbens/ Commersonia procumbens	141_Good	**Variation options**		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	397_Good	**Like-for-like options**		
		Spp	IBRA region	
		Commersonia procumbens/Commersonia procumbens	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	398_Derived	**Like-for-like options**		
		Spp	IBRA region	
		Commersonia procumbens/Commersonia procumbens	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	398_Good	**Like-for-like options**		
		Spp		IBRA region
		Commersonia procumbens/Commersonia procumbens		Any in NSW
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	399_Good	**Like-for-like options**		
		Spp		IBRA region
		Commersonia procumbens/Commersonia procumbens		Any in NSW
		Variation options		
		Kingdom	Any species with same or higher category of listing	IBRA region

			under Part 4 of the BC Act shown below	
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	404_Good	**Like-for-like options**		
		Spp	IBRA region	
		Commersonia procumbens/Commersonia procumbens	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	406_Good	**Like-for-like options**		
		Spp	IBRA region	
		Commersonia procumbens/Commersonia procumbens	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	409_Good	**Like-for-like options**		
		Spp		IBRA region
		Commersonia procumbens/Commersonia procumbens		Any in NSW
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	414_Good	**Like-for-like options**		
		Spp		IBRA region
		Commersonia procumbens/Commersonia procumbens		Any in NSW
		Variation options		
		Kingdom	Any species with same or higher category of listing	IBRA region

			under Part 4 of the BC Act shown below	
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	88_Good	**Like-for-like options**		
		Spp	IBRA region	
		Commersonia procumbens/Commersonia procumbens	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Diuris tricolor/ Pine Donkey Orchid	1384_Good	**Like-for-like options**		
		Spp	IBRA region	
		Diuris tricolor/Pine Donkey Orchid	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Diuris tricolor/ Pine Donkey Orchid	255_Good	**Like-for-like options**		
		Spp	IBRA region	
		Diuris tricolor/Pine Donkey Orchid	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	397_Good	**Like-for-like options**		
		Spp	IBRA region	
		Diuris tricolor/Pine Donkey Orchid	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	398_Derived	**Like-for-like options**		
		Spp	IBRA region	
		Diuris tricolor/Pine Donkey Orchid	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	398_Good	**Like-for-like options**		
		Spp	IBRA region	
		Diuris tricolor/Pine Donkey Orchid	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	399_Good	**Like-for-like options**		
		Spp	IBRA region	
		Diuris tricolor/Pine Donkey Orchid	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	404_Good	**Like-for-like options**		
		Spp	IBRA region	
		Diuris tricolor/Pine Donkey Orchid	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	409_Good	**Like-for-like options**		
		Spp	IBRA region	
		Diuris tricolor/Pine Donkey Orchid	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	414_Good	**Like-for-like options**		
		Spp	IBRA region	
		Diuris tricolor/Pine Donkey Orchid	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	473_Good	**Like-for-like options**		
		Spp	IBRA region	
		Diuris tricolor/Pine Donkey Orchid	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	746_Good	**Like-for-like options**		
		Spp	IBRA region	
		Diuris tricolor/Pine Donkey Orchid	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	88_Good	**Like-for-like options**		
		Spp	IBRA region	
		Diuris tricolor/Pine Donkey Orchid	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Hieraaetus morphnoides/ Little Eagle	202_Good	**Like-for-like options**		
		Spp	IBRA region	
		Hieraaetus morphnoides/Little Eagle	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Hieraaetus morphnoides/ Little Eagle	399_Good	**Like-for-like options**		
		Spp	IBRA region	
		Hieraaetus morphnoides/Little Eagle	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	473_Good	**Like-for-like options**		
		Spp	IBRA region	
		Hieraaetus morphnoides/Little Eagle	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	78_Good	**Like-for-like options**		
		Spp	IBRA region	
		Hieraaetus morphnoides/Little Eagle	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	88_Good	**Like-for-like options**		
		Spp	IBRA region	
		Hieraaetus morphnoides/Little Eagle	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Hoplocephalus bitorquatus/ Pale-headed Snake	1384_Good	**Like-for-like options**		
		Spp	IBRA region	
		Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	148_Good	**Like-for-like options**		
		Spp	IBRA region	
		Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW	
		Variation options		
		Kingdom	Any species with same or	IBRA region

			higher category of listing under Part 4 of the BC Act shown below	
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	35_Good	**Like-for-like options**		
		Spp	IBRA region	
		Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	394_Fire_derived	**Like-for-like options**		
		Spp	IBRA region	
		Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	394_Good	**Like-for-like options**		
		Spp	IBRA region	
		Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	397_Good	**Like-for-like options**		
		Spp	IBRA region	
		Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	398_Derived	**Like-for-like options**		
		Spp	IBRA region	
		Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	398_Good	**Like-for-like options**		
		Spp	IBRA region	
		Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	399_Good	**Like-for-like options**		
		Spp	IBRA region	
		Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	404_Good	**Like-for-like options**		
		Spp	IBRA region	
		Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	411_Good	**Like-for-like options**		
		Spp	IBRA region	
		Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	473_Good	**Like-for-like options**		
		Spp	IBRA region	
		Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	589_Good	**Like-for-like options**		
		Spp	IBRA region	
		Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	78_Good	**Like-for-like options**		
		Spp	IBRA region	
		Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	88_Good	**Like-for-like options**		
		Spp	IBRA region	
		Hoplocephalus bitorquatus/Pale-headed Snake	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Lepidium aschersonii/ Spiny Peppercress	35_Good	**Like-for-like options**		
		Spp	IBRA region	
		Lepidium aschersonii/Spiny Peppercress	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Lepidium aschersonii/ Spiny Peppercress	88_Good	**Like-for-like options**		
		Spp	IBRA region	
		Lepidium aschersonii/Spiny Peppercress	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Lepidium monoplocoides/ Winged Peppercress	397_Good	**Like-for-like options**		
		Spp	IBRA region	
		Lepidium monoplocoides/Winged Peppercress	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Flora		Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	619_Derived	**Like-for-like options**		
		Spp	IBRA region	
		Lepidium monoplocoides/Winged Peppercress	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Flora		Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	78_Good	**Like-for-like options**		
		Spp	IBRA region	
		Lepidium monoplocoides/Winged Peppercress	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora		Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Lophoictinia isura/ Square-tailed Kite	148_Good	**Like-for-like options**		
		Spp	IBRA region	
		Lophoictinia isura/Square-tailed Kite	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	248_Good	**Like-for-like options**		
		Spp	IBRA region	
		Lophoictinia isura/Square-tailed Kite	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing	IBRA region

			under Part 4 of the BC Act shown below	
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	88_Good	**Like-for-like options**		
		Spp	IBRA region	
		Lophoictinia isura/Square-tailed Kite	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Ninox connivens/ Barking Owl	248_Good	**Like-for-like options**		
		Spp	IBRA region	
		Ninox connivens/Barking Owl	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Ninox connivens/ Barking Owl	399_Good	**Like-for-like options**		
		Spp	IBRA region	
		Ninox connivens/Barking Owl	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	411_Good	**Like-for-like options**		
		Spp	IBRA region	
		Ninox connivens/Barking Owl	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	473_Good	**Like-for-like options**		
		Spp	IBRA region	
		Ninox connivens/Barking Owl	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	78_Good	**Like-for-like options**		
		Spp	IBRA region	
		Ninox connivens/Barking Owl	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	88_Good	**Like-for-like options**		
		Spp	IBRA region	
		Ninox connivens/Barking Owl	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Petaurus norfolcensis/ Squirrel Glider	1384_Good	**Like-for-like options**		
		Spp	IBRA region	
		Petaurus norfolcensis/Squirrel Glider	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	148_Good	**Like-for-like options**		
		Spp	IBRA region	
		Petaurus norfolcensis/Squirrel Glider	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	256_Good	**Like-for-like options**		
		Spp	IBRA region	
		Petaurus norfolcensis/Squirrel Glider	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	394_Fire_derived	**Like-for-like options**		
		Spp	IBRA region	
		Petaurus norfolcensis/Squirrel Glider	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	394_Good	**Like-for-like options**		
		Spp	IBRA region	
		Petaurus norfolcensis/Squirrel Glider	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	397_Good	**Like-for-like options**		
		Spp	IBRA region	
		Petaurus norfolcensis/Squirrel Glider	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	398_Derived	**Like-for-like options**		
		Spp	IBRA region	
		Petaurus norfolcensis/Squirrel Glider	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	398_Good	**Like-for-like options**		
		Spp	IBRA region	
		Petaurus norfolcensis/Squirrel Glider	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	399_Good	**Like-for-like options**		
		Spp	IBRA region	
		Petaurus norfolcensis/Squirrel Glider	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	404_Good	**Like-for-like options**		
		Spp	IBRA region	
		Petaurus norfolcensis/Squirrel Glider	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	409_Good	**Like-for-like options**		
		Spp	IBRA region	
		Petaurus norfolcensis/Squirrel Glider	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	411_Good	**Like-for-like options**		
		Spp	IBRA region	
		Petaurus norfolcensis/Squirrel Glider	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	414_Good	**Like-for-like options**		
		Spp	IBRA region	
		Petaurus norfolcensis/Squirrel Glider	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	473_Good	**Like-for-like options**		
		Spp	IBRA region	
		Petaurus norfolcensis/Squirrel Glider	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	589_Good	**Like-for-like options**		
		Spp	IBRA region	
		Petaurus norfolcensis/Squirrel Glider	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	746_Good	**Like-for-like options**		
		Spp	IBRA region	
		Petaurus norfolcensis/Squirrel Glider	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	78_Good	**Like-for-like options**		
		Spp	IBRA region	
		Petaurus norfolcensis/Squirrel Glider	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	88_Good	**Like-for-like options**		
		Spp	IBRA region	
		Petaurus norfolcensis/Squirrel Glider	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Phascolarctos cinereus/ Koala	141_Good	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Phascolarctos cinereus/ Koala	148_Good	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	244_Good	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	248_Good	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	255_Good	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	256_Good	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	35_Good	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	36_Good	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	394_Fire_derived	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	394_Good	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	397_Good	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	398_Derived	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	398_Good	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	399_Good	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	404_Good	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	406_Good	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	409_Good	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	411_Good	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	414_Good	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	435_Good	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	444_Good	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	473_Good	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	56_Good	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	589_Good	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	599_Good	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	746_Good	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	78_Good	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	88_Good	**Like-for-like options**		
		Spp	IBRA region	
		Phascolarctos cinereus/Koala	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Polygala linariifolia/ Native Milkwort	1384_Good	**Like-for-like options**		
		Spp	IBRA region	
		Polygala linariifolia/Native Milkwort	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Endangered	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Polygala linariifolia/ Native Milkwort	394_Fire_derived	**Like-for-like options**		
		Spp	IBRA region	
		Polygala linariifolia/Native Milkwort	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Endangered	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	394_Good	**Like-for-like options**		
		Spp	IBRA region	
		Polygala linariifolia/Native Milkwort	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Flora	Endangered	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	397_Good	**Like-for-like options**		
		Spp	IBRA region	
		Polygala linariifolia/Native Milkwort	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Flora	Endangered	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	398_Derived	**Like-for-like options**		
		Spp	IBRA region	
		Polygala linariifolia/Native Milkwort	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Endangered	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	398_Good	**Like-for-like options**		
		Spp	IBRA region	
		Polygala linariifolia/Native Milkwort	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Endangered	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	399_Good	**Like-for-like options**		
		Spp	IBRA region	
		Polygala linariifolia/Native Milkwort	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Flora	Endangered	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	406_Good	**Like-for-like options**		
		Spp	IBRA region	
		Polygala linariifolia/Native Milkwort	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Flora	Endangered	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	409_Good	**Like-for-like options**		
		Spp	IBRA region	
		Polygala linariifolia/Native Milkwort	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Endangered	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	746_Good	**Like-for-like options**		
		Spp	IBRA region	
		Polygala linariifolia/Native Milkwort	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Endangered	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	88_Good	**Like-for-like options**		
		Spp	IBRA region	
		Polygala linariifolia/Native Milkwort	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Flora	Endangered	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Pterostylis cobarensis/ Greenhood Orchid	1384_Good	**Like-for-like options**		
		Spp	IBRA region	
		Pterostylis cobarensis/Greenhood Orchid	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	141_Good	**Like-for-like options**		
		Spp	IBRA region	
		Pterostylis cobarensis/Greenhood Orchid	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	148_Good	**Like-for-like options**		
		Spp	IBRA region	
		Pterostylis cobarensis/Greenhood Orchid	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	256_Good	**Like-for-like options**		
		Spp	IBRA region	
		Pterostylis cobarensis/Greenhood Orchid	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	397_Good	**Like-for-like options**		
		Spp	IBRA region	
		Pterostylis cobarensis/Greenhood Orchid	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	404_Good	**Like-for-like options**		
		Spp	IBRA region	
		Pterostylis cobarensis/Greenhood Orchid	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	406_Good	**Like-for-like options**		
		Spp	IBRA region	
		Pterostylis cobarensis/Greenhood Orchid	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	746_Good	**Like-for-like options**		
		Spp	IBRA region	
		Pterostylis cobarensis/Greenhood Orchid	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	88_Good	**Like-for-like options**		
		Spp	IBRA region	
		Pterostylis cobarensis/Greenhood Orchid	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Swainsona murrayana/ Slender Darling Pea	244_Good	**Like-for-like options**		
		Spp	IBRA region	
		Swainsona murrayana/Slender Darling Pea	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Swainsona murrayana/ Slender Darling Pea	27_Good	**Like-for-like options**		
		Spp	IBRA region	
		Swainsona murrayana/Slender Darling Pea	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	35_Good	**Like-for-like options**		
		Spp	IBRA region	
		Swainsona murrayana/Slender Darling Pea	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	414_Good	**Like-for-like options**		
		Spp	IBRA region	
		Swainsona murrayana/Slender Darling Pea	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	444_Good	**Like-for-like options**		
		Spp	IBRA region	
		Swainsona murrayana/Slender Darling Pea	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	49_Derived	**Like-for-like options**		
		Spp	IBRA region	
		Swainsona murrayana/Slender Darling Pea	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Tylophora linearis/ Tylophora linearis	1384_Good	**Like-for-like options**		
		Spp	IBRA region	
		Tylophora linearis/Tylophora linearis	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	141_Good	**Like-for-like options**		
		Spp	IBRA region	
		Tylophora linearis/Tylophora linearis	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	397_Good	**Like-for-like options**		
		Spp	IBRA region	
		Tylophora linearis/Tylophora linearis	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	398_Derived	**Like-for-like options**		
		Spp	IBRA region	
		Tylophora linearis/Tylophora linearis	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	398_Good	**Like-for-like options**		
		Spp	IBRA region	
		Tylophora linearis/Tylophora linearis	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	399_Good	**Like-for-like options**		
		Spp	IBRA region	
		Tylophora linearis/Tylophora linearis	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	404_Good	**Like-for-like options**		
		Spp	IBRA region	
		Tylophora linearis/Tylophora linearis	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	406_Good	**Like-for-like options**		
		Spp	IBRA region	
		Tylophora linearis/Tylophora linearis	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	409_Good	**Like-for-like options**		
		Spp	IBRA region	
		Tylophora linearis/Tylophora linearis	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	414_Good	**Like-for-like options**		
		Spp	IBRA region	
		Tylophora linearis/Tylophora linearis	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	473_Good	**Like-for-like options**		
		Spp	IBRA region	
		Tylophora linearis/Tylophora linearis	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	746_Good	**Like-for-like options**		
		Spp	IBRA region	
		Tylophora linearis/Tylophora linearis	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	88_Good	**Like-for-like options**		
		Spp	IBRA region	
		Tylophora linearis/Tylophora linearis	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act	IBRA region

			shown below	
		Flora	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Tyto novaehollandiae/ Masked Owl	202_Good	**Like-for-like options**		
		Spp	IBRA region	
		Tyto novaehollandiae/Masked Owl	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	78_Good	**Like-for-like options**		
		Spp	IBRA region	
		Tyto novaehollandiae/Masked Owl	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	88_Good	**Like-for-like options**		
		Spp	IBRA region	
		Tyto novaehollandiae/Masked Owl	Any in NSW	
		Variation options		
		Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
		Fauna	Vulnerable	Pilliga, Bogan-Macquarie, Castlereagh-Barwon, Inland Slopes, Kerrabee, Liverpool Plains, Liverpool Range, Pilliga Outwash and Talbragar Valley. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Candidate Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00019514/BAAS18086/20/00019515	Inland Rail - Narromine to Narrabri - N2N - contruction footprint	20/08/2020
Assessor Name	**Report Created**	**BAM Data version ***
	28/08/2020	30
Assessor Number	**Assessment Type**	**BAM Case Status**
	Major Projects	Finalised
	Assessment Revision	**Date Finalised**
	3	27/08/2020

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

List of Species Requiring Survey

Name	Presence	Survey Months
Ardeotis australis Australian Bustard	No (surveyed)	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Burhinus grallarius Bush Stone-curlew	Yes (assumed present)	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Hoplocephalus bitorquatus Pale-headed Snake	Yes (surveyed)	Jan Feb Mar Nov Dec
Lophoictinia isura Square-tailed Kite	Yes (assumed present)	Jan Sep Oct Nov Dec
Ninox connivens Barking Owl	Yes (assumed present)	May Jun Jul Aug Sep Oct Nov Dec

Swainsona murrayana Slender Darling Pea	Yes (assumed present)	Jan Feb Mar Apr May Jun Jul Aug **Sep** Oct Nov Dec
Tyto novaehollandiae Masked Owl	Yes (assumed present)	Jan Feb Mar Apr **May** **Jun** **Jul** **Aug** Sep Oct Nov Dec
Hieraaetus morphnoides Little Eagle	Yes (assumed present)	Jan Feb Mar Apr May Jun Jul **Aug** **Sep** **Oct** Nov Dec
Haliaeetus leucogaster White-bellied Sea-Eagle	No (surveyed)	Jan Feb Mar Apr May Jun **Jul** **Aug** **Sep** **Oct** **Nov** **Dec**
Aepyprymnus rufescens Rufous Bettong	Yes (assumed present)	**Jan** **Feb** **Mar** **Apr** **May** **Jun** **Jul** **Aug** **Sep** **Oct** **Nov** **Dec**
Aprasia parapulchella Pink-tailed Legless Lizard	No (surveyed)	Jan Feb Mar Apr May Jun Jul Aug **Sep** **Oct** **Nov** Dec
Bertya opponens Coolabah Bertya	Yes (assumed present)	**Jan** **Feb** **Mar** **Apr** **May** **Jun** **Jul** **Aug** **Sep** **Oct** **Nov** **Dec**
Diuris tricolor Pine Donkey Orchid	Yes (assumed present)	Jan Feb Mar Apr May Jun Jul Aug **Sep** **Oct** Nov Dec
Calyptorhynchus lathami Glossy Black-Cockatoo	Yes (surveyed)	Jan Feb Mar **Apr** **May** **Jun** **Jul** **Aug** Sep Oct Nov Dec
Cercartetus nanus Eastern Pygmy-possum	Yes (assumed present)	**Jan** **Feb** **Mar** Apr May Jun Jul Aug Sep **Oct** **Nov** **Dec**
Lepidium aschersonii Spiny Peppercress	Yes (assumed present)	**Jan** **Feb** **Mar** **Apr** May Jun Jul Aug Sep Oct **Nov** **Dec**

Petaurus norfolcensis Squirrel Glider	Yes (surveyed)	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Phascolarctos cinereus Koala	Yes (surveyed)	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Polygala linariifolia Native Milkwort	Yes (assumed present)	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Pterostylis cobarensis Greenhood Orchid	Yes (surveyed) *Survey months are outside of the months specified in Bionet.	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Commersonia procumbens Commersonia procumbens	Yes (assumed present)	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Tylophora linearis Tylophora linearis	Yes (assumed present)	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Lepidium monoplocoides Winged Peppercress	Yes (assumed present)	Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

List of Species Not On Site

Name
Lophochroa leadbeateri Major Mitchell's Cockatoo
Dichanthium setosum Bluegrass
Digitaria porrecta Finger Panic Grass
Polytelis swainsonii Superb Parrot
Swainsona sericea Silky Swainson-pea
Chalinolobus dwyeri Large-eared Pied Bat
Hamirostra melanosternon Black-breasted Buzzard
Homoranthus darwinioides Homoranthus darwinioides

Indigofera efoliata Leafless Indigo
Lathamus discolor Swift Parrot
Miniopterus orianae oceanensis Large Bent-winged Bat
Monotaxis macrophylla Large-leafed Monotaxis
Ninox strenua Powerful Owl
Petrogale penicillata Brush-tailed Rock-wallaby
Pomaderris queenslandica Scant Pomaderris
Pteropus poliocephalus Grey-headed Flying-fox
Thesium australe Austral Toadflax
Vespadelus troughtoni Eastern Cave Bat
Anthochaera phrygia Regent Honeyeater
Zieria ingramii Keith's Zieria
Crinia sloanei Sloane's Froglet

BAM Credit Summary Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00019514/BAAS18086/20/00019515	Inland Rail - Narromine to Narrabri - N2N - contruction footprint	20/08/2020
Assessor Name	**Report Created**	**BAM Data version ***
	28/08/2020	30
Assessor Number	**BAM Case Status**	**Date Finalised**
	Finalised	27/08/2020
Assessment Revision	**Assessment Type**	
3	Major Projects	

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	Vegetation integrity loss / gain	Area (ha)	Constant	Species sensitivity to gain class (for BRW)	Biodiversity risk weighting	Potential SAII	Ecosystem credits

Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.								
5	55_Good	44.7	0.2	0.25	High Sensitivity to Potential Gain	2.00		5
							Subtotal	**5**
Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion								
39	599_Good	58.1	2.2	0.25	High Sensitivity to Potential Gain	2.00	TRUE	64
							Subtotal	**64**
Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion								
2	35_Good	61.1	0.6	0.25	High Sensitivity to Potential Gain	2.00	TRUE	19
							Subtotal	**19**
Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion								
10	141_Good	38.5	29.5	0.25	High Sensitivity to Potential Gain	1.50		425
							Subtotal	**425**
Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion								
41	746_Good	45.6	2.1	0.25	High Sensitivity to Potential Gain	1.50		36
							Subtotal	**36**
Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion								
32	411_Good	99.7	8.8	0.25	High Sensitivity to Potential Gain	1.50		327
							Subtotal	**327**

Derived Copperburr shrubland of the NSW northern inland alluvial floodplains								
13	168_Derived	88.9	8.6	0.25	High Sensitivity to Potential Gain	1.50		286
							Subtotal	**286**
Derived Kurrajong grassy open woodland / isolated trees in the Brigalow Belt South Bioregion and Nandewar Bioregion								
35	436_Degraded	12.0	6.0	0.25	High Sensitivity to Potential Gain	1.50		0
							Subtotal	**0**
Derived tussock grassland of the central western plains and lower slopes of NSW								
20	250_Derived	91.6	82.8	0.25	High Sensitivity to Potential Gain	1.50		2845
							Subtotal	**2845**
Derived Wire Grass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion								
40	619_Derived	33.2	326.3	0.25	High Sensitivity to Potential Gain	1.50		4067
							Subtotal	**4067**
Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion								
31	409_Good	47.2	0.8	0.25	High Sensitivity to Potential Gain	1.50		15
							Subtotal	**15**
Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion								
12	148_Good	86.1	45.0	0.25	High Sensitivity to Potential Gain	1.75		1697
							Subtotal	**1697**

Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion								
16	206_Good	67.9	12.7	0.25	High Sensitivity to Potential Gain	1.75		376
							Subtotal	**376**
Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion								
14	185_Moderate	10.7	1.4	0.25	High Sensitivity to Potential Gain	1.50		0
							Subtotal	**0**
Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion								
15	202_Good	99.5	3.6	0.25	High Sensitivity to Potential Gain	2.00	TRUE	179
							Subtotal	**179**
Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion								
22	256_Good	41.3	0.3	0.25	High Sensitivity to Potential Gain	1.50		4
							Subtotal	**4**
Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion								
18	247_Good	77.3	6.9	0.25	High Sensitivity to Potential Gain	1.75		234
							Subtotal	**234**
Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW								
19	248_Good	64.0	14.7	0.25	High Sensitivity to Potential Gain	2.00		470
							Subtotal	**470**

Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion								
21	255_Good	36.8	11.8	0.25	High Sensitivity to Potential Gain	1.75		190
							Subtotal	**190**
Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion								
26	398_Derived	49.3	8.5	0.25	High Sensitivity to Potential Gain	1.50		157
27	398_Good	61.2	361.3	0.25	High Sensitivity to Potential Gain	1.50		8287
							Subtotal	**8444**
Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions								
23	394_Fire_derived	24.6	10.9	0.25	High Sensitivity to Potential Gain	1.50		100
24	394_Good	48.0	58.8	0.25	High Sensitivity to Potential Gain	1.50		1059
							Subtotal	**1159**
Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion								
4	49_Derived	36.9	176.1	0.25	High Sensitivity to Potential Gain	1.75		2843
							Subtotal	**2843**
Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion								
8	88_Good	49.5	276.1	0.25	High Sensitivity to Potential Gain	1.50		5130
9	88_Degraded	57.5	1.7	0.25	High Sensitivity to Potential Gain	1.50		36
							Subtotal	**5166**

Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW							
6	56_Good	57.8	19.5	0.25	High Sensitivity to Potential Gain	2.00	564
						Subtotal	**564**
Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion							
25	397_Good	51.2	15.8	0.25	High Sensitivity to Potential Gain	1.50	303
						Subtotal	**303**
Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).							
17	244_Good	42.5	31.8	0.25	High Sensitivity to Potential Gain	2.00	677
						Subtotal	**677**
Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion							
37	473_Good	55.5	15.3	0.25	High Sensitivity to Potential Gain	1.50	318
						Subtotal	**318**
Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion							
28	399_Good	54.9	53.7	0.25	High Sensitivity to Potential Gain	1.50	1105
						Subtotal	**1105**
Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests							
29	404_Good	62.9	23.1	0.25	High Sensitivity to Potential Gain	1.50	544
						Subtotal	**544**

River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion								
7	78_Good	50.9	26.2	0.25	High Sensitivity to Potential Gain	1.75		585
							Subtotal	**585**
River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion								
3	36_Good	51.9	5.1	0.25	High Sensitivity to Potential Gain	1.75		115
							Subtotal	**115**
Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion								
36	444_Good	66.6	1.1	0.25	High Sensitivity to Potential Gain	2.00		37
							Subtotal	**37**
Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion								
1	27_Good	83.5	3.1	0.25	High Sensitivity to Potential Gain	2.00		127
							Subtotal	**127**
Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion								
11	145_Good	23.9	54.0	0.25	High Sensitivity to Potential Gain	2.00		645
							Subtotal	**645**
White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests								
30	406_Good	57.0	2.3	0.25	High Sensitivity to Potential Gain	1.50		49
							Subtotal	**49**

White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion								
38	589_Good	44.0	1.2	0.25	High Sensitivity to Potential Gain	2.00		27
							Subtotal	**27**
White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion								
34	435_Good	100.0	6.1	0.25	High Sensitivity to Potential Gain	2.00	TRUE	305
							Subtotal	**305**
White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion								
42	1384_Good	94.6	8.8	0.25	High Sensitivity to Potential Gain	2.00		415
							Subtotal	**415**
White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion								
33	414_Good	55.9	7.3	0.25	High Sensitivity to Potential Gain	1.50		153
							Subtotal	**153**
							Total	**34820**

Species credits for threatened species

Vegetation zone name	Habitat condition (HC)	Area (ha) / individual (HL)	Constant	Biodiversity risk weighting	Potential SAII	Species credits
Aepyprymnus rufescens / Rufous Bettong (Fauna)						
394_Good	48.0	36.09	0.25	2	False	867
398_Derived	49.3	8.5	0.25	2	False	209
398_Good	61.2	156.34	0.25	2	False	4781
399_Good	54.9	27.29	0.25	2	False	749

404_Good	62.9	15.63	0.25	2	False	492
589_Good	44.0	0.5	0.25	2	False	11
					Subtotal	**7109**
Bertya opponens / Coolabah Bertya (Flora)						
399_Good	N/A	4	0.25	2	False	8
					Subtotal	**8**
Burhinus grallarius / Bush Stone-curlew (Fauna)						
35_Good	61.1	0.61	0.25	2	False	19
49_Derived	36.9	61.46	0.25	2	False	1134
78_Good	50.9	8.56	0.25	2	False	218
88_Good	49.5	35.12	0.25	2	False	870
206_Good	67.9	10.14	0.25	2	False	344
248_Good	64.0	0.74	0.25	2	False	24
394_Fire_derived	24.6	10.87	0.25	2	False	133
394_Good	48.0	17.54	0.25	2	False	421
398_Good	61.2	176.33	0.25	2	False	5393
399_Good	54.9	15.91	0.25	2	False	436
					Subtotal	**8992**
Calyptorhynchus lathami / Glossy Black-Cockatoo (Fauna)						
148_Good	86.1	3.75	0.25	2	False	162
394_Good	48.0	1	0.25	2	False	24

398_Good	61.2	25.74	0.25	2	False	787
404_Good	62.9	0.06	0.25	2	False	2
					Subtotal	**975**
Cercartetus nanus / Eastern Pygmy-possum (Fauna)						
141_Good	38.5	29.47	0.25	2	False	567
256_Good	41.3	0.27	0.25	2	False	6
409_Good	47.2	0.82	0.25	2	False	19
473_Good	55.5	15.26	0.25	2	False	424
78_Good	50.9	9.33	0.25	2	False	238
88_Good	49.5	77.08	0.25	2	False	1909
148_Good	86.1	34.96	0.25	2	False	1506
394_Fire_derived	24.6	10.87	0.25	2	False	133
394_Good	48.0	47.57	0.25	2	False	1143
397_Good	51.2	13.48	0.25	2	False	345
398_Derived	49.3	8.5	0.25	2	False	209
398_Good	61.2	358.88	0.25	2	False	10975
399_Good	54.9	52.09	0.25	2	False	1429
404_Good	62.9	23.05	0.25	2	False	725
411_Good	99.7	8.76	0.25	2	False	437
414_Good	55.9	7.32	0.25	2	False	205
589_Good	44.0	0.5	0.25	2	False	11

1384_Good	94.6	8.77	0.25	2	False	415
					Subtotal	**20696**
Commersonia procumbens / Commersonia procumbens (Flora)						
141_Good	38.5	29.47	0.25	2	False	567
409_Good	47.2	0.82	0.25	2	False	19
88_Good	49.5	68.66	0.25	2	False	1701
397_Good	51.2	13.48	0.25	2	False	345
398_Derived	49.3	8.5	0.25	2	False	209
398_Good	61.2	358.88	0.25	2	False	10975
399_Good	54.9	43.89	0.25	2	False	1204
404_Good	62.9	23.05	0.25	2	False	725
406_Good	57.0	2.3	0.25	2	False	66
414_Good	55.9	7.32	0.25	2	False	205
1384_Good	94.6	8.77	0.25	2	False	415
					Subtotal	**16431**
Diuris tricolor / Pine Donkey Orchid (Flora)						
409_Good	47.2	0.82	0.25	1.5	False	15
473_Good	55.5	15.25	0.25	1.5	False	318
88_Good	49.5	140.22	0.25	1.5	False	2605
255_Good	36.8	7.69	0.25	1.5	False	106

397_Good	51.2	13.48	0.25	1.5	False	259
398_Derived	49.3	8.5	0.25	1.5	False	157
398_Good	61.2	358.88	0.25	1.5	False	8232
399_Good	54.9	43.89	0.25	1.5	False	903
404_Good	62.9	23.05	0.25	1.5	False	544
414_Good	55.9	7.32	0.25	1.5	False	153
746_Good	45.6	2.12	0.25	1.5	False	36
1384_Good	94.6	8.77	0.25	1.5	False	311
					Subtotal	**13639**
Hieraaetus morphnoides / Little Eagle (Fauna)						
202_Good	99.5	3.46	0.25	1.5	False	129
473_Good	55.5	4.08	0.25	1.5	False	85
78_Good	50.9	4.51	0.25	1.5	False	86
88_Good	49.5	1.78	0.25	1.5	False	33
399_Good	54.9	2.07	0.25	1.5	False	43
					Subtotal	**376**
Hoplocephalus bitorquatus / Pale-headed Snake (Fauna)						
473_Good	55.5	3.75	0.25	2	False	104
35_Good	61.1	0.27	0.25	2	False	8
78_Good	50.9	11.78	0.25	2	False	300
88_Good	49.5	5.48	0.25	2	False	136

148_Good	86.1	10.4	0.25	2	False	448
394_Fire_derived	24.6	1.19	0.25	2	False	15
394_Good	48.0	18	0.25	2	False	432
397_Good	51.2	6.17	0.25	2	False	158
398_Derived	49.3	0.46	0.25	2	False	11
398_Good	61.2	88.57	0.25	2	False	2709
399_Good	54.9	52.09	0.25	2	False	1429
404_Good	62.9	1.61	0.25	2	False	51
411_Good	99.7	4.96	0.25	2	False	247
589_Good	44.0	0.5	0.25	2	False	11
1384_Good	94.6	1.46	0.25	2	False	69
					Subtotal	**6128**
Lepidium aschersonii / Spiny Peppercress (Flora)						
35_Good	61.1	0.61	0.25	2	False	19
88_Good	49.5	9.67	0.25	2	False	240
					Subtotal	**259**
Lepidium monoplocoides / Winged Peppercress (Flora)						
78_Good	50.9	0.33	0.25	2	False	8
397_Good	51.2	13.48	0.25	2	False	345
619_Derived	33.2	180.48	0.25	2	False	3000
					Subtotal	**3353**

Lophoictinia isura / Square-tailed Kite (Fauna)						
88_Good	49.5	24	0.25	1.5	False	446
148_Good	86.1	6.36	0.25	1.5	False	205
248_Good	64.0	4.74	0.25	1.5	False	114
					Subtotal	**765**
Ninox connivens / Barking Owl (Fauna)						
473_Good	55.5	0.93	0.25	2	False	26
78_Good	50.9	1.61	0.25	2	False	41
88_Good	49.5	1.92	0.25	2	False	48
248_Good	64.0	0.61	0.25	2	False	20
399_Good	54.9	18.12	0.25	2	False	497
411_Good	99.7	1.1	0.25	2	False	55
					Subtotal	**687**
Petaurus norfolcensis / Squirrel Glider (Fauna)						
256_Good	41.3	0.27	0.25	2	False	6
409_Good	47.2	0.82	0.25	2	False	19
473_Good	55.5	15.26	0.25	2	False	424
78_Good	50.9	11.78	0.25	2	False	300
88_Good	49.5	78.33	0.25	2	False	1940
148_Good	86.1	39.92	0.25	2	False	1719
394_Fire_derived	24.6	10.87	0.25	2	False	133

394_Good	48.0	47.57	0.25	2	False	1143
397_Good	51.2	13.48	0.25	2	False	345
398_Derived	49.3	8.5	0.25	2	False	209
398_Good	61.2	358.88	0.25	2	False	10975
399_Good	54.9	52.09	0.25	2	False	1429
404_Good	62.9	23.05	0.25	2	False	725
411_Good	99.7	8.76	0.25	2	False	437
414_Good	55.9	7.32	0.25	2	False	205
589_Good	44.0	0.5	0.25	2	False	11
746_Good	45.6	2.12	0.25	2	False	48
1384_Good	94.6	8.77	0.25	2	False	415
					Subtotal	**20483**
Phascolarctos cinereus / Koala (Fauna)						
141_Good	38.5	20.31	0.25	2	False	391
256_Good	41.3	0.27	0.25	2	False	6
409_Good	47.2	0.82	0.25	2	False	19
473_Good	55.5	15.25	0.25	2	False	423
599_Good	58.1	2.21	0.25	2	False	64
35_Good	61.1	0.61	0.25	2	False	19
36_Good	51.9	2.56	0.25	2	False	66
56_Good	57.8	0.46	0.25	2	False	13

78_Good	50.9	12.71	0.25	2	False	324
88_Good	49.5	138.86	0.25	2	False	3440
148_Good	86.1	45.04	0.25	2	False	1940
244_Good	42.5	16.14	0.25	2	False	343
248_Good	64.0	14.71	0.25	2	False	470
255_Good	36.8	11.77	0.25	2	False	217
394_Fire_derived	24.6	10.87	0.25	2	False	133
394_Good	48.0	47.57	0.25	2	False	1143
397_Good	51.2	15.78	0.25	2	False	404
398_Derived	49.3	8.5	0.25	2	False	209
398_Good	61.2	256.88	0.25	2	False	7856
399_Good	54.9	44.92	0.25	2	False	1232
404_Good	62.9	23.05	0.25	2	False	725
406_Good	57.0	2.3	0.25	2	False	66
411_Good	99.7	8.76	0.25	2	False	437
414_Good	55.9	7.32	0.25	2	False	205
435_Good	100.0	6.11	0.25	2	False	305
444_Good	66.6	1.11	0.25	2	False	37
589_Good	44.0	1.23	0.25	2	False	27
746_Good	45.6	2.12	0.25	2	False	48
					Subtotal	**20562**

Polygala linariifolia / Native Milkwort (Flora)						
409_Good	47.2	0.82	0.25	2	False	19
88_Good	49.5	68.66	0.25	2	False	1701
394_Fire_derived	24.6	10.87	0.25	2	False	133
394_Good	48.0	47.57	0.25	2	False	1143
397_Good	51.2	13.48	0.25	2	False	345
398_Derived	49.3	8.5	0.25	2	False	209
398_Good	61.2	358.88	0.25	2	False	10975
399_Good	54.9	43.89	0.25	2	False	1204
406_Good	57.0	2.3	0.25	2	False	66
746_Good	45.6	2.12	0.25	2	False	48
1384_Good	94.6	8.77	0.25	2	False	415
					Subtotal	**16258**
Pterostylis cobarensis / Greenhood Orchid (Flora)						
141_Good	38.5	29.47	0.25	2	False	567
256_Good	41.3	0.27	0.25	2	False	6
88_Good	49.5	78.33	0.25	2	False	1940
148_Good	86.1	35.26	0.25	2	False	1519
397_Good	51.2	13.48	0.25	2	False	345
404_Good	62.9	23.05	0.25	2	False	725
406_Good	57.0	2.3	0.25	2	False	66

746_Good	45.6	2.12	0.25	2	False	48
1384_Good	94.6	8.77	0.25	2	False	415
					Subtotal	**5631**
Swainsona murrayana / Slender Darling Pea (Flora)						
27_Good	83.5	3.05	0.25	2	False	127
35_Good	61.1	0.61	0.25	2	False	19
49_Derived	36.9	27.99	0.25	2	False	516
244_Good	42.5	3.5	0.25	2	False	74
414_Good	55.9	7.32	0.25	2	False	205
444_Good	66.6	1.11	0.25	2	False	37
					Subtotal	**978**
Tylophora linearis / Tylophora linearis (Flora)						
141_Good	38.5	29.47	0.25	2	False	567
409_Good	47.2	0.82	0.25	2	False	19
473_Good	55.5	15.25	0.25	2	False	423
88_Good	49.5	68.66	0.25	2	False	1701
397_Good	51.2	13.48	0.25	2	False	345
398_Derived	49.3	8.5	0.25	2	False	209
398_Good	61.2	358.88	0.25	2	False	10975
399_Good	54.9	43.89	0.25	2	False	1204
404_Good	62.9	23.04	0.25	2	False	725

406_Good	57.0	2.3	0.25	2	False	66
414_Good	55.9	7.32	0.25	2	False	205
746_Good	45.6	2.12	0.25	2	False	48
1384_Good	94.6	8.77	0.25	2	False	415
					Subtotal	**16902**
Tyto novaehollandiae / Masked Owl (Fauna)						
202_Good	99.5	0.38	0.25	2	False	19
78_Good	50.9	4.12	0.25	2	False	105
88_Good	49.5	2.61	0.25	2	False	65
					Subtotal	**189**

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00019514/BAAS18086/20/00019515	Inland Rail - Narromine to Narrabri - N2N - contruction footprint	20/08/2020
Assessor Name	Report Created	BAM Data version *
	28/08/2020	30
Assessor Number	Assessment Type	BAM Case Status
	Major Projects	Finalised
	Assessment Revision	Date Finalised
	3	27/08/2020

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Australasian Bittern	Botaurus poiciloptilus	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion
Australian Painted Snipe	Rostratula australis	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion
Barking Owl	Ninox connivens	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion

Barking Owl	Ninox connivens	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions

Barking Owl	Ninox connivens	397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		436-Derived Kurrajong grassy open woodland / isolated trees in the Brigalow Belt South Bioregion and Nandewar Bioregion
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion

Barking Owl	Ninox connivens	746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Black-breasted Buzzard	Hamirostra melanosternon	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion

Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Black-necked Stork	Ephippiorhynchus asiaticus	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion

Black-striped Wallaby	Macropus dorsalis	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion

Black-striped Wallaby	Macropus dorsalis	589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Blue-billed Duck	Oxyura australis	247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion
Brolga	Grus rubicunda	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion

Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion

Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Corben's Long-eared Bat	Nyctophilus corbeni	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion

Corben's Long-eared Bat	Nyctophilus corbeni	244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion

Corben's Long-eared Bat	Nyctophilus corbeni	444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Diamond Firetail	Stagonopleura guttata	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion

Diamond Firetail	Stagonopleura guttata	202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		250-Derived tussock grassland of the central western plains and lower slopes of NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests

Diamond Firetail	Stagonopleura guttata	409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
		619-Derived Wire Grass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Dusky Woodswallow	Artamus cyanopterus cyanopterus	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.

Dusky Woodswallow	Artamus cyanopterus cyanopterus	56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		250-Derived tussock grassland of the central western plains and lower slopes of NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion

Dusky Woodswallow	Artamus cyanopterus cyanopterus	394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		436-Derived Kurrajong grassy open woodland / isolated trees in the Brigalow Belt South Bioregion and Nandewar Bioregion
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion

Dusky Woodswallow	Artamus cyanopterus cyanopterus	599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
		619-Derived Wire Grass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Flame Robin	Petroica phoenicea	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		250-Derived tussock grassland of the central western plains and lower slopes of NSW
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
		619-Derived Wire Grass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion
Freckled Duck	Stictonetta naevosa	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion
Gilbert's Whistler	Pachycephala inornata	141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion

Gilbert's Whistler	Pachycephala inornata	255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Glossy Black-Cockatoo	Calyptorhynchus lathami	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW

Glossy Black-Cockatoo	Calyptorhynchus lathami	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion

Glossy Black-Cockatoo	Calyptorhynchus lathami	404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Greater Broad-nosed Bat	Scoteanax rueppellii	394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
Grey Falcon	Falco hypoleucos	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion

Grey Falcon	Falco hypoleucos	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		250-Derived tussock grassland of the central western plains and lower slopes of NSW
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.

Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		250-Derived tussock grassland of the central western plains and lower slopes of NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions

Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis temporalis	397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Grey-headed Flying-fox	Pteropus poliocephalus	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).

Grey-headed Flying-fox	Pteropus poliocephalus	394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
		619-Derived Wire Grass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion

Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion

Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion

Hooded Robin (south-eastern form)	Melanodryas cucullata cucullata	599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Koala	Phascolarctos cinereus	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW

Koala	Phascolarctos cinereus	255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion

Koala	Phascolarctos cinereus	589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Large Bent-winged Bat	Miniopterus orianae oceanensis	55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion

Large Bent-winged Bat	Miniopterus orianae oceanensis	399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Little Eagle	Hieraaetus morphnoides	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion

Little Eagle	Hieraaetus morphnoides	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion

Little Eagle	Hieraaetus morphnoides	248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		250-Derived tussock grassland of the central western plains and lower slopes of NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion

Little Eagle	Hieraaetus morphnoides	473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
		619-Derived Wire Grass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Little Lorikeet	Glossopsitta pusilla	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion

Little Lorikeet	Glossopsitta pusilla	399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Little Pied Bat	Chalinolobus picatus	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW

Little Pied Bat	Chalinolobus picatus	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion

Little Pied Bat	Chalinolobus picatus	398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion

Magpie Goose	Anseranas semipalmata	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion
		250-Derived tussock grassland of the central western plains and lower slopes of NSW
Major Mitchell's Cockatoo	Lophochroa leadbeateri	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion

Major Mitchell's Cockatoo	Lophochroa leadbeateri	148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		250-Derived tussock grassland of the central western plains and lower slopes of NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		619-Derived Wire Grass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion

Major Mitchell's Cockatoo	Lophochroa leadbeateri	1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Malleefowl	Leipoa ocellata	185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
Masked Owl	Tyto novaehollandiae	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion

Masked Owl	Tyto novaehollandiae	202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion

Masked Owl	Tyto novaehollandiae	411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Painted Honeyeater	Grantiella picta	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion

Painted Honeyeater	Grantiella picta	148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests

Painted Honeyeater	Grantiella picta	409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		436-Derived Kurrajong grassy open woodland / isolated trees in the Brigalow Belt South Bioregion and Nandewar Bioregion
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Pilliga Mouse	Pseudomys pilligaensis	88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).

Pilliga Mouse	Pseudomys pilligaensis	255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Powerful Owl	Ninox strenua	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions

Regent Honeyeater	Anthochaera phrygia	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Scarlet Robin	Petroica boodang	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion

Scarlet Robin	Petroica boodang	202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		250-Derived tussock grassland of the central western plains and lower slopes of NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
		619-Derived Wire Grass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Speckled Warbler	Chthonicola sagittata	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW

Speckled Warbler	Chthonicola sagittata	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion

Speckled Warbler	Chthonicola sagittata	404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Spotted Harrier	Circus assimilis	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion

Spotted Harrier	Circus assimilis	49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		250-Derived tussock grassland of the central western plains and lower slopes of NSW
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion

Spotted Harrier	Circus assimilis	409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
		619-Derived Wire Grass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Spotted-tailed Quoll	Dasyurus maculatus	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion

Spotted-tailed Quoll	Dasyurus maculatus	399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
Square-tailed Kite	Lophoictinia isura	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW

Square-tailed Kite	Lophoictinia isura	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion

Square-tailed Kite	Lophoictinia isura	404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Stripe-faced Dunnart	Sminthopsis macroura	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion

Stripe-faced Dunnart	Sminthopsis macroura	49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion
Superb Parrot	Polytelis swainsonii	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion

Superb Parrot	Polytelis swainsonii	148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		250-Derived tussock grassland of the central western plains and lower slopes of NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
Swift Parrot	Lathamus discolor	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion

Swift Parrot	Lathamus discolor	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion

Swift Parrot	Lathamus discolor	435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
Turquoise Parrot	Neophema pulchella	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).

Turquoise Parrot	Neophema pulchella	248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion

Turquoise Parrot	Neophema pulchella	589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
Varied Sittella	Daphoenositta chrysoptera	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion

Varied Sittella	Daphoenositta chrysoptera	206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion

Varied Sittella	Daphoenositta chrysoptera	435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
		619-Derived Wire Grass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion
White-bellied Sea-Eagle	Haliaeetus leucogaster	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion
		49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion

White-bellied Sea-Eagle	Haliaeetus leucogaster	141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW
		250-Derived tussock grassland of the central western plains and lower slopes of NSW
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests

White-bellied Sea-Eagle	Haliaeetus leucogaster	409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		436-Derived Kurrajong grassy open woodland / isolated trees in the Brigalow Belt South Bioregion and Nandewar Bioregion
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
		589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
White-fronted Chat	Epthianura albifrons	49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion
		250-Derived tussock grassland of the central western plains and lower slopes of NSW
		619-Derived Wire Grass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion
		36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion

Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW
		78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion
		88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
		141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion
		148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion
		168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains
		185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion
		244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).
		247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion
		248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW

Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion
		394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions
		397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
		398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
		399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
		404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
		406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion
		414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
		435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion
		444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion

Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
		619-Derived Wire Grass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion
		746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion
		1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion

Threatened species not within the area of these PCT's

Common Name	Scientific Name	Vegetation Types(s)
Grey-headed Flying-fox	Pteropus poliocephalus	55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.
		202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion
		409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
		599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion
Major Mitchell's Cockatoo	Lophochroa leadbeateri	256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion
		473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion
Malleefowl	Leipoa ocellata	141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
		256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion

Powerful Owl	Ninox strenua	202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion

BAM Vegetation Zones Report

Proposal Details

Assessment Id
00019514/BAAS18086/20/00019515

Assessment name
Inland Rail - Narromine to Narrabri - N2N - contruction footprint

BAM data last updated *
20/08/2020

Assessor Name

Report Created
28/08/2020

BAM Data version *
30

Assessor Number

Assessment Type
Major Projects

BAM Case Status
Finalised

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Assessment Revision
3

Date Finalised
27/08/2020

Vegetation Zones

#	Name	PCT	Condition	Area	Minimum number of plots	Management zones
1	27_Good	27-Weeping Myall open woodland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Good	3.05	2	

2	35_Good	35-Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion	Good	0.61	1	
3	36_Good	36-River Red Gum tall to very tall open forest / woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion	Good	5.08	3	
4	49_Derived	49-Partly derived Windmill Grass - copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Derived	176.1	6	
5	55_Good	55-Belah woodland on alluvial plains and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions.	Good	0.21	1	
6	56_Good	56-Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW	Good	19.5	3	
7	78_Good	78-River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	Good	26.23	4	
8	88_Good	88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	Good	276.14	7	

9	88_Degraded	88-Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion	Degraded	1.65	1	
10	141_Good	141-Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion	Good	29.47	4	
11	145_Good	145-Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion	Good	53.99	5	
12	148_Good	148-Dirty Gum - Buloke - White Cypress Pine - ironbark shrubby woodland on deep sandy soils in the Liverpool Plains region of the Brigalow Belt South Bioregion	Good	45.04	4	
13	168_Derived	168-Derived Copperburr shrubland of the NSW northern inland alluvial floodplains	Derived	8.56	3	
14	185_Moderate	185-Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland mainly in the NSW South Western Slopes Bioregion	Moderate	1.37	1	
15	202_Good	202-Fuzzy Box woodland on colluvium and alluvial flats in the Brigalow Belt South Bioregion (including Pilliga) and Nandewar Bioregion	Good	3.59	2	

16	206_Good	206-Dirty Gum - White Cypress Pine tall woodland of alluvial sand (sand monkeys) in the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion	Good	12.66	3	
17	244_Good	244-Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt).	Good	31.84	4	
18	247_Good	247-Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion	Good	6.91	3	
19	248_Good	248-Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW	Good	14.71	3	
20	250_Derived	250-Derived tussock grassland of the central western plains and lower slopes of NSW	Derived	82.84	5	
21	255_Good	255-Mugga Ironbark - Buloke - Pillga Box - White Cypress Pine shrubby woodland on sandstone in the Dubbo region, south-western Brigalow Belt South Bioregion	Good	11.77	3	
22	256_Good	256-Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion	Good	0.27	1	

23	394_Fire_derived	394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions	Fire_derived	10.87	3	
24	394_Good	394-Narrow-leaved Ironbark - White Cypress pine woodland on slopes and flats in the Coonabarabran - Pilliga Scrub regions	Good	58.79	5	
25	397_Good	397-Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion	Good	15.78	3	
26	398_Derived	398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion	Derived	8.5	3	
27	398_Good	398-Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion	Good	361.28	7	
28	399_Good	399-Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion	Good	53.71	5	

29	404_Good	404-Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests	Good	23.05	4	
30	406_Good	406-White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests	Good	2.3	2	
31	409_Good	409-Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion	Good	0.82	1	
32	411_Good	411-Buloke - White Cypress Pine woodland on outwash plains in the Pilliga Scrub and Narrabri regions, Brigalow Belt South Bioregion	Good	8.76	3	
33	414_Good	414-White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion	Good	7.32	3	
34	435_Good	435-White Box - White Cypress Pine shrub grass hills woodland in the Brigalow Belt South Bioregion and Nandewar Bioregion	Good	6.11	3	

35	436_Degraded	436-Derived Kurrajong grassy open woodland / isolated trees in the Brigalow Belt South Bioregion and Nandewar Bioregion	Degraded	5.98	3	
36	444_Good	444-Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion	Good	1.11	1	
37	473_Good	473-Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion	Good	15.26	3	
38	589_Good	589-White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion	Good	1.23	1	
39	599_Good	599-Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South Bioregion and Nandewar Bioregion	Good	2.21	2	
40	619_Derived	619-Derived Wire Grass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion	Derived	326.26	7	

41	746_Good	746-Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion	Good	2.12	2	
42	1384_Good	1384-White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion	Good	8.77	3	

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TECHNICAL REPORT 1

Biodiversity development assessment report

Appendix L Plot justifications and BAM input data

NARROMINE TO NARRABRI ENVIRONMENTAL IMPACT STATEMENT

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Plot use justifications for construction impact zone (CIZ)

PCTID	PCT name	Plot ID	Within CIZ	Plot use justification for plots outside CIZ
27	Weeping Myall open woodland of the Darling Riverine Plains bioregion and Brigalow Belt South Bioregion	T2-SP2	Yes	
35	Brigalow - Belah open forests / woodland on alluvial often gilgaied clay from Pilliga scrub to Gondiwindi, Brigalow Belt South Bioregion	T1-P5	No	350 metres to the east of CIZ. In same roadside patch of Brigalow as that to be impacted
36	River Red Gum tall to very tall open forest/woodland wetland on rivers on floodplains mainly in the Darling Riverine Plains Bioregion	T2-P30	No	80 metres to west. Same PCT and same paddock under same management
		T2-P32	No	40 metres to north. Same PCT and same paddock under same management
		T1-25	Yes	
49	Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South bioregion.	Plot 11	No	700 metres to the west in same paddock under same management and landholder as CIZ.
		T1-MP-38	Yes	
		T2-MP24	Yes	
		T2-P18	No	1.4 kilometres to west of CIZ within Travelling Stock Reserve. Disjunct patch.
		Plot 14	Yes	
		Plot 20	No	530 metres to the west in same paddock under same management and landholder as CIZ.
		WP1	Yes	
		WP2	Yes	
		WP3	Yes	
55	Belah woodland on alluvial plain and low rises in the central NSW wheatbelt to Pilliga and Liverpool Plains regions	WP6	No	35 metres to the east of CIZ in roadside corridor.

PCTID	PCT name	Plot ID	Within CIZ	Plot use justification for plots outside CIZ
56	Poplar Box-Belah woodland on clay-loam soils on alluvial plains of north-central NSW	T1-P13	Yes	
		T2-P21	No	60 metres to the east of CIZ
		Singles 2	Yes	
		WP5	No	11 metres to the south
78	River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion	T2-P1	Yes	
		T1-P8	No	60 metres to west. Same PCT and same paddock under same management
		T2-P15	Yes	
		T2-P14	No	70 metres to west. Same PCT and same patch under same management by same landowner
		T1-P9	No	30 metres to the south east. Part of same riparian corridor of Castlereagh River on same Crown land patch.
88	Pilliga Box - White Cypress Pine- Buloke shrubby woodland in the Brigalow Belt South Bioregion	T1-MP4	Yes	
		T1-MP24	Yes	
		T2-MP13	Yes	
		T2-P16	No	20 metres to west. Same PCT and same patch. Different landowner and therefore different management to plot location across the fence.
		T1-P12	No	140 metres to the south east. Patch not impacted
		T1-P11	No	30 metres to the north west. Part of same patch rising out of Castlereagh River on same Crown land patch.
		T1-P10	No	20 metres to the south east. Part of same patch rising out of Castlereagh River on same Crown land patch.
		T1-P16	Yes	
		T2-P25	No	40 metres to the east of CIZ in connected patch as preferred alignment CIZ under the same management/landowner.

PCTID	PCT name	Plot ID	Within CIZ	Plot use justification for plots outside CIZ
		T1-P17	No	40 metres to the east of CIZ in connected patch as preferred alignment CIZ under the same management/landowner.
		T2-P31	No	40 metres to west. Same PCT and same roadside patch under same management
		T2-P34	Yes	
		T1-P22	Yes	
		T1-20	Yes	
		W4	Yes	
141	Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions. Brigalow Belt South Bioregion	T1-MP11	Yes	
		T1-MP13	Yes	
		T1-MP14	Yes	
		T1-MP19	Yes	
145	Western Rosewood - Wilga - Wild Orange - Belah low woodland of the Brigalow Belt South Bioregion and eastern Darling Riverine Plains Bioregion	T1SP1	Yes	
		T2-SP4	No	20 metres to west of CIZ within same patch as area to be impacted in preferred alignment
		T1SP2	Yes	
		T1BP5	No	340 metres to the south-east of CIZ. Same patch as within preferred alignment CIZ under the same management/landowner.
		Singles 1	Yes	
148	Dirty Gum - Buloke - White cypress pine - ironbark shrubby woodland of the deep sandy soils on the Liverpool Plains Region of the Brigalow Belt South Bioregion	T2-P6	No	50 metres to north. Same PCT part of same patch to be impacted on local roadside.
		T2-P13	No	20 metres to west. Same PCT and same connected patch as preferred alignment CIZ under the same management/landowner.
168	Derived Copperburr shrubland of the NSW northern inland alluvial floodplains	T1-P1	No	410 metres to the north west of CIZ in connected patch as preferred alignment CIZ under the same management/landowner.

PCTID	PCT name	Plot ID	Within CIZ	Plot use justification for plots outside CIZ
185	Dwyer's Red Gum - White Cypress Pine - Currawang shrubby woodland	T2-BP3	Yes	
		T2-BP3-2	Yes	
244	Poplar Box grassy woodland on alluvial clay-loam soils mainly in the temperate (hot summer) climate zone of central NSW (wheatbelt)	T2P19	No	10 metres to the west of CIZ.
		T2-MP25	Yes	
		T2-MP26	Yes	
		T2-P24	No	100 metres to the west in same patch and creekline with same landowner and management
247	Lignum shrubland wetland on regularly flooded alluvial depressions in the Brigalow Belt South Bioregion and Darling Riverine Plains Bioregion	T1-P21	No	40 metres to north. Same PCT and same property under same management
248	Mixed box eucalypt woodland on low sandy-loam rises on alluvial plains in central western NSW	T1-24	No	40 metres to north. Same PCT and same crown reserve under same management
		T2-P37	No	20 metres to east in roadside patch
255	Mugga Ironbark - Buloke - Pilliga Box - White Cypress Pine shrubby woodland	T2-BP2	Yes	
		T2-BP5	Yes	
		T2-BP5-2	Yes	
256	Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion	T1-MP25	Yes	
394	Narrow-leaved Ironbark, White Cypress Pine woodland on slopes and flats in the Coonabarabran, Pilliga scrub regions	T1-MP18	Yes	
		T1-MP22	Yes	
		T1-MP23	Yes	
		T2-MP8	Yes	
		T1-MP30	Yes	
		T1-MP31	Yes	
		T1-MP34	Yes	

PCTID	PCT name	Plot ID	Within CIZ	Plot use justification for plots outside CIZ
		T1-MP42	Yes	
		T2-P23	No	60 metres to the east of CIZ in same patch to be impacted by preferred alignment
		T1-P14	No	20 metres to the east of CIZ in same patch to be impacted by preferred alignment
		T1-P15	No	20 metres to the east of CIZ in same patch to be impacted by preferred alignment
397	Poplar Box- White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion	T2-MP17	Yes	
		T2-MP11	Yes	
		T2-MP18	Yes	
		T2-MP12	Yes	
		T1-MP33	Yes	
		T1-MP39	Yes	
398	Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion	T1-MP6	Yes	
		T1-MP3	Yes	
		T1-MP7	Yes	
		T1-MP9	Yes	
		T1-MP10	Yes	
		T2-MP2	No	15 metres to north west. Same PCT and same patch under same management as CIZ of preferred alignment
		T2-MP1	No	40 metres to north west. Same PCT and same patch under same management as CIZ of preferred alignment
		T2-MP5	Yes	
		T1-MP20	Yes	
		T2-MP14	Yes	

PCTID	PCT name	Plot ID	Within CIZ	Plot use justification for plots outside CIZ
		T2-MP20	Yes	
		T1-MP35	Yes	
		T1-MP36	Yes	
		T2-MP15	No	20 metres to the west same PCT and patch as CIZ of preferred alignment
		T2-MP19	Yes	
		T1-MP40	Yes	
		T1-MP41	Yes	
399	Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Piliga - Goonoo sandstone forests, Brigalow Belt South Bioregion	T2-P11	No	20 metres to west. Same PCT and same patch under same management as CIZ in preferred alignment.
		T2-MP3	Yes	
		T1-MP17	Yes	
		T1-MP21	Yes	
		T1-MP29	Yes	
		T1-MP32	Yes	
		T2-MP16	Yes	
404	Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga fores	T2-MP6	Yes	
		T2-MP7	Yes	
		T2-MP10	Yes	
406	White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests	T1-MP16	Yes	
		T1-MP15	No	70 metres to south east. Same PCT and same patch under same management
409	Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion	T1-MP28	Yes	

PCTID	PCT name	Plot ID	Within CIZ	Plot use justification for plots outside CIZ
414	White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion	T1-MP26	Yes	
		T1-MP27	Yes	
436	Derived Kurrajong grassy open woodland / isolated trees in the Brigalow Belt South and Nandewar Bioregion	T2-P28	Yes	
		T2-P29	Yes	
		T2-SP1	Yes	
444	Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion	T2-P20	Yes	
473	Red gum - Rough-barked Apple - Narrow-leaved Ironbark - cypress pine grassy open forest on flats and drainage lines in the Goonoo and surrounding forests, southern Brigalow Belt South Bioregion	T2-P8	Yes	
		T2-P7	No	70 metres to west. Same PCT and same patch under same management as CIZ of preferred alignment.
		T2-P4	No	890 metres to east of the CIZ of preferred alignment. Patch is part of wider connected patch to be impacted to the south along the Newell Highway
589	White Box - White Cypress Pine - Silver-leaved Ironbark grassy woodland on mainly clay loam soils on hills mainly in the Nandewar Bioregion	T1-MP37	Yes	
599	Blakely's Red Gum - Yellow Box grassy tall woodland on flats and hills in the Brigalow Belt South and Nandewar bioregion	T2-P36	No	10 metres to the east of alignment but patch to be cleared is connected to this plot.
		T2-P35	No	140 metres to the east of alignment but patch to be cleared in the north is connected to this patch and same PCT in roadside
619	Derived Wiregrass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion	T2-P2	No	40 metres to west. Same PCT and same patch under same management as CIZ.
		T2-P3	No	15 metres to east. Same PCT and same patch under same management as CIZ.
		T2-P10	Yes	

PCTID	PCT name	Plot ID	Within CIZ	Plot use justification for plots outside CIZ
		T2-P22	Yes	
		T2-P4	No	220 metres to south. Same PCT and same patch under same management as CIZ in preferred alignment.
		T1-P6	No	750 metres to west of alignment. Same patch and under same management as CIZ in preferred alignment.
746	Brown Bloodwood - cypress - ironbark heathy woodland in the Pilliga region of the Brigalow Belt South Bioregion	T1-BP1	Yes	
		T1-BP2	Yes	
1384	White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion	T1-MP12	Yes	

plot	pct	area	patchsize	conditionclass	zone	easting	northing	bearing	compTree	compShrub	compGrass	compForbs	compFerns	compOther	strucTree	strucShrub	strucGrass	strucForbs	strucFerns	strucOther	funLargeTrees	funHollowtrees	funLitterCover	funLenFallenLogs	funTreeStem5to9	funTreeStem10to19	funTreeStem20to29	funTreeStem30to49	funTreeStem50to79	funTreeRegen	funHighThreatExotic
T2-SP2	27	3.05	101	Good	55	659057	6524827	0	1	3	5	12	0	3	10	0.3	0.5	1.2	0	0.4	4	0	12	42	0	1	1	1	0	1	0.1
27-BenchA	27	3.05	101	Good	55	111111	1111111	0	2	7	7	11	0	2	8	28	19	7	0	0	4	4	45	10	1	1	1	1	1	1	0
T1-P5	35	0.61	101	Good	55	762537	6637450	216	3	3	6	8	0	0	32	1.2	5.5	1	0	0	1	1	31	57	0	1	1	1	0	0	0.3
T1-P25	36	5.08	101	Good	55	622160	6431885	311	2	0	4	1	0	0	31	0	0.5	0.1	0	0	6	2	85	12	0	0	0	1	1	1	0.2
T2-P32	36	5.08	101	Good	55	630279	6461582	137	4	5	7	13	0	0	10	0.6	2.5	1.3	0	0	3	3	34	8	0	1	1	1	0	0	0
T2-P30	36	5.08	101	Good	55	630172	6461554	176	4	0	9	4	0	1	12.2	0	61.5	0.4	0	0.1	0	0	50	0	1	1	1	1	0	1	0
T2-MP24	49	176.1	101	Derived	55	626987	6452842	149	0	2	4	3	0	0	0	0.2	0.4	0.3	0	0	0	0	6.8	0	0	0	0	0	0	0	0.1
T2-P18	49	176.1	101	Derived	55	666697	6546371	0	0	2	6	12	0	0	0	5.1	5.7	1.3	0	0	0	0	2.9	0	0	0	0	0	0	0	0.1
T1-MP38	49	176.1	101	Derived	55	691530	6582685	238	0	3	4	5	0	1	0	0.3	2.4	0.5	0	0.1	0	0	12	0	0	0	0	0	0	0	0.1
Plot 14	49	176.1	101	Derived	55	768735	6646845	282	0	2	3	7	0	0	0	5.1	11.1	1.5	0	0	0	0	7	0	0	0	0	0	0	0	0
Plot 20	49	176.1	101	Derived	55	768317	6646860	30	0	2	5	6	0	0	0	0.4	10.5	0.6	0	0	0	0	24	0	0	0	0	0	0	0	0
Plot 11	49	176.1	101	Derived	55	767853	6646967	221	0	2	4	8	0	0	0	0.3	58	2.1	0	0	0	0	21	0	0	0	0	0	0	0	0
WP1	49	176.1	101	Derived	55	640761	6489660	358	0	3	8	11	0	1	0	2.2	50.4	1.1	0	0.1	0	0	0	0	0	0	0	0	0	0	0
WP2	49	176.1	101	Derived	55	640929	6490776	359	0	1	11	10	0	1	0	1	70.6	1	0	1	0	0	0	0	0	0	0	0	0	0	0
WP3	49	176.1	101	Derived	55	641138	6492177	350	1	1	14	13	0	1	0.1	0.1	54	1.3	0	0.5	0	0	0	0	0	0	0	0	0	0	0.1
WP6	55	0.21	101	Good	55	641307	6492883	2	1	5	8	7	0	0	30	0.6	8.4	10.6	0	0	0	1	1.4	34	0	1	1	1	0	0	30.1
T2-P21	56	19.5	25	Good	55	641225	6492153	10	1	5	7	10	0	1	1	1	1.3	1.2	0	0.1	0	0	12	5	0	0	0	1	0	0	0.1
T1-P13	56	19.5	25	Good	55	643629	6502913	211	3	4	8	14	0	0	25.5	0.4	1.6	3.3	0	0	3	1	77	23	0	0	1	1	1	0	0
Singles 2	56	19.5	25	Good	55	675355	6563308	85	2	4	2	3	0	1	20.1	7.4	0.3	3.1	0	2	5	4	48	38	1	1	0	1	1	1	1.1
WP5	56	19.5	25	Good	55	641085	6491467	8	3	4	7	10	0	0	20.1	5.3	40.2	5.8	0	0	0	3	2.6	8	1	0	1	1	1	0	10
T2-P14	78	26.23	101	Good	55	659642	6527650	110	2	1	4	7	0	2	20	0.1	10.3	0.8	0	0.2	2	2	39	8	1	1	1	0	0	0	0.6
T2-P15	78	26.23	101	Good	55	659648	6528044	160	1	0	2	5	1	1	3	0	40.2	0.8	0.1	0.1	2	1	42.2	22	0	0	0	0	1	0	0.3
T2-P1	78	26.23	101	Good	55	765840	6643315	90	1	3	4	7	0	0	10	0.5	20.3	0.9	0	0	4	0	46	29	0	0	0	1	1	0	5.2
T1-P8	78	26.23	101	Good	55	759793	6633923	136	4	2	13	17	0	2	45.2	0.2	14.4	1.7	0	0.2	3	0	62	38.5	1	1	1	1	1	1	0.2
T1-P9	78	26.23	101	Good	55	650395	6510353	331	1	0	5	6	0	0	15	0	25.5	0.6	0	0	5	3	85	42.5	0	0	1	1	1	0	0.1
T1-P11	88	276.14	101	Good	55	650348	6510472	62	2	5	5	10	0	1	25	10.4	1.9	1	0	0.1	1	1	18.2	11	1	1	1	0	0	1	0
T1-P12	88	276.14	101	Good	55	651331	6510780	66	3	4	4	12	0	2	45	0.8	2.7	1.2	0	0.2	1	1	49.4	46	0	1	1	1	1	1	0.2
T1-MP4	88	276.14	101	Good	55	750244	6624091	214	4	2	5	2	1	0	57	0.2	0.7	0.2	0.1	0	1	0	46	80	1	1	1	1	1	1	0
T1-MP24	88	276.14	101	Good	55	709453	6602623	92	3	3	3	3	1	0	33.1	50.2	0.3	0.4	0.1	0	1	0	30	26	1	1	1	1	1	1	0.1
T2-MP13	88	276.14	101	Good	55	701244	6592182	260	4	3	4	2	0	0	25.3	0.7	0.4	0.2	0	0	1	3	69	139	0	1	1	1	1	0	0.1
T2-P16	88	276.14	101	Good	55	659470	6526938	180	1	4	4	13	0	1	3	0.9	20.3	1.4	0	0.1	3	2	39	34	1	1	1	0	1	1	0.2
T2-P31	88	276.14	101	Good	55	630058	6461424	129	1	5	9	8	1	1	6	0.8	2.9	0.9	0.2	0.1	0	0	22	6	1	1	0	1	0	1	0
T2-P25	88	276.14	101	Good	55	640528	6483386	180	2	1	6	1	1	0	8.2	0.1	0.7	0.1	0.1	0	0	0	47	2	1	1	1	0	0	1	0
T1-P10	88	276.14	101	Good	55	650460	6510408	90	0	3	11	12	0	0	0	0.3	21.7	4.1	0	0	0	0	37	0	0	0	0	0	0	0	0.3
T1-P16	88	276.14	101	Good	55	640339	6483891	261	3	7	7	9	0	1	20.1	1.4	0.7	0.9	0	0.1	1	0	35	13	1	1	1	1	1	1	0
T1-P17	88	276.14	101	Good	55	640367	6482407	6	3	5	7	3	0	0	11	5.7	0.7	0.3	0	0	0	0	54	7	1	1	1	1	0	1	0
T1-P20	88	276.14	101	Good	55	614002	6425724	0	2	2	8	14	1	2	21	0.2	9.7	1.4	0.1	0.2	2	2	36	5	0	0	1	1	0	0	0
T1-P22	88	276.14	101	Good	55	615457	6425366	59	0	1	6	8	0	1	0	0.1	41.4	0.8	0	0.1	0	0	60	0	0	0	0	0	0	0	0.2
T2-P34	88	1.65	2	Degraded	55	623541	6439434	51	2	6	4	4	0	1	16	10.7	0.5	0.4	0	5	1	1	72	11	1	1	1	0	0	1	0
WP4	88	276.14	101	Good	55	640856	6489946	10	2	4	10	20	0	0	15	1.3	46.6	2	0	0	1	3	4.2	36	1	1	1	1	1	0	0.1
T1-MP11	141	29.47	101	Good	55	736345	6616491	126	1	6	2	0	0	1	3	82.6	0.6	0	0	0.1	1	0	26	2	1	1	1	1	1	1	0
T1-MP13	141	29.47	101	Good	55	731689	6612411	241	2	7	3	1	0	1	7	75.7	3.4	0.2	0	0.1	0	0	22	3	1	1	0	1	0	1	0
T1-MP14	141	29.47	101	Good	55	731011	6611838	315	1	8	2	1	0	1	2	82.2	10.1	0.5	0	0.3	0	0	13	11	1	1	1	1	0	1	0
T1-MP19	141	29.47	101	Good	55	717347	6605465	64	1	8	2	0	1	0	0.1	59.1	80.1	0	0.1	0	0	0	30	3	0	0	0	1	0	1	0
T1-SP1	145	53.99	101	Good	55	674395	6565366	220	1	5	1	3	0	0	10	0.7	0.1	0.7	0	0	2	2	16	9	0	1	1	1	0	0	0
T1-SP2	145	53.99	101	Good	55	659066	6524989	62	1	3	0	2	0	0	5	1.1	0	0.3	0	0	1	1	3.2	6	0	0	1	1	0	0	0
T1-SP4	145	53.99	101	Good	55	672447	6556374	265	4	2	0	2	0	1	4.5	0.2	0	0.2	0	0.1	2	1	13.4	7	0	0	1	1	0	1	0
T1-BP5	145	53.99	101	Good	55	674966	6564841	96	2	6	0	3	0	2	4	7.8	0	0.8	0	0.4	2	0	8	8	0	1	1	1	0	0	0
Singles 1	145	53.99	101	Good	55	674400	6565362	4	2	6	0	3	0	0	10	8.2	0	0.3	0	0	1	3	7	6	1	1	1	1	0	1	0.5
T2-P6	148	45.04	101	Good	55	762014	6637817	250	2	1	6	5	0	0	13	0.1	1	0.4	0.1	0	1	0	59.6	78	1	1	1	1	1	1	0
T2-P13	148	45.04	101	Good	55	758223	6631327	285	3	0	5	0	0	0	11	0	51.4	0	0	0	1	0	23	12	1	1	1	1	1	0	0
148-BenchA	148	45.04	101	Good	55	111111	1111111	0	5	8	8	9	1	2	50	22	25	5	0	0	3	1	61	48	1	1	1	1	1	1	0
148-BenchB	148	45.04	101	Good	55	111111	1111111	0	5	8	8	9	1	2	50	22	25	5	0	0	3	1	61	48	1	1	1	1	1	1	0
T1-P1	168	8.56	4	Derived	55	764998	6643436	275	0	7	6	6	0	0	0	15.6	7.5	0.9	0	0	0	0	2.4	0	0	0	0	0	0	0	0.1
168-BenchA	168	8.56	4	Derived	55	111111	1111111	0	1	8	5	6	0	0	0	65	3	5	0	0	0	0	30	0	0	0	0	0	0	0	0
168-BenchB	168	8.56	4	Derived	55	111111	1111111	0	1	8	5	6	0	0	0	65	3	5	0	0	0	0	30	0	0	0	0	0	0	0	0
T2-BP3	185	1.37	10	Moderate	55	621788	6409615	272	1	2	3	5	1	0	0.1	10.1	20.2	0.5	0.1	0	0	0	16	5	0	0	0	0	0	0	0
T2-BP3-2	185	1.37	10	Moderate	55	621416	6409718	186	0	1	6	6	1	0	0	0.1	21.9	0.6	0.1	0	0.1	0	4	0	0	0	0	0	0	0	0.1
202-BenchA	202	3.59	101	Good	55	111111	1111111	0	3	4	9	12	1	2	18	2	42	6	0	1	2	1	30	41	1	1	1	1	1	1	0
202-BenchB	202	3.59	101	Good	55	111111	1111111	0	3	4	9	12	1	2	18	2	42	6	0	1	2	1	30	41	1	1	1	1	1	1	0
WP7	206	12.66	101	Good	55	641412	6494027	15	3	0	6	13	1	0	5.2	0	5.4	28	1	0	0	0	4.4	6	1	1	1	1	0	1	0
WP8	206	12.66	101	Good	55	641467	6493936	185	2	1	7	16	1	1	45	0.1	5.9	33.2	0.5	0.1	0	1	1	21	1	1	1	1	1	1	0.1
206-BenchA	206	12.66	101	Good	55	111111	1111111	0	5	5	7	11	0	3	68	7	66	10	0	1	4	4	50	38	1	1	1	1	1	1	0
T2-P19	244	31.84	50	Good	55	667463	6543464	170	3	1	4	3	0	0	14	0.1	2.2	0.3	0	0	2	2	59	25	1	1	1	1	1	1	0
T2-P24	244	31.84	50	Good	55	763126	6638011	75	3	3	5	10	0	1	22.5	1.3	1	1.2	0	0.1	0	0	31	51	1	1	1	1	0	1	0.5
T2-MP25	244	31.84	50	Good	55	627125	6453245	236	3	3	7	2	0	1	15.1	1.2	0.7	0.2	0	0.1	1	1	16	53	1	1	1	1	1	1	0.1
T2-MP26	244	31.84	50	Good	55	627070	6453801	162	1	1	3	0	1	0	20	1	2.2	0	0.1	0	0	0	34	24	1	1	1	0	0	1	0
T1-P21	247	6.91	50	Good	55	615457	6425366	5	0	2	5	6	1	0	0	0.3	2.4	0.6	0.1	0	3	1	19	9	0	0	0	0	1	0	0.1
247-BenchA	247	6.91	50	Good	55	111111	1111111	0	1	5	5	8	1	1	0	27	13	4	0	0	0	0	30	77	0	0	0	0	0	0	0
247-BenchB	247	6.91	50	Good	55	111111	1111111	0	1	5	5	8	1	1	0	27	13	4	0	0	0	0	30	77	0	0	0	0	0	0	0
T1-P24	248	14.71	101	Good	55	622612	6431283	277	2	2	8	12	0	0	10	1.1	7	1.4	0	0	2	1	42	13	0	0	0	0	0	1	0
T2-P37	248	14.71	101	Good	55	622263	6428516	160	3	3	8	14	0	0	17	0.3	10.9	1.3	0	0	4	3	50	8	1	1	1	1	1	1	0
81-BenchB	248	14.71	101	Good	55	111111	111111	0	3	6	5	7	0	1	22	5	18	5	0	0	3	1	36	55	1	1	1	1	1	1	0
250-BenchA	250	82.84	101	Derived	55	111111	1111111	0	1	2	7	9	1	1	0	1	102	8	0	0	0	0	19	0	0	0	0	0	0	0	0
250-BenchB	250	82.84	101	Derived	55	111111	1111111	0	1	2	7	9	1	1	0	1	102	8	0	0	0	0	19	0	0	0	0	0	0	0	0
250-BenchC	250	82.84	101	Derived	55	111111	1111111	0	1	2	7	9	1	1	0	1	102	8	0	0	0	0	19	0	0	0	0	0	0	0	0
250-BenchD	250	82.84	101	Derived	55	111111	1111111	0	1	2	7	9	1	1	0	1	102	8	0	0	0	0	19	0	0	0	0	0	0	0	0
250-BenchE	250	82.84	101	Derived	55	111111	1111111	0	1	2	7	9	1	1	0	1	102	8	0	0	0	0	19	0	0	0	0	0	0	0	0
T2-BP2	255	11.77	101	Good	55	616674	6421450	148	2	2	5	0	0	0	35	0.2	5	0	0	0	4	1	59	64	1	1	1	1	1	0	0
T2-BP5	255	11.77	101	Good	55	623604	6434914	92	3	5	1	0	0	0	30.5	5.4	0.1	0	0	0	1	1	56	105	1	1	1	1	1	0	0
T2-BP5-2	255	11.77	101	Good	55	623574	6435151	133	2	3	1	0	0	0	20.5	1.2	0.1	0	0	0	3	1	64	52	1	1	1	1	1	1	0
T1-MP25	256	0.27	101	Good	55	708253	6602211	334	1	3	3	1	0	2	35	2.6	0.3	0.1	0	0.5	0	0	70	200	1	1	1	1	0	1	0
T2-MP8	394	10.87	101	Fire_derived	55	712557	6603654	287	1	4	0	0	1	0	10	57.5	0	0	0.1	0	0	0	94	73	1	1	1	1	0	1	0
T1-MP22	394	10.87	101	Fire_derived	55	714161	6604257	232	1	5	0	0	1	0	3	95.2	0	0	0.2	0	1	0	19	1	1	1	1	1	1	0	0
T1-MP23	394	10.87	101	Fire_derived	55	713478	6604002	280	2	2	2	2	1	0	1.3	93.2	0.2	0.2	0.1	0	1	0	42	12	1	1	1	0	1	0	0
T1-MP18	394	58.79	101	Good	55	718007	6605737	162	2	6	3	3	1	1	16	28.4	1	0.3	0.1	0.1	1	0	56	9	1	1	1	1	1	1	0
T1-MP30	394	58.79	101	Good	55	704436	6598802	229	4	3	3	6	1	1	40.3	5.2	0.3	0.7	0.1	0.1	0	0	56	32	1	1	1	1	0	1	0.1
T1-MP31	394	58.79	101	Good	55	703577	6597466	94	4	5	5	1	1	0	30.5	17.7	0.5	1.1	0.1	0	2	0	54	53	1	1	1	1	1	1	0
T2-P23	394	58.79	101	Good	55	641008	6486314	210	2	1	6	0	1	0	3.3	0.1	1.5	0	0.1	0	0	0	18	62	1	1	1	1	0	1	0
T1-MP34	394	58.79	101	Good	55	700981	6591107	170	3	3	8	1	1	1	59	5.2	1	0.5	0.1	0.5	1	1	66	56	1	1	1	1	1	1	0
T1-P14	394	58.79	101	Good	55	640889	6485803	176	3	1	5	1	1	0	55.1	0.1	0.5	0.1	0.1	0	1	1	39	61	1	1	1	1	1	1	0
T1-P15	394	58.79	101	Good	55	640857	6485661	171	3	1	6	2	1	0	25	0.1	0.6	0.2	0.1	0	1	0	56	33	1	1	1	1	1	1	0
T1-MP42	394	58.79	101	Good	55	695893	6582704	137	2	4	4	0	0	0	52	0.7	0.4	0	0	0	0	0	66	88	1	1	1	1	0	1	0.1
T2-MP11	397	15.78	101	Good	55	702014	6595343	178	5	2	5	3	2	1	26.2	0.2	0.6	0.3	0.2	0.1	0	0	74	164	1	1	1	1	0	1	0.1
T2-MP12	397	15.78	101	Good	55	701964	6594985	265	5	2	6	2	0	0	45.4	0.2	0.6	0.2	0	0	0	0	85	236	1	1	1	1	0	1	0.1
T2-MP17	397	15.78	101	Good	55	702233	6595526	244	3	1	4	0	0	0	30.1	0.1	0.4	0	0	0	0	0	66	159	1	1	1	1	0	1	0.1
T2-MP18	397	15.78	101	Good	55	701987	6595228	223	4	1	4	1	1	0	45.6	0.1	1.3	0.1	0.1	0	0	3	66	120	1	1	1	1	0	1	0.1
T1-MP33	397	15.78	101	Good	55	701960	6594843	209	2	1	4	2	0	2	60	1	0.8	0.2	0	0.2	1	0	66	110	1	1	1	1	1	1	0
T1-MP39	397	15.78	101	Good	55	692321	6582506	108	2	1	4	2	0	0	40	0.1	0.4	0.2	0	0	6	6	78	194	0	1	1	1	1	1	0
T1-MP40	398	8.5	101	Derived	55	698531	6584867	186	3	3	4	1	0	1	36.5	3.3	1	0.1	0	0.1	0	0	59	24	1	1	1	1	0	1	0
T1-MP41	398	8.5	101	Derived	55	698347	6584420	266	2	4	4	3	0	0	40.1	0.4	0.5	0.3	0	0	2	3	48	13	0	1	1	1	1	1	0
T1-MP6	398	361.28	101	Good	55	746630	6622441	46	3	4	3	2	1	0	25	11.4	4.1	0.2	0.1	0	0	0	62	110	1	1	1	1	0	1	0
T1-MP3	398	361.28	101	Good	55	745303	6621725	359	4	4	3	1	1	0	59	0.5	0.4	0.1	0.1	0	1	0	52	68	1	1	1	1	1	1	0
T1-MP7	398	361.28	101	Good	55	741979	6620091	44	3	2	4	1	1	0	39	0.4	1.1	0.1	0.1	0	0	0	70	150	1	1	1	1	0	1	0
T1-MP10	398	361.28	101	Good	55	736800	6616957	255	2	9	3	0	1	1	1.5	89.4	1.2	0	0.1	0.5	2	0	21	8	1	1	1	1	1	1	0.5
T2-MP1	398	361.28	101	Good	55	728045	6610909	54	5	6	4	1	1	0	28.1	3.6	0.4	0.2	0.1	0	0	1	51	82	1	1	1	1	0	1	0
T2-MP2	398	361.28	101	Good	55	730245	6611560	349	5	4	5	1	1	2	31.1	10.3	0.5	0.1	0.1	0.4	1	2	64	67	1	1	1	1	1	1	0
T2-MP5	398	361.28	101	Good	55	725571	6609735	330	3	9	4	1	0	0	31	1	0.4	0.1	0	0	0	0	84	56	1	1	1	1	0	1	0
T1-MP20	398	361.28	101	Good	55	715877	6604892	158	2	12	3	1	1	1	31	48	0.4	0.3	0.1	0.1	1	0	37	21	1	1	1	1	1	1	0
T2-MP14	398	361.28	101	Good	55	701504	6593225	265	3	3	5	2	0	0	40	0.7	0.5	0.2	0	0	0	0	77	139	1	1	1	1	0	1	0.1
T2-MP20	398	361.28	101	Good	55	701152	6592056	312	3	2	4	1	0	0	40.1	0.3	0.4	0.1	0	0	0	0	57	178	1	1	1	1	0	1	0.1
T1-MP35	398	361.28	101	Good	55	700762	6590417	281	3	4	5	0	1	0	35.1	8.4	4.2	0	0.1	0	1	1	55	72	1	1	1	1	1	1	0
T1-MP36	398	361.28	101	Good	55	699943	6587936	272	3	8	4	1	0	1	31	8.5	0.4	0.1	0	0.1	0	0	34	50	1	1	1	1	0	1	0
T2-MP15	398	361.28	101	Good	55	699550	6586958	93	3	8	4	1	0	0	35.2	1.2	40.3	0.1	0	0	1	2	45	80	1	1	1	1	1	1	0
T2-MP19	398	361.28	101	Good	55	699589	6586793	163	3	7	3	1	0	0	35	0.7	0.3	0.1	0	0	0	0	91	112	1	1	1	1	0	1	0
T1-MP9	398	361.28	101	Good	55	737656	6617784	357	3	5	5	3	1	0	33	11.5	0.7	0.3	0.1	0	5	4	72	21	1	1	1	1	1	1	0
T2-MP3	399	53.71	101	Good	55	733338	6613704	345	4	5	5	1	0	1	26.2	15.3	5.9	0.1	0	0.1	1	0	67	129	1	1	1	1	1	1	0
T2-P11	399	53.71	101	Good	55	757142	6629870	340	3	8	1	3	0	0	12.2	1.9	0.3	0.3	0	0	1	1	43	59	1	1	1	0	0	1	0
T2-MP16	399	53.71	101	Good	55	702302	6595700	120	2	3	5	3	0	3	25.2	40.1	2.3	0.3	0	1.2	1	3	48	33	1	1	1	1	0	1	0.1
T1-MP21	399	53.71	101	Good	55	715071	6604630	300	5	10	2	3	1	0	19.6	7.8	0.3	0.4	0.1	0	2	2	41	19	1	1	1	1	1	1	0
T1-MP17	399	53.71	101	Good	55	718659	6606032	131	3	3	4	1	0	0	31.1	1	15.2	0.1	0	0	8	7	12	32	1	1	1	1	1	1	0

T1-MP32	399	53.71	101	Good	55	702819	6596182	134	2	7	3	2	0	1	32	6.2	0.5	0.2	0	0.1	1	1	56	16	1	1	1	1	1	1	0.1
T1-MP29	399	53.71	101	Good	55	705690	6600063	104	2	3	4	3	1	1	23	17.5	16.2	0.3	0.1	0.1	2	1	15	41	1	1	1	1	1	1	0.1
T2-MP10	404	23.05	101	Good	55	711180	6603121	68	4	7	0	0	0	0	31.1	2.6	0	0	0	0	0	0	66	51	1	1	1	1	0	1	0
T2-MP6	404	23.05	101	Good	55	725401	6609595	158	4	5	0	0	0	1	26.1	0.9	0	0	0	0.1	1	3	53	25	1	1	1	0	1	1	0
T2-MP7	404	23.05	101	Good	55	725351	6609691	350	2	9	3	0	0	1	55	0.9	0.3	0	0	0.1	0	1	56	32	1	1	1	1	0	1	0
404-BenchA	404	23.05	101	Good	55	111111	1111111	0	5	11	8	8	1	2	61	28	22	5	0	0	1	1	70	60	1	1	1	1	1	1	0
T1-MP15	406	2.3	101	Good	55	720456	6607062	53	3	5	2	1	0	0	61	5.1	0.3	0.1	0	0	1	0	18	38	1	1	1	1	1	1	0
T1-MP16	406	2.3	101	Good	55	720349	6607125	210	5	3	1	1	1	0	48.1	60.5	0.1	0.1	0.1	0	5	2	76	12	1	1	0	1	1	1	0
T1-MP28	409	0.82	101	Good	55	706928	6661545	172	3	5	4	1	0	0	19	13.5	0.6	0.1	0	0	1	1	58	68	1	1	1	1	1	1	0
411-BenchA	411	8.76	101	Good	55	111111	1111111	0	5	8	8	9	1	2	50	22	25	5	0	0	3	1	61	48	1	1	1	1	1	1	0
411-BenchB	411	8.76	101	Good	55	111111	1111111	0	5	8	8	9	1	2	50	22	25	5	0	0	3	1	61	48	1	1	1	1	1	1	0
411-BenchC	411	8.76	101	Good	55	111111	1111111	0	5	8	8	9	1	2	50	22	25	5	0	0	3	1	61	48	1	1	1	1	1	1	0
T1-MP26	414	7.32	101	Good	55	707548	6601887	248	1	11	1	0	1	2	0.5	38	0.1	0	0.1	0.7	0	0	35	2	1	1	0	0	0	1	0
T1-MP27	414	7.32	101	Good	55	707474	6601844	255	3	10	1	1	0	0	2.2	58.1	0.1	0.2	0	1	0	0	19	8	1	0	0	0	0	0	0
414_BenchA	414	7.32	101	Good	55	111111	1111111	0	5	11	8	8	1	2	61	28	22	5	0	0	1	1	70	60	1	1	1	1	1	1	0
BM435	435	6.11	101	Good	55	111111	1111111	0	5	8	9	12	1	3	60	22	30	7	1	2	3	1	60	62	1	1	1	1	1	1	0
BM435	435	6.11	101	Good	55	111111	1111111	0	5	8	9	12	1	3	60	22	30	7	1	2	3	1	60	62	1	1	1	1	1	1	0
BM435	435	6.11	101	Good	55	111111	1111111	0	5	8	9	12	1	3	60	22	30	7	1	2	3	1	60	62	1	1	1	1	1	1	0
T2-P28	436	5.98	101	Degraded	55	625240	6445737	10	0	0	10	9	0	1	0	0	1.5	1.9	0	0.1	0	0	1.6	0	0	0	0	0	0	0	0.3
T2-P29	436	5.98	101	Degraded	55	625353	6446480	90	0	0	6	9	1	1	0	0	0.7	1.1	0.1	0.2	0	0	2.6	0	0	0	0	0	0	0	2
T2-SP1	436	5.98	101	Degraded	55	625423	6446921	200	1	0	7	2	0	0	0.1	0	18.3	0.2	0	0	0	0	13	0	0	0	0	0	0	1	1
T2-P20	444	1.11	50	Good	55	665076	6539557	270	4	0	11	8	0	2	15.9	0	15	1.1	0	0.2	6	1	39	36	1	0	0	1	1	1	0.1
T2-P4	473	15.26	101	Good	55	763126	6638011	270	3	2	4	2	0	0	22	0.2	0.3	0.3	0	0.1	3	2	55	31	1	1	1	0	1	1	0.1
T2-P7	473	15.26	101	Good	55	755916	6628401	350	4	2	9	7	0	2	37.1	0.3	1	0.7	0	0.2	3	2	34	18	1	1	1	1	1	1	0.1
T2-P8	473	15.26	101	Good	55	756227	6628551	80	4	5	7	6	1	0	12.5	2.4	28.6	3.6	0.3	0	1	1	34	45	1	1	1	1	0	1	0.3
T1-MP37	589	1.23	101	Good	55	690486	6582956	90	2	1	5	5	0	0	35	0.1	0.8	0.5	0	0	1	1	61	157	1	1	1	1	1	1	0
T2-P35	599	2.21	50	Good	55	621961	6426820	165	2	4	11	16	0	2	24	1.6	3.9	1.7	0	0.4	7	7	39	12	1	1	0	1	1	0	0.4
T2-P36	599	2.21	50	Good	55	622082	6427525	165	2	2	6	13	0	3	22	1.1	5.8	1.8	0	0.3	2	2	61	19	0	0	1	1	1	0	0.3
T2-P2	619	326.26	101	Derived	55	762150	6638148	290	0	1	6	11	0	0	0	0.3	46.9	1.1	0	0	0	0	78	0	0	0	0	0	0	0	0
T2-P3	619	326.26	101	Derived	55	762363	6638717	88	0	2	9	15	0	0	0	0.8	5.9	2.5	0	0	0	0	85	0	0	0	0	0	0	0	0.1
T2-P10	619	326.26	101	Derived	55	755490	6627449	290	0	1	7	10	0	1	0	0.1	6.4	1	0	0.1	0	0	8	3	0	1	0	0	0	0	0.1
T2-P22	619	326.26	101	Derived	55	640822	6489517	95	0	1	8	8	0	0	0	0.1	6.7	1.1	0	0	0	0	1	0	0	0	0	0	0	0	0.1
T2-P4	619	326.26	101	Derived	55	698931	6585384	152	0	0	4	3	0	0	0	0	65.3	0.3	0	0	0	0	1	0	0	0	0	0	0	0	0.3
T1-P6	619	326.26	101	Derived	55	761172	6637537	67	0	1	11	5	0	0	0	0.1	26	0.5	0	0	0	0	0.8	0	0	0	0	0	0	0	0
619-BenchA	619	326.26	101	Derived	55	111111	1111111	0	1	2	7	9	1	1	0	1	102	8	0	0	0	0	18	0	0	0	0	0	0	0	0
T1-BP1	746	2.12	101	Good	55	764934	6632370	0	5	1	6	2	1	2	26	0.1	3.5	0.2	0.1	0.5	1	0	61.4	21	0	1	1	1	1	1	0
T1-BP2	746	2.12	101	Good	55	764950	6632523	0	5	1	5	2	1	3	19.1	0.1	5.8	0.2	0.1	0.4	2	0	69	122	1	1	1	1	1	1	0
T1-MP12	1384	8.77	101	Good	55	732599	6613219	304	4	4	2	3	1	0	42	2.6	2.1	0.3	0.1	0	1	0	84	45	1	1	1	1	1	1	0
1384BenchA	1384	8.77	101	Good	55	111111	1111111	0	5	8	8	9	1	2	50	22	25	5	0	0	3	1	61	48	1	1	1	1	1	1	0
1384BenchB	1384	8.77	101	Good	55	111111	1111111	0	5	8	8	9	1	2	50	22	25	5	0	0	3	1	61	48	1	1	1	1	1	1	0

TECHNICAL REPORT 1

Biodiversity development assessment report

Appendix M EPBC Act assessments of significance

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Koala (*Phascolarctos cinereus*) – vulnerable species

Distribution

The Koala (*Phascolarctos cinereus*) occurs in a range of forest and woodland communities throughout NSW.

Habitat requirements

Habitat occupied by the Koala is associated with vegetation containing nutritionally desirous Myrtaceous species (ie preferred feed tree species) capable of maintaining a positive nitrogen balance of slightly above 1 per cent. In this respect higher value foraging habitat is often associated with vegetation on fertile soils and reliable access to water resources for drought affected regions. Up to 120 feed tree species are known to provide suitable foliage for the Koala although the Koala is known to exhibit regional, local and seasonal preferences (TSSC, 2012).

The size of an individual Koala's home range varies in accordance with two main factors these being the abundance of preferentially utilised food trees, and gender (ie males have larger home ranges than females). Stable populations are characterised by a well-structured network of overlapping adult Koala home ranges. Landscapes exceeding 60-70 per cent native vegetation cover also appear to be linked with population stability, with 150 hectares being the minimum habitat patch area supporting non-declining populations (McAlpine et al. 2006).

Males and females disperse from natal home ranges. Dispersal generally occurs between June and December, with the dispersal of males commencing in July and August and that of females commencing between September and November. Dispersal is likely to be a social behaviour and mating systems of Koala populations provide mechanisms for young Koalas to disperse (Dique et al. 2003).

Habitat in the study area

No Koala individuals were recorded during surveys, however scats were recorded at two locations in the Pilliga: Etoo Creek and Coolangala Creek.

The Pilliga Area of Regional Koala Significance (ARKS) covers much of the alignment in the Pilliga area. It is mapped west from where Yarraman Road meets Pilliga Forest Way to the Baradine area, and also a small area near the Newell Highway. The majority of the ARKS is mapped as being of low functional habitat and low resilience. Most of the ARKS is mapped as having very high threat of impacts from wildfire, heat stress and climate change, high impact from dog attack, and moderate threat from fragmentation and vehicle strike (OEH 2019).

Surveys of the Pilliga forests in the 1990s suggested that the forests were carrying the largest population of Koalas west of the Great Dividing Range in NSW, with the numbers estimated at approximately 15,000. Koalas were most common in the western half of the central Pilliga, fairly common in West Pilliga, and least common in the eastern and southern Pilliga (Kavanagh and Barrott, 2001). A combined series of more recent repeat surveys for Koalas within the Pilliga forests showed a decline of over 80 per cent in both the distribution and activity of Koalas within the forests (Lunney et al. 2017). Although Koalas remain within the forests, they were found in the later surveys to be restricted to moister areas adjacent to creek lines (Kavanagh and Barrott, 2001).

Logistic regression analysis found that Koalas appear to persist better in areas of the Pilliga that are closer to mapped drainage lines with deep soils and high water-holding capacity. Sites with these characteristics tend to occur in the western part of the study area (Lunney et al 2017).

The recent decline of Koalas in the Pilliga is not likely to have been the result of a single short-lived catastrophic event (eg a single heatwave) reducing numbers, but is more likely to have

been the result of ongoing disturbance (eg a prolonged drought), or a series of adverse events (eg a series of heatwaves or large-scale fires) (Lunney et al 2017).

Patchy and isolated records occur elsewhere in the Narromine and Dubbo districts, with a roadside record south of Narromine (EES 2019a).

Koala habitat in the proposal site scores 10, and is thus habitat critical to the survival of the species. This is due to the existence of recent records, the presence of vegetation with two or more feed tree species and a large area of contiguous habitat likely to be important for achieving the interim recovery objectives (DotE 2014).

Table N1: Assessment of significance for the Koala

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	An 'important population' is a population that is necessary for a species' long-term survival and recovery. The Koala population(s) of the Pilliga Forests and Gunnedah must be considered significant at the state scale and of particular importance west of the Great Dividing Range (Predavec 2016). The Koala population of the Pilliga is identified as an Area of Regional Koala Significance (OEH 2019), although one with low resilience. Given recent wildlifes affecting large areas of Koala habitat on the east coast, any remaining Koala habitat is of additional importance. Given these points, the Koala population in the Pilliga is considered an 'important population' for the purpose of this assessment.
Lead to a long-term decrease in the size of an important population of a species	The proposal will remove a total of 1125 hectares of forest and woodland, including about 595 hectares of habitat from within the Pilliga. This clearing will occur as a new 73 kilometres by about 50 metres wide linear gap through the forest. For much of this length, the clearing occurs alongside Pilliga Forest Gap, and would thus substantially widen the existing gap (which is currently about 5 metres wide), or would create two parallel gaps with small linear strip of vegetation in between. Elsewhere in the proposal site, clearing will further fragment small isolated and linear patches of potential Koala habitat. The Pilliga Koala population has undergone recent population declines as a result of logging, wildfires, drought and possibly infection from Tiger Pear wounds. Koalas now tend to occur along drainage lines with deep soils and high water-holding capacity. Sites with these characteristics tend to occur in the western part of the study area (Lunney et al 2017). The proposal crosses many drainage lines through the Pilliga, and would clear 46 hectares of this preferred habitat. The direct impacts on the Pilliga population as a result of the Proposal would likely occur over a long-term duration and be difficult to predict or directly attribute to the Proposal given the recent decline of the population and other ongoing threats. Large areas of potential habitat currently remain in the Pilliga Forests and would continue to provide habitat for the population. Logging is not undertaken along major watercourses in the Pilliga, protecting many of these areas from clearing. Operation of the rail line would affect movement of Koalas and create a risk of mortality from train strike. Many of the creeks would be crossed by bridges, and Koalas would be able to pass safely under the rail line at these locations. In addition, minor drainage lines would be crossed by mostly multicell culverts. Many of these are of a suitable size for Koalas to utilise to cross under the rail line. Fencing and fauna furniture would increase the efficacy of these crossings for Koalas.

Criteria	Discussion
	Based on the above points, the proposal may result in long-term decreases in the Koala population of the Pilliga as the proposal would exacerbate existing threats. This species has already undergone substantial reductions in population size, and the clearing of 1125 hectares of woodland and forest habitat would remove a large area of potential habitat for this population.
Reduce the area of occupancy of an important population	The Pilliga forests cover an areas of about 535,000 hectares, and comprise the single largest remaining tract of native forest and woodland in NSW west of the Great Dividing Range (Predavec 2016). The population within the Pilliga has declined dramatically since the 1990s. The removal of 595 hectares of habitat within this area would not reduce the area of occupancy, given the narrow, linear nature of the proposal.
Fragment an existing important population into two or more populations	The proposal will clear a gap of about 73 kilometres by about 50 metres through the Pilliga, and for much of this length increase the existing gap smaller gap associated with Pilliga Forest Way or create a parallel gap nearby. Operation of the rail line would affect movement of Koalas and create a risk of injury and mortality from train strike. The disruption of home-ranging patterns as a result of habitat fragmentation and degradation, the loss of home-range trees and creation of barriers to movement may result in the disintegration of social structure, potentially contributing to the decline of the population (Phillips 2000). Genetic research has identified major roads as a barrier to gene flow for Koalas (Lee et al 2009; 2010). A new rail line through the Pilliga Forest would create a barrier to movement, affecting home ranges of individual koalas, and impacting movement corridors along better quality riparian habitat. Elsewhere along the alignment, the proposal would fragment habitat links for Koalas seeking to access habitats either side of the rail line. Koalas may attempt to cross the rail tracks, and are at risk of rail strike, although rail traffic initially will be low, and the risk of mortality is also relatively low, although this will increase as train traffic increases over time. Koalas would currently be at some risk of vehicle strike in the Pilliga, although given the low levels of vehicle traffic at night, this risk is likely to also be low. There is likely to be ongoing mortality of Koalas as a result of the proposal, however the Koala occurs at low densities which may minimise the impact. Impacts on gene flow may be mitigated by the presence of a variety of underpasses. Many of the creeks would be crossed by bridges, and Koalas would be able to pass safely under the rail line. In total, 23 bridges creating 2.39 kilometres of underpasses would be constructed in the Pilliga. The average bridge length is 104 metres, with bridges ranging from 30 metres in length to 345 metres in length (Etoo Creek). In addition, minor drainage lines would be crossed by mostly multicell culverts. Many of these are of a suitable size for Koalas to utilise to cross under the rail line. Koalas have been found to prefer riparian habitat in the Pilliga, and thus may be more likely to attempt to cross the rail line where bridges and culverts are located. Fencing and fauna furniture would increase the efficacy of these crossings for Koalas. Based on the above points, the proposal has the potential to fragment the population, although the ability of Koalas to cross the rail line and use underpasses created by bridges and culverts would allow continued gene flow across the proposal.

Criteria	Discussion
Adversely affect habitat critical to the survival of a species	Habitat in the Pilliga is considered critical to the survival of the Koala. This is due to the existence of recent records, vegetation with two or more feed trees present, presence of a large areas of contiguous habitat, and habitat present is likely to be important for achieving the interim recovery objectives (DotE 2014). The proposal would remove up to 595 hectares of Koala habitat from the Pilliga, and create a barrier that has the potential to reduce gene flow across the proposal site.
Disrupt the breeding cycle of an important population	Koalas live in breeding aggregations, generally comprising a dominant male, a small number of mature females, as well as juveniles of various ages (Phillips 1997). The home range of koalas varies depending on the quality of the habitat and the number of available food trees. In the Pilliga State Forest of central-western NSW, the average home range is 10–15 hectares (DECC 2008). The home range of the dominant male generally overlaps extensively with the home ranges of several females (DECC 2008). Adult koalas generally exhibit long-term fidelity to their individual home range areas (Mitchell 1990). Males and females disperse from natal home ranges, with dispersal of males commencing in July and August and that of females commencing between September and November (Dique et al. 2003). Koalas are known to adjust home ranges in response to road construction (AMBS 2011), and this is likely to be similar for rail construction. Clearing would likely affect a single breeding cycle of Koalas along the alignment if Koalas are using the proposal site for breeding. Removal of habitat would permanently affect breeding habitat in the proposal site, however large areas of habitat are present in adjacent areas. Dispersal events would be affected throughout operation, as the rail line would create a semi-permeable barrier to movement. Impacts on movement may be mitigated by the presence of a variety of underpasses, including bridges and culverts. Bridges in particular would provide safe crossing opportunities as they cover a wide expanse. Culverts are spread throughout the alignment in the Pilliga, and a high proportion of these are of a suitable size for Koalas to utilise to cross under the rail line. The proposal would impact breeding ok Koalas that occur near the proposal site, but are unlikely to affect the breeding cycle of the population as a whole.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove up to 595 hectares of habitat from within the Pilliga areas, and a total of 1125 hectares of woodland and forest across the proposal site. In the Pilliga this clearing will occur as a new 73 kilometres x 50 metres wide linear gap through the forest. For much of this length, the clearing occurs alongside or near Pilliga Forest Way, and would thus substantially widen the existing gap, which is about 5 metres wide, or create a second gap in close proximity to this existing gap. Elsewhere in the proposal site, clearing will further fragment small isolated and linear patches of potential Koala habitat. This large area of clearing and fragmentation would further reduce the availability of habitat, particularly in the Pilliga, and may further add to the decline of the species.

Criteria	Discussion
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Introduction of weeds is of particular concern in the Pilliga Forests as they can reduce quality of vegetation and thus impact fauna and flora habitats. Weeds such as the Tiger Pear, which is currently common in the Pilliga, may pose an infection risk to Koalas, and further spread of this weed through the alignment would further impact habitat for the Koala. Predator species have been shown to prefer moving down linear clearings, and therefore, clearings could increase predation risk for other species (Dawson et al 2017). The creation of a 73 kilometres linear gap through the Pilliga may increase the risk of fox predation on Koalas. There is little risk of establishment of predators elsewhere in the alignment as a result of the proposal.
Introduce disease that may cause the species to decline	The decline in Koala numbers in the Pilliga and Gunnedah areas post 2006 coincided with a significant heatwave experienced in the region in 2009. This extreme weather event saw above average temperatures in the region, and importantly the high temperatures occurred over strings of successive days rather than simply isolated days. The weather event saw an estimated 25 per cent of the koala population of the Gunnedah region die and an increase in the expression of symptoms of Chlamydia infection (Lunney et al., 2012). While the proposal is unlikely to introduce disease, further threats including clearing of habitat and impacts on movement may further affect Koala resilience. This could similarly lead to an increase in expression of symptoms of Chlamydia infection, further impacting the health of the remaining population.
Interfere substantially with the recovery of the species	Loss, fragmentation and degradation of habitat are the most important threats to Koalas throughout their range. The disruption of home-ranging patterns as a result of habitat fragmentation and degradation, the loss of home-range trees and creation of barriers to movement may result in the disintegration of social structure, potentially contributing to the decline of the population (Phillips 2000). The proposal will remove a large area of Koala habitat, particularly from within the Pilliga forest which is regionally significant habitat for the species. The construction and operation of the rail line will fragment habitat and create a barrier to movement. Some Koalas would likely cross the tracks or use bridges and culverts to cross under the rail line, and thus gene flow across the proposal site is likely to continue. Despite, this, there is likely to be impacts on dispersing individuals, and some individuals may have their home range fragmented. Given the large area of regionally significant habitat that would be removed, the proposal may interfere with the recovery of the Koala.
Conclusion	The proposal is likely to have a significant impact on the Koala given: • A total of up to 1125 hectares of woodland and forest habitat would be removed across the entire proposal • Large areas of habitat would be cleared from within the Pilliga (595 hectares, of which 46 hectares comprises riparian woodland), which is regionally significant for the species and an areas where the species is in decline due to fire and drought • The proposal would further fragment habitat through widening of gaps in vegetation elsewhere along the alignment • The proposal would create a barrier to movement, although there would be opportunities for Koalas to cross safely under the rail line along riparian areas via bridges and culverts • Koalas would be at risk of mortality through train strike, although this would be mitigated by the presence of bridges and culverts.

Pilliga Mouse (*Pseudomys pilligaensis*) – vulnerable species

Distribution

The Pilliga Mouse is restricted to the Pilliga Forests and Timallallie National Park. There is one record from the Warrumbungles National Park (EES 2019a).

Habitat requirements

Within the Pilliga region this species is largely restricted to low-nutrient deep sand soils which are recognised as supporting a distinctive vegetation type referred to as the Pilliga Scrub (EES 2019b). It appears to prefer areas with sparse ground cover (EES 2019b). It is nocturnal, seeking refuge in burrows (EES 2019b).

The Pilliga Mouse is found in greatest abundance in recently burnt moist gullies, areas dominated by Broombush (*Melaleuca uncinata*) and areas containing an understorey of *Acacia burrowii* with a *Corymbia trachyphloia* overstorey. Consistent features of the latter two habitats were: a relatively high plant species richness; a moderate to high low-shrub cover; site moisture retention; and groundcover of plants, litter and fungi. Areas with high rates of capture have extensive low grasses and sedges, with little shrub cover and large areas of ash-covered ground (Fox & Briscoe 1980; NSW DECC 2005ad; Tokushima et al. 2008).

Studies suggest that its population erupts when environmental conditions are favourable before suddenly declining (Tokushima et al. 2008).

Habitat in the study area

Broadly suitable foraging habitat occurs throughout the Pilliga Forests (Paull et al 2014), but the species distribution is influenced by site specific factors, including local floristic variation, and different disturbance and fire histories across the forest.

The potential distribution of 'important habitat' for the Pilliga Mouse was mapped by Paull et al (2014) based on floristic and structural preferences and presented as a predictive map. Much of this habitat is located to the south-east of the proposal site in the Pilliga, with some to the north-west. Much of the alignment appears to pass through gaps in important habitat, however the proposal would impact some areas mapped by Paull et al (2014).

The proposal will remove a total of 624 hectares of woodland and forest from within the Pilliga forest which is potential habitat for the Pilliga Mouse, including 29 hectares of PCT 141, a preferred breeding habitat, and 457 hectares of PCTs that contain *Acacia burrowii* and *Corymbia trachyphloia*, also identified as habitat for this species.

Table N2: Assessment of significance for the Pilliga Mouse

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	An 'important population' is a population that is necessary for a species' long-term survival and recovery. The Pilliga Mouse population is considered an 'important population' as the species only occurs in the Pilliga area.

Criteria	Discussion
Lead to a long-term decrease in the size of an important population of a species	Broadly suitable habitat occurs throughout the Pilliga Forests, but the species distribution is influenced by site specific factors, including local floristic variation, and different disturbance and fire histories across the forest (Paull et al 2014). Some patches of PCT 141 Broombush (*Melaleuca uncinata*) have been found to sustain breeding animals and all-year occupancy, however some patches do not, and this is likely due to fire history, with young (1.5-3) year regrowth and old regrowth (>25 years) selected preferentially by the species (Paull et al 2014). The proposal will remove a total of 624 hectares of woodland and forest from within the Pilliga forest which is potential habitat for the Pilliga Mouse, including 29 hectares of PCT 141, a preferred breeding habitat, and 457 hectares of PCTs that contain *Acacia burrowii* and *Corymbia trachyphloia*, also identified as habitat for this species. This clearing will occur as a new 73 kilometres x 50 metres wide linear gap through the forest. For much of this length, the clearing occurs alongside or near Pilliga Forest Way, and would thus substantially widen the existing gap (which is about 5 metres wide), or create two parallel gaps with small patches of vegetation in between. The potential distribution of 'important habitat' for the Pilliga Mouse was mapped by Paull et al (2014) based on floristic and structural preferences of the Pilliga Mouse and was presented as a predictive map. Much of this habitat is located to the south-east of the proposal site in the Pilliga, with some to the north-west. Much of the alignment appears to pass through gaps in important habitat, however the proposal would impact some areas mapped by Paull et al (2014). The Pilliga Mouse is terrestrial and lives in burrows and is at high risk of injury and mortality during construction. The proposal will result in the clearing of a large area of potential habitat in the Pilliga, and would create a gap that may impact movement of individuals, and thus may impact gene flow between areas of important habitat. The proposal has the potential to lead to a long-term decrease in the size of the important population.
Reduce the area of occupancy of an important population	The extent of possible habitat for the Pilliga Mouse covers some 106 800 hectares in the Pilliga State Forest and State Conservation Areas at any one time, although not all of this area would actually be suitable as important habitat due to local floristic variation and different disturbance and fire histories across the forest (Paull et al 2014). Milledge (2011) showed that within a broad area identified as possible habitat only 20 per cent on average was suitable for the Pilliga Mouse. The proposal will remove a total of 624 hectares of woodland and forest from within the Pilliga forest, including 29 hectares of PCT 141, which has been shown to support breeding and provides year-round occupancy. This clearing will occur as a new 73 kilometres x 50 metres wide linear gap through the forest, and would exacerbate existing clearings such as Pilliga Forest Way. The proposal is likely to reduce the area of occupancy given the large amount of vegetation clearing within potential and known habitat.

Criteria	Discussion
Fragment an existing important population into two or more populations	The proposal will clear a gap of about 73 kilometres by 50 metres through the Pilliga, and for much of this length increase the existing gap associated with Pilliga Forest Way. Operation of the rail line may affect movement of the Pilliga Mouse and create a risk of injury and mortality from train strike. Paull et al (2014) mapped areas of important habitat for the species. The majority of important habitat occurs south-east of the proposal site and east of the Newell Highway, however areas do occur to the north-west of the rail line. The Newell Highway is a major barrier between the eastern and western portions of the areas of important habitat. The proposal would create another major barrier for areas to the north-west and could fragment the important population into two or more populations. Impacts on gene flow may be mitigated by maintaining habitat connectivity through the construction of a variety of underpasses. Drainage lines would be crossed either by bridges or culverts. In total, 23 bridges and over 130 culverts are included in the design. Many of these are multicell culverts and have an average width of about 13 metres. These will be dry for the majority of the time. Seven drainage culverts are located within PCT141 (Broombrush - wattle very tall shrubland), totalling 61 metres in length. Ten culverts totalling 122 metres are located within 200 metres of this vegetation type. Many other culverts are located in other PCTs in which this species has been associated with (EES 2020). Dedicated culverts will be located in PCT 141 to provide additional crossing points for this species. Their size and number will be determined during detailed design. Tokushima and Jarman (2008) measured average movement distances of 50 metres (range 0–181 metres) for recaptured individuals, however, larger movement patterns cannot be disregarded, particularly during dispersal. Most culverts in the Pilliga will be 7.3 metres wide (perpendicular to the rail). One crossing loop is located in the Pilliga and culverts in this location will be 18.3 metres wide. Based on the average movement distances, this species is likely to be able to cross the rail line using culverts as 7.3 metres is well within the average movement distance of the species, however crossings depend on the willingness of the species to use culverts. Monitoring of culverts is recommended to assess usage and efficacy of the structures. Revegetation is proposed at culverts to encourage use by fauna. For many small- and medium-sized mammals drainage culverts can mitigate the potentially harmful effects of transport corridors by providing a vital habitat linkage (Clevenger et al 2002). A variety of predators have been found using wildlife passages regularly, for movement or as part of their territories, and this has been suggested as evidence of hunting behaviour or higher predator concentration at underpasses. Little et al (2002) found no evidence of passages commonly being exploited as prey-traps, however, no studies specifically examined predation rates in or near passages compared to areas further away. The potential for predators to use the rail corridor as a means of moving through the area, and their use of culverts may increase the risk of predation for the Pilliga Mouse.

Criteria	Discussion
Adversely affect habitat critical to the survival of a species	The potential distribution of “important habitat” for the Pilliga Mouse was mapped by Paull et al (2014) based on floristic and structural preferences and presented as a predictive map. Much of this habitat is located to the south-east of the proposal site in the Pilliga, with some to the north-west. Much of the alignment appears to pass through gaps in important habitat, however the proposal would impact some areas mapped by Paull et al (2014). The proposal has the potential to create a barrier to movement between areas of important habitat, although culverts and bridges may assist in retaining connectivity.
Disrupt the breeding cycle of an important population	The peak breeding season occurs from October to April. Studies suggest that its population erupts when environmental conditions are favourable before suddenly declining (Tokushima et al. 2008). A significant correlation between numbers of Pilliga Mice, in particular breeding sites and a well-developed low shrub cover < 50 cm high was observed by Paull (2009). Habitats having this type of cover, in particular Broombush and Kurricabah/Bloodwood scrublands were the only habitats where burrows of this species were detected. Pilliga Mice showed a preference for early and late post-fire stages of vegetation and an avoidance of intermediate age habitats post fire (5-15 years old) probably due to an absence of suitable low shrub cover in this age class (Paull 2009). Construction and operation of the proposal may potentially have an impact on the breeding cycle over the longer term if the proposal affects the species’ ability to move between preferred and important habitat areas. Is unlikely to affect the breeding cycle of the important population, other than for a single season during construction for individuals that may occur near the rail line.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove a total of 624 hectares of woodland and forest from within the Pilliga forest, including 29 hectares of PCT 141, which is important breeding habitat for the species, and 457 hectares of PCTs that contain *Acacia burrowii* and *Corymbia trachyphloia*, also identified as habitat for this species. This clearing will occur as a new 73 kilometres x 50 metres wide linear gap through the forest. In some locations this would be adjacent to the existing 5 metres wide gap created by Pilliga Forest Way, while in other locations two parallel gaps would be created with linear strips of vegetation in between. Habitat for the Pilliga Mouse is not homogenous through the forest, and occurs as small patches depending on disturbance history. The proposal would fragment areas of preferred habitat and reduce their size. For much of the alignment through the Pilliga, the clearing occurs alongside Pilliga Forest Way, and would thus substantially widen the existing gap. Elsewhere in the proposal site, clearing will further fragment small isolated and linear patches of potential Pilliga Mouse habitat. The rail line would create a hostile gap and has the potential to limit gene flow across the rail line. The 23 bridges and 130 culverts spread along the alignment in the Pilliga would mitigate this if they are located in habitat of relevance and if the Pilliga Mouse uses them. The feasibility of culvert heights to facilitate the movement of Pilliga Mouse is currently being investigated for the proposal. This large area of clearing and fragmentation would further reduce the availability of habitat, particularly in the Pilliga, and may further add to the decline of the species.

Criteria	Discussion
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Introduction of weeds is of particular concern in the Pilliga Forests as they can reduce quality of vegetation and thus impact fauna and flora habitats. Weeds such as the Tiger Pear, are already common in the Pilliga, and may be further spread during construction. Operation of the proposal has the potential to spread weeds and pests into the Pilliga. The surroundings of railways (eg verges and embankments) often host a high diversity of non-native species (Gelbard and Belnap 2003; Hansen and Clevenger 2005), in many cases due to their transportation as stowaways in or on trains. Predation by feral species may be a threat to this species. Predator species have been shown to prefer moving down linear clearings, and therefore, clearings could increase predation risk for other species (Dawson et al 2017). The creation of a 73 kilometres linear gap through the Pilliga may increase the risk of fox and cat predation. There is little risk of establishment of predators elsewhere in the alignment as a result of the proposal.
Introduce disease that may cause the species to decline	The proposal is unlikely to introduce disease into the Pilliga that may cause the species to decline.
Interfere substantially with the recovery of the species	The Pilliga Mouse is predominantly restricted to the Pilliga, and located in areas subject to habitat loss and disturbance as a result of logging and gas exploration activities. Removal of habitat and predation by feral predators are significant threats to this species. The proposal will remove a total of 624 hectares of woodland and forest that is potential habitat for the species, including 29 hectares of PCT 141 and 457 hectares of PCTs that contain *Acacia burrowii* and *Corymbia trachyphloia*. This clearing will occur as a new 73 kilometres x 50 metres wide linear gap through the forest, exacerbating current fragmentation and further reducing habitat connectivity. Given the large area of clearing within the Pilliga, the proposal has the potential to interfere substantially with the recovery of the species.
Conclusion	The proposal is likely to have a significant impact on the Pilliga Mouse as: • The proposal will remove a total of 624 hectares of woodland and forest from within the Pilliga forest which is potential habitat for the species, including 29 hectares of PCT 141 (preferred breeding habitat) and 457 hectares of PCTs that contain *Acacia burrowii* and *Corymbia trachyphloia*, also identified as habitat for this species. • This clearing will occur as a new 73 kilometres x 50 metres wide linear gap through the forest, impacting connectivity of habitat, and will exacerbate existing clearing and fragmentation already present in the forest. • The creation of a 73 kilometres linear gap through the Pilliga may increase the risk of fox and cat predation by facilitating predator movements. • Small patches of preferred breeding and foraging habitat would become fragmented and isolated. • While culverts and bridges would provide some connectivity, there is likely to be a reduction in gene flow across the rail line.

Corben's Long-eared Bat (*Nyctophilus corbeni*) – vulnerable species

Distribution

Distribution of the species coincides approximately with the Murray Darling Basin, with the Pilliga Scrub region being the distinct stronghold for this species (EES 2019b).

Habitat requirements

Corben's Long-eared Bat inhabits a variety of vegetation types, including mallee, Bulloke (*Allocasuarina leuhmanni*) and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland. It roosts in tree hollows, crevices, and under loose bark (EES 2019b). The species avoids roosting in commercially thinned stands and selected old regrowth (Law et al 2016) and prefers larger remnants with a well-developed understorey (Turbill and Ellis 2006).

Habitat in the study area

One individual was trapped at Coolangala Creek (Trap site 1) in the Pilliga during surveys for the proposal. Calls of *Nyctophilus* species were also recorded at Rocky Creek (Trap site 6) and Trap Site 5 in the Pilliga, and sites near Narromine, although the precise species cannot be determined by Anabat analysis. The Lesser Long-eared bat (*N. geoffroyi*) was also trapped in the Pilliga and near Gilgandra during surveys.

Table N3: Assessment of significance for Corben's Long-eared Bat

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	An 'important population' is a population that is necessary for a species' long-term survival and recovery. Corben's Long-eared Bat has a scattered distribution mostly within the Murray-Darling Basin, with its stronghold occurring in the Pilliga Scrub (EES 2019b). As such, the population that occurs in the Pilliga area is considered an important population.
Lead to a long-term decrease in the size of an important population of a species	Construction would require the permanent removal of a maximum area of 1125 hectares of woodland and forest habitat, including 624 hectares from the Pilliga. An estimated 13,000-30,000 hollow-bearing trees are likely to be removed, which are a critical breeding component of this species' habitat. Clearing of this forest and woodland vegetation would permanently remove foraging and breeding resources for Corben's Long-eared Bat. Clearing of vegetation has the potential to result in significant mortality of roosting individuals given the high number of hollow-bearing trees that would be removed. The Pilliga forests cover an areas of about 535,000 hectares, and comprise the single largest remaining tract of native forest and woodland in NSW west of the Great Dividing Range (Predavec 2016). While the proposal would remove a large area of habitat for this species, this is a small proportion of available habitat in the Pilliga area. Given the Pilliga is considered a stronghold for the species, the loss of 1125 hectares of woodland and forest and up to 30,000 hollow-bearing trees are likely to lead to a long-term decrease in the size of an important population of a species.

Criteria	Discussion
Reduce the area of occupancy of an important population	Corben's Long-eared Bat is known from a large area of central NSW, within the Murray-Darling Basin. The loss of 1125 hectares of habitat along 300 kilometres alignment would not reduce the area of occupancy of the important population.
Fragment an existing important population into two or more populations	The proposal will create a new linear gap through the Pilliga forests, exacerbating the existing impacts on connectivity created by Pilliga Forest Way and the Newell Highway. Corben's Long-eared Bat is a slow flying agile bat, utilising the understorey to hunt non-flying prey. This species is at risk of injury and mortality from train strike during operation of the rail line. Given the low numbers of trains that would travel through the Pilliga at night, and the large areas of available habitat, this risk is considered to be relatively low. Given the mobility of the species and large area of available habitat, the proposal is unlikely to fragment an existing important population into two or more populations.
Adversely affect habitat critical to the survival of a species	This species inhabits a range of vegetation types, and is more common in box/ironbark/cypress-pine vegetation that dominates the Pilliga area. Habitat critical to its survival comprises hollow-bearing trees, which are a limiting resource. Logging and wildfires have impacted the availability of hollow-bearing trees. The proposal would clear 1125 hectares of woodland and forest habitat, including an estimated 13,000-30,000 hollow-bearing trees. Given the large numbers of hollow-bearing trees that would be removed, and the large extent of foraging habitat from within the Pilliga which is the species' stronghold, the proposal is likely to adversely affect habitat critical to the survival of a species.
Disrupt the breeding cycle of an important population	Corben's Long-eared Bat mates in autumn, and young are born in late spring to early summer. Hollow-bearing trees are required for breeding. Construction would remove a significant number of hollow-bearing trees from an area of habitat which represents a stronghold for the species. Noise from construction may impact breeding success in adjacent areas for one breeding season, and train traffic would create a novel noise in the Pilliga forests and elsewhere which would create a novel noise impact and could disrupt breeding near the proposal. Given these points, the proposal is likely to disrupt a single breeding cycle of the important population.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Construction would require the permanent removal of a maximum area of 1125 hectares of woodland and forest habitat, including a significant number of hollow-bearing trees. Clearing of this forest and woodland vegetation would permanently remove foraging and breeding resources for Corben's Long-eared Bat, and would have a substantial impact on the species' stronghold of the Pilliga forest. Clearing of vegetation has the potential to result in significant mortality of roosting individuals given the high number of hollow-bearing trees that would be removed. This species is at risk of injury and mortality from train strike during operation of the rail line. Given the low numbers of trains that would travel through the Pilliga at night, and the large areas of available habitat, this risk is considered to be relatively low. Given the large area of habitat and significant number of hollow-bearing trees to be removed, the proposal has the potential to lead to a decline of the species.

Criteria	Discussion
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Introduction of weeds is of particular concern in the Pilliga Forests as they can reduce quality of vegetation and thus impact fauna and flora habitats. Operation of the proposal has the potential to spread weeds and pests into the Pilliga. Introduction and spread of weeds is unlikely to substantially impact foraging habitat for this species. Predator species have been shown to prefer moving down linear clearings, and therefore, clearings could increase predation risk for other species (Dawson et al 2017). The creation of a 73 kilometres linear gap through the Pilliga may increase the risk of fox and cat predation, although this risk would be low for this species. There is little risk of establishment of predators elsewhere in the alignment as a result of the proposal.
Introduce disease that may cause the species to decline	The proposal is unlikely to introduce disease into the Pilliga that may cause the species to decline.
Interfere substantially with the recovery of the species	The key threats to the viability of this species are loss, fragmentation and degradation of habitat. The proposal would clear 1,125 hectares of woodland and forest habitat, including a significant number of hollow-bearing trees, which are a critical component of this species' habitat. A large area of habitat (624 hectares) would be removed from the species' stronghold in the Pilliga. The proposal therefore has the potential to interfere with the recovery of the species.
Conclusion	The proposal is likely to have a significant impact on Corben's Long-eared Bat as: • Construction would require the permanent removal of a maximum area of 1,125 hectares of woodland and forest habitat, with 624 hectares of this clearing occurring in the species' stronghold in the Pilliga • An estimated 13,000-30,000 hollow-bearing trees would be removed. Hollow-bearing trees are a limiting resource essential for breeding, and logging and fire have already affected their density in the forest. • Clearing of vegetation has the potential to result in significant mortality of roosting individuals given the high number of hollow-bearing trees that would be removed within the species habitat stronghold. • Operation of trains has the potential to result in mortality from train strike, although this risk is low due to the low number of trains likely to pass through the forest at night.

Large-eared Pied Bat (*Chalinolobus dwyeri*) – vulnerable species

Distribution

The Large-eared Pied Bat is found mainly in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. It is generally rare with a very patchy distribution in NSW. There are scattered records from the New England Tablelands and North West Slopes (EES 2019b).

Habitat requirements

The Large-eared Pied Bat roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (*Petrochelidon ariel*), frequenting low to mid-elevation dry open forest and woodland close to these features. Three communal maternity roosts are known from caves in the Pilliga Sandstone region (Pennay 2008), including sandstone outcrops in Pilliga Nature Reserve, about 35 kilometres to the east of Baradine.

Almost all records of the species are within several kilometres of cliff lines or rocky terrain, in fertile wooded valley habitat. This species has been recorded foraging in a range of vegetation types, including dry and wet sclerophyll forest, grassy woodland, Callitris dominated forest, tall open eucalypt forest with a rainforest sub-canopy, sub-alpine woodland and sandstone outcrop country (DERM 2011). Wing morphology suggests that it is a relatively slow-flying manoeuvrable species that forages predominantly below the canopy.

Habitat in the study area

Anabat surveys of six sites in the Pilliga by Law et al (2011) recorded only one call of this species over 920 hours of sampling. No individuals were trapped.

During the March 2019 surveys in the Pilliga for the proposal, probable calls of this species were recorded at Coolangala Creek (Trap site 1). No other evidence of this species was recorded along the alignment.

The Large-eared Pied Bat would forage in the Pilliga, particularly where forested habitat is in close proximity to sandstone outcrops. No sandstone outcrops suitable for breeding are located within 2 kilometres of the alignment.

Table N4: Assessment of significance for the Large-eared Pied Bat

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	An 'important population' is a population that is necessary for a species' long-term survival and recovery. The population associated with sandstone caves of the Pilliga is considered an important population.

Criteria	Discussion
Lead to a long-term decrease in the size of an important population of a species	The proposal would not impact any breeding or roosting habitat. No sandstone caves with dome roofs occur within 2 kilometres of the proposal site. Sandstone caves are known from Dandry Gorge and Pilliga Nature Reserve, about 35 kilometres to the east of Baradine. During the March 2019 surveys in the Pilliga for the proposal, probable calls of this species were recorded at Coolangala Creek. No other evidence of this species was recorded along the alignment. The proposal is located well away from sandstone caves and fertile wooded valley habitat. Occasional individuals may forage along the alignment. The proposal would remove 624 hectares of forested habitat, including 46 hectares of riparian habitat from within the Pilliga forests. This is not considered preferred habitat given the distance from sandstone caves. Given there would be no impact on roosting and breeding habitat, and potential foraging habitat to be removed is not located near sandstone cliffs and fertile wooded valley habitat within close proximity of each other, the proposal is unlikely to lead to a long-term decrease in the size of an important population of a species.
Reduce the area of occupancy of an important population	The large-eared pied bat is known from Shoalwater Bay, north of Rockhampton, QLD, south to the vicinity of Ulladulla in NSW, and west to the Pilliga (DERM 2011). The removal of a narrow linear area of habitat from within the Pilliga would not reduce the area of occupancy of the important population
Fragment an existing important population into two or more populations	The proposal will create a new linear gap through the Pilliga forests, exacerbating the existing impacts on connectivity created by Pilliga Forest Way and the Newell Highway. The Large eared Bat is a slow flying agile bat that forages below the canopy (DERM 2011). This species is at risk of injury and mortality from train strike during operation of the rail line. Given the low numbers of trains that would travel through the Pilliga at night, and the large areas of available habitat, this risk is considered to be relatively low. Given the mobility of the species and large area of available habitat, the proposal is unlikely to fragment an existing important population into two or more populations.
Adversely affect habitat critical to the survival of a species	The structure of maternity roosts appears to be very specific (arch caves with dome roofs). Caves need to be high and deep enough to allow juvenile bats to learn to fly safely inside and have indentations in the roof. Roosting bats cluster in these indentations, presumably to allow the capture of heat. These physical characteristics are very uncommon in the landscape and their scarcity presumably poses an important limiting factor in the distribution of the large-eared pied bat (Pennay 2008, DERM 2011) Sandstone cliffs and fertile wooded valley habitat within close proximity of each other should be considered habitat critical to the survival of the large-eared pied bat (DECC 2007). There would be no impact on roosting and breeding habitat, and potential foraging habitat to be removed is not located near sandstone cliffs and fertile wooded valley habitat within close proximity of each other. As such, the proposal would not adversely affect habitat critical to the survival of this species.

Criteria	Discussion
Disrupt the breeding cycle of an important population	Females have been recorded raising young in maternity caves (c. 20-40 females) from November through to January. They remain loyal to the same cave over many years (DERM 2011). The proposal would not impact any maternity caves or roost sites, and is unlikely to impact the movement of this species between breeding, roosting and foraging areas. As such, the proposal is unlikely to disrupt the breeding cycle of an important population.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal is located well away from sandstone caves and fertile wooded valley habitat. Occasional individuals may forage along the alignment. The proposal would remove 624 hectares of forested habitat, including 46 hectares of riparian habitat from within the Pilliga forests. This is not considered preferred habitat given the distance from sandstone caves. This species is at risk of injury and mortality from train strike during operation of the rail line. Given the low numbers of trains that would travel through the Pilliga at night, and the large areas of available habitat, this risk is considered to be relatively low. Given there would be no impact on roosting and breeding habitat, and potential foraging habitat to be removed is not located near sandstone cliffs and fertile wooded valley habitat within close proximity of each other, the proposal is unlikely to lead to a long-term decline of the species.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Introduction of weeds is of particular concern in the Pilliga Forests as they can reduce quality of vegetation and thus impact fauna and flora habitats. Operation of the proposal has the potential to spread weeds and pests into the Pilliga. Introduction and spread of weeds is unlikely to substantially impact foraging habitat for this species. Predator species have been shown to prefer moving down linear clearings, and therefore, clearings could increase predation risk for other species (Dawson et al 2017). The creation of a 73 kilometres linear gap through the Pilliga may increase the risk of fox and cat predation, although this risk would be low for this species. Given the lack of breeding habitat near the alignment, the risk of impact from feral predators is negligible.
Introduce disease that may cause the species to decline	The proposal is unlikely to introduce disease into the Pilliga that may cause the species to decline.
Interfere substantially with the recovery of the species	The overall objective of the recovery plan for the Large-eared Pied Bat is to ensure the persistence of viable populations throughout its geographic range. Important actions comprise protection of maternity roosts (DERM 2011). Given there would be no impact on roosting and breeding habitat, and potential foraging habitat to be removed is not located near sandstone cliffs and fertile wooded valley habitat within close proximity of each other, the proposal is unlikely to interfere substantially with the recovery of the species.

Criteria	Discussion
Conclusion	The proposal is unlikely to result in a significant impact on the Large-eared Pied Bat as: • There would be no impact on roosting and breeding habitat • Potential foraging habitat to be removed is not preferred habitat (not located near sandstone cliffs and fertile wooded valley habitat within close proximity of each other) • While this species is at risk of injury and mortality from train strike during operation of the rail line, this risk is considered to be relatively low given the low numbers of trains that would travel through the Pilliga at night, and the large areas of available habitat. • Clearing of a 50 metres wide gap in the forest (and exacerbation of the existing gap) would not affect movement between foraging and breeding and roosting habitat.

Five-clawed Worm-skink (*Anomalopus mackayi*) – vulnerable species

Distribution

The Five-clawed Worm-skink has a patchy distribution on the North West Slopes and Plains of north-east NSW and south-east Queensland (EES 2019b). The species' known distribution in NSW is confined to the Namoi River and Gwydir River floodplains and the lower north-western slopes of the Great Dividing Range (DEE 2019b).

Habitat requirements

The Five-clawed Worm-skink is found in open woodland areas with low grass cover (usually between 5 to 10 cm) and scattered eucalypts, generally supported by redblack to black clay-loam soils (NPWS 1999). It occurs close to or on the lower slopes of slight rises in grassy White Box woodland on moist black soils, and River Red Gum-Coolibah-Bimble Box woodland on deep cracking loose clay soils (EES 2019b). Individuals also occur in open grassy paddocks with scattered eucalypts and moist black soil (NPWS 1999). It uses fallen logs and timber as sheltering sites and digs in loose soil to create permanent tunnel-like burrows (NPWS 1999).

The species shelters at the soil surface where moisture is sufficiently retained under decaying leaf litter, coarse woody debris or artificial debris. The species also lives in cavities in rotting tree bases, logs and in tussock bases.

Habitat in the study area

Scattered records of the Five-clawed Worm-skink occur from the Narrabri area north (EES 2019a). Limited areas of potential habitat occur in the proposal site given the clearing for agriculture and industry in this area.

Grey, Brown and Red clays occur north from the Namoi River (chainage 845.3 – 850.5), and Black Earths occur in the vicinity of Killarney Gap Road (chainage 850.5-852.0). About 6.7 kilometres of the proposal intersects with appropriate soil profiles for this species.

North of Wee Waa Road the proposal is predominantly located in cropped or highly modified land with minimal connectivity to areas of better quality habitat. The Five-clawed Worm-skink is highly unlikely to persist in this area.

South of Wee Waa Road, the proposal passes through cropped or highly modified land, as well as areas of PCT 78 River Red Gum riparian tall woodland, PCT 619 Derived Wire Grass grassland, and PCT 168 Derived Copperburr shrubland. Given the lower intensity of farming and presence of some remnant vegetation and paddock trees, there is potential for this species to occur. The Narrabri bridge will be located from north of Wee Waa Road south to Yarrie Lake Road (the Namoi River floodplain), and will cross about 2.73 kilometres of this area of potential habitat (ie all habitat south of Narrabri Creek), with an impact area of 7.27 hectares. This bridge will span agricultural land, and of the 7.27 hectares of native grassland located under the bridge, only 0.08 hectares would be directly impacted by the piers, and of the 1.51 hectares of riparian woodland located under the bridge, 0.04 hectares would be directly impacted by the piers. As such, connectivity of habitat will be retained in this area, although construction of piers would remove some potential habitat.

Table N5: Assessment of significance for the Five-clawed Worm-skink

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	An 'important population' is a population that is necessary for a species' long-term survival and recovery. Given that this species is difficult to detect and population information is limited, important habitat is taken as a surrogate for important populations. Important habitat includes habitat near the limit of the species' known range (DSEWPAC 2011). Given the proposal is located at the southern edge of the species' range and there are records in the Narrabri area, an important population is considered likely to be present in the proposal site.
Lead to a long-term decrease in the size of an important population of a species	On the floodplains within its range in north-eastern NSW, the Five-clawed Worm-skink occurs in grasslands and grassy, open woodlands on heavy black and grey, alluvial cracking clay soils. All suitable habitat within floodplains and riparian zones, uncultivated grassy headlands and strips between cropped areas, road reserves, travelling stock routes and remnant vegetation on vacant lands is considered important habitat for this species (DSEWPAC 2011). Potential habitat for the species is present in the Narrabri area. Grey, Brown and Red clays occur north from the Namoi River (chainage 845.3 – 850.5), and Black Earths occur in the vicinity of Killarney Gap Road (chainage 850.5-852.0). About 6.7 kilometres of the proposal intersects with appropriate soil habitat for this species. North of Wee Waa Road the proposal is predominantly located in cropped or highly modified land with minimal connectivity to areas of better quality habitat. The Five-clawed Worm-skink is highly unlikely to persist in this area. South of Narrabri Creek, the proposal passes through cropped or highly modified land, as well as areas of PCT 78 River Red Gum riparian tall woodland, PCT 619 Derived Wire Grass grassland, and PCT 168 Derived Copperburr shrubland. Given the lower intensity of farming and presence of some remnant vegetation and paddock trees, there is potential for this species to occur. The Narrabri bridge will be located from north of Wee Waa road south to Yarrie Lake Road (the Namoi River floodplain), and will cross about 2.73 kilometres of this area of potential habitat south of Narrabri Creek, with an impact area of 7.27 hectares. This bridge will span agricultural land, and of the 0.6 hectares of native grassland located under the bridge, only 0.08 hectares would be directly impacted by the piers, and of the 1.51 hectares

Criteria	Discussion
	of riparian woodland located under the bridge, 0.04 hectares would be directly impacted by the piers. As such, connectivity of habitat will be retained in this area, although construction of piers would remove some potential habitat. Given the low potential for the species to occur north of Narrabri Creek, small area of potential habitat south of Narrabri Creek and retention of most of this habitat south of Narrabri Creek under the bridge, the proposal is unlikely to lead to a long-term decrease in the size of an important population of a species.
Reduce the area of occupancy of an important population	The species' known distribution in NSW is confined to the Namoi River and Gwydir River floodplains and the lower north-western slopes of the Great Dividing Range. The proposal will impact up to 2.03 hectares of potential habitat for this species in the Narrabri area. Much of the land to be impacted at this location is cropped or highly modified, and the use of an almost 4 kilometres bridge will allow retention of habitat and connectivity south of Narrabri Creek. The proposal is therefore unlikely to reduce the area of occupancy of an important population.
Fragment an existing important population into two or more populations	The proposal is located at the southern edge of the species' known range. North of Wee Waa Road the proposal is predominantly located in cropped or highly modified land with minimal connectivity to areas of better quality habitat. The Five-clawed Worm-skink is highly unlikely to persist in this area. The Narrabri bridge will be located from north of Wee Waa road south to Yarrie Lake Road, and will cross about 2.73 kilometres of this area of potential habitat (ie all habitat south of Narrabri Creek). As such, connectivity of habitat will be retained in this area, although construction of piers would remove some potential habitat. Given the low potential for the species to occur north of Narrabri Creek, and retention of habitat south of Narrabri Creek, the proposal is unlikely to fragment an existing important population into two or more populations.
Adversely affect habitat critical to the survival of a species	The Five-clawed Worm-skink relies on remnant and non-remnant woodlands and grasslands on cracking clay soils. Much of the proposal occurs in land highly modified by cropping and industry. In areas where potential habitat remains, the proposal would comprise a bridge across the Namoi River floodplain, and habitat and connectivity would be retained and only a small area (up to 2.03 hectares) of potential habitat would be removed. As such, the proposal is unlikely to adversely affect habitat critical to the survival of a species.
Disrupt the breeding cycle of an important population	Very little is known about the species' biology, however eggs are likely to be laid in burrows in cracking clay soils. The construction of piers across the Namoi River floodplain have the potential to remove habitat for the species and result in mortality of individuals. Given that construction of the bridge would minimise impacts on the majority of the floodplain and retain connectivity, the proposal is unlikely to disrupt the breeding cycle of an important population.

Criteria	Discussion
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Potential habitat for the species is present in the Narrabri area. Grey, Brown and Red clays occur north from the Namoi River and Black Earths occur in the vicinity of Killarney Gap Road. About 6.7 kilometres of the proposal intersects with potential habitat for this species, however about 2.73 kilometres of this area would be spanned by the Narrabri bridge. North of Wee Waa Road the proposal is predominantly located in cropped or highly modified land with minimal connectivity to areas of better quality habitat. The Five-clawed Worm-skink is highly unlikely to persist in this area. South of Narrabri Creek In this area, the proposal is passes through cropped or highly modified land, as well as areas of PCT 78 River Red Gum riparian tall woodland, PCT 619 Derived Wire Grass grassland, and PCT 168 Derived Copperburr shrubland. The proposal would remove up to 2.03 hectares of potential habitat in this area. The construction of piers across the Namoi River floodplain have the potential to remove habitat for the species and result in mortality of individuals, however potential habitat would be retained and connectivity maintained. Given the poor quality habitat north of Wee Waa Road, and that construction of the bridge would avoid impacts on the majority of the floodplain and retain habitat connectivity, the proposal is unlikely to lead to the decline of the species.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Operation of the proposal has the potential to spread weeds and pests. The surroundings of railways (eg verges and embankments) often host a high diversity of non-native species (Gelbard and Belnap 2003; Hansen and Clevenger 2005), in many cases due to their transportation as stowaways in or on trains. Predator species have been shown to prefer moving down linear clearings, and therefore, clearings could increase predation risk for other species (Dawson et al 2017). Feral species, such as cats and foxes, are a threat to this species. These species already occur in the Narrabri area, and the rail corridor is unlikely to substantially increase their numbers at this location. In addition, feral predators are not considered a key threat toi this species.
Introduce disease that may cause the species to decline	The proposal is unlikely to introduce disease into the Pilliga that may cause the species to decline.
Interfere substantially with the recovery of the species	The proposal is located at the southern edge of the species' known range. The Five-clawed Worm-skink is highly unlikely to persist north of Wee Waa Road given an absence of suitable habitat. Up to 2.03 ha would be impacted south of Narrabri Creek. Potential habitat in this area will be spanned by the bridge with only small areas affected by the piers. Given the low potential for the species to occur north of Narrabri Creek, and retention of potential habitat and connectivity south of Narrabri Creek, the proposal is unlikely to interfere substantially with the recovery of the species.

Criteria	Discussion
Conclusion	The proposal is unlikely to have a significant impact on the Five-clawed Worm-skink as: • The proposal site is located at the southern edge of the species' distribution and there are few recent records in the area. • The Five-clawed Worm-skink is highly unlikely to persist in this area north of Wee Waa Road in the proposal site given the land is predominantly cropped or highly modified with minimal connectivity to areas of better quality habitat. • Given the low potential for the species to occur north of Narrabri Creek, and retention of habitat south of Narrabri Creek, the proposal is unlikely to fragment an existing important population into two or more populations • The Narrabri bridge will be located from north of Wee Waa road south to Yarrie Lake Road, and will cross about 2.03 hectares of potential habitat (ie all habitat south of Narrabri Creek). As such, connectivity of habitat will be retained in this area, although construction of piers would remove some potential habitat.

Pink-tailed Legless Lizard (*Aprasia parapulchella*) – vulnerable species

Distribution

The Pink-tailed Legless Lizard has a patchy distribution from Bendigo in Victoria to Gunnedah in NSW. This species was previously thought to be confined to the Canberra region (EES 2019b). The majority of the proposal site is located west of the identified distribution of the species.

Borrow Pit A south of Narromine is located within the Inland Slopes Bioregion, where there are other records of the species (eg at West Wyalong). Potential habitat at this location is at the western edge of identified habitat range. There are no local records.

Habitat requirements

The Pink-tailed Legless Lizard inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by Kangaroo Grass (*Themeda australis*). Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks. It is commonly found beneath small, partially-embedded rocks and appear to spend considerable time in burrows below these rocks; the burrows have been constructed by and are often still inhabited by small black ants and termites (EES 2019b).

The Pink-tailed Legless Lizard is only known from the Central and Southern Tablelands, and the South Western Slopes. There is a concentration of populations in the Canberra/Queanbeyan Region. Other populations have been recorded near Cooma, Yass, Bathurst, Albury and West Wyalong (EES 2019b).

Habitat in the study area

Rocky woodland habitat is present at Borrow Pit A. This is located in a generally cleared agricultural landscape. Rocky areas are scattered throughout agricultural land in this area. The site has low topographic relief, limited outcropping of rock, and minimal connectivity with better areas of potential habitat located to the east of the site. Habitat is therefore considered marginal at best.

Flora surveys and fauna habitat assessments were conducted at this site on one day in spring 2019, and included active surveys for this species.

Table N6: Assessment of significance for the Pink-tailed Legless Lizard

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	An 'important population' is a population that is necessary for a species' long-term survival and recovery. Given that this species is difficult to detect and population information is limited, important habitat is taken as a surrogate for important populations. Important habitat includes habitat near the limit of the species' known range (DSEWPAC 2011). Given that Borrow Pit A is located at the western edge of the species' range, an important population may be present in the wider area.
Lead to a long-term decrease in the size of an important population of a species	The proposal would remove 11.7 hectares of rocky woodland habitat from Borrow Pit A. This site is located in the Inner Slopes IBRA subregion, a subregion where this species is known to occur. There are no known records near the proposal site and no individuals were recorded during surveys. Similar potential habitat is present throughout agricultural land in this area, however topographic relief is low, potentially suitable habitat is patchy, and there is minimal connectivity to better quality potential habitat located to the east. The loss of 11.7 hectares of potential marginal habitat is unlikely to lead to a decrease in the size of an important population of a species.
Reduce the area of occupancy of an important population	This species was thought to be confined to the Canberra region, however the species has more recently been recorded near Bathurst and Bendigo, indicating a wider distribution. There are no local records, and the proposal occurs at the western edge of the species possible range. The proposal is therefore unlikely to reduce the area of occupancy of an important population.
Fragment an existing important population into two or more populations	The proposal is located at the western edge of the species' potential range. The loss of 11.7 hectares of potential marginal habitat at Borrow Pit A is unlikely to fragment an existing important population into two or more populations, given the presence of similar habitat in surrounding land, and isolation from other better quality habitat in the locality.
Adversely affect habitat critical to the survival of a species	The Pink-tailed Legless Lizard requires partially embedded stones and boulders on hillsides and the upper slopes of river valleys. The Borrow Pit is located in an area of low topographic relief, and potential habitat is considered marginal at best, and there are no local records. As such, the proposal is unlikely to adversely affect habitat critical to the survival of a species.
Disrupt the breeding cycle of an important population	Removal of surface rock has the potential to remove breeding burrows of this species. As noted above, potential habitat is marginal given the low topographic relief, fragmented habitat, and limited connectivity to better quality potential habitat located to the east. The proposal is therefore unlikely to disrupt the breeding cycle of an important population.

Criteria	Discussion
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal would remove 11.7 hectares of rocky woodland habitat from Borrow Pit A. This site is located in the Inner Slopes IBRA subregion, a subregion where this species is known to occur. There are no known records near the proposal site. Similar potential habitat is present throughout agricultural land in this area, however topographic relief is low, potentially suitable habitat is patchy, and there is minimal connectivity to better quality potential habitat located to the east. The loss of 11.7 hectares of potential marginal habitat is unlikely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Construction of the proposal has the potential to spread weeds and pests. Weed species already occur in the area surrounding Borrow Pit A, and the proposal is unlikely to substantially increase weeds at this location.
Introduce disease that may cause the species to decline	The proposal is unlikely to introduce disease that may cause the species to decline.
Interfere substantially with the recovery of the species	The proposal is located at the western edge of the species' potential range. Given the low potential for the species to occur at Borrow Pit A, marginal habitat and lack of evidence of any local populations, the proposal is unlikely to interfere substantially with the recovery of the species.
Conclusion	The proposal is unlikely to have a significant impact on the Pink-tailed Legless Lizard as: • The proposal site is located at the western edge of the species' distribution and there are no local records. • The Borrow Pit is located in an area of low topographic relief, and potential habitat is considered marginal at best for this species.

Superb Parrot (*Polytelis swainsoni*) – vulnerable species

Distribution

The Superb Parrot is found in NSW and northern Victoria, where it occurs on the inland slopes of the Great Divide and on adjacent plains, especially along the major river-systems; vagrants have also been recorded in southern Queensland (DEE 2019b).

Habitat requirements

The breeding range of the Superb Parrot is divided into three main areas: the first, along the Murray and Edward Rivers; the second, along the Murrumbidgee River; and the third, in a triangle bounded by Molong, Yass and Young (DEE 2019a). Superb Parrots breed in either River Red Gum forests and woodlands or box woodlands (Webster 1998).

At least part of the population of the Superb Parrot undertakes regular seasonal movements, vacating the breeding area after the conclusion of the breeding season, and then returning in spring, while others remain in the breeding areas throughout the year. In central NSW,

movements are said to occur when eucalypts flower, and when food becomes scarce due to drought and birds seek alternative sources of food (Higgins 1999).

The species seasonally occurs in Box-Cypress Pine (*Callitris* spp.) and Weeping Myall (*Acacia pendula*) woodlands (DEE 2019a). The Superb Parrot feeds mainly on the ground, on the seeds of grasses as well as cereal crops and spilt grain. They also eat the seed-pods of many understorey species of wattles, and flowers and fruits of eucalypts, berries of mistletoe and lerps (EES 2019a).

Habitat in the study area

A flock of four individuals was recorded in roadside vegetation north-east of Gunnedah during surveys. Vegetation comprised Box – Callitris woodland and was connected to a large patch of remnant vegetation located on private property to the east of this location. No River Red Gum habitat is located in close proximity to this location, and it is assumed that these individuals were non-breeding vagrants.

The recovery plan for the species maps the southern portion of the study area (south-west of Mount Tendandra) as where the species is likely to occur, while the northern portion is mapped as where the species may occur. No areas mapped as 'breeding likely to occur' are located in the study area, however there are scattered records of birds breeding outside these mapped areas (Baker-Gabb 2011). Based on the lack of known breeding habitat in the study area, an important population is not considered to be present.

Table N7: Assessment of significance for the Superb Parrot

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	An 'important population' is a population that is necessary for a species' long-term survival and recovery. No areas mapped as 'breeding likely to occur' are located in the study area (Baker-Gabb 2011). Individuals that occur are likely to be non-breeding visitors to the areas. Based on the lack of known breeding habitat in the study area, an important population is not considered to be present.
Lead to a long-term decrease in the size of an important population of a species	The proposal would not impact any known breeding habitat for the species. Species that occur in the area would be non-breeding visitors. Construction would require the permanent removal of a maximum area of 1,125 hectares of woodland and forest habitat along a 300 kilometres alignment. Clearing of this forest and woodland vegetation would permanently remove foraging resources for the species. The Superb Parrot is nomadic, moving large distance between breeding and non-breeding areas. The linear nature of clearing for the proposal is unlikely to affect movement of this species. Patches of vegetation would be retained throughout this foraging range. Birds are at risk of vehicle and train strike as they forage for seed on the ground. Grain spill in particular can lead to accidental road kill of many individuals (Baker-Gibb 2011). Transport of grain during operation has the potential to result in train-strike of individuals, however this would be limited to certain times of year and presence of individuals. Risk is likely to be low given the location of the proposal away from breeding areas where larger numbers of individual are likely to occur. Given the lack of impact on breeding habitat, and linear nature of clearing through scattered foraging habitat, the proposal is unlikely

Criteria	Discussion
	to lead to a long-term decrease in the size of an important population of a species.
Reduce the area of occupancy of an important population	The Superb Parrot occurs through the inland slopes and plains of NSW (including the Australian Capital Territory) to northern Victoria (Baker-Gibb 2011). Most birds undertake regular seasonal movements between breeding and non-breeding areas. The proposal would not reduce the area of occupancy of an important population given the lack of impact on breeding habitat.
Fragment an existing important population into two or more populations	Most Superb Parrots undertake regular seasonal movements between breeding and non-breeding areas. Riparian corridors are known to provide movement corridors for this species. Clearing of riparian vegetation will create narrow gaps in the corridors. There is also a risk of train strike during operation. Risk of train strike is low given the relatively low train traffic, lack of breeding habitat, and likely low numbers of individuals that may occur in riparian corridors in the proposal site. Given the high mobility of the species, and large area of NSW in which it occurs, and low risk of train strike, the proposal is unlikely to fragment an important population into two or more populations.
Adversely affect habitat critical to the survival of a species	Habitat critical to the survival of the species comprises breeding and foraging habitat (Baker-Gibb 2011). No breeding habitat occurs in the proposal site. After breeding, different populations move to different foraging grounds. Most of the breeding population from the inland slopes appears to move to the eucalypt-pine woodlands on the plains of west-central and north-central NSW (Webster 1988). The proposal would remove scattered patches of habitat along a linear construction site. The species is more likely to occur in the southern parts of the proposal site where vegetation is more fragmented. Given the lack of impact on breeding habitat, and linear nature of clearing through scattered foraging habitat, the proposal is unlikely to adversely affect habitat critical to the survival of a species.
Disrupt the breeding cycle of an important population	No breeding habitat occurs in or near the proposal site. Clearing of scattered patches of foraging habitat would not affect the ability of the species to move between breeding and non-breeding areas. As such, the proposal would not disrupt the breeding cycle of an important population.
Modify, destroy, remove or isolate or decre ase the availability or quality of habitat to the extent that the species is likely to decline	No breeding habitat occurs in or near the proposal site. Construction would require the permanent removal of a maximum area of 1,125 hectares of woodland and forest habitat along a 300 kilometres alignment. Clearing of scattered patches of foraging habitat would not affect the ability of the species to move between breeding and non-breeding areas. Given the lack of impact on breeding habitat, and linear nature of clearing through scattered foraging habitat, the proposal is unlikely to lead to a decline in the species.

Criteria	Discussion
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Operation of the proposal has the potential to spread weeds and pests. The surroundings of railways (eg verges and embankments) often host a high diversity of non-native species (Gelbard and Belnap 2003; Hansen and Clevenger 2005), in many cases due to their transportation as stowaways in or on trains. Introduction of grasses may encourage birds to feed along the rail verge and could potentially result in risk of train-stike. Predator species have been shown to prefer moving down linear clearings, and therefore, clearings could increase predation risk for other species (Dawson et al 2017). Feral species, such as cats and foxes, are a threat to this species. These species already occur throughout the study area.
Introduce disease that may cause the species to decline	Psittacine beak and feather disease is a common and potentially deadly disease of parrots. Susceptibility to the infection may be influenced by environmental factors, such as climate, nutrition, habitat quality and social factors (DEH 2005). The proposal is unlikely to introduce Psittacine beak and feather disease, however cumulative impacts of further land clearing and impacts on habitat has the potential to increase susceptibility of individuals.
Interfere substantially with the recovery of the species	The long-term objective of recovery is to minimise the probability of extinction of the Superb Parrot in the wild, and to increase the probability of important populations becoming self-sustaining in the long term (Baker-Gibb 2011). Priority management areas are focused on breeding habitat for the species. Other priority actions include the identification and protection of key movement corridors. The proposal would not impact any breeding habitat for this species. Construction of the proposal would remove foraging habitat and has the potential to impact riparian movement corridors. Clearing of riparian vegetation will create narrow gaps in riparian corridors. There is also a risk of train strike during operation. Risk of train strike is low given the relatively low train traffic, lack of breeding habitat, and likely low numbers of individuals that may occur in riparian corridors in the proposal site. The species is more likely to occur in the southern parts of the proposal site where vegetation is more fragmented. Individuals that occur in the study area are most likely to be non-breeding vagrants, and the proposal is unlikely to interfere substantially with the recovery of the species, given that no breeding habitat is likely to be removed and the linear nature of clearing through scattered foraging habitat.

Criteria	Discussion
Conclusion	The proposal is unlikely to have a significant impact on the Superb Parrot as: • No breeding habitat would be impacted • Clearing of patches of foraging habitat would not affect the ability of the species to move between breeding and non-breeding areas. • Loss of foraging habitat involves small patches along a long linear alignment in the southern part of the proposal site where the species is most likely to occur. The species is less likely to occur in the Pilliga, where large areas of vegetation would be removed • The proposal would create small gaps in vegetation along riparian corridors, but is not likely to substantially disrupt the movement of the species between breeding and foraging areas.

Painted Honeyeater (*Grantiella picta*) – vulnerable species

Distribution

The Painted Honeyeater is found in Queensland and NSW west of the Great Dividing Range, through to northern Victoria. It is dispersive and rare throughout its range (Birdlife Australia 2020).

Habitat requirements

The Painted Honeyeater inhabits dry open woodland and forests, particularly Boree/ Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests. It is a specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias, with a preference for the mistletoes of the genus *Amyema*. Insects and nectar from mistletoe or eucalypts are occasionally eaten (EES 2019b). It may also be found along rivers, on plains with scattered trees and on farmland with remnant vegetation. It has been seen in urban parks and gardens where large eucalypts are available (Birdlife Australia 2020).

The Painted Honeyeater nests from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches. It breeds in loose colonies, forming pair bonds for the duration of the breeding season. In some areas, the same nest or tree may be re-used over several years (Birdlife Australia 2020).

Habitat in the study area

This species would occur throughout the proposal site, and particularly the Pilliga forests. The whole Pilliga is important for the Painted Honeyeater with main habitat areas for this species comprising creek lines (Birdlife International 2020), possibly due to the higher number of mature trees, as these host more mistletoes. Mistletoes are also present in woodland patches elsewhere along the alignment.

Table N8: Assessment of significance for the Painted Honeyeater

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	An 'important population' is a population that is necessary for a species' long-term survival and recovery. The Painted Honeyeater is nomadic and occurs at low densities throughout its range. Considering its dispersive habits, the species is considered to have a single population (Garnett et al., 2011). As such, any individuals that occur along the alignment are considered part of an important population.
Lead to a long-term decrease in the size of an important population of a species	Construction would require the permanent removal of a maximum area of 1,125 hectares of woodland and forest habitat along a 300 kilometres alignment. Vegetation would be removed is potential breeding and foraging habitat for the species. The whole Pilliga is important for woodland birds, including the Painted Honeyeater, given the large size of the forest. The Pilliga forests cover an areas of about 535,000 hectares, and comprise the single largest remaining tract of native forest and woodland in NSW west of the Great Dividing Range (Predavec 2016). The proposal would remove 624 hectares of forest and woodland from the Pilliga, a small proportion of available habitat in the Pilliga area. The main habitat areas for this species in the Pilliga comprise creek lines (Birdlife International 2020), possibly due to the higher number of mature trees, as these host more mistletoes. The proposal would result in the loss of extensive areas of vegetation containing mistletoe which is a critical resource for this species. While this species occurs at low densities, the removal of an extensive area of habitat may lead to long-term decrease in the size of an important population of the species.
Reduce the area of occupancy of an important population	The species is sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory. The removal of 1,125 hectares of woodland and forest habitat along a 300 kilometres alignment is not likely to reduce the area of occupancy of the important population.
Fragment an existing important population into two or more populations	The proposal will create a new linear gap through the Pilliga forests, exacerbating the existing impacts on connectivity created by Pilliga Forest Way and the Newell Highway. Elsewhere in the alignment, the proposal will further fragment patches of vegetation that occur in agricultural land and roadsides. The Painted Honeyeater is nomadic and occurs at low densities throughout its range. It often occurs in small fragments and isolated trees. Given the high mobility of the species, and linear nature of the proposal, the proposal is unlikely to fragment an important population into two or more populations.
Adversely affect habitat critical to the survival of a species	The Painted Honeyeater is the most specialised of Australia's honeyeaters, with its diet mainly consisting of mistletoe fruits (DoE 2015). The proposal will remove 1125 hectares of woodland and forest habitat containing mistletoes along a 300 kilometres alignment. Mistletoes occur sporadically along the alignment, however a high number of mistletoes would be removed along the alignment, and particularly from within the Pilliga. Given the loss of a large area of habitat, the proposal may adversely affect habitat critical to the survival of the species.

Criteria	Discussion
Disrupt the breeding cycle of an important population	The Painted Honeyeater is nomadic and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. During the winter it is more likely to be found in the north of its distribution (EES 2019b). The removal of potential breeding habitat along a narrow linear corridor may disrupt breeding for individuals that occur along the route. Given the nomadic nature of the species, individuals would move to other areas of available habitat for breeding. As such, the proposal is not likely to disrupt the breeding cycle of the important population.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	Construction would require the permanent removal of a maximum area of 1,125 hectares of woodland and forest habitat along a 300 kilometres alignment, including 624 hectares from within the Pilliga, an important area for this species. Vegetation that would be removed is potential breeding and foraging habitat for the species. While the proposal would remove a large area of habitat for this species, this is a small proportion of available habitat in the Pilliga area. Despite, this, the reliance on mistletoes that occur sporadically in the landscape makes this clearing more significant. The proposal is unlikely to fragment the population, given it is a highly mobile, nomadic species that can travel large distances across cleared landscapes. Given the large area of clearing, the proposal is may lead to a decline in the species.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Introduction of weeds is of particular concern in the Pilliga Forests as they can reduce quality of vegetation and thus impact fauna and flora habitats. Operation of the proposal has the potential to spread weeds and pests into the Pilliga and elsewhere. Introduction and spread of weeds is unlikely to substantially impact foraging habitat for this species. Predator species have been shown to prefer moving down linear clearings, and therefore, clearings could increase predation risk for other species (Dawson et al 2017). The creation of a 73 kilometres linear gap through the Pilliga may increase the risk of fox and cat predation. There is little risk of establishment of predators elsewhere in the alignment as a result of the proposal.
Introduce disease that may cause the species to decline	The proposal is unlikely to introduce disease into the Pilliga that may cause the species to decline.
Interfere substantially with the recovery of the species	Habitat loss is a key threat to this species. Much of its breeding habitat has been cleared or has been reduced to ageing, widely-spaced trees, particularly in box-ironbark and boree woodlands. Its non-breeding habitat is also still being cleared for agriculture (Barea, 2008a). The proposal will remove 1,125 hectares of woodland and forest habitat along a 300 kilometres alignment, including a substantial area of habitat from the Pilliga, a stronghold for the species. The proposal would result in the loss of extensive areas of vegetation containing mistletoe which is a critical resource for this species. Given these points, the proposal may interfere with the recovery of the species.

Criteria	Discussion
Conclusion	The proposal is likely to have a significant impact on the Painted Honeyeater as: • Construction would require the permanent removal of a maximum area of 1,125 hectares of woodland and forest habitat along the 300 kilometres alignment, with 624 hectares of this clearing occurring in the species' stronghold in the Pilliga • It is highly specialised and predominantly forages on mistletoe. The proposal would result in the loss of extensive areas of vegetation containing mistletoe which is a critical resource for this species.

Australian Painted Snipe (*Rostratula australis*) – vulnerable species

Distribution

The Australian Painted Snipe has been recorded at wetlands in all states of Australia and is most common in eastern Australia.

Habitat Requirements

The Australian Painted Snipe is a wading bird inhabiting shallow, terrestrial, freshwater (occasionally brackish) wetlands in all states of Australia. These wetlands include temporary and permanent lakes, swamps, clay pans, inundated/waterlogged grasslands or saltmarsh, dams, rice crops, sewage dams and bore drains (DAWE 2020b).

This species is migratory, breeding in southern Australia from August to February (DAWE 2020b).Australian Painted Snipe breeding habitat requirements may be quite specific: shallow wetlands with areas of bare wet mud and both upper and canopy cover nearby. Nest records are all, or nearly all, from or near small islands in freshwater wetlands, provided that these islands are a combination of very shallow water, exposed mud, dense low cover and sometimes some tall dense cover (Rogers et al. 2005).

Habitat in the study area

There are a small number of records within 20 kilometres of the alignment, including a creekline in agricultural land north of Dubbo, Carmel Lagoon (a farm dam) north-west of Baradine, and Narrabri Lake (EES 2019b, Birdata 2020).

Limited wetland habitat is present in the study area. A patch of PCT 247 Lignum shrubland wetland is located near Narromine that could provide habitat for this species in suitable conditions. Small areas of mudflats and emergent reeds were observed near Narrabri Creek and Namoi River that could provide habitat for the species. Emergent reeds occur in the sandy bed of the Castlereagh River. Small areas of mudflats were observed near small remnant ponds. When under higher flows, areas of mudflats would reduce.

Table N9: Assessment of significance for the Australian Painted Snipe

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	An 'important population' is a population that is necessary for a species' long-term survival and recovery. The Australian Painted Snipe is considered to occur in a single, contiguous breeding population (DAWE 2020b). As such, any individuals that may occur would be part of this important population.
Lead to a long-term decrease in the size of an important population of a species	The proposal will have limited impacts on wetland habitat. Bridges will be constructed across large rivers such as the Castlereagh River and the Namoi River/Narrabri River and disturbance of emergent vegetation at these locations would be limited. Mudflat habitat on the edge of Narrabri Creek would be retained, however this is impacted by grazing and little cover is present. Shading from the bridges may have indirect impacts on these areas. About 7 hectares of PCT 247 Lignum shrubland wetland would be removed near Narromine. This is located in grazed paddocks. This may provide suitable habitat following rain events, but is ephemeral and likely to remain dry for much of the time. Areas of low quality potential habitat associated with farm dams would be removed where these occur along the alignment, however these would likely be replaced elsewhere on the properties. There are three records of the species within 20 kilometres of the 300 kilometres alignment. No large wetlands would be impacted by the proposal. Given the limited habitat present, the proposal is unlikely to lead to a long-term decrease in the size of an important population.
Reduce the area of occupancy of an important population	The Australian Painted Snipe has been recorded at wetlands in all states of Australia and is most common in eastern Australia. The area of occupancy has undoubtedly declined as approximately 50 per cent of wetlands in Australia have been removed since European settlement (DAWE 2020b). The removal of up to 7 hectares of wetland and disturbance of patches of emergent reeds within riverine habitat and farm dams along a 300 kilometres alignment is not likely to reduce the area of occupancy of an important population.
Fragment an existing important population into two or more populations	Movement patterns are poorly known for this species and it is possibly dispersive or migratory (DAWE 2020b). The removal or disturbance of up to 7 hectares of wetland and disturbance of patches of emergent reeds within riverine habitat and farm dams along a 300 kilometres alignment is not likely to fragment the population of this mobile species.

Criteria	Discussion
Adversely affect habitat critical to the survival of a species	Australian Painted Snipe breeding habitat requirements may be quite specific: shallow wetlands with areas of bare wet mud and both upper and canopy cover nearby. Nest records are all, or nearly all, from or near small islands in freshwater wetlands, provided that these islands are a combination of very shallow water, exposed mud, dense low cover and sometimes some tall dense cover (Rogers et al. 2005). No preferred breeding habitat (islands in freshwater wetlands) is present, however areas of tall emergent reeds are present at the Castlereagh River and Namoi River, which may provide marginal breeding habitat. Bridges will be constructed across these rivers and direct impacts on breeding habitat are unlikely. The proposal would have limited impacts on wetland habitat. A small area of Lignum Shrubland wetland would be impacted near Narromine, and areas of low quality habitat associated with farm dams would be removed. Mudflat habitat on the edge of Narrabri Creek would be retained, however this is impacted by grazing and little cover is present. Given the small area of wetland habitat present, the proposal is unlikely to adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population	The Australian Painted Snipe may breed in response to wetland conditions rather than during a particular season. The nest is usually placed in a scrape in the ground, normally concealed in thick marshy vegetation (DAWE 2020b). No preferred breeding habitat (islands in freshwater wetlands) is present, however areas of tall emergent reeds are present at the Castlereagh River and Namoi River, which may provide marginal breeding habitat. The proposal will have limited impacts on wetland habitat. Bridges will be constructed across large rivers and direct impacts on breeding habitat are unlikely. A small area of ephemeral wetland habitat within grazed paddocks near Narromine would be removed. Given the above points, the proposal is unlikely to disrupt the breeding cycle of a population.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will have limited impacts on wetland habitat. Bridges will be constructed across large rivers such as the Castlereagh River and the Namoi River/Narrabri River, and direct impacts on breeding habitat are unlikely. Some shading may occur in these areas that may alter small sections of reedland patches. A small area of Lignum Shrubland wetland would be impacted near Narromine, and areas of low quality habitat associated with farm dams would be removed. Removal of linear patches of vegetation along a 300 kilometres alignment is unlikely to affect movement of this species between wetland habitats. Given the small area of wetland habitat associated with farm dams, wetland vegetation and reedland in rivers that would be impacted, and limited number of records present, and lack of good quality breeding habitat, the proposal is unlikely to affect habitat such that the species declines.

Criteria	Discussion
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Operation of the proposal has the potential to spread weeds and pests. The surroundings of railways (eg verges and embankments) often host a high diversity of non-native species (Gelbard and Belnap 2003; Hansen and Clevenger 2005), in many cases due to their transportation as stowaways in or on trains. The proposal may spread environmental weeds in riparian areas, but is unlikely to introduce invasive aquatic weeds. Predator species have been shown to prefer moving down linear clearings, and therefore, clearings could increase predation risk for other species (Dawson et al 2017). Feral species, such as cats and foxes, are a threat to this species. These species already occur in the study area, and the rail corridor is unlikely to substantially increase their numbers in wetland and riparian habitats.
Introduce disease that may cause the species to decline	The proposal is unlikely to introduce disease that may cause the species to decline.
Interfere substantially with the recovery of the species	The Australian Painted Snipe has primarily been impacted by the loss of wetland habitat (DAWE 2020b). The proposal would have limited impacts on wetland habitat. No key breeding habitat (large freshwater wetlands) is located in the proposal site or would be affected by the proposal. Few local records are known. As such, the proposal is unlikely to interfere with the recovery of the species.
Conclusion	The proposal is unlikely to have a significant impact on the Australian Painted Snipe as: • No key breeding habitat is located in the proposal site or would be affected by the proposal • The proposal would have limited impacts on wetland habitat (7 hectares of wetland habitat that is not permanently inundated) • Bridges would be constructed above rivers, and there would be no direct impacts on mudflat habitats in these area • The proposal would not isolate any habitat or interrupt movements of the species between wetland habitats.

Australasian Bittern (*Botaurus poiciloptilus*) – endangered species

Distribution

The Australasian Bittern occurs from south-east Queensland to south-east South Australia. There is one record of the species within 20 kilometres of the 300 kilometres alignment.

Habitat requirements

The Australasian Bittern is a relatively large wetland bird (66-76 cm long) occurring in Australia in south east Queensland, south east Australia, Tasmania and south west Western Australia (DAWE 2020b). This species favours terrestrial wetlands (and rarely estuarine habitats) vegetated with tall, dense vegetation dominated by sedges, rushes and/or reeds (flora species from the genera *Phragmites, Cyperus, Eleocharis, Juncus, Typha, Baumea, Bolboschoenus* and *Gahnia*) on muddy/peaty substrates. The Australasian Bittern forages in still water of 30 cm

maximum depth at the edges of pools or waterways, or platforms/mats of vegetation over deep water (DAWE 2020b).

Knowledge of the breeding habitats is poor, however data indicates that the species breeds in relatively deep, densely vegetated freshwater swamps and pools. The species builds nests in deep cover over shallow water (DAWE 2020b). Large numbers of bitterns may breed in rice crops of the New South Wales' Riverina each year (Bitterns in Rice Project 2018).

Habitat in the study area

There is one record of the species within 20 kilometres of the 300 kilometres alignment (EES 2019b). No Birdata (2020) records occur near the alignment.

Limited wetland habitat is present in the study area. A patch of PCT 247 Lignum shrubland wetland is located near Narromine that could provide habitat for this species in suitable conditions. Small areas of mudflats and emergent reeds were observed near Narrabri Creek and Namoi River that could provide habitat for the species. Emergent reeds occur in the sandy bed of the Castlereagh River. Small areas of mudflats were observed near small remnant ponds. When under higher flows, areas of mudflats would reduce.

Table N10: Assessment of significance for the Australasian Bittern

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of a population	The proposal will have limited impacts on wetland habitat. Bridges will be constructed across large rivers such as the Castlereagh River and the Namoi River/Narrabri River where large areas of emergent reeds were observed. Direct impacts on these habitats are unlikely, although the bridges would shade some areas of reeds, which could indirectly impact this habitat type. Up to 7 hectares of PCT 247 Lignum shrubland wetland would be removed near Narromine. This may provide suitable habitat following rain events, but is likely to remain dry for much of the time. There is one record of the species within 20 kilometres of the 300 kilometres alignment. No large wetlands would be impacted by the proposal. Given the limited habitat present, the proposal is unlikely to lead to a long-term decrease in the size of a population.
Reduce the area of occupancy of the species	In Australia, the Australasian Bittern occurs from south-east Queensland to south-east South Australia as far as the Adelaide Region, southern Eyre Peninsula, Tasmania and in the southwest of Western Australia (Garnett et al. 2011). The area of occupancy of the Australasian Bittern in Australia is thought to have declined by 70 per cent between 1977 and 2008. These declines are considered to have led to a comparable decline in the size of the adult population. The declines are primarily linked to the clearing or modification of wetlands for urban and agricultural development, as well as the extraction of water from wetlands for irrigation (TSSC 2011). The proposal will have limited impacts on wetland habitat. Bridges will be constructed across large rivers such as the Castlereagh River and the Namoi River/Narrabri River where large areas of emergent reeds were observed. The removal of up to 7 hectares of wetland and disturbance of patches of emergent reeds within

Criteria	Discussion
	riverine habitat along a 300 kilometres alignment is not likely to reduce the area of occupancy of an important population.
Fragment an existing population into two or more populations	The Australasian Bittern was previously thought to be largely sedentary, however recent tracking studies have shown extensive movements (over hundreds of kilometres) between wetlands in southeast Australia (Bitterns in Rice Project 2016). Occasional movements to inland areas have also been recorded during extensive flooding events (Marchant and Higgins 1990). The removal of up to ephemeral 7 hectares of wetland habitat and disturbance of patches of emergent reeds within riverine habitat along a 300 kilometres alignment is not likely to fragment the population of this mobile species.
Adversely affect habitat critical to the survival of a species	Given that the Australasian Bittern is presumed to have undergone a severe reduction in numbers, based on historic habitat loss and degradation across the core part of its range, all natural habitat (including constructed wetlands with suitable habitat) in which the Australasian Bittern is known or likely to occur should be considered critical to the survival of the species. The proposal would have limited direct impacts on areas of emergent reeds as bridges would be constructed to span these areas. A small area of Lignum Shrubland wetland would be impacted near Narromine, and areas of low quality habitat associated with farm dams would be removed. Small patches of emergent reeds in river beds may be disturbed or removed. Given the small area of wetland habitat present, and limited impact on reedland habitats, the proposal is unlikely to adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of a population	The Australasian Bittern generally breeds in solitary pairs, although sometimes several nests may be placed in close proximity to each other (Marchant and Higgins 1990). The species nests adjacent to relatively deep, densely vegetated freshwater swamps and pools, building its nests under dense cover over shallow water (Marchant and Higgins 1990). Annual surveys conducted by the Bitterns in Rice Project since 2012 suggest that approximately 500-1000 Bitterns may breed in rice crops of the New South Wales' Riverina each year (Bitterns in Rice Project 2018). The proposal would not impact this key breeding habitat. The proposal will have limited impacts on ephemeral wetland habitat. Bridges will be constructed across large rivers such as the Castlereagh River and the Namoi River/Narrabri River where large areas of emergent reeds were observed, and direct impacts on breeding habitat are unlikely. Small patches may be removed and other areas shaded. Removal of linear patches of vegetation along a 300 kilometres alignment is unlikely to affect movement of this species between wetland habitats. Given the above points, the proposal is unlikely to disrupt the breeding cycle of a population.

Criteria	Discussion
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will have limited impacts on wetland habitat. Bridges will be constructed across large rivers such as the Castlereagh River and the Namoi River/Narrabri River where large areas of emergent reeds were observed, and direct impacts on breeding habitat are unlikely. Some shading may occur in these areas that may alter small sections of reedland patches. A small area of Lignum Shrubland wetland would be impacted near Narromine, and areas reeds in river beds and low quality habitat associated with farm dams would be removed or disturbed. Removal of linear patches of vegetation along a 300 kilometres alignment is unlikely to affect movement of this species between wetland habitats. Given the small area of wetland habitat present, and limited impact on reedland habitats, the proposal is unlikely to affect habitat such that the species declines.
Result in invasive species that are harmful to the species becoming established in the species' habitat	Operation of the proposal has the potential to spread weeds and pests. The surroundings of railways (eg verges and embankments) often host a high diversity of non-native species (Gelbard and Belnap 2003; Hansen and Clevenger 2005), in many cases due to their transportation as stowaways in or on trains. The proposal may spread environmental weeds in riparian areas, but is unlikely to introduce invasive aquatic weeds. Predator species have been shown to prefer moving down linear clearings, and therefore, clearings could increase predation risk for other species (Dawson et al 2017). Feral species, such as cats and foxes, are a threat to this species. These species already occur in the study area, and the rail corridor is unlikely to substantially increase their numbers in wetland and riparian habitats.
Introduce disease that may cause the species to decline	The proposal is unlikely to introduce disease into the Pilliga that may cause the species to decline.
Interfere with the recovery of the species	The Australasian Bittern has primarily been impacted by the loss of wetland habitat through the diversion of water away from wetlands; drainage of swamps; and clearing for urban and agricultural development (TSSC 2019). The proposal would have limited impacts on wetland habitat. No key breeding habitat is located in the proposal site or would be affected by the proposal. As such, the proposal is unlikely to interfere with the recovery of the species.
Conclusion	The proposal is unlikely to have a significant impact on the Australasian Bittern as: • No key breeding habitat is located in the proposal site or would be affected by the proposal • The proposal would have limited impacts on wetland habitat (7 hectares of ephemeral wetland habitat) • Bridges would be constructed above reedland areas, and there would be limited direct impacts on this habitat type • The proposal would not isolate any habitat or interrupt movements of the species between wetland habitats.

Regent Honeyeater (*Anthochaera phrygia*) – critically endangered species

Distribution

The Regent Honeyeater has a patchy distribution which extends from south-east Queensland, through NSW and the ACT, to central Victoria. Records are widely distributed across its range, but it is only found regularly at a few localities in NSW and Victoria where most of the sightings have been recorded (DEE 2019b).

Habitat requirements

There are four known key breeding regions remaining for the Regent Honeyeater: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley, the Bundarra-Barraba region near Gunnedah and the Hunter Valley. In NSW the distribution is very patchy and mainly confined to the two main breeding areas and surrounding fragmented woodlands. In some years flocks converge on flowering coastal woodlands and forests (EES 2019a).

The Regent Honeyeater is a generalist forager, although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar. Most records of regent honeyeaters come from box-ironbark eucalypt associations, where the species seems to prefer more fertile sites with higher soil water content, including creek flats, broad river valleys and lower slopes. Regent honeyeaters may use different areas in different years depending on food resources (DoE 2016).

Key eucalypt species include Mugga Ironbark, Yellow Box, White Box and Swamp Mahogany. Flowering of associated species such as Thin-leaved Stringybark *Eucalyptus eugenioides* and other Stringybark species, and Broad-leaved Ironbark *E. fibrosa* can also contribute important nectar flows at times. Nectar and fruit from the mistletoes *Amyema miquelii, A. pendula* and *A. cambagei* are also utilised (EES 2019a). When nectar is scarce lerp and honeydew can comprise a large proportion of the diet. Insects make up about 15 per cent of the total diet and are important components of the diet of nestlings

Habitat in the study area

There is one record of this species within 20 kilometres of the alignment in the last twenty years. No individuals were recorded during surveys.

PCT 398 which occurs in the Pilliga contains Yellow Box and Mugga Ironbark. Mugga Ironbark also occurs in PCT 397 in the Pilliga. *Amyema miquelii* was recorded in plots in PCT 394. This species was observed elsewhere in the Pilliga. About 444 hectares of habitat with these species would be removed from within the Pilliga.

Another mistletoe (*Amyema quandong*) was recorded in a plot in PCT 27 (Weeping Myall Woodland) and unidentified mistletoes (*Amyema* spp.) were recorded in a plot in PCT 244. About 35 hectares of these PCTs would be removed. A patchy distribution of mistletoes was recorded elsewhere throughout the alignment.

The Recovery Plan notes the Pilliga forests are important for the species and maps this habitat area. It is located in the south-east of the forests, well away from the proposal site. The Baradine/Yearinan Creek in the central Pilliga is noted as being important habitat for the Regent Honeyeater (Birdlife International 2020). This is located south-east of the proposal site and would not be affected.

No important habitat (breeding areas) has been mapped in the study area by OEH (correspondence received January 2019, EES 2020).

Table N11: Assessment of significance for the Regent Honeyeater

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of a population	There is one record of this species within 20 kilometres of the alignment in the last twenty years. No individuals were recorded during surveys. No breeding habitat is known from the Pilliga or elsewhere along the alignment. No important habitat has been mapped in the study area (EES 2020). The Baradine/Yearinan Creek in the central Pilliga is noted as being important foraging habitat for the Regent Honeyeater (Birdlife International 2020). This area is located to the south-east of the proposal and would not be impacted. The proposal would remove 1,125 hectares of forest and woodland habitat along the 300 kilometres alignment, of which 479 hectares in the Pilliga contains preferred foraging species. While individuals may forage along the alignment on occasion, the habitat to be removed has not been identified as important foraging habitat for this species by Birdlife Australia (2020). This habitat loss will decrease the availability of winter forage for individual honeyeaters that disperse nomadically throughout the region (and the study area) during winter. As such, the proposal is unlikely to lead to a long-term decrease in the size of a population.
Reduce the area of occupancy of the species	The distributional range of the Regent Honeyeater extends from parts of Victoria, through NSW to southeast Queensland. The area of occupancy is estimated at 300,000 kilometres^2. The extent of occurrence is likely to be declining based on historical declines and the present status of the species (DoE 2016). The study area is not considered an important foraging or breeding area of habitat for the Regent Honeyeater (Birdlife 2020, EES 2020). The removal of linear patches of habitat along the 300 kilometres alignment would be unlikely to reduce the area of occupancy of the species.
Fragment an existing population into two or more populations	Highly mobile species such as the Regent Honeyeater are expected to be less impacted by fragmentation and this species is well-adapted to accessing widely spaced habitat resources given its mobility and preference for seasonal foraging resources. Given the clearing occurs along a mainly 50 metres wide corridor, the high mobility of the species, and large areas of forest to be retained in the Pilliga, the proposal is unlikely to fragment a population into two or more populations.
Adversely affect habitat critical to the survival of a species	Habitat critical to the survival of the Regent Honeyeater includes any breeding or foraging areas where the species is likely to occur, and any newly discovered breeding or foraging locations. Three important breeding areas are known for the species in NSW: Barraba-Bundarra (located east of Mt Kaputar), the Capertee Valley and the Hunter Valley (DoE 2016). These breeding areas contain stands of box-gum trees growing on high quality sites where nectar production is copious and relatively predictable and constitute critical habitat for the

Criteria	Discussion
	survival of the species. As these areas are located at a substantial distance from the study area, and as there is no record of breeding within locality, it can be assumed that breeding is unlikely to occur within the study area. The Recovery Plan notes the Pilliga forests are important for the species and maps this habitat area. It is located in the south-east of the forests, well away from the proposal site. No important habitat has been identified in the study area by OEH (correspondence received January 2019, EES 2020). The proposal would remove 479 hectares of forest in the Pilliga that contains preferred feed trees. Individuals may forage on occasion in these areas, and the proposal may therefore adversely affect habitat critical to the survival of the species.
Disrupt the breeding cycle of a population	The Regent Honeyeater breeds on the western slopes of the Great Dividing Range in three key areas: Bundarra-Barraba, Capertee Valley and north-east Victoria. No breeding habitat is located in the proposal site. Habitat loss as a result of the proposal will decrease the availability of winter forage for individual honeyeaters that disperse nomadically throughout the region (and the study area) during winter. The reduced availability of foraging habitat, particularly during poor flowering seasons and/or drought periods, could reduce the health and condition of adult birds, which could in turn, lead to reduced breeding success. However, the study area is not considered critical to the Regent Honeyeater and it is unlikely that the condition and health of Regent Honeyeaters that may forage in the study area on occasion would be compromised to the extent that breeding success of individuals would be affected. Furthermore, the proposed action would not fragment a population of the Regent Honeyeater or create a barrier to local or regional movements of the species between foraging and breeding areas. Given the above considerations, the proposal is unlikely to significantly disrupt the breeding cycle of the Regent Honeyeater.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal would remove 1,125 hectares of forest and woodland habitat along the 300 kilometres alignment. Of this, 479 hectares of forest in the Pilliga contains preferred feed trees. No breeding habitat would be removed. No areas of important foraging habitat have been identified in the proposal site, although individuals may forage on occasion in the proposal site. The proposal would contribute to cumulative fragmentation of habitat in the landscape. Highly mobile species such as the Regent Honeyeater are expected to be less impacted by fragmentation and this species is well-adapted to accessing widely spaced habitat resources given its mobility and preference for seasonal foraging resources. Fragmentation of forested patches by the proposal would not impact movement of the species in the locality. While no breeding habitat and no important foraging habitat would be removed, the loss of 479 hectares of forest habitat in the Pilliga containing preferred feed species may contribute to the overall decline of the species.

Criteria	Discussion
Result in invasive species that are harmful to the species becoming established in the species' habitat	Introduction of weeds is of particular concern in the Pilliga Forests as they can reduce quality of vegetation and thus impact fauna and flora habitats. Operation of the proposal has the potential to spread weeds and pests into the Pilliga and elsewhere along the alignment. Introduction and spread of weeds is unlikely to substantially impact foraging habitat for this species. Predator species have been shown to prefer moving down linear clearings, and therefore, clearings could increase predation risk for other species (Dawson et al 2017). The creation of a 73 kilometres linear gap through the Pilliga may increase the risk of fox and cat predation. There is little risk of establishment of predators elsewhere in the alignment.
Introduce disease that may cause the species to decline	The proposal is unlikely to introduce disease into the study area that may cause the species to decline.
Interfere with the recovery of the species	'Significant reductions in extent of habitat' is listed as a key factor in the current threatened status of the Regent Honeyeater (DoE 2016). Vegetation removal associated with construction of the Proposal would cause the permanent removal of 1,125 hectares of potential winter foraging habitat along the 300 kilometres alignment for the Regent Honeyeater, of which 479 hectares contains preferred feed trees. This habitat loss will decrease the availability of winter forage for individual honeyeaters that disperse nomadically throughout the region (and the study area) during winter. However, the habitat to be is not considered to support critical habitat for this species. While no breeding habitat and no important foraging habitat would be removed, the loss of 479 hectares of forest habitat in the Pilliga containing preferred feed species may interfere with the recovery of the species.
Conclusion	The proposal may result in a significant impact on the Regent Honeyeater as: • No breeding habitat would be removed. • No important foraging habitat would be removed. • There would be no impact on the ability of this species to move from breeding areas to foraging areas. • However, 479 hectares of habitat containing preferred feed species would be removed from the Pilliga.

Swift Parrot (*Lathamus discolor*) – critically endangered species

Distribution

The Swift Parrot breeds in Tasmania during the summer and the entire population migrates north to mainland Australia for the winter, with the majority being found in Victoria and NSW (DEE 2019b).

Habitat requirements

The Swift Parrot only breeds in Tasmania, arriving in August from the mainland to nest in hollows in old trees of a range of eucalypt species. Nest sites in eastern Tasmanian are usually located near the coast in dry forests on upper slopes and ridge tops (Parks 2010).

While on the mainland, Swift Parrots are nomadic, spending weeks or months at some sites and only a few hours at others, determined by the supply of nectar (Parks 2010). On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations (EES 2019b). Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifer*a, Forest Red Gum *E. tereticornis*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens* (EES 2019b). Commonly used lerp infested trees include Inland Grey Box *E. microcarpa*, Grey Box *E. microcarpa*, Blackbutt *E. pilularis*, and Yellow Box *E. melliodora*. The Swift Parrot returns to some foraging sites on a cyclic basis depending on food availability (EES 2019b).

The extent of habitat use in each region varies according to food availability and competition, with Swift Parrots briefly passing through some habitats feeding opportunistically, and remaining in other habitats foraging for several days, weeks or months (). The north-west slopes and the tablelands are used when local conditions are favourable, but are not part of the core winter foraging area.

During drought swift parrot abundance was significantly correlated with rainfall, whereby most of the population either concentrated in a few regions or migrated longer distances (up to 1000km) to drought refuges in wetter coastal areas.

Habitat in the study area

The Swift Parrot has a patchy distribution of records between Narromine and Narrabri. Local records are known around Dubbo, Gunnedah, Warrumbungles National Park and Mt Kaputar National Park. No important habitat for the species has been mapped by OEH in the study area (email correspondence from OEH received January 2019). No individuals were recorded during surveys for the proposal.

The eastern Pilliga is identified as being important for the Swift Parrot, with irregular records such as at Barkala in 2002 and Warrumbungle National Park in 2005 (Birdlife International 2020). Potential foraging habitat is present in the proposal site, particularly in the Pilliga area, with PCTs 88, 397, 398 and 399 containing preferred feed trees (Mugga Ironbark, Yellow Box and Grey Gum). In total 717 hectares of potential foraging habitat for this species occurs in the proposal site, with 511 hectares of this in the Pilliga.

Table N12: Assessment of significance for the Swift Parrot

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of a population	The Swift Parrot breeds only in Tasmania, migrating to the mainland outside the breeding season. No important habitat for the species was identified by OEH (communication January 2019) in the study area. There is one record within 20 kilometres of the alignment in the last twenty years. The proposal would remove 717 hectares of potential foraging habitat containing preferred feed species for this species, of which 511 hectares is in the Pilliga. No clearing would occur in the eastern Pilliga which is identified as being important for the Swift Parrot (Birdlife International 2020). While individuals may forage along the alignment on occasion, the habitat to be removed has not been identified as important foraging habitat for this species by Birdlife Australia (2020). This habitat loss will decrease the availability of winter forage for individual honeyeaters that disperse nomadically throughout the region (and the study area) during winter. As such, the proposal is unlikely to lead to a long-term decrease in the size of a population.
Reduce the area of occupancy of the species	The distributional range of the Swift Parrot extends from Tasmania through parts of Victoria and NSW to southeast Queensland. Within this range, the area of occupancy for the species would include breeding grounds in Tasmania, migration routes and foraging habitats on mainland Australia. The study area is not considered a critical area of habitat for the Swift Parrot. The removal of linear patches of habitat along the 300 kilometres alignment would be unlikely to reduce the area of occupancy of the species..
Fragment an existing population into two or more populations	The Swift Parrot is a highly mobile species that routinely traverses large expanses of open water and open country, including Bass Straight, agricultural land and other clearings during its annual migration. The Swift Parrot would rely on 'stepping stones' of suitable foraging and roosting habitat during migrations and is thought to prefer 'corridors' of woodland vegetation over which to traverse. While the proposal would, in places, widen an existing gap, or create a new narrow linear gap in the forest canopy, dispersal or movement of the Swift Parrot across the landscape is unlikely to be affected as clearings created by the proposal would not be of a scale that would isolate habitat with respect to this species. As such, the proposal would not fragment the existing population into two or more populations.

Criteria	Discussion
Adversely affect habitat critical to the survival of a species	The *Recovery Plan for the Swift Parrot* (Swift Parrot Recovery Team 2001) notes the important breeding habitats for the species within Tasmania and important foraging habitats within mainland Australia. No important habitat for the species was identified by OEH (communication January 2019) in the study area. The eastern Pilliga is identified as being important for the Swift Parrot (Birdlife International 2020). There is one record within 20 kilometres of the alignment in the last twenty years. While individuals may forage along the alignment on occasion, the habitat to be removed is not likely to be important habitat for this species. As no breeding habitat and no preferred foraging habitat would be impacted, the proposal is unlikely to adversely affect habitat critical to the survival of a species.
Disrupt the breeding cycle of a population	Breeding does not occur on mainland Australia. Adult birds would only occur within the study area as part of seasonal foraging behaviour during winter. Habitat loss could decrease the availability of winter forage for individuals that disperse nomadically throughout the region (and the study area) during winter. The reduced availability of foraging habitat, particularly during poor flowering seasons and/or drought periods, could theoretically reduce the health and condition of adult birds, which could in turn, lead to poor condition and reduced breeding success. However, the habitats in the study area are not considered critical to the Swift Parrot and it is unlikely that the condition and health of individuals that may forage in the study area on occasion would be compromised to the extent that breeding success of individuals would be affected. Furthermore, the proposed action would not fragment a population of the Swift Parrot or create a barrier to local or regional movements of the species between foraging and breeding areas. Given the above points, the proposal is unlikely to disrupt the breeding cycle of a population of Swift Parrot.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal would remove 717 hectares of potential foraging habitat containing preferred feed species for this species, of which 511 hectares is in the Pilliga. No clearing would occur in the eastern Pilliga which is identified as being important for the Swift Parrot (Birdlife International 2020). The proposal would contribute to cumulative fragmentation of habitat in the landscape. Highly mobile species such as the Swift Parrot are expected to be less impacted by fragmentation and this species is well-adapted to accessing widely spaced habitat resources given its mobility and preference for seasonal foraging resources. Fragmentation of forested patches by the proposal would not impact movement of the species in the locality. Given that no breeding habitat would be impacted, no important foraging habitat would be removed, and that no areas of habitat would become isolated, it is unlikely that the proposal would result in the overall decline of the species.

Criteria	Discussion
Result in invasive species that are harmful to the species becoming established in the species' habitat	Introduction of weeds is of particular concern in the Pilliga Forests as they can reduce quality of vegetation and thus impact fauna and flora habitats. Operation of the proposal has the potential to spread weeds and pests into the Pilliga and elsewhere along the alignment. Introduction and spread of weeds is unlikely to substantially impact foraging habitat for this species. Predator species have been shown to prefer moving down linear clearings, and therefore, clearings could increase predation risk for other species (Dawson et al 2017). The creation of a 73 kilometres linear gap through the Pilliga may increase the risk of fox and cat predation. There is little risk of establishment of predators elsewhere in the alignment.
Introduce disease that may cause the species to decline	Psittacine beak and feather disease is a common and potentially deadly disease of parrots. Susceptibility to the infection may be influenced by environmental factors, such as climate, nutrition, habitat quality and social factors (DEH 2005). The proposal is unlikely to introduce Psittacine beak and feather disease, however cumulative impacts of further land clearing and impacts on habitat has the potential to increase susceptibility of individuals.
Interfere with the recovery of the species	Habitat loss is a key factor in the current threatened status of the Swift Parrot. The proposal would remove 717 hectares of potential foraging habitat containing preferred feed species for this species, of which 511 hectares is in the Pilliga. No clearing would occur in the eastern Pilliga which is identified as being important for the Swift Parrot (Birdlife International 2020). This habitat loss will decrease the availability of winter forage for individual honeyeaters that disperse nomadically throughout the region (and the study area) during winter. However, the habitat to be is not considered to support critical habitat for this species. Given that there would be no impact on breeding habitat, no important foraging habitat would be removed, and the lack of records of the species in the locality, the proposal is unlikely to interfere with the recovery of the species.
Conclusion	The proposal may result in a significant impact on the Swift Parrot as: • No breeding habitat would be removed. • No important foraging habitat would be removed. • There would be no impact on the ability of this species to move from breeding areas to foraging areas. • However, 717 hectares of potential foraging habitat containing preferred feed species for this species would be removed, of which 511 hectares is in the Pilliga.

Slender Darling-pea – (*Swainsona murrayana*) – vulnerable species

Habitat requirements

Swainsona murrayana is distributed mainly throughout NSW, but is also found in Victoria, South Australia and Queensland (DoE, 2020). Within NSW, *Swainsona murrayana* occurs is known to occur within the Pilliga IBRA sub-region in addition to being predicted within the Pilliga Outwash IBRA sub-region (OEH, 2019a). *Swainsona murrayana* has been recorded in the Jerilderie and Deniliquin areas of the southern riverine plain, the Hay plain as far north as Willandra National Park, near Broken Hill and in various localities between Dubbo and Moree (OEH, 2020).

Swainsona murrayana occurs on clay-based soils, ranging from grey, red and brown cracking clays to red-brown earths and loams with varied vegetation types, including Bladder Saltbush, Black Box and grassland communities on level plains, floodplains and depressions (OEH, 2019b). Species associations for *Swainsona murrayana* include Maireana species (*Maireana* spp.), Wallaby-grass (*Austrodanthonia* spp), and Speargrass (*Austrostipa* spp.) (Harden, 2002).

The population size of *Swainsona murrayana* is highly variable, and has been recorded from at least 60 geographically distinct sub populations in NSW, with up to 200 000 individuals estimated to occur within these sub populations (NSW SC, 2008). Plant abundance is generally described as locally common to abundant in NSW, with counts ranging from single plants to at least 1000 plants made at various sites (DoE, 2020). Small numbers appear to represent incidental records, with potential population sizes likely to be much larger (NSW SC, 2008). Within the locality, a small number of records of *Swainsona murrayana* have been found, mostly associated with the towns of Baradine (8 kilometres from proposal site), Narrabri and Gulargambone (21 kilometres from proposal site) (OEH, 2019c). Isolated recordings also occur within Pilliga East (42 kilometres from proposal site). The closest records to the proposal site are in Narrabri about 500 metres to the east near the Namoi River. This record has no date and is from a Royal Botanic Gardens Specimen.

Swainsona murrayana is a perennial herb, which produces a winter-spring growth (PlantNET, 2020; OEH, 2020). The species flowers in spring to early summer and then dies back after flowering. It re-shoots readily and often carpets the landscape after good cool-season rains (OEH, 2020). It is suspected that the species may require some disturbance and has been known to occur in paddocks that have been moderately grazed or occasionally cultivated (DEWHA, 2008a). One study on the Murray Valley Plain, in northern Victoria, found that *Swainsona murrayana* was only pollinated by *Trichocolletes maximus*, a solitary, ground nesting bee (DoE, 2020). The bee may fare poorly during extended drought and *Swainsona murrayana* may be susceptible to reproductive failure if this specialist pollinator declines (Morgan & Williams 2015).

Habitat in the study area

Swainsona murrayana was not recorded during targeted surveys during the recommended survey period. Within this period, well below average rainfall was recorded across the study area for the two years over which surveys were completed. These conditions resulted in a reduced ability to detect the species as the species is unlikely to have sprouted and flowered.

Less than 50 per cent of the proposal site was able to be accessed for field surveys. Of the 1732 hectares of native vegetation to be impacted about 57 hectares represents potential habitat for *Swainsona murrayana*. These areas are mostly represented by grassy native dominant and forb rich PCTs for which the species has a known association. These include:

- PCT 444 - Silver-leaved Ironbark grassy tall woodland on clay-loam soils on plains in the Brigalow Belt South Bioregion.

- PCT 414 - White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion.
- PCT 49 - Partly derived Windmill Grass - Copperburr alluvial plains shrubby grassland of the Darling Riverine Plains Bioregion and Brigalow Belt South Bioregion.

These PCTs provide suitable clayey woodland and grassland habitat. While this species has associations with other PCTs identified in the proposal site, the likelihood of the species occurring in these areas is unlikely based on a number of factors observed during field surveys:

- small patch size and less about 10 metres wide in Box-Gum woodland area with roads and cropped areas on each side
- low native species diversity and prevalence of introduced species
- past and grazing by introduced livestock
- within some Pilliga areas, dense regrowth areas of White Cypress Pine and Buloke with high litter cover and low grass and forb cover.

Table N13 Slender Darling Pea

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	Despite *Swainsona murrayana* not being found within the construction footprint during targeted surveys, consideration has been given to its potential occurrence due to its occurrence within the locality. *Swainsona murrayana* has a widespread and diverse range across NSW, Victoria, South Australia and in a small area of Queensland. In the proposal site, previous records are from scattered and isolated occurrences mostly near town centres that are not recent. Any potential occurrence of *Swainsona murrayana* within the construction footprint would also occur within the middle of its range, both in NSW and throughout Australia. Based on the above considerations, the occurrence of *Swainsona murrayana* within the areas of potential habitat in the proposal site is not likely to be an 'important population'.
Lead to a long-term decrease in the size of an important population of a species	As the species has not been found within the construction footprint and also has a small number of records within the locality, the likelihood that the species would decline as a result of the proposal is minor. About 57 hectares of potential habitat occurs within the proposal site and will be removed. Most potential habitat for this species occurs within open grassy woodlands and derived grasslands that have not been severely disturbed. These are not common in the proposal site. Despite suitable potential habitat occurring within the proposal site, the proposal is unlikely to lead to a long-term decrease in the size of any important population of *Swainsona murrayana* within the proposal site.

Criteria	Discussion
Reduce the area of occupancy of an important population	Complete vegetation clearance is proposed within the construction footprint of the proposal. *Swainsona murrayana* has the potential to occur within or adjacent to the proposal and is known to occur within the wider locality of the proposal. Suitable habitat to be impacted by the proposal is about 57 hectares. As the proposal will clear about 57 hectares of suitable potential habitat within the construction footprint, the proposal is likely to reduce the area of occupancy for an important population *Swainsona murrayana* if this species occurs within the proposal.
Fragment an existing important population into two or more populations	The proposal is located in close proximity to roadsides and access tracks within the Pilliga forests and at various locations between Narromine and Narrabri. With the exception of Segment 10 (Pilliga), the proposal traverses mostly agricultural land which has been extensively cleared for agriculture including cropping and intensive grazing. This has resulted in isolated patches of remnant native vegetation and small connected patches, mostly limited to roadside reserves and smaller patches on private properties. Potential habitat for this species that may occur in the proposal site, occurs in an already highly fragmented landscape for this species. The addition of a 40 metres wide corridor of clearing is in an already highly fragmented and modified landscape is unlikely to fragment any population into two or more populations.
Adversely affect habitat critical to the survival of a species	There is no registered critical habitat for *Swainsona murrayana* on the Register of Critical Habitat (DAWE, 2020). About 57 hectares of potential habitat occurs in the proposal site. Habitat critical to the survival of the species include grassy open woodland on fertile clay rich soils where there has been less disturbance and only moderate historical grazing. The 57 hectares of potential habitat occurs as scattered patches in derived and grassy open woodlands along the proposal. Due to the already highly fragmented nature and grazing by livestock of potential habitat scattered along the proposal site, the proposal is unlikely to adversely affect habitat critical to the survival of *Swainsona murrayana.*
Disrupt the breeding cycle of an important population	The pollination of *Swainsona murrayana* is thought to occur by one bee species, *Trichocolletes maximus* (Williams et al., 2015). Given the small size of this pollinator bee species, it is likely to have a home range of only a few kilometres. Given the proposal is mostly 40 metres wide and the ability of this pollinator to move over kilometres, the proposal is unlikely to inhibit the movement of this pollinator. This species is known to tolerate moderate levels of grazing and disturbance and if this species was to occur, slight disturbances may potentially encourage the species to germinate. Due to the pollination requirements and nature of the species in disturbed habitat, the proposal is unlikely to disrupt the breeding cycle of potential occurrences of *Swainsona murrayana* within the proposal.

Criteria	Discussion
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove about 57 hectares of suitable potential habitat for this species within the proposal site. Potential habitat for this species is scattered in isolated patches through the proposal site and mostly occurs as small patches depending on disturbance history. The proposal would remove some areas of potential habitat and reduce potential habitat availability for the species. The proposal will likely decrease the availability and quality of potential habitat for the species. However, given the widespread and already fragmented nature of potential habitat for the species in the proposal site, it is not likely to occur to an extent that the species is likely to further decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The proposal has the potential to introduce a number of invasive flora to the areas in which *Swainsona murrayana* may occur. This is due to the use of plant and machinery introducing weed seed into the proposal site and adjacent areas. As the majority of the construction footprint runs adjacent to existing access tracks and roads, a number of invasive species were recorded including *Opuntia* species which is common and widespread along the entire proposal site. Provided that appropriate plant and machinery hygiene measures are taken, the proposal is unlikely to facilitate the spread of invasive flora to the extent of a significant impact to *Swainsona murrayana*. In addition to invasive flora, a number of threat abatement plans have been established for the species, including those regarding rabbits, feral pigs and goats (DEE, 2016, 2017; DEWHA, 2008). Impacts from these species include habitat degradation, grazing and introduction of weed species. As the proposal occurs mostly adjacent to existing access tracks and within intensive agricultural land, the proposal is unlikely to further facilitate the spread of invasive species to the extent that this species would be further impacted.
Introduce disease that may cause the species to decline	The proposal is unlikely to introduce disease into the proposal site that may cause the species to decline. There are no diseases that are known to affect this species.
Interfere substantially with the recovery of the species	There is no recovery plan for this species. There are a number of general flora species threat abatement plans (not *S. murrayana* specific), including those regarding rabbits, feral pigs and goats (DEE, 2016, 2017; DEWHA, 2008). These threat abatement plans indicate that a number of threats likely to be associated with these species occur, including: • habitat degradation • preventing plant regeneration • overgrazing and damage to plants • promotion of introduced weed growth. As the proposal occurs adjacent to existing access tracks and within an already highly fragmented landscape where weeds are common and widespread due to access and spread by some feral fauna, the proposal is unlikely to increase the opportunity for these species to increase their range throughout the locality and impact on *Swainsona murrayana*.

Criteria	Discussion
Conclusion	The proposal is unlikely to have a significant impact on *Swainsona murrayana* given: • That an important population is not likely to occur in the proposal site or study area. • That 57 hectares of moderate quality potential habitat within a fragmented and modified agricultural landscape would be removed. • the proposal would not isolate any known or potential habitat for the species further than has already occurred in the highly modified proposal site in which it could potentially occur.

Commersonia procumbens – vulnerable species

Habitat requirements

Commersonia procumbens (syn. *Androcalva procumbens* and *Rulingia procumbens*) is endemic to NSW, mainly confined to the Dubbo-Mendooran-Gilgandra region, but also in the Pilliga and Nymagee areas (OEH, 2020a). Similarly, these areas correspond to its known distribution in the Pilliga IBRA sub-region and predicted occurrence in the Pilliga Outwash IBRA sub-region (OEH, 2019a). Populations of *Commersonia procumbens* are known in Goonoo State Forest, Mt Kaputar National Park, and Pilliga Nature Reserve with additional populations occurring on crown land, state forests, and private land (DEWHA, 2008). The mapped range of this species reaches from Goobang National Park south of Dubbo, to Yelarbon State Forest on the NSW/QLD border (DoE, 2020).

Commersonia procumbens occurs on sandy soils in woodland or scrub communities and are often, but not always, associated with disturbed habitats such as road verges, quarry boundaries, gravel stockpiles, and power line easements (OEH, 2019b; DEWHA, 2008). Canopy species associated with *Commersonia procumbens* include *Eucalyptus dealbata* and *Eucalyptus sideroxylon* communities, *Melaleuca uncinata* scrub, under mallee eucalypts with a *Calytrix tetragona* understorey in addition to *Eucalyptus fibrosa* subsp. *nubila, Eucalyptus dealbata, Eucalyptus albens* and *Callitris glaucophylla* woodlands north of Dubbo (OEH, 2019b).

Whilst previous records indicate that this species is abundant in the Pilliga and its locality (OEH, 2019c), biodiversity surveys of Brigalow Belt South in 2002 recorded *Commersonia procumbens* at only one of 32 previously known locations (DEWHA, 2008). It was not relocated at Pilliga East State Forest, Goonoo State Forest or Trinkey State Forest. The species has been recorded in populations of 50+ individuals of various ages, with individual numbers of populations corresponding to environmental conditions such as amount of received sunlight.

Commersonia procumbens appears to respond to fire moderately well, with adaptive abilities regarding reproduction. Populations have been found in a recently burnt Ironbark and Callitris area (OEH, 2019b). *Commersonia procumbens* is a pioneer species, potentially due to a persistent soil seed bank which responds positively to fire (OEH, 2020). Despite this, suitable habitat for the species should not be burnt more frequently than once every seven years (NSW RFS, 2004). The species is also thought to be clonal, with the potential for populations to comprise of a single cohort, or have a multi-aged structure where some individuals appear to be older (OEH, 2019b).

The flowering period of C*ommersonia procumbens* is from August to December followed by fruiting from summer to autumn with the recommended survey period between August and May (OEH, 2020). The species will however appear after one to two seasons after fire, which is essential for above ground identification. When conditions are not favourable, the species will appear senescent and return to an underground root stock (OEH, 2020). This shrub species is most likely pollinated by insect species (PlantNET, 2020).

Within the locality, most records are known from the Pilliga east of the Newell Highway and a few scattered records in Pilliga East forest west of the Newell Highway. The closest records to the proposal are within Pilliga East forest and are about 2.5 kilometres from the proposal site recorded in 2012 (about 50 plants). Most other records are from Goonoo Conservation Area (about 30 kilometres east of the proposal).

Habitat in the study area

Commersonia procumbens was not recorded during targeted surveys during the recommended survey period. Within this period, well below average rainfall was recorded across the study area for the two years over which surveys were completed. These conditions resulted in a reduced ability to detect the species as the species is unlikely to have sprouted. In addition, there have been no known recent fires in the proposal site within potential habitat.

Less than 50 per cent of the proposal site was able to be accessed for field surveys. Of the 1732 hectares of native vegetation to be impacted about 565.14 hectares represents potential habitat for *Commersonia procumbens*. These areas are mostly represented by sandy soils in scrubby woodland communities for which the species has a known association. These include:

- PCT 88 - Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion
- PCT 141 – Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion
- PCT 397 – Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion
- PCT 398 – Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion
- PCT 399 – Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion
- PCT 404 – Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests
- PCT 406 – White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests
- PCT 409 – Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion
- PCT 414 - White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion
- PCT 1384 - White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion

These PCTs provide suitable sandy woodland and scrub communities in addition to the areas within the proposal site providing areas of previously disturbed access tracks.

Table N14 Assessment of significance – *Commersonia procumbens*

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	The main records for this species occur in Pilliga forest and Goonoo State Conservation Area. There are known and recent records within the investigation corridor and in the study area of the proposal site. Given that this species is known mostly from two locations, the population in the Pilliga would be considered an important population.
Lead to a long-term decrease in the size of an important population of a species	Suitable potential habitat occurs throughout the Pilliga Forests and within the proposal site, but the species distribution is influenced by site specific factors, including local floristic variation, and different disturbance and fire histories across the forest. Populations of *Commersonia procumbens* have been in apparent decline, with the exclusion of the population within Goonoo State Conservation Area. Described population sizes are approximately 50+ individuals, which suggests that the species is limited in genetic diversity and reproductive opportunity. Due to the species observed response to fire, it is likely that populations are dependent on fire to germinate. The extensiveness of the soil seed bank nor the frequency or location of fires however cannot be determined, and can therefore not be relied upon to maintain the genetic diversity of the population. The proposal will result in the removal of 565.14 hectares of suitable potential habitat for the species. The proposal will result in the clearing of a large area of potential habitat in Segment 10 (Pilliga), and may impact gene flow and germination between areas of potential habitat. The proposal has the potential to lead to a long-term decrease in the size of the important population.
Reduce the area of occupancy of an important population	The proposal will remove a total of 565.14 hectares of potential habitat in Segment 10 (Pilliga). This clearing will occur as a new 73 kilometres x 50 metres wide linear gap through the forest and adjacent to existing cleared areas of Pilliga Forest Way for much of the segment. Roadside populations of *Commersonia procumbens* near Pilliga Forest Way have the potential to occur within or adjacent to the proposal. The proposal is likely to reduce the area of occupancy given the large amount of potential habitat removal.
Fragment an existing important population into two or more populations	The proposal is located in close proximity to roadsides and access tracks within the Pilliga. Whilst the proposal runs through suitable habitat adjacent to important populations, it also runs adjacent to existing access tracks and roads which are known habitat for this species as it can sometimes favour previously modified roadside verges. The proposal is unlikely to further fragment the important population into two or more populations given the existing cleared areas in the Pilliga and the species ability to adapt to some modification.

Criteria	Discussion
Adversely affect habitat critical to the survival of a species	Within the Pilliga where the species occurs, there are known records on both the eastern and western side of the proposal site. The species often occurs in post fire areas and is sometimes associated with moderate levels of disturbance particularly on the edges of roads such as occurs parallel to Pilliga Forest Way. Individuals which may occur within the proposal, may be critical to the long-term genetic diversity of the species in habitat which is suitable for reproduction and dispersal. Reducing the potential area of occupancy of this species may subsequently reduce the reproduction potential of the species. Approximately 565.14 hectares of suitable habitat would be cleared as a result of the proposal. Despite not being found during targeted surveys, the proposal site has suitable potential habitat for this species that would be removed. Whilst *Commersonia procumbens* is not listed on the Register of Critical Habitat (DAWE, 2020), the proposal may adversely affect potential habitat critical to the survival of *Commersonia procumbens.*
Disrupt the breeding cycle of an important population	The potential genetic population within the proposal site may contribute to the overall population within the study area and locality resulting in a reduced opportunity for the species to reproduce and disperse. There is potential for the proposal to disrupt the reproduction and germination cycle of the population.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will result in the removal of 565.14 hectares of suitable potential habitat for the species in Segment 10 (Pilliga). Due to the apparent decline in previously known populations, and that suitable potential habitat would be removed, the proposal will likely decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Introduction of weeds is of particular concern in the Pilliga Forests as they can reduce the quality of vegetation and thus impact flora habitats. Weeds such as the Tiger Pear (*Opuntia aurantiaca*), are already common in the Pilliga, and may be further spread during construction. Operation of the proposal has the potential to spread weeds and pests into the Pilliga. The surroundings of railways (eg verges and embankments) often host a high diversity of non-native species (Gelbard and Belnap 2003; Hansen and Clevenger 2005), in many cases due to their transportation as stowaways in or on trains. Provided that appropriate plant and machinery hygiene measures are taken, the proposal is unlikely to facilitate the spread of invasive flora to the extent of a significant impact to *Commersonia procumbens*.
Introduce disease that may cause the species to decline	The proposal is unlikely to introduce disease into the proposal site that may cause the species to decline. There are no diseases that are known to affect this species.

Criteria	Discussion
Interfere substantially with the recovery of the species	There is no recovery plan for *Commersonia procumbens*. Despite this, the *Pilliga Nature Reserve Plan of Management* (NPWS, 2015), identifies developments or activities in or near the Pilliga Nature Reserve that may compromise the recovery of species should be opposed. Road grading and altered fire regimes are a particular threat to the species (OEH, 2019b). The proposal requires the removal of 565.14 hectares of suitable potential habitat for *Commersonia procumbens*. Due to the large area of suitable habitat of *Commersonia procumbens* within the proposal site to be removed near known records of the species, the proposal may interfere with the recovery of *Commersonia procumbens.*
Conclusion	The proposal is likely to have a significant impact on *Commersonia procumbens* given: • the large area of suitable potential habitat of 565.14 hectares to be impacted which may decrease the availability and quality of habitat to the extent that the species is likely to decline • the occurrence of nearby records in similar habitats and therefore its likely occurrence in the proposal site • The low genetic diversity of the species of which any loss of plants is likely to further impact genetic diversity of the species.

Spiny Peppercress – (*Lepidium aschersonii*) – vulnerable species

Habitat requirements

Lepidium aschersonii is not widespread however this species is known to occur within the Pilliga and Pilliga Outwash IBRA sub-regions (OEH, 2019a). This species occurs in the marginal central-western slopes and north-western plains regions of NSW including within Brigalow Nature Reserve, Brigalow State Conservation Area, Leard State Conservation Area and Bobbiwaa State Conservation Area (OEH, 2020; 2019b).

Lepidium aschersonii is mainly found on ridges of gilgai clays dominated by open to dense vegetation structures with sparse grassy understoreys and moderate leaf litter (OEH, 2020). Associated canopy species include Brigalow *(Acacia harpophylla),* Belah *(Casuarina cristata),* Buloke *(Allocasuarina luehmanii)* and Grey Box *(Eucalyptus microcarpa)* (OEH, 2020). In the south, the species has also been recorded growing in Bull Mallee *(Eucalyptus behriana).*

Recorded population sizes of *Lepidium aschersonii* vary from 18 to 5000+ individual plants with 50 per cent of the total *Lepidium aschersonii* recorded for Australia occurring in NSW. (OEH, 2020; 2019b). The National Recovery Plan for *Lepidium aschersonii* has indicated that one population in Brigalow Park Nature Reserve near Narrabri contains 'many thousands' of individuals and may be the largest remaining population of *Lepidium aschersonii* (Carter, 2010). A number of smaller populations also occur along roadsides within Narrabri, with populations ranging from 18 individuals to around 600 individuals (both recorded in 1994) (Carter, 2010). The closest records to the proposal site are in Segment 11 between Pilliga and Narrabri about 165 metres from the proposal site (records from 2017).

Plant numbers fluctuate depending on surrounding environment and appear to be influenced by hydrological processes. Population numbers may be negatively correlated with an increasing overstorey density with a lack of individuals where Brigalow canopy cover exceeded approximately 60 per cent (OEH, 2019b). Populations have also been known to disappear from the site following flood inundation to reappear years later, whilst conversely increasing in numbers during drought conditions (OEH, 2020). When this occurs, *Lepidium aschersonii* is often described as a "weed" where it dominates paddocks.

Lepidium aschersonii is a small annual herb (PlantNET, 2020), which flowers from Spring to Autumn (OEH, 2020). The recommended survey period for *Lepidium aschersonii* is November to April, with some populations known to produce abundant seed, due to the short-lived occurrence of the species and high population sizes when observed (OEH, 2020).

Habitat in the study area

Lepidium aschersonii was not recorded during targeted surveys during the recommended survey period. Within this period, well below average rainfall was recorded across the study area for the two years over which surveys were completed. In addition, no land access agreements were available for the nearest locations previous locations of this species. Some areas of suitable potential habitat within Segment 11 could not be accessed and in these areas, potential habitat has been assumed for the species. These conditions resulted in a reduced ability to detect the species as the species is unlikely to have sprouted and seeded.

Additional targeted surveys planned for this species in early April 2020 due to increased rainfall, were cancelled due to the global coronavirus pandemic and associated travel restrictions.

Habitat for *Lepidium aschersonii* has been defined as PCTs, of which a total of four are located within the construction footprint and include:

- PCT35 – Brigalow - Belah open forest / woodland on alluvial often gilgaied clay from Pilliga Scrub to Goondiwindi, Brigalow Belt South Bioregion.
- PCT 56 – Poplar Box - Belah woodland on clay-loam soils on alluvial plains of north-central NSW.
- PCT 88 - Pilliga Box - White Cypress Pine- Buloke shrubby woodland in the Brigalow Belt South Bioregion.
- PCT 256 - Green Mallee tall mallee woodland on rises in the Pilliga - Goonoo regions, southern Brigalow Belt South Bioregion.

These PCTs potentially provide suitable alluvial open to closed woodlands associated with the gilgai clays of the region.

Table N15 Assessment of significance – Spiny Peppercress

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	*Lepidium aschersonii* was not observed in the proposal site during targeted surveys. The species is assumed to occur and was likely not observed due to ongoing drought conditions during field surveys. It is assumed presence is based on previous records in the study area and observed potential habitats. In areas surrounding Narrabri (segment 11), records for the species occurs within 200 meters of the proposal site, however most known populations of this species are restricted to Brigalow Nature Reserve and the Brigalow State Conservation Area which are located about six kilometres west of the proposal site. The occurrence of the roadside populations within Narrabri, however, are located closer to the proposal site. Although roadside populations in the Narrabri region are small, these populations have been included in the *National Recovery Plan* (Carter, 2010). These populations may contribute to the dispersal of the species within the north and south of its range therefore populations in this region must be considered an 'important population'.
Lead to a long-term decrease in the size of an important population of a species	Within the the limitations outlined above, targeted surveying and database records do not indicate that the species occurs within the proposal site. Habitat for this species is limited in the proposal site and surrounding study area, and known populations for the species are mostly limited to the Brigalow Nature Reserve and the Brigalow State Conservation Areas. Given the proximity of some roadside records to the proposal site in the Narrabri area, this species may occur in suitable potential habitat within the proposal site. About 10.27 hectares of potential habitat occurs within the proposal site based on observed habitats and the species known habitat preferences. Most potential habitat for this species occurs within open grassy woodlands and derived grasslands that have not been severely disturbed. These are not common in the proposal site. Despite suitable potential habitat occurring within the proposal site, the proposal is unlikely to lead to a long-term decrease in the size of any important population of *Lepidium aschersonii* within the proposal site.
Reduce the area of occupancy of an important population	Complete vegetation clearance will occur within the proposal site. About 10.27 hectares of suitable habitat, including gilgai clays dominated by Brigalow (*Acacia harpophylla*), Belah (*Casuarina cristata*), Buloke (*Allocasuarina luehmanii*) and Grey Box (*Eucalyptus microcarpa*) has been identified plot surveys and targeted flora surveys within the proposal site. The removal of this potential habitat will reduce the area of potential occupancy for the species. Given that abundant records for the species exist in the wider locality including conservation reserves, and the proposal site will reduce only 10.27 hectares of suitable potential habitat within the proposal site, the area of occupancy for *Lepidium aschersonii* is unlikely to be significantly reduced.

Criteria	Discussion
Fragment an existing important population into two or more populations	The proposal site is located in close proximity to roadside populations surrounding Narrabri. Vegetation clearing associated with the proposal will potentially fragment known populations of the species occurring on the eastern side of the proposal site, from potential populations occurring on the western side of the proposal site by up to 40 meters. With the exception of Segment 10 (Pilliga), the proposal site traverses mostly agricultural land, and roadsides which has been extensively cleared for agriculture including cropping and intensive grazing, and for the construction of roadways. This has resulted in isolated patches of remnant native vegetation and small connected patches, mostly limited to roadside reserves and smaller patches on private properties. Any important population that may occur in the proposal site, would occur in an already highly fragmented landscape for this species. The addition of a 40 metre wide corridor of clearing in an already highly fragmented and modified landscape is unlikely to significantly fragment any populations into two or more populations.
Adversely affect habitat critical to the survival of a species	There is no registered critical habitat for *Lepidium aschersonii* on the Register of Critical Habitat (DAWE, 2020). Additionally, the recovery plan for *Lepidium aschersonii* does not identify habitat critical for the species. In total, the proposal will remove 10.27 hectares of suitable potential habitat for the species. This includes Brigalow- Belah woodland on gilgaied clays, Poplar Box- Belah woodland and Pilliga Box – White Cypress Pine – Buloke shrubby woodland and derived grasslands from these communities recorded in the proposal site. Given the lack of records for species within the proposal site, the abundance of records within more suitable habitat in the surrounding locality and the suitable habitat in conservation reserves in the surrounding locality, it is unlikely that the removal of 10.27 hectares of habitat from the proposal site will adversely affect habitat critical to the survival of *Lepidium aschersonii.*
Disrupt the breeding cycle of an important population	The species exhibits a short-lived lifecycle, and an ability to re-appear several seasons after disturbance occurs. This species also typically produces abundant seed during favourable conditions. If vegetation clearing impacted on individuals or populations of this species, it is likely that seed dispersion of the species would still occur. Additionally, no known populations of the species occur within the proposal site, and favourable habitat within the site is limited 10.27 hectares. As such, for the reasons discussed above, it is unlikely that vegetation clearing within the proposal site will disrupt the breeding cycle of an important population of *Lepidium aschersonii.*

Criteria	Discussion
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove about 10.27 hectares of suitable habitat for *Lepidium aschersonii* from the proposal site. This will decrease the availability and quality of potential habitat for the species in the proposal site, however, no known records for the species exist within habitat to be removed from the proposal site. Known and suitable potential habitat for this species exists in the surrounding study area and locality including in dedicated conservation reserevs. As areas known, or previously known to contain population of this species will not be impacted by the proposal, it is unlikely that the proposal will modify, destroy, remove, isolate or decrease the availability or quality of habitat to an extent that the species is likely to further decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Given the occurrence of *Lepidium aschersonii* in areas surrounding Narrabri, the species already occurs in a highly modified landscape likely to support a wide array of introduced and invasive flora species. The proposal has the potential to further introduce a number of invasive flora species to areas occupied by *Lepidium aschersonii*. Introduction of weed species via vehicles and machinery operating in the proposal site could occur, as vehicles would be required to traverse a large area and variety of landscapes, including highly modified agricultural land and disturbed roadsides containing an abundance of introduced and invasive flora species (eg Mother of Millions and Tiger Pear). Given the implementation of safeguards and management measures pertaining to weed hygiene, it is unlikely that invasive species harmful to *Lepidium aschersonii* would become further established in the species habitat. In addition to invasive flora, a number of feral fauna such as rabbits, feral pigs and goats can impact the species. Impacts from these species include habitat degradation, grazing and introduction of weed species. It is unlikely that the proposal will further facilitate the spread or establishment of feral fauna species in the proposal site. For the reasons discussed above, it is unlikely that the proposal will result in invasive species that are harmful to *Lepidium aschersonii* becoming established in habitat available for the species any more than already occurs.
Introduce disease that may cause the species to decline	The proposal is unlikely to introduce disease into the proposal site that may cause the species to decline.
Interfere substantially with the recovery of the species	The recovery plan for *Lepidium aschersonii* identifies a number of threats to the occurrence of populations of the species occurring around Narrabri, including weed invasion, grazing and disturbance by feral animals and livestock, habitat destruction and roadworks (Carter, 2010). The proposal will remove about 10.27 hectares of suitable potential habitat for *Lepidium aschersonii* from the proposal site, however no known records for the species exist within habitat to be removed. Given that impacts of the proposal do not occur within areas known to contain population's of the species, it is unlikely that the proposal will contribute further to any known threats to the species, it is unlikely that the proposal will to interfere with the recovery of the species.

Criteria	Discussion
Conclusion	The proposal is unlikely to have a significant impact on *Lepidium aschersonii* given: • No known records for the species occur within the proposal site • Removal of potential habitat for the species is limited to 10.27 hectares Potential habitat to be removed is of moderate quality, as it occurs within a fragmented and modified agricultural landscape

Tylophora linearis – endangered species

Habitat requirements

Tylophora linearis has been recorded within Goonoo, Pilliga West, Pilliga East, Bibblewindi, Cumbil and Eura State Forests, Coolbaggie National Reserve, Goobang National Park and Beni State Conservation Area (OEH, 2019a). it has also has been recorded at Hiawatha State Forest near West Wyalong in the south and there are old records as far north as Crow Mountain near Barraba and near Glenmorgan in the western Darling Downs in addition to Pilliga Nature Reserve (DEWHA, 2008). The species is also mapped as known to occur within the Pilliga and Pilliga Outwash IBRA sub-regions (OEH, 2019b).

Tylophora linearis grows in dry scrub to open forest and has been recorded from low-altitude sedimentary flats in dry woodlands (OEH, 2020). *Tylophora linearis* grows in association with many different canopy and shrub species including *Melaleuca uncinata, Eucalyptus fibrosa, E. sideroxylon, E. albens, Callitris endlicheri, C. glaucophylla, Allocasuarina luehmannii, Acacia hakeoides, A. lineata, Myoporum spp., and Casuarina spp* (DEWHA, 2008).

The total population of *Tylophora linearis* in NSW is estimated to include at least 250-500 mature individuals (Copeland, 2008). However, no data is available to estimate the size of several of the known populations and estimates are also complicated by difficulties in positively identifying plants that may not be flowering at the time of survey. Although the total population *of Tylophora linearis* may be larger than current estimates suggest, there are unlikely to be more than 1000 mature individuals (NSW SC, 2019).

Tylophora linearis is a herbaceous twiner which reproduces through rhizomatous roots but is also assumed to be insect-pollinated (PlantNET, 2020; Forster *et al.* 2004). This species flowers in spring with flowers recorded in November or May with fruiting probably two to three months later. This species is easily confused with other climbers when not in flower or fruit, however has a recommended survey period of October to May (OEH, 2020).

Within the locality, most records are known from Pilliga East forest and within Segment 10. There are a number of records close to the proposal site including within 20 metres, 210 and 260 metres within Pilliga East and Euligal state forests.

Habitat in the study area

Tylophora linearis was not recorded during targeted surveys during the recommended survey period. Within this period, well below average rainfall was recorded across the study area for the two years over which surveys were completed. These conditions resulted in a reduced ability to detect the species as the species is unlikely to have sprouted and flowered. The wide variation in flowering times, is also suspected to be linked to rainfall (NSW SC, 2019).

Less than 50 per cent of the proposal site was able to be accessed for field surveys. Of the 1732 hectares of native vegetation to be impacted about 580.45 hectares represents suitable potential habitat for *Tylophora linearis*. These areas are mostly represented by areas within the

Pilliga (Segment 10) for which the species has a known association. PCTs for which this species is assumed to occur in the Pilliga include:

- PCT 88 - Pilliga Box - White Cypress Pine - Buloke shrubby woodland in the Brigalow Belt South Bioregion.
- PCT 141 – Broombush - wattle very tall shrubland of the Pilliga to Goonoo regions, Brigalow Belt South Bioregion.
- PCT 397 – Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion.
- PCT 398 – Narrow-leaved Ironbark - White Cypress Pine - Buloke tall open forest on lower slopes and flats in the Pilliga Scrub and surrounding forests in the central north Brigalow Belt South Bioregion.
- PCT 399 – Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion.
- PCT 404 – Red Ironbark - White Bloodwood +/- Burrows Wattle heathy woodland on sandy soil in the Pilliga forests.
- PCT 406 – White Bloodwood - Motherumbah - Red Ironbark shrubby sandstone hill woodland / open forest mainly in east Pilliga forests.
- PCT 409 – Dirty (Baradine) Gum - White Bloodwood - White Cypress Pine - Motherumbah shrubby woodland on sandy soils in the Pilliga Scrub and surrounding region, Brigalow Belt South Bioregion.
- PCT 414 - White Mallee - Dwyer's Red Gum mallee heath on sands in the Goonoo - Pilliga region, Brigalow Belt South Bioregion.
- PCT 1384 - White Cypress Pine - Bulloak - ironbark woodland of the Pilliga area of the Brigalow Belt South Bioregion.

These PCTs provide suitable dry scrub and open forest within the mapped known distributions. The species has associations with few other PCTs in the proposal site and the PCTs listed above are assumed to support suitable potential habitat for the species.

Table N16 Assessment of significance – *Tylophora linearis*

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of a population	This species is a small climber with a limited range for pollination. Its estimated population of no more than 1000 individuals indicates that any occurrences of this species are likely to be important to the population. It is known from previous records within 20 metres of the proposal site and in the wider investigation corridor. In the proposal site, 10 PCTs have been described as suitable potential habitat for this species and a total of 580.45 hectares of suitable potential habitat will be removed as a result of the proposal. Given the large area of potential habitat to be cleared near known records for this species, the proposal is likely to lead to a long-term decrease in the size of the population.

Criteria	Discussion
Reduce the area of occupancy of the species	The proposal will remove a total of 580.45 hectares of potential habitat in Segment 10 (Pilliga). This clearing will occur as a new 73 kilometres x 50 metres wide linear gap through the forest and adjacent to existing cleared areas of Pilliga Forest Way for much of the segment. Given the large area of potential habitat to be cleared near known records for this species, the proposal is likely to reduce the area of occupancy of the species.
Fragment an existing population into two or more populations	The construction footprint runs through the middle of the Pilliga Forest. Whilst possibly causing fragmentation of potential habitat, it also runs adjacent to existing access tracks. These tracks cause existing fragmentation throughout the Pilliga Forest. The proposal is located in close proximity to roadsides and access tracks within the Pilliga. The proposal is unlikely to further fragment the important population into two or more populations given the existing cleared areas in the Pilliga.
Adversely affect habitat critical to the survival of a species	The population size of 1,000 individuals of *Tylophora linearis* indicates that the genetic pool for this species is limited, particularly when considering its distribution is wide. Individuals which may occur within the proposal, may be critical to the long-term genetic diversity of the species. Reducing the area of occupancy of this species would subsequently reduce the reproduction potential of the species. About 580.45 hectares of suitable habitat would be cleared as a result of the proposal. Despite not being found during targeted surveys, proposal site has suitable potential habitat for this species that would be removed. Whilst *Tylophora linearis* is not listed on the Register of Critical Habitat (DAWE, 2020), the proposal may adversely affect potential habitat critical to the survival of *Tylophora linearis.*
Disrupt the breeding cycle of a population	As *Tylophora linearis* is insect pollinated and reproduces vegetatively through rhizomatous roots, clearing of potential habitat, or species will disrupt the breeding cycle of the population. The potential genetic population within the proposal site may contribute to the overall population within the locality, resulting in a reduced opportunity for the species to reproduce and disperse. The proposal is likely to disrupt the reproduction and germination cycle of the population.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will result in the removal of 580.45 hectares of suitable potential habitat for the species in Segment 10 (Pilliga). Due to the apparent decline in previously known populations, and that suitable potential habitat would be removed, the proposal will likely decrease the availability or quality of habitat to the extent that the species is likely to decline.

Criteria	Discussion
Result in invasive species that are harmful to the species becoming established in the species' habitat	Introduction of weeds is of particular concern in the Pilliga Forests as they can reduce the quality of vegetation and thus impact flora habitats. Weeds such as the Tiger Pear (*Opuntia aurantiaca*), are already common in the Pilliga, and may be further spread during construction. Operation of the proposal has the potential to spread weeds and pests into the Pilliga. The surroundings of railways (eg verges and embankments) often host a high diversity of non-native species (Gelbard and Belnap 2003; Hansen and Clevenger 2005), in many cases due to their transportation as stowaways in or on trains. Provided that appropriate plant and machinery hygiene measures are taken, the proposal is unlikely to facilitate the spread of invasive flora to the extent of a significant impact to *Tylophora llinearis*
Introduce disease that may cause the species to decline	The proposal is unlikely to introduce disease into the proposal site that may cause the species to decline. There are no diseases that are known to affect this species.
Interfere with the recovery of the species	There is no recovery plan for *Tylophora linearis*. Despite this, the *Pilliga Nature Reserve Plan of Management* (NPWS, 2015), identifies developments or activities in or near the Pilliga Nature Reserve that may compromise the recovery of species should be opposed. The proposal requires the removal of 580.45 hectares of suitable potential habitat for *Tylophora linearis*. Due to the large area of suitable habitat of *Tylophora linearis* within the proposal site to be removed near known records of the species, the proposal may interfere with the recovery of *Tylophora linearis.*
Conclusion	The proposal is likely to have a significant impact on *Tylophora linearis* given: • the large area of suitable potential habitat of 580.45 hectares to be impacted which may decrease the availability and quality of habitat to the extent that the species is likely to decline • the occurrence of nearby records in similar habitats • the low number of estimated plants (100 individuals) suggests a low genetic diversity and any loss of plants is likely to further impact genetic diversity of the species.

Coolabah Bertya – (*Bertya opponens*) – vulnerable species

Habitat requirements

Bertya opponens has been mapped as having a known distribution within QLD and NSW, specifically within the Pilliga, and north-east of Cobar (DoE, 2020; OEH, 2019). Within the Pilliga, the species is known to occur at Jacks Creek State Forest south of Narrabri with a population size of at least 5 000 000 plants (NPWS, 2002) and a second population of five plants 12 kilometres to the north-west (DoE, 2020).

Another known population also occurs at Nurrungal (formerly Elmore Station) north-east of Cobar, however the population of approximately 500-600 plants has been recorded to be in poor condition (DoE, 2020). The recovery plan for the species outlines that this population may have been two to three times this number originally, with senescent individuals either dying or being blown-out gradually over the past 20 years (NPWS, 2002).

Bertya opponens is usually associated with gravelly ridges, shallow or skeletal soils, or sandy gullies, stony mallee ridges and cypress pine forest on red soils, like that which occur in the Pilliga Forest (OEH, 2020a). Suitable habitat of the species is highly variable and whilst being associated with sandy loam and red earth soils, it can also be associated with rhyolite, shale and metasediments (QLD DEHP, 2013). Suitable hydrology for the species is also variable, with habitat being described as shallow and rocky to deep and well-drained (NSW SC, 2009). Known associations of canopy species for *Bertya opponens* include *Eucalyptus chloroclada, Callitris glaucophylla* and *Eucalyptus fibrosa* (OEH, 2020a).

The recent 2019/2020 bush fires within southern and eastern Australia has reduced the potential population of *Bertya opponens* (DAWE, 2020a). The recent bushfires have resulted in a reduction of 10-30 per cent of suitable habitat, based on its known distribution within fire affected areas. This species is suspected to positively respond to fire and disturbance, with the population at Jacks Creek State Forest responding to ground disturbance through grading (NPWS, 2002), and wildfires increasing the rate of germination from the seed bank (NSW SC, 2009).

The largest known population of *Bertya opponens*, which occurs at Jacks Creek State Forest consists of an even distribution of male and female plants and an even distribution of seedlings (NPWS, 2002). Reproductive and germination success does not appear to be limited given the high densities of *Bertya opponens* in some areas. Although this population may be thriving, the continued drought conditions and bushfire may be attributed to the decline of the Nurrungal population (DoE, 2020). The larger population size of the Jacks Creek State Forest population may contribute to the resilience of the species due to the density of the population.

Habitat in the study area

Less than 50 per cent of the proposal site was able to be accessed for field surveys. Of the 1732 hectares of native vegetation to be impacted about 13.85 hectares represents known and potential habitat for this species. *Bertya opponens* is known from a recent record of four plants within the proposal site near Bohena Creek rest area.

Within the proposal site, suitable potential habitat is known from PCT 399 - Red gum - Rough-barked Apple +/- tea tree sandy creek woodland (wetland) in the Pilliga - Goonoo sandstone forests, Brigalow Belt South Bioregion. The associated canopy species *Eucalyptus chloroclada* and *Callitris glaucophylla* are characteristic with this PCT, in addition to occurring on loamy sands in stream beds, benches and banks.

This species was not located during targeted field surveys, despite the survey period extending throughout the year (OEH, 2020a) and a known previous record at Bohena Creek rest area. Within this period, well below average rainfall was recorded across the study area for the two years over which surveys were completed. These conditions may have resulted in a reduced ability to detect the species.

Table N17 Assessment of significance – Coolabah Bertya

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	This species was not recorded during field surveys. However, one database record for *Bertya opponens* exists within the proposal site for the species. This record occurs at the Bohena Creek rest area, and recorded five (at the time juvenile) individuals of the species from 2001. These are unlikely to represent key population for breeding or dispersal, or be necessary for the maintenance of genetic diversity of the species. Jacks Creek State Forest, which occurs about 14 kilometres east of the proposal site contains the largest known population of reproducing *Bertya opponens*. However it occurs well outside the impact area of the proposal. *Bertya opponens* has a widespread and diverse range across NSW and Queensland, and is specifically known to be distributed in the Pilliga and north-east of Cobar. Based on the above considerations, the occurrence of *Bertya opponens* within the proposal is not likely to be an 'important population'.
Lead to a long-term decrease in the size of an important population of a species	As described above, a population within Jacks Creek State Forest, about 14 kilometres east of the proposal site is the largest known population with an estimated population of 5 million plants. This will not be impacted by the proposal. One record for this species, and 13.85 hectares of potential suitable habitat exists within the proposal site. Due to a lack of records for the species, and limited suitable habitat in the proposal; site, it is unlikely that the proposal site contains an important population of the species. As such, the proposal is unlikely to lead to a long-term decrease in the size of any important population of *Bertya opponens* within the proposal site, as described above.
Reduce the area of occupancy of an important population	The proposal wil remove will include 13.85 hectares of suitable potential habitat for the species. As discussed above, a record of five plants of *Bertya opponens* occurring within the proposal site near Bohena Creek rest area is unlikely to represent an important population of the species. As such, the potential impact to this population during construction, and the removal of 13.85 hectares of potential habitat from the proposal site is unlikely to significantly reduce the area of occupancy of an important population.
Fragment an existing important population into two or more populations	As described above, one isolated record for *Bertya opponens* exists within the proposal site, and a large population of the species exists 14 kilometres to the east of the proposal site within Jacks Creek State Forest. This population will not be impacted by the proposal. With the exception of Segment 10 (Pilliga), the proposal site traverses mostly agricultural land which has been extensively cleared for agriculture including cropping and intensive grazing. This has resulted in isolated patches of remnant native vegetation and small connected patches, mostly limited to roadside reserves and smaller patches on private properties.

Criteria	Discussion
	Any important population that may occur in the proposal site, would occur in an already highly fragmented landscape for this species. The addition of a 40 metre wide corridor of clearing is in an already highly fragmented and modified landscape is unlikely to fragments to the population into two or more populations.
Adversely affect habitat critical to the survival of a species	There is no registered critical habitat for *Bertya opponens* on the Register of Critical Habitat (DAWE, 2020) The wide variation of habitat types between populations of this species makes the identification of critical habitat difficult. In total, the proposal will remove 13.85 hectares of vegetation with a known habitat association with this species. Given the lack of records for the species in the study area, and limited suitable habitat for the species within the proposal site, it is unlikely that the proposal will affect habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population	Given that the disturbance agents of fire and mechanical disturbance appear to trigger germination and/or suckering of *Bertya opponens*, it is possible that potential construction disturbance on the known record of the species at the Bohena Creek rest stop could trigger the species to germinate. Additionally, as described above, the proposal is unlikely to impact on an important population of the species, due to a lack of records within the proposal site, and limited availability if suitable potential habitat. As such, the proposal is unlikely to disrupt the breeding cycle of an important population of the species.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will remove about 13.85 hectares of suitable habitat for *Bertya opponens* from the proposal site. This will decrease the availability and quality of potential habitat for the species in the proposal site. Specifically, the potential removal and disturbance of habitat from the Bohena Creek rest stop will remove habitat known to support the species. Known and suitable potential known habitat for this species exists in the surrounding locality, particularly in Jacks Creek State Forest where an important population occurs. The proposal will likely decrease the availability and quality of potential habitat for the species. However, given the widespread and already fragmented nature of potential habitat for the species in the proposal site, it is not likely to occur to an extent that the species is likely to further decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The proposal has the potential to further introduce a number of invasive flora species to areas of potential habitat for *Bertya opponens*. Introduction of weed species via vehicles and machinery operating in the proposal site could occur, as vehicles would be required to traverse a large area and variety of landscapes, including highly modified agricultural land and disturbed roadsides containing an abundance of introduced and invasive flora species. Given the implementation of safeguards and management measures pertaining to weed hygiene, it is unlikely that invasive species harmful to *Bertya opponens* would become further established in the species habitat.

Criteria	Discussion
	In addition to invasive flora, a number of feral fauna such as rabbits, feral pigs and goats can impact the species. Impacts from these species include habitat degradation, grazing and introduction of weed species. It is unlikely that the proposal will further facilitate the spread or establishment of feral fauna species in the proposal site. For the reasons discussed above, it is unlikely that the proposal will result in invasive species that are harmful to *Bertya opponens* becoming established in habitat available for the species.
Introduce disease that may cause the species to decline	The proposal is unlikely to introduce disease into the proposal site that may cause the species to decline.
Interfere substantially with the recovery of the species	The recovery plan for *Bertya opponens* (NPWS, 2002) identifies a number of threats to the occurrence of the species including clearing, disturbance and drought. Although disturbance is listed as a threat to the species fire and mechanical disturbance triggers germination in the species, some disturbance generated by the construction of the proposal may be beneficial. The proposal will clear about 13.85 hectares of suitable potential habitat for *Bertya opponens* and five individual plants from near Bohema Creek rest area in the proposal site. Given that impacts of the proposal do not occur within areas known to contain significant or important populations of the species, it is unlikely that the proposal will contribute to any known threats likely to interfere with the recovery of the species.
Conclusion	The proposal is unlikely to have a significant impact on *Bertya opponens* given: • That an important population is not likely to occur in the proposal site or study area • Records from the proposal site are limited to a record from 2001 for five plants(at the time juvenile) at the Bohena Creek rest area. This is unlikely to represent a significant population of the species • Removal of potential habitat for the species is limited to 13.56 hectares. • No additional invasive species that are harmful to the species are likey to be introduced, further than those that already occur.

Winged Peppercress – (*Lepidium monoplocoides*) – endangered species

Habitat requirements

Lepidium monoplocoides is known to occur within the Pilliga Outwash IBRA sub-region (OEH, 2019a). This species occurs within western NSW and Victoria, with one record at Narrandera in 1995 (DoE, 2020). Excluding this record however, it has not been recorded since 1950 (Leigh et al. 1984). The species has been collected from scattered locations, with historical records occurring in Bourke, Cobar, Urana, Lake Cargelligo, Balranald, Wanganella and Deniliquin (OEH, 2019b).

Lepidium monoplocoides occurs in mallee scrub in semi-arid areas (Leigh et al., 1984) but can also occur in wetland-grassland communities (OEH, 2019b). This species occurs on areas which are seasonally moist to water-logged with heavy, fertile soils and a mean annual rainfall of around 300 to 500 mm (OEH, 2019b; DoE, 2020). Previous observations of this species within ephemeral locations, suggest that this species is opportunistic and is able to take advantage of seasonally available habitat (Mavromihalis, 2010). *Lepidium monoplocoides* can be associated with open woodland habitat dominated by *Allocasuarina luehmannii* (Bulloak) and/or eucalypts, particularly *Eucalyptus largiflorens* (Black Box) or *Eucalyptus populnea* (Poplar Box), however it has also been known to occur with wetland-grassland species including *Eragrostis australasicus, Agrostis avenacea, Austrodanthonia duttoniana, Homopholis proluta, Myriophyllum crispatum, Utricularia dichotoma* and *Pycnosorus globosus* (OEH, 2019b).

Due to limited recordings of the species, the population size of *Lepidium monoplocoides* is also limited. *Lepidium monoplocoides* is currently known from 13 locations, six in Victoria and seven in NSW (DSE 2010). The recovery plan describes that the largest population size recorded within NSW is located at Lake Urana Nature Reserve with a population of 2000 individuals in the year 2000, an increase from 600 individuals in 1996. Despite this increase, a general decline in the population sizes within both Victoria and NSW is occurring.

There is a single record of this species from 2017 from the edge of the Narrabri multi-function compound (Segment 3) and there is suitable potential habitat for this species within Segment 3 and Segment 11. In addition, there is a large population about five kilometres west of the record near Segment 3 with multiple records (Santos Wilga Park power station).

Lepidium monoplocoides is a small annual herb (PlantNET, 2020), which flowers from August to October (DoE, 2020) with pollination likely from insects. Despite this observation, the recommended survey period for this species is November to February, potentially due to the plant behavior of emerging one month after rain and persisting for a few months (OEH, 2020). The number of plants at each site varies greatly with seasonal conditions, but sites tend to be small in area with local concentrations of the plant (OEH, 2020).

Habitat in the study area

Lepidium monoplocoides was not recorded during targeted surveys during the recommended survey period. Within this period, well below average rainfall was recorded across the study area for the two years over which surveys were completed. These conditions resulted in a reduced ability to detect the species as the species is unlikely to have sprouted and seeded.

Less than 50 per cent of the proposal site was able to be accessed for field surveys. Of the 1732 hectares of native vegetation to be impacted about 196.05 hectares represents potential habitat for *Lepidium monoplocoides*. These areas are mostly near Narrabri within Segment 3 (Narrabri multi-function compound) and 11 (Pilliga to Narrabri) with a small area of habitat all assumed within Segment 10 (Pilliga).

Additional targeted surveys planned for this species in early April 2020 due to increased rainfall, were cancelled due to the global coronavirus pandemic and associated travel restrictions.

PCTs within these segments for which suitable habitat is present include:

- PCT 78 - River Red Gum riparian tall woodland / open forest wetland in the Nandewar Bioregion and Brigalow Belt South Bioregion (within 150 metres buffer of a known record).
- PCT 619 - Derived Wiregrass grassland of the NSW Brigalow Belt South Bioregion and Nandewar Bioregion.
- PCT 397 - Poplar Box - White Cypress Pine shrub grass tall woodland of the Pilliga - Warialda region, Brigalow Belt South Bioregion.

These PCTs provide suitable open woodland and ephemeral habitat within the mapped known distributions.

Table 18 Assessment of significance – Winged peppercress

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of a population	Population sizes of *Lepidium monoplocoides* are quite small and variable (as high as 2,000 individuals at Lake Urana Nature Reserve and as low as no plants in some previously known populations (Mavromihalis, 2010)) with a general decline occurring in most populations throughout NSW. Despite not being recorded during field surveys, suitable habitat totalling 196.05 hectares occurs within the proposal. Whilst the population decline is occurring prior to the proposal occurring, any further clearing of suitable habitat would decrease the size of a potential population of *Lepidium monoplocoides* within the proposal. Therefore, the proposal may lead to a long-term decrease in the size of a population.
Reduce the area of occupancy of the species	*Lepidium monoplocoides* is known to occur within the Pilliga Outwash IBRA sub-region. About 196.05 hectares of suitable habitat for *Lepidium monoplocoides* will be removed as a result of the proposal including within 150 metres of a known record of which similar habitat extends into Segment 3 and further south into derived grasslands. The removal of 196.05 hectares will likely result in a reduced area of occupancy of potential habitat for the species.
Fragment an existing population into two or more populations	Within segment 11 and 3 where most potential habitat occurs in the proposal site, there is extensive fragmentation and clearing of native vegetation for agriculture. Records of this species occur mostly as scattered plants throughout the Narrabri area and are already highly fragmented. For this reason, the proposal is unlikely to further fragment the important population into two or more populations given the existing cleared areas in the potential habitat areas.

Criteria	Discussion
Adversely affect habitat critical to the survival of a species	Habitat of *Lepidium monoplocoides* is variable within the proposal, due to the open woodland and wetland-grassland characteristic associated with the species occurrence. Despite having a range of suitable habitat, it appears that the occurrence of the species is mainly associated with hydrological flows associated with ephemeral processes. Within segment 11, there are gilgaied and derived grassland areas that would be impacted and that are providing good quality potential habitat for the species. The general decline in the species populations also suggests that these ephemeral gilgai areas are critical to the recovery of the species. A number of ephemeral drainage lines and PCTs occur within the construction footprint, which indicates that habitat critical to the survival of the species may occur. The recovery plan for *Lepidium monoplocoides* does not identify habitat critical for the species, nor is the species listed on the Register of Critical Habitat (Mavromihalis, 2010; DAWE, 2020). The recovery plan does however identify the need to include survey for and mapping of habitat that is critical to the survival of *Lepidium monoplocoides*. As a result of the above discussion, the proposal is likely to adversely affect habitat critical to the survival of *Lepidium monoplocoides.*
Disrupt the breeding cycle of a population	The potential genetic population within the proposal site may contribute to the overall population within the study area and locality resulting in a reduced opportunity for the species to reproduce and disperse. There is potential for the proposal to disrupt the reproduction and germination cycle of the population
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposal will result in the removal of 196.05 hectares of suitable potential habitat for the species in Segment 11 and 3 (Pilliga to Narrabri and Narrabri multi-function compound). Due to the apparent decline in previously known populations, and that suitable potential habitat would be removed, the proposal will likely decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to the species becoming established in the species' habitat	The proposal has the potential to introduce a number of invasive flora species to the areas of potential habitat for *Lepidium monoplocoides*. This is due to the use of plant and machinery introducing weed seed into the proposal and adjacent areas within the study area. As the majority of the construction footprint runs adjacent to existing access tracks and roads, a number of invasive species may potentially occur, including Tiger Pear which is common and widespread in Segment 11 and 3. *Lepidium monoplocoides* is also susceptible to habitat degradation, particularly by feral pigs and rabbits (Doe, 2020; DEE, 2017). The Threat Abatement Plan indicates that Feral Pigs may impact on *Lepidium monoplocoides* due to 'reduced or failed recruitment of new plants, spread of weeds through spreading seeds via faeces or in fur and creation of habitat suitable for plant disease vectors'. Provided that appropriate plant and machinery hygiene measures are taken, the proposal is unlikely to facilitate the spread of invasive flora in more than has already occurred to the extent that a harmful species would become established in the species habitat.
Introduce disease that may cause the species to decline	The proposal is unlikely to introduce disease into the proposal site that may cause the species to decline. There are no diseases that are known to affect this species.

Criteria	Discussion
Interfere with the recovery of the species	The recovery plan for *Lepidium monoplocoides* identifies a number of threats to the occurrence of the species including weed invasion, physical damage and drought and climate change (Mavromihalis, 2010). The proposal is likely contribute to the physical damage of suitable habitat due to the vegetation clearing associated with the proposal. Weed invasion may also occur due to the use of plant and machinery introducing weed seed into the construction footprint and adjacent area within the locality. This impact is likely to be minor however with weed invasion greater than that which has already occurred and the use of appropriate plant and machinery hygiene measures. The recovery plan suggests that pro-longed drought may be a major threat to the recovery of the species, particularly due to the unknown viability of the seed within the soil for extended dry periods and reduction of favourable habitat (Mavromihalis, 2010). The clearing of suitable habitat within the construction footprint would also increase the impact of recovery (in conjunction with drought conditions), which has historically been unsuccessful. As a result of the discussion above, the proposal is likely to interfere with the recovery of the species, both directly and indirectly.
Conclusion	The proposal is likely to have a significant impact on *Lepidium monoplocoides* given: • the large area of suitable potential habitat of 196.05 hectares to be impacted which may decrease the availability and quality of habitat to the extent that the species is likely to decline • the species likely occurrence in the proposal site due to the occurrence of nearby records in similar habitats • the species poor ability to recover from drought conditions.

Weeping Myall Woodlands – Endangered Ecological Community

Diagnostic features

Weeping Myall Woodlands occur as mid-high and low woodland to open woodland. Weeping Myall (*Acacia pendula*) is the sole or dominant overstorey species sometimes occurring with other canopy species such as Belah (*Casuarina cristata*) and Poplar Box (*Eucalyptus populnea* subsp. *bimbil*). The understorey includes an open layer of chenopod shrubs and forbs with an open ground layer of grasses and herbs (DEWHA, 2008b).

This community can vary in structure throughout its range. In higher rainfall areas it typically forms an open woodland. As rainfall decreases the ecological community becomes increasingly restricted, tending to sparse or scattered stands of woodland occurring in discrete bands fringing better-watered country.

Geographic distribution

This community generally occurs on the inland alluvial plains west of the Great Dividing Range in NSW and QLD. It occurs on flat areas shallow depressions on raised alluvial plains. Throughout this range it occurs in small pockets of isolated remnant vegetation. Due to the occurrence of this community on highly fertile soils large areas have been cleared for agricultural use.

Extent

The current national extent lies within the range of 220,000 to 361,000 hectares, a decline within the range of 82.1 to 93.5 per cent from its pre-European extent (Accad *et al.* 2006; Benson, 2006). Three is no more recent literature that provides updated extent since the listing advice publication. The extent of this community is likely to have further reduced since these estimates were published. Within NSW, the Weeping Myall Woodlands have declined from an estimated original extent between 1,900,000 and 3,300,000 hectares to a current extent of between 190,000 and 330,000 hectares (Benson, 2006). These estimates do not consider the condition of these remnants. Poor land management practices, minimal regeneration and destruction of the understorey make it likely that much of the remaining Weeping Myall Woodlands is in poor condition.

Threats

The Weeping Myall Woodlands ecological community is listed as endangered under the EPBC Act due its decline in geographic distribution (DEWHA, 2008b). Other contributing factors have put stress on the Weeping Myall Woodlands. Clearing and lopping for drought fodder has removed Weeping Myall trees, and grazing combined with drought and changed fire regimes has eliminated much of the understorey. Most areas remaining in good condition are on lightly-grazed, uncropped sites, including areas conserved by farmers, road reserves and Travelling Stock Routes and Reserves. Weeping Myall is also highly susceptible to attack by the Bag-Shelter Moth (*Ochrogaster lunifer*) which can defoliate large trees to such an extent that they do not recover. Introduction of invasive species has impacted areas due to the poor ability of important species like chenopods to recover due to limited seed longevity and low competitive abilities (DEWHA, 2008b).

Occurrence in the study area

This community occurs as two patches within the proposal (see Figure 7.1). These two patches occur Segment 9 (Curban to Pilliga), approximately 20 kilometres apart. Both of these patches will be impacted by the proposal. The northern patch exists as poor condition roadside vegetation and minimal clearing will be required. This patch is mostly one to two trees wide and occurs in a narrow roadside corridor between an unsealed road and a cropped paddock. About 0.5 hectares of single width trees from this 3.3 hectare patch would be cleared. This patch is not well connected to other vegetation patches of any type and is not likely to be viable patch. In addition, this patch is subject to regular clearing on the edges during road grading as observed during field surveys.

The patch to the south occurs approximately 20 kilometres south-east of Gulargambone and is part of a larger patch of about 25 hectares of which about 2.5 hectares would be removed. The patch will be fragmented into two patches following construction of about 17 hectares to the west and four hectares to the east. The patch to the west is connected to other linear patches of native vegetation. The patch to the east would not be connected to another native vegetation. Despite the drought conditions, species diversity was dominated by native species and in moderate condition.

Table N19 Assessment of significance – Weeping Myall Woodland

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:	
Reduce the extent of an ecological community	The proposal will remove a total of 3.05 hectares of Weeping Myall Woodlands from one patch within private property, and a small section of roadside vegetation. The northern patch exists as poor condition roadside vegetation and minimal clearing will be required. This patch is mostly one to two trees wide and occurs in a narrow roadside corridor between an unsealed road and a cropped paddock. About 0.5 hectares of single width trees from this 3.3 hectare patch would be removed. The southern patch and is part of a larger patch of about 25 hectares of which about 2.5 hectares would be removed. The removal of 3.05 hectares of this community represents about 11 per cent of the extent of the community in the investigation corridor. The community is known to occur in other roadside patches and on private property in the wider locality including John Renshaw Parkway (about nine kilometres east of the proposal). The listing advice for this community estimated the extent of the community to be about between 220,000 to 361,000 hectares when published in 2009. This amount is likely to have further to decreased since 2009. Using a conservative estimate of 200,000 hectares remaining, the removal of 3.05 hectares represents about 0.001 per cent of the remaining extent of the community.
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	Weeping Myall Woodlands occur on highly fertile and arable soils where there is considerable pressure to clear for cropping. This has resulted in this ecological community occurring predominantly as small, varied and fragmented patches (DEWHA, 2008b). Both patches are already occur in a highly fragmented landscape surrounded by high intensity agriculture. Remaining patches of native vegetation are mostly restricted to roadside linear corridors and patches of crown land. The northern patch would remove about 0.5 hectares of single width trees from this 3.3 hectare patch. This patch is not well connected to other vegetation patches of any type and is not likely to be a viable patch. In addition, this patch is subject to regular clearing on the edges during road grading as observed during field surveys. The removal of the 0.5 hectare area in the northern patch is already fragmented and would not fragment the patch any further than is already occurring. The clearing of this patch occurs at the southern end of the patch. The patch to the south occurs as part of a larger patch of about 25 hectares of which about 2.5 hectares would be removed. The patch will be fragmented into two patches following construction of about 17 hectares to the west and four hectares to the east. The patch to the west is connected to other linear patches of native vegetation. The patch to the east would not be connected to any other native vegetation. Construction will result in the clearing of a 40 metre wide corridor that will pass through this patch of Weeping Myall Woodland.

Criteria	Discussion
	Disturbance as a result of construction will likely exacerbate fragmentation, with introduction of weeds being of particular concern due to the poor ability of important species like chenopods to recover due to limited seed longevity and low competitive abilities.
Adversely affect habitat critical to the survival of an ecological community	No critical habitat has been listed for the Weeping Myall Woodland ecological community under the EPBC Act. Habitat critical to the survival of a species or ecological community also refers to areas that are necessary: • For activities such as foraging, breeding, roosting or dispersal • For the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators) • To maintain genetic diversity and long term evolutionary development, or • For the reintroduction of populations or recovery of the species or ecological community (DoE, 2013) Due to the limited area of Weeping Myall Woodlands remaining across the landscape this patch of vegetation is important and its removal will contribute to the reduction of geographical extent of this community in NSW. However, it is unlikely that the proposal will damage habitat necessary for dispersal, maintenance, genetic diversity or recovery of Weeping Myall Woodlands as the areas to be impacted are isolated from other patches of Weeping Myall Woodland and therefore is not critical to the survival of the community.
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	The Weeping Myall Woodlands is associated with flat areas, depressions, or gilgais on raised alluvial plains on heavy clays and alluvials. These areas are not associated with active channels and are rarely flooded, although the depressions and microreliefs may hold water during significant rain events. The proposal will involve earthworks as part of the construction of the proposal and may alter local surface drainage flows within the proposal site. However, it is unlikely to cause substantial alterations of surface water drainage patterns where the community occurs that are necessary for the long-term survival of the ecological community. The earthworks have the potential to cause soil erosion in the proposal site which may run off into the study area, with the potential to impact on surface water quality to the remnant patches of Weeping Myall Woodland, particularly at the southern patch which will be fragmented into to smaller patches. Additionally, vehicle and machinery traffic could cause compaction of soil, which can lead to increased surface run-off and hence greater erosion potential. Although soil disturbance may have adverse impacts on the community, for example, by exacerbating weed impacts on functionally important species such as chenopods and Weeping Myall trees, The proposal is unlikely to significantly modify abiotic factors critical to the long-term survival of the community.

Criteria	Discussion
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	The chenopod shrubs that constitute the understorey and the Weeping Myall trees are functionally important to this ecological community. Construction will result in the removal of 3.05 hectares of this community. Disturbance as a result of construction has potential to indirectly affect remaining occurrences of chenopod shrubs, with introduction of weeds being of particular concern due to the poor ability of chenopods to recover as a result of limited seed longevity and low competitive abilities (DEWHA, 2008b). Vegetation that occurs on the edges of the proposal may be subject to increased weed invasion and it is possible that any weeds that are introduced may change and transform the composition of the ecological community by outcompeting chenopod shrubs, resulting in a loss of functionally important species.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: -assisting invasive species, that are harmful to the listed ecological community, to become established, or	Within the proposal site, Weeping Myall Woodlands occur as a stand of canopy species over a predominantly native understorey. The proposal would result in the complete removal of all vegetation (native and exotic) from within the proposal site. Vegetation outside of the proposal site that would not be directly impacted by the proposal is at some risk of indirect impacts resulting from the proposal, if appropriate mitigation measures are not adopted and implemented. The introduction of weeds poses a heightened threat due to the poor ability of important species like chenopods to recover as a result of limited seed longevity and low competitive abilities.
-causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants in to the ecological community which kill or inhibit the growth of species in the ecological community	Construction of the proposal has the potential to result in the mobilisation of contaminated sediments or chemical spill from vehicles or plants. The introduction of pollutants into the surrounding environment, if uncontrolled, could impact on surrounding areas of Weeping Myall Woodlands.
Interfere with the recovery of an ecological community	There is no national recovery plan for this ecological community. Given the occurrence of this community in the proposal site as small isolated patches of the community, the proposal is unlikely to interfere with the recovery of the community due to the patches being impacted already being fragmented and isolated from other patches. Relevant priority recovery and threat abatement actions listed in the approved conservation advice relevant to the proposal include (DEWHA, 2008b): • Use of lopping methods near the edge of required clearing that do not result in the death of the dominant tree species • Protecting remnants of the listed ecological community through the development of conservation agreements and covenants. Spread of invasive species as a result of clearing is a threat that may be exacerbated by the proposal. The proposal will result in the clearing of 3.05 hectares of Weeping Myall Woodlands and result in the fragmentation of two isolated patches of this community into two smaller patches.

Criteria	Discussion
	The amount of this community to be impacted is small in the context of the NSW community occurrence (3.05 hectare; or <0.001 per cent of the estimated NSW extent). Given the isolated nature of the two patches to be impacted, they are unlikely to be viable patches that are contributing to the recovery of the community in the long term and the proposal is unlikely to interfere with the recovery of the ecological community. The proposal will require the acquisition of biodiversity offsets that will protect remnants of native vegetation including the requirement to protect this community.
Conclusion	The community has a relatively widespread although patchy and fragmented distribution. The proposal will impact on two small patches within the known range of the community through the removal of 3.05 hectares (about 0.001 per cent of the community in NSW). Given the isolated nature of the two patches to be impacted, and that they are not connected to any nearby patches they are unlikely to be viable patches that are contributing to the recovery of the community and the proposal is unlikely to significantly impact the occurrence of the community. However, it is acknowledged that the proposal: • Is likely to increase the fragmentation of the southern patch of the community • Has potential to result in a reduction in the quality of the community, by increasing the risk of establishment of potentially invasive species harmful to the community These risks would be managed through the implementation of construction controls and other mitigation measures as part of the proposal.

Brigalow (*Acacia harpophylla* dominant and co-dominant) – endangered ecological community

Diagnostic features

The Brigalow ecological community is characterised by the presence of *Acacia harpophylla* (Brigalow) as one of the most abundant tree species (Butler, 2007). This ecological community has a considerable range of vegetation structure and composition. The canopy varies from nine metres in low rainfall areas up to 25 metres in higher rainfall areas. Although usually dominated by Brigalow, the canopy may also be scattered with *Casuarina cristata* (Belah), or various *Eucalyptus* sp. The understorey consists of a moderately dense low tree and shrub layer. Litter on the floor of brigalows woodlands is important to certain fauna, particularly reptiles and insects. Mature *Casurina cristata* trees are key habitat factor for species such as the Glossy Black-Cockatoo and large *Eucalyptus* species provide hollows of various sizes that provide important roost and nesting sites for many birds and mammals.

Geographic distribution

The Brigalow ecological community occurs over a substantial geographic area in semi-arid eastern Australia. Brigalow woodlands are found mostly west of the Great Dividing Range, stretching from Narrabri to Townsville. Minor occurrences of this ecological community have also been found in the Pilliga East State Forest (Benson *et al*. 2006).

Extent

In NSW, specifically in the Western Plains botanical region, the historical extent of the Brigalow ecological community is thought to have covered approximately 300,000 hectares, with only one third remaining largely as fragments within substantially modified landscapes. The majority of historical clearing of this community occurred in QLD, which had an estimated historical extent of 7.3 million hectares (DAWE 2020b). Nationally, the community has been reduced in extent to about 10 per cent of its former area.

Of an estimated original extent of 304,200 hectares in NSW approximately 142,950 hectares of the Brigalow endangered community remain (DEWHA, 2010).

Threats

The Brigalow ecological community is listed as endangered under the EPBC act due to its decline in geographic distribution (DoE, 2013). Other threats to the Brigalow ecological community fire, invasive species and inappropriate land management techniques, which may further reduce its extent or result in a decline of condition.

Occurrence in the study area

This community occurs as within the study area as a low open woodland dominated by *Acacia harpophylla* with a sparse understorey characterised by low abundances of saltbush species and native grasses. The canopy layer includes occasional occurrences of Poplar Box (*Eucalyptus populnea*) and Pilliga Box (*Eucalyptus pilligaensis*). The low shrub layer is characterised by Ruby Saltbush (*Enchylaena tomentosa*), Berry Saltbush (*Einadia hastata*) and *Maireana enchylaenoides*. Construction will result in the clearing 0.6 hectares of this community in a long linear section that is part of a larger patch of the community that runs parallel to the Newell Highway and extending onto small adjacent private properties. The vegetation to be cleared occurs on the edge of a larger patch, with other scattered patches occurring throughout the northern end of segment 11 in the investigation area and wider study area and locality. The

area to be removed forms part of a viable patch that is connected to other patches of this and other native vegetation communities in the study area.

Table N20 Assessment of significance – Brigalow

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:	
Reduce the extent of an ecological community	Of an estimated original extent of 304 200 hectares in NSW approximately 142 950 hectares of the Brigalow endangered community remain (DEWHA, 2010). The proposal will remove a total of 0.6 hectares of this community. The vegetation to be removed is a small linear patch found along the Newell Highway that extends onto private properties. This represents a clearing of less than 0.0001 per cent of the current estimated remaining Brigalow ecological community in NSW. The clearing from this community will occur on the eastern edge of the existing patch of the community and the retained patch of the community would remain connected to other patches of this and other native vegetation. The viability of the patch would not to be compromised.
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	The Brigalow ecological community is now occurs largely as fragments within modified landscapes (TSSC, 2001). The proposal will result in the clearing of 0.6 hectares from the edge of this community in a wider 10 hectare patch. Fragmentation is unlikely to increase as a result of this clearing due to the small edge that is being removed. The clearing will not impact connectivity between other patches as this patch will remain connected to other native vegetation and Brigalow patches to the north and south. The widest point of clearing of this community for the proposal is about 12 metres.
Adversely affect habitat critical to the survival of an ecological community	No critical habitat has been listed for the Brigalow ecological community under the EPBC Act 1999. However, habitat critical to the survival of the ecological community is described in the conservation advice (TSSC, 2001) as all patches that meet the key diagnostic characteristics and condition thresholds for the ecological community; plus the buffer zones, particularly where these include native vegetation. Habitat critical to the survival of a species or ecological community also refers to areas that are necessary: • For activities such as foraging, breeding, roosting or dispersal • For the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators) • To maintain genetic diversity and long term evolutionary development, or • For the reintroduction of populations or recovery of the species or ecological community (DoE, 2013) Due to the limited area of Brigalow Woodlands remaining across the landscape this patch of vegetation is important and its removal will contribute to the reduction of geographical extent of this community in NSW. However, it is unlikely that the proposal will damage habitat necessary for dispersal, maintenance,

Criteria	Discussion
	genetic diversity or recovery of Brigalow Woodlands as the area to be impacted occurs on the edge of larger 10 hectare patch. Vegetation surrounding the community is largely grassland and derived native grassland to the west and Brigalow and other native woodland vegetation to the east and would not be considered as habitat critical to the survival of this ecological community.
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	This community often occurs associated with gilgaied clay soils on flat land. The proposal will involve earthworks as part of the construction of the proposal and may alter local surface drainage flows within the proposal site. However, it is unlikely to cause substantial alterations of surface water drainage patterns where the community occurs that are necessary for the long-term survival of the ecological community. The earthworks have the potential to cause soil erosion in the proposal site which may run off into the study area, with the potential to impact on surface water quality to the remnant patches of Brigalow woodland. Additionally, vehicle and machinery traffic could cause compaction of soil, which can lead to increased surface run-off and hence greater erosion potential. Although soil disturbance may have adverse impacts on the community, for example, by exacerbating weed impacts to the canopy and regenerating trees. The proposal is unlikely to significantly modify abiotic factors critical to the long-term survival of the community.
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	The proposal will remove about five per cent of the occurrence of the community within the proposal site. The occurrence of the overall patch will be retained but the proposal may increase edge impacts that may have long-term impacts on the condition of the understorey and species composition. Disturbance as a result of construction has potential to indirectly affect remaining occurrences of Brigalow regeneration, with introduction of weeds likely to impact the recovery of community as a result of competition from weed species. Vegetation that occurs on the edges of the proposal may be subject to increased weed invasion and it is possible that any weeds that are introduced may change and transform the composition of the ecological community by outcompeting chenopod shrubs, resulting in a loss of functionally important species.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: -assisting invasive species, that are harmful to the listed ecological community, to become established, or	Within the proposal site, Brigalow Woodland occur as a stand of canopy species over a mixed native and introduced understorey. The proposal would result in the complete removal of all vegetation (native and exotic) from within the proposal site. Vegetation outside of the proposal site that would not be directly impacted by the proposal is at some risk of indirect impacts resulting from the proposal, if appropriate mitigation measures are not adopted and implemented. The clearing of the linear patch connected to the remaining Brigalow ecological community has the potential to introduce weeds that may be harmful to quality and integrity of the ecological community. Introduced grasses, such as Buffel grass, Rhodes grass and Green panic grass, pose the greatest threat by drawing fires into the Brigalow ecological community and increasing fire severity (DEWHA 2013). However, none of these species were observed

Criteria	Discussion
	in the investigation corridor during field surveys. Succulent type plants are known to thrive in this community. This includes the invasive Mother of Millions (*Kalanchoe daigremntiana*) which was observed in the Brigalow community in the wider investigation corridor.
-causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants in to the ecological community which kill or inhibit the growth of species in the ecological community	Construction of the proposal has the potential to result in the mobilisation of contaminated sediments or chemical spill from vehicles or plants. The introduction of pollutants into the surrounding environment, if uncontrolled, could impact on surrounding areas of Brigalow Woodlands.
Interfere with the recovery of an ecological community	There is no national recovery plan for this ecological community. Given the occurrence of this community in the proposal site as small isolated patches of the community, the proposal is unlikely to interfere with the recovery of the community due to the patches being impacted already being fragmented and isolated from other patches. Threat reduction and control actions listed in the approved conservation advice relevant to the proposal include (DEWHA, 2010): • Where further clearance is unavoidable — mitigate the severity of impacts (eg avoid higher quality areas, avoid dissection of patches, act to minimise hydrological disruption and the spread of weeds) — offsetting should consider the location and emulate qualities of affected patches. The proposal will result in the clearing of 0.60 hectares of the Brigalow ecological community from the edge of a viable patch. This patch is likely to remain viable with the vegetation to be removed to occur on the edge of one side of the patch. The proposal will require the acquisition of biodiversity offsets that will protect remnants of native vegetation including the requirement to protect this community.
Conclusion	The proposal is not likely to have a significant impact on the endangered Brigalow Woodlands ecological community giventhat thethe community occurs only in segment 11 which is at the southern edge of the communities distribution. The community, although widespread further to the north of the proposal has a relatively patchy and fragmented distribution. The proposal will impact on the edge of one patch and remove 0.6 hectares (less than 0.0001 per cent of the community in NSW). Although the proposal will result in the removal of 0.6 hectares of the community, the removal will occur on the edge of the patch and the patch would remain viable and connected to other native vegetation and the proposal is unlikely to significantly impact the occurrence of the community. However, it is acknowledged that the proposalhas potential to result in a reduction in the quality of the community, by increasing the risk of establishment of potentially invasive species harmful to the community

Criteria	Discussion
	These risks would be managed through the implementation of construction and operational mitigation measures as part of the proposal.

Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and derived native grasslands of South-eastern Australia – endangered ecological community

Diagnostic features

This community is a grassy woodland dominated by dominated or co-dominated by Grey Box (*Eucalyptus microcarpa*). The community also includes grassland understorey derived from the historic clearing of the woody components of the woodland. Both the grassy woodland and the derived native grassland provide vital support to a diverse range of native flora and fauna that are important to retaining regional, state and national biodiversity.

In grassy woodland occurrences, the shrub layer is variable, ranging from absent in areas of intense grazing, to moderately dense cover. In many situations, regrowth of the canopy trees may also be present in the mid layer. This community is heavily influenced by landscape factors and past land management practices. The ground layer varies in compositions, with a combination of grasses, herbs and smaller chenopods.

This community supports fauna species from a variety of conditions, ranging from wetter forest and woodland ecosystems further east and south to the semi-arid environment to the west and north. The Grey Box Grassy Woodlands have a strong influence on bird assemblage composition and provides foraging, roosting and breeding habitat. Larger mammals such as kangaroos and wallabies often utilise this community for grazing and arboreal species such as possums utilise tree-hollows for shelter and breeding (TSSC, 2010).

Geographic distribution

The Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-Eastern Australia occurs from central NSW, through northern and central Victoria into eastern South Australia (TSSC, 2001)

Extent

This community was once widespread throughout south-eastern Australia but now, across its national range, only 10 to 15 per cent of the original extent remains. The community is found in wheat-sheep belt of eastern Australia and as a result has been extensively cleared since European settlement. It is estimated that the extent of the ecological community has declined from between 1.8 to 2.0 million hectares to a present extent between 300 000 and 330 000 hectares in NSW. Most of the remaining areas of this ecological community occur on private land. At present, less than one per cent of what remains of the community in NSW is in formal conservation reserves (TSSC, 2001).

Threats

The Grey Box ecological community is listed as an endangered ecological community due to the significant loss of integrity throughout much of its extent. This includes both vegetation and fauna components, combined with weed invasion, fragmentation and degradation of habitat. Clearing of this community continues to pose serious threats to the Grey Box Grassy Woodlands ecological community. Unfavourable management practices and a lack of protection in reserves are also highlighted as key threats for this ecological community (DEWHA, 2010).

Occurrence in the study area

Within the study area the community is a tall woodland averaging about 14 metres high with a mix of a number of tree species including Grey Box (*E. microcarpa*), Pilliga Box (*E. pilligaensis*), Fuzzy Box (*E. conica*) and Poplar Box (*E. populnea subsp. bimbil*). Although similar communities were found within the study area, only one occurrence of this community, occurring between the Mitchell highway and the Macquarie River is commensurate Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia (EPBC Act). This area occurs mostly within the Crown Reserve between the Macquarie River and Mitchell Highway near Narromine and extending into roadside reserves in the wider investigation corridor and study area. The proposal will result in the clearing of 14.7 hectares of this community from a 160 hectare patch.

Table N21 Assessment of significance – Grey Box Woodland

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:	
Reduce the extent of an ecological community	The proposal will result in the removal of 14.7 hectares of the Grey Box ecological community from a larger 160 hectare patch (about 9 per cent of the patch). The vegetation occurs as one patch within roadside vegetation and connected Crown Reserve. This represents a clearing of less than 0.005 of the current estimated remaining Grey Box ecological community in NSW. The removal of 14.7 hectares of this community represents about nine per cent of the extent of the community in the study area. The community is known to occur in other roadside patches and on private property in the wider locality mostly to the south where the community is more common and widespread. The listing advice for this community estimated the extent of the community to be about between 300,000 to 330,000 hectares. Using a conservative estimate of 300,000 hectares remaining, the removal of 14.7 hectares represents about 0.005 per cent of the remaining extent of the community in NSW.

Criteria	Discussion
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	The proposed clearing will result in the fragmentation of this patch of the Grey Box ecological community. This community is already highly fragmented due to historical clearing throughout NSW. The patch of vegetation to be impacted by the works is currently fragmented due to the Mitchell Highway and another minor road and railway line passing through it from east to west. The patch occurs in a highly fragmented landscape surrounded by high intensity agriculture. Remaining patches of native vegetation are mostly restricted to roadside linear corridors and patches of crown land. The vegetation to be removed occurs as part of a larger 160 hectare patch of this community. The patch will be fragmented into two patches following construction of about 17 hectares to the west and four hectares to the east. Both the east and west patches would remain connected to other roadside native vegetation and would not be isolated from other linear roadside vegetation. Disturbance as a result of construction will likely exacerbate fragmentation, with further introduce weeds that already occur in the study area.
Adversely affect habitat critical to the survival of an ecological community	No critical habitat has been listed for the Grey Box Woodland ecological community under the EPBC Act 1999. Habitat critical to the survival of a species or ecological community also refers to areas that are necessary: • For activities such as foraging, breeding, roosting or dispersal • For the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators) • To maintain genetic diversity and long term evolutionary development, or • For the reintroduction of populations or recovery of the species or ecological community (DoE, 2013) Due to the limited area of Grey Box Woodlands remaining across the landscape, this patch of vegetation is important and its removal will contribute to the reduction of geographical extent of this community in NSW, especially given this patch occurs at the northern extent of the species distribution in NSW. However, it is unlikely that the proposal will damage habitat necessary for dispersal, maintenance, genetic diversity or recovery of Grey Box Woodlands as the areas to be impacted occur as part of a larger patch and connected linear roadside corridors and therefore is not critical to the survival of the community.

Criteria	Discussion
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	The proposal will involve earthworks as part of the construction of the proposal and may alter local surface drainage flows within the proposal site. However, it is unlikely to cause substantial alterations of surface water drainage patterns where the community occurs that are necessary for the long-term survival of the ecological community. The earthworks have the potential to cause soil erosion in the proposal site which may run off into the study area, with the potential to impact on surface water quality to the remnant patches of Grey Box woodland, particularly where it occurs in the Crown Reserve adjacent to the Macquarie River. Additionally, vehicle and machinery traffic could cause compaction of soil, which can lead to increased surface run-off and hence greater erosion potential. Although soil disturbance may have adverse impacts on the community, for example, by exacerbating weed impacts on functionally important species such as chenopods and Weeping Myall trees, The proposal is unlikely to significantly modify abiotic factors critical to the long-term survival of the community
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	The proposal will 14.7 hectares of the community from a 160 hectare patch in the proposal site. The occurrence of the overall patch will be retained but the proposal is likely to fragment the patch and increase edge impacts; these may have long-term impacts on the condition of the understorey and species composition of retained areas of this community. Vegetation that occurs on the edges of the proposal may be subject to increased weed invasion and it is possible that any weeds that are introduced may change the composition of the ecological community by outcompeting native understorey, resulting in a loss of functionally important species.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: -assisting invasive species, that are harmful to the listed ecological community, to become established, or	The Grey Box ecological community is listed as an endangered ecological community due to the significant loss of integrity throughout much of its extent. This includes both vegetative and faunal components, combined with weed invasion, fragmentation and degradation of habitat. Part of the patch occurs in a Crown Reserve close to the town of Narromine and hence already contains a high weed component due to intensive use for recreation. The proposal will result in the removal of 14.7 hectares of this community, exacerbating the impacts of edge effects and weed invasion. Connected patches of this community would remain in the roadside reserve of the Mitchell Highway, Narromine Crown Reserve and roadside reserves to the south. All are in a similar condition to the area to be removed due to similar management. The introduction of invasive weed species are a key factor contributing to the degradation of this ecological community. The works have the potential to further contribute to this threat through the disturbance of the area to be cleared.

Criteria	Discussion
-causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants in to the ecological community which kill or inhibit the growth of species in the ecological community	Construction of the proposal has the potential to result in the mobilisation of contaminated sediments or chemical spill from vehicles or plants. The introduction of pollutants into the surrounding environment, if uncontrolled, could impact on surrounding areas of Grey Box Woodlands.
Interfere with the recovery of an ecological community	There is no national recovery plan for this ecological community. Given the occurrence of this community in the proposal site as mostly roadside vegetation in the Narromine Crown Reserve small isolated patches of the community, the proposal is unlikely to interfere with the recovery of the community due to the patches being impacted by fragmentation from other linear and residential infrastructure and agricultural development. Priority recovery and threat abatement actions listed in the approved conservation advice relevant to the proposal include: • Enabling recovery of additional sites. This would occur through future biodiversity offsets required for the proposal and impacts to this community. • Protecting remnants of the listed ecological community through the development of conservation agreements and covenants. Spread of invasive species as a result of clearing is a threat that may be exacerbated by the proposal. The remaining two patches split by the proposal are likely to still function as viable patches and contribute to the recovery of the ecological community.
Conclusion	The proposal is not likely to have a significant impact on the endangered Grey Box Woodlands ecological community given: • The small area to be removed (about 14.7 hectares) from a larger 160 hectares patch. • The area to be removed represents less than 0.01 per cent of the occurrence of the community in NSW. The community has a relatively widespread although patchy and fragmented distribution which occurs mostly to the south of the proposal. The proposal will remove 14.7 hectares (about 0.005 per cent) of the community in NSW. The remain two patches that would be fragmented after the proposal are likely to still remain as viable patches due to the connectivity to other roadside linear vegetation. However, it is acknowledged that the proposal: • Is likely to increase the fragmentation of the community of the patch in general which is already fragmented from east to west by roads. • Has potential to result in a reduction in the quality of the community, by increasing the risk of establishment of potentially invasive species harmful to the community. These risks would be managed through the implementation of construction and operational mitigation measures as part of the proposal.

Poplar Box grassy woodland on alluvial plains- endangered ecological community

Diagnostic features

The Poplar Box grassy woodland endangered ecological community is variable, ranging from grassy woodland to grassy open woodland, and can resemble an open forest structure. The canopy is dominated by Poplar Box (E*ucalyptus populnea*) with an understorey of forbs and grasses. Low density shrubs are sometimes present within this community in areas of lower nutrient and sandier soils, but taller shrubs are general lacking. The mid layer also often includes juvenile trees of canopy species and in some circumstances this layer may occur as a thicket.

Geographic distribution

The Poplar Box ecological community occurs on paleo and recent depositional soils on flat terrain within the Brigalow Belt North, Brigalow Belt South, Southeast Queensland, Cobar Peneplain, Darling Riverine Plains, NSW South Western Slopes and Riverina IBRA bioregions. It occasionally is found in proximity to ephemeral watercourses and depressions. With decreasing soil fertility and increasing topographic relief this community is replaced by woodlands dominated by shrubby *Eucalyptus* sp. as well as Ironbark and Cypress pine communities.

Extent

Prior to European settlement it is estimated that Poplar Box Grassy Woodland occupied over five million hectares throughout NSW and QLD. The historic extent in NSW is estimated to be approximately 2.57 million hectares (Benson, 2006). Estimates indicate that the ecological community has declined in NSW to the present extent of approximately 705,000 hectares. This ecological community has undergone a decline in extent throughout Australia of at least 75 per cent.

Threats

Clearing, fragmentation, weed invasion, inappropriate land management practices and loss of faunal components have resulted in severe degradation of the community and its habitat (Conservation advice).

Occurrence in the study area

The Poplar Box ecological community occurs as scattered smaller remnant patches throughout the investigation area. Small fragmented areas, predominantly consisting of small patches within agricultural areas and to a lesser extent; roadside vegetation, will be cleared in Segment 8 (Narromine to Curban) but the majority of the clearing will occur in Segment 9 (Curban to Pilliga). Within the study area the vegetation consisted of mid-high to tall woodland or open woodland, averaging 13 metres high, dominated by *Eucalyptus populnea subsp. bimbil* (Poplar Box) with sparse occurrences of *Brachychiton populneus* (Kurrajong). The shrub layer is absent or sparse. Although the ground cover is likely to usually be mid-dense to sparse, during the survey period it was very low and in most cases had been heavily grazed.

Of the 309 hectares identified in the investigation corridor, 25.7 hectares will be removed by the proposal (8 per cent of the occurrence of the community in the investigation corridor).

Table N22 Assessment of significance – Poplar Box grassy woodland

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:	
Reduce the extent of an ecological community	The proposal will remove a total of 25.7 hectares of Poplar Box Woodland from about 15 separate small patches across private property and some roadside reserves. The vegetation to be removed occurs as small fragmented patches of vegetation throughout Segment 8 (Narromine to Curban) and 9 (Curban to Pilliga). Large sections of Segment 9 could not be accessed during the survey period and plant community type allocation is based on the method outlined in BDAR and previous broad vegetation type mapping. Most of these small patches occur as small isolated patches within an agricultural matrix of crops and livestock grazing. The proposal will remove about 2537 hectares of the 309 hectares (8 per cent) mapped in the investigation corridor. The community was commonly observed in roadside reserves and as scattered patches in private property in the wider locality of Segment 9 during field surveys. The listing advice for this community estimated the extent of the community to be about between 705,000 hectares. This amount is likely to have further to decreased. Using a conservative estimate of 650,000 hectares remaining, the removal of 25.7 hectares represents about 0.004 per cent of the remaining extent of the community in NSW.
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	Fragmentation is a key cause of the loss of integrity of Poplar Box communities throughout Australia. The proposal in areas will reduce the size of small fragments of this community and will also divide larger patches, causing a loss in connectivity and further fragmentation. Disturbance as a result of construction may introduce weeds and increase edge effects further exacerbating the fragmentation of this community. Poplar Box Woodlands occur on highly fertile and arable soils where there is considerable pressure to clear for agriculture. This has resulted in this ecological community occurring predominantly as small, varied and fragmented patches. Two locations of this community to be removed occur along small ephemeral creeks and connectivity of woodland vegetation along these creeks will be retained after construction of the proposal. The remanent patches to be removed occur mostly as scattered open woodland patches that are not connected to other remnant vegetation. Disturbance as a result of construction will likely exacerbate fragmentation of these patches that are already highly fragmented and not connected to other woodland patches.

Criteria	Discussion
Adversely affect habitat critical to the survival of an ecological community	No critical habitat has been listed for the Poplar Box ecological community under the EPBC Act 1999. The area's most critical to the survival of the Poplar Box ecological community are described by DAWE in their conservation advice (DoEE, 2019) as being the best quality, most intact patches of the ecological community. These patches represent those parts of the ecological community that retain the highest diversity and degree of structure and ecological functions. They represent those sites closest to the original, benchmark values of the ecological community and that must retain their inherent values through protection and ongoing management (DoEE. 2019). The areas of Poplar Box Grassy Woodland to be removed by the proposal occurs scattered in small patches throughout the proposal site. This vegetation is largely modified and disturbed and occur within active agricultural land. During field surveys, where accessed, this community was one of the plant community types most heavily impacted by overgrazing and drought conditions and had a ground layer dominated by introduced species. As such, the proposal will not affect any habitat critical to the survival of an ecological community.
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	The proposal would modify surface water flows and other abiotic factors within the proposal site by removing native vegetation and modifying the natural landform during construction and operation. The proposal will involve earthworks as part of the construction of the proposal and may alter local surface drainage flows within the proposal site. However, it is unlikely to cause substantial alterations of surface water drainage patterns where the community occurs that are necessary for the long-term survival of the ecological community. The earthworks have the potential to cause soil erosion in the proposal site which may run off into the study area, with the potential to impact on surface water quality to the remnant patches of Poplar Box woodland, particularly in the two locations where they occur near ephemeral waterways. Although soil disturbance may have adverse impacts on the community, for example, by exacerbating weed impacts on groundcover species regeneration. The proposal is unlikely to significantly modify abiotic factors critical to the long-term survival of the community due to the 40 metre of the proposal and the wider extent of the community in the investigation corridor and locality. The proposal would cause soil disturbance due to the earthworks required for the construction of the proposal. The earthworks have the potential to cause soil erosion in the proposal site which may run off into the study area, with the potential to impact on surface water quality throughout the community. Additionally, vehicle and machinery traffic could cause compaction of soil, which can lead to increased surface run-off and hence greater erosion potential.

Criteria	Discussion
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	The proposal will reduce the size of small fragments of this community and will also reduce the extent of two larger patches along ephemeral waterways. During field surveys, this community was one of the most heavily impacted by overgrazing and drought conditions and has been previously and currently been heavily modified for agriculture. These may have long-term impacts on the condition of the understorey and species composition of retained areas of this community, without implementation of mitigation measures during construction. However, the proposal is unlikely to result in a substantial change in the species composition of the retained occurrences of the Poplar Box ecological community due to its already highly modified condition due to agriculture.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: -assisting invasive species, that are harmful to the listed ecological community, to become established, or	Within the proposal site, Poplar Box Woodlands occur mostly as scattered smaller patches within the agricultural matrix of crops and livestock grazing. Where accessed, the occurrences of this community in the proposal site had a degraded groundcover layer, dominated by introduced species and with low per cent cover and abundance. The proposal would result in the complete removal of all vegetation (native and exotic) from within the proposal site. Vegetation outside of the proposal site that would not be directly impacted by the proposal is at some risk of indirect impacts resulting from the proposal, if appropriate mitigation measures are not adopted and implemented. The further introduction of weeds poses a threat due to the already degraded groundcover layer of most of these patches. The proposed works will result in the complete removal of 25.7 hectares of this community, exacerbating the impacts of edge effects. The introduction of invasive weed species are a key factor contributing to the degradation of this ecological community and the proposal could further increase this.
-causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants in to the ecological community which kill or inhibit the growth of species in the ecological community	Construction of the proposal has the potential to result in the mobilisation of contaminated sediments or chemical spill from vehicles or plants. The introduction of pollutants into the surrounding environment, if uncontrolled, could impact on surrounding areas of Poplar Box Grassy Woodlands.
Interfere with the recovery of an ecological community	There is no national recovery plan for this ecological community. Given the occurrence of this community in the proposal site as small isolated patches of the community, the proposal is unlikely to interfere with the recovery of the community due to the patches being impacted already being fragmented and isolated from other patches. The conservation advice (DoEE, 2019) outlines four key approaches to achieve their conservation objectives for Poplar Box Grassy Woodlands of which one may be relavent: • Protect the ecological community to prevent further loss of extent and condition. The proposal will require the acquisition of biodiversity offsets that will protect remnants of native vegetation including the requirement to protect this community.

Criteria	Discussion
	While the smaller patches will in most cases be completely removed by the proposal, the viability of the patches on the ephemeral creek lines is likely to be retained. The smaller patches are unlikely to be contributing to the recovery of the community in the long term and the proposal is unlikely to interfere with the recovery of the ecological community.
Conclusion	The community has a relatively widespread although patchy and fragmented distribution. The proposal will impact on about 15 patches within the known range of the community through the removal of 25.7 hectares of the sommunity (about 0.004 per cent of the community in NSW). Given the isolated nature of most of patches to be impacted, they are unlikely to be viable patches that are contributing to the recovery of the community and the proposal is unlikely to significantly impact the occurrence of the community. However, it is acknowledged that the proposal: • Is likely to increase the fragmentation of the occurrence of this community in two locations on ephemeral waterways • Has potential to result in a further reduction in the already highly degraded quality of the community, by increasing the risk of establishment of potentially invasive species harmful to the community These risks would be managed through the implementation of construction controls and other mitigation measures as part of the proposal.

White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland- Critically Endangered Ecological Community

Diagnostic features

The White Box Yellow Box Blakey's Red Gum Grassy Woodlands and Derived Grasslands ecological community (Box-Gum Grassy woodland) has a canopy that is, or once was, dominated by *Eucalyptus albens* (White Box), *Eucalyptus melliodora* (Yellow Box) or *Eucalyptus blakelyi* (Blakely's Red Gum). This community can occur as either a woodland or a derived grassland. It has a ground layer of native tussock grasses and herbs, with a sparse, scattered shrub layer. At the western end of the community's distributional range White Box is more prevalent, with Yellow Box and Blakely's Red Gum occurring more frequently in the east (TSSC, 2006).

Geographic distribution

The Box – Gum Grassy Woodland critically endangered ecological community occurs in an arc along the western slopes and tablelands of the Great Dividing Range. Its extent ranges from Southern Queensland through NSW to Victoria. This ecological community occurs on moderate to highly fertile soils at altitudes of 170 to 1200 metres in areas where rainfall is between 400 and 1200 mm per year (TSSC, 2006).

Extent

A large portion of the original extent of the Box –Gum Grassy Woodland ecological community has been cleared for agriculture. This community commonly occurs as fragmented and highly disturbed patches, with few healthy and intact areas remaining. In NSW it is estimated that the historical extent of this community was approximately 3,717,000 hectares. The current extent is estimated to be approximately 251,000 hectares, a decline of 93 per cent in NSW. It is estimated that less than 0.1 per cent of this ecological community remains in high condition. High condition areas tend to occur on public land that has not been used for agriculture, such as cemeteries, travelling stock routes and road verges (TSSC, 2006)

Threats

Due to a severe geographic decline throughout Australia, including NSW, this community has been listed as critically endangered. The majority of remaining vegetation of this community is highly fragmented, occurring in small isolated patches within agricultural land. Continued modification and degradation of this community as a result of fire, weed invasion and a loss of functionally important species is also identified as a criteria for the listing of this community as critically endangered. It is unlikely that re-establishment of composition and community structure to original levels is possible, even with immediate positive human intervention (TSSC, 2006).

Occurrence in the study area

Within the investigation corridor Box – Gum Grassy Woodland occurs as a roadside patch of vegetation that extends to a small patch of vegetation on private property. The patch is about 14.8 hectares and occurs south of the Macquarie River near Narromine in Segment 8. The vegetation within in this area is dominated by *Eucalyptus blakelyi* (Blakely's Red Gum) and *Eucalyptus melliodora* (Yellow Box) with occurrences of *Eucalyptus microcarpa* (Grey Box). Ground cover and shrub layer was sparse and dominated by grasses and forbs. The proposal will remove about 2.2 hectares of the community from the 14.8 hectare patch (14.9 per cent of the occurrence in the investigation corridor). The retained part of the patch will occur as one

patch and will not be split into two fragments. This is the only occurrence of the community in the proposal.

Table N23 Assessment of significance – Box-Gum Grassy Woodland

Criteria	Discussion
According to the DotE (2013) 'significant impact criteria', an action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:	
Reduce the extent of an ecological community	The proposal will remove 2.2 hectares of Box-Gum Woodland from one patch within private property within Segment 8 near Narromine. The area to be removed is part of a larger 14.8 hectare patch. The removal of 2.2 hectares represents about 14.9 per cent of the patch in the investigation corridor. The retained part of the patch will occur as one patch to the west of the proposal and will not be split into two fragments. The remaining fragment would be about 12.6 hectares. This is the only occurrence of the community in the proposal. The clearing of 2.2 hectares represents a loss of less than 0.001 per cent of the remaining Box – Gum Grassy Woodland ecological community within NSW.
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	Bog-Gum Grassy Woodlands occur on highly fertile and arable soils where there is considerable pressure to clear for agriculture. The patch to be removed occurs in a highly fragmented landscape surrounded by high intensity agriculture. Crops and roads occur on all four sides of the proposal and an unsealed road. The patch is already highly fragmented and not connected to any other vegetation patches. Even prior to removal of the 2.2 hectares, the patch is unlikely to be viable in the long term due to increased pressure from agriculture, weed invasion and edge effects. Loss of integrity and continued degradation as a result of fragmentation was highlighted as one of the key threats facing this ecological community. The proposal will reduce the size of the patch of this community to be impacted and will exacerbate the fragmentation currently present as a result of the road. Disturbance related to construction also has the potential to introduce weeds and increase edge effects, adding to the fragmentation of this community.
Adversely affect habitat critical to the survival of an ecological community	No critical habitat has been listed for the Box – Gum Grassy Woodland ecological community ecological community under the EPBC Act 1999. Within NSW where the proposal occurs, habitat critical to the survival of Box-Gum Grassy Woodland is on the moderate to highly fertile soils of the western slopes of NSW Due to the limited area of the Box – Gum Grassy Woodland ecological community remaining across the landscape, this patch of vegetation is important, and its removal will contribute to the reduction of geographical extent of this community in NSW. The patch is surrounded on all sides by intensive agriculture and is not connected to any other vegetation patches in the investigation corridor or wider study area. However, it is unlikely that the proposed works will damage habitat necessary for dispersal, maintenance, genetic diversity or recovery of the Box – Gum Grassy Woodland ecological community.

Criteria	Discussion
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	The majority of the works will occur in crops and adjacent to the existing road where the patch occurs as roadside vegetation in low condition. Erosion and compaction are not likely to significantly vary from existing conditions in these areas. The proposal would modify surface water flows and other abiotic factors within the proposal site by removing native vegetation, modifying the natural landform, and constructing the proposal. The proposal will involve earthworks as part of the construction of the proposal and may alter local surface drainage flows within the proposal site. However, it is unlikely to cause substantial alterations of surface water drainage patterns where the community occurs that are necessary for the long-term survival of the ecological community. The earthworks have the potential to cause soil erosion in the proposal site which may run off into the study area, with the potential to impact on surface water quality to the isolated remnant patches of Box-Gum Grassy woodland. Additionally, vehicle and machinery traffic could cause compaction of soil, which can lead to increased surface run-off and hence greater erosion potential. Although soil disturbance may have adverse impacts on the community, for example, by exacerbating weed impacts the community. The proposal is unlikely to significantly modify abiotic factors critical to the long-term survival of the community.
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	Construction will result in the removal of 2.2 hectares of this community. Disturbance as a result of construction has potential to indirectly affect remaining occurrences of groundcover species which are characteristic of this forb rich community. The continued introduction of weeds and increased edge effects from construction is likely to further compromise the species composition of the this patch of the community.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: -assisting invasive species, that are harmful to the listed ecological community, to become established, or	Loss of integrity and continued degradation as a result of fragmentation is one of the key threats facing this ecological community. The proposal will result in the complete removal of 2.2 hectares of this ecological community. Although already fragmented, it is likely that the proposal will further exacerbate edge effects and fragmentation for this community as the patch to be removed already occurs as part of a very small (14.8 hectare) patch isolated within an agricultural matrix. The likely further introduction of invasive weed species is highlighted as a factor contributing to the loss of integrity for this community. The proposal has the potential to contribute to this threat through the disturbance of the area proposed to be cleared.
-causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants in to the ecological community which kill or inhibit the growth of species in the ecological community	Construction of the proposal has the potential to result in the mobilisation of contaminated sediments or chemical spill from vehicles or plants. The introduction of pollutants into the surrounding environment, if uncontrolled, could impact on surrounding areas Box – Gum Grassy Woodland ecological community.

Criteria	Discussion
Interfere with the recovery of an ecological community	The adopted recovery plan for the Box – Gum Grassy Woodland ecological community outlines five recovery plan objectives of which those listed below are relevant to the proposal (DECC, 2010): • Achieving no net loss in extent and condition of the ecological community throughout its geographic distribution. • Increasing landscape functionality of the ecological community through management and restoration of degraded sites. The proposal will result in the clearing of 2.2 hectares through a patch of an already fragmented and disturbed patch of Box-Gum Grassy Woodland. The proposal will interfere with recovery objectives listed above.
Conclusion	The community has a relatively widespread although patchy and fragmented distribution. The proposal will impact one patch within the known range of the community through the removal of 2.2 hectares (about 0.001 per cent of the community in NSW). Given the already isolated nature, high edge effects and current exposure to weed invasion, it is unlikely to be a viable patch that is contributing to the recovery of the community and the proposal is unlikely to significantly impact the occurrence of the community. However, it is acknowledged that the proposal: • Has potential to result in a reduction in the quality of the patch of the community by increasing the risk of further establishment of potentially invasive species harmful to the community. • These risks would be managed through the implementation of construction controls and other mitigation measures as part of the proposal. The total 2.2 hectares to be removed occurs as an already isolated private property patch adjacent to a roadside within cropped farming area.

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