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Project No. 221708-001
Project: Fairview Ecological Assessment
Report – Lot 25 WT22

Prepared for:
Santos Ltd

4 August 2011

Santos Document No: 0020-GLNG-4-1.3-0067 rev0

Document Control Record

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Document control						aurecon	
Report Title		Fairview Ecological Assessment Report – Lot 25 WT22					
Document ID		Lot_25_WT22_Report	Project Number		221708-001		
Client		Santos Ltd		Client Contact			
Rev	Date	Revision Details/Status	Prepared by	Author	Verifier	Approver	
0	2 July 2011	Draft for Review	LF	LF	GAP		
1	7 July 2011	Final for Review	LF	LF	GAP		
2	4 August 2011	Final for Issue	KH	LF	GAP	VJB	
Current Revision		Revision 2					

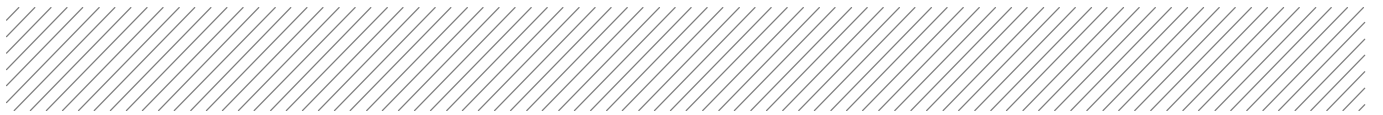
Approval			
Author Signature		Approver Signature	
Name		Name	
Title		Title	

Fairview Ecological Assessment Report – Lot 25 WT22

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1 Background

1.1 Project description

Santos Ltd (Santos) have commissioned Aurecon Australia Pty Ltd (Aurecon) to undertake ecological investigations of proposed areas of development for the Fairview gas fields.

The Fairview gas fields are centred around the Injune area in southern Queensland. This area is characterised by elevated sandstone ranges including the Carnarvon and Expedition Ranges and part of the Mount Hutton and Kongabula Ranges. The Dawson River and other smaller watercourses drain this area and the dominant native vegetation types include Eucalyptus and White Cypress Pine woodland, Brigalow and Semi-evergreen Vine Thicket (Eddie, 2007). Much of this area has been subject to cattle grazing and other agricultural practices, as well as previous development associated with the gas fields.

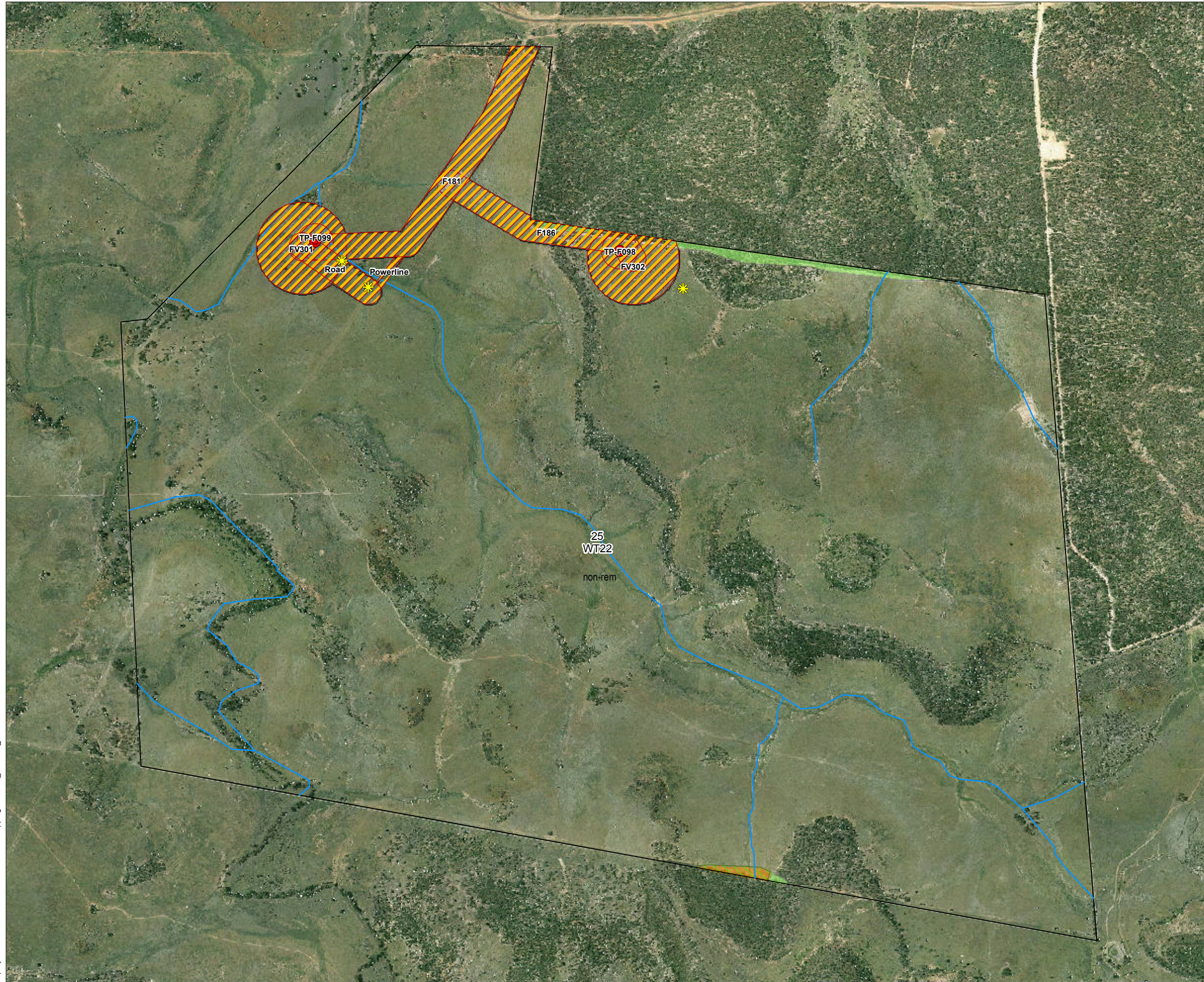
This report is specific to the proposed development areas located in Lot 25 WT22, which are listed below and shown in Figure 1 (Appendix B):

- Pipeline corridors F181 and F186
- Well pads FV301 and FV302
- Road corridor, and
- Powerline corridor

Note that the subject of this report is solely related to Lot 25 WT22. Where survey areas overlap additional properties, these sites will be further addressed in the report relevant to those properties/lots.

1.2 Purpose of report

The aim of this report is to provide an ecological assessment of the proposed development areas located on Lot 25 WT22 (Figure 1, Appendix B) and to identify areas and species of notable ecological or conservation value. This report does not make any recommendations regarding the development in relation to any Santos environmental authorities or other approvals.



Legend

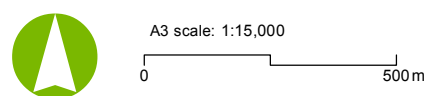
- Notable Species
 - Geotech Borehole Locations
 - LOT 25WT22 Ground Truthed Areas
 - Drainage (100K)
 - ESA Category A
 - ESA Category B
 - ESA Category C
- Regional Ecosystem Mapping**
- Non-remnant / regrowth
 - Endangered - Sub-dominant
 - Endangered - Dominant
 - Of Concern - Sub-dominant
 - Of Concern - Dominant
 - Not Of Concern
 - Plantation forest
 - Water

Notes:

Date: 05/07/2011

Version: 1

Map by: Moore NK P:\CW\215648 Santos\Mapping\3WT18_Fairview_Overview.mxd 09/06/2011 09:01



Job No: 215648
Coordinate system: GDA 1994 MGA Zone 55

2 Methodology

2.1 Desktop methodology

Areas of development have been projected on a range of maps provided by Santos. These maps include Regional Ecosystem (RE) Mapping (version 6.0 DERM), Environmentally Sensitive Areas (ESA) mapping, drainage mapping and aerial photography. Where available ahead of time, these resources were reviewed to determine target areas for the field inspection. It is important to note that the Regional Ecosystem classifications used in this report are based on the 'biodiversity status' of the vegetation and not the '*Vegetation Management Act 1999* status' of the vegetation.

2.2 Field methodology

The proposed corridors were assessed by two (2) Aurecon ecologists (Grant Paterson and Luke Foster) on 20 June 2011. These assessments were to determine the existing vegetation communities and habitat value of the proposed clearing within the pipeline corridors as well as to verify the RE mapping as produced by the Department of Environment and Resource Management (DERM).

GIS layers of the proposed development areas and environmental constraints mapping (e.g. RE Mapping, ESA mapping) and high resolution aerial photography were uploaded onto a toughbook (C5 mobile clinical assistant CFT-001 – Motion computing) with an integrated GPS to assist in locating the areas to be assessed whilst on site. Handheld Garmin GPS units (GPS map 76) were also used during the field investigations. It should be noted that while efforts were made to ensure the accuracy of GPS co-ordinates provided in this report, they should only be considered to be accurate to +/- 15 metres due to the limitations of the GPS devices used.

The corridors were 100 m wide and of varying lengths, and the circular well pad areas had a radius of 175 m. Geotechnical survey locations were also assessed as part of the corridors (a 50m buffer zone around each survey location was assessed). The ground-truthing of the corridors, well pad areas and the geotechnical survey locations included undertaking detailed flora species surveys including sampling of unknown flora, and recording all incidental fauna observations. All species known to be of conservation significance (such as endangered, vulnerable, near threatened or Type A species under the *Nature Conservation Act 1992* and/or the *Environment Protection and Biodiversity Conservation Act 1999*) were recorded using the toughbook.

A list of flora species observed in the proposed development areas has been included in **Appendix A**. Incidental fauna observations are provided in the relevant sections throughout this report.



3 Ecological assessment

3.1 Corridor 181-including FV301, TP-F099, Powerline and Road

General

This corridor (Figure 2) heads south-west from the Injune-Taroom Road and splits off towards the west ending in FV301(Figure 3). A small road corridor (Figure 4) and a portion of a powerline corridor (Figure 5) adjoin FV301.

No RE mapping exists for this corridor and associated pads, as the location of the proposed areas is within historically cleared farming land.

Small scattered patches of intact remnant vegetation occur within the creek-line (stream order 3) running through FV301 and along the edge of the road corridor.

No ESAs were identified within the corridor and adjoined pads. The closest being 320 m away towards the north-east.

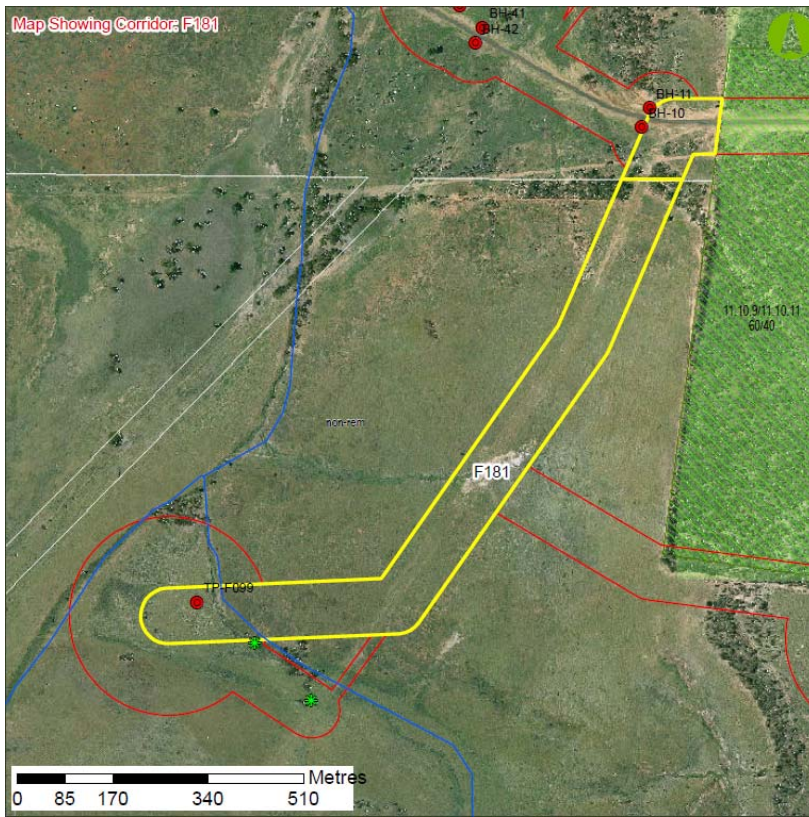
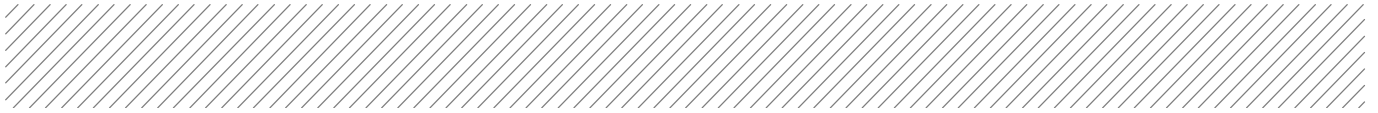


Figure 2 Corridor F181

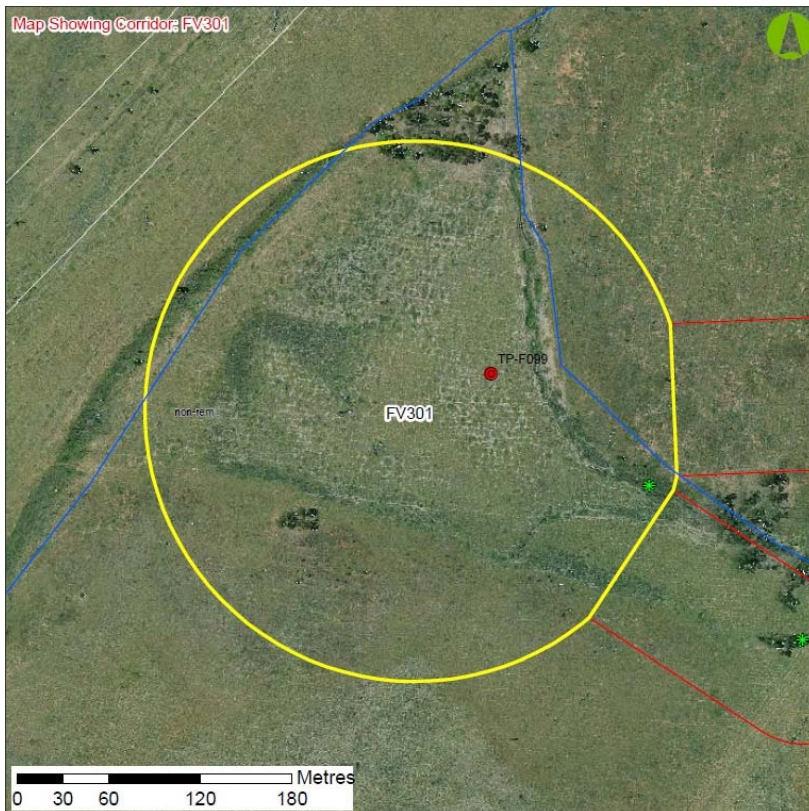


Figure 3 Well Pad FV301

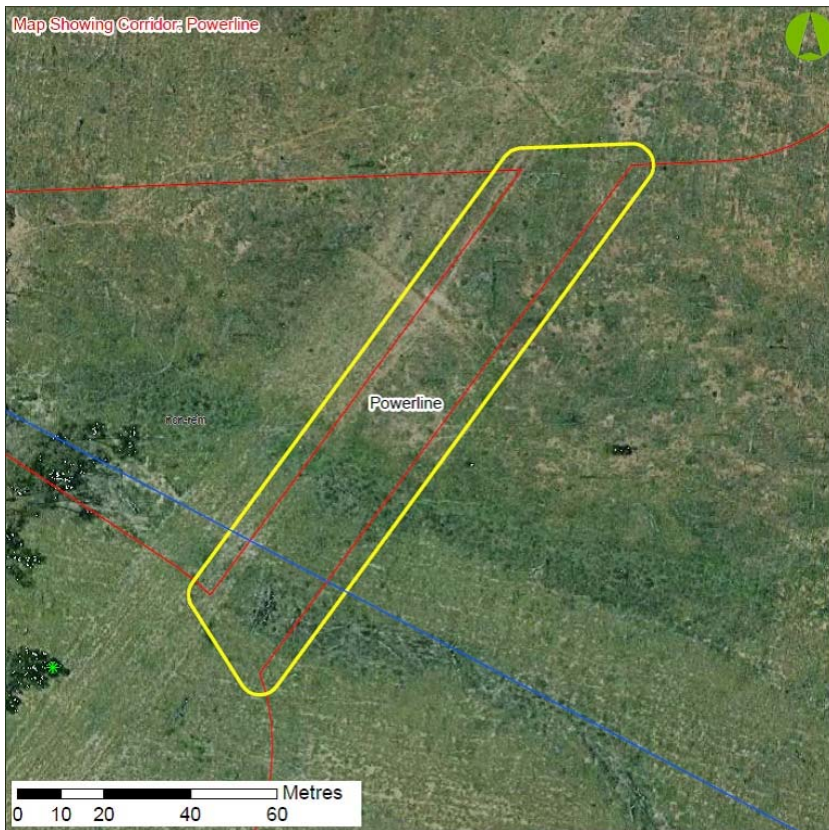
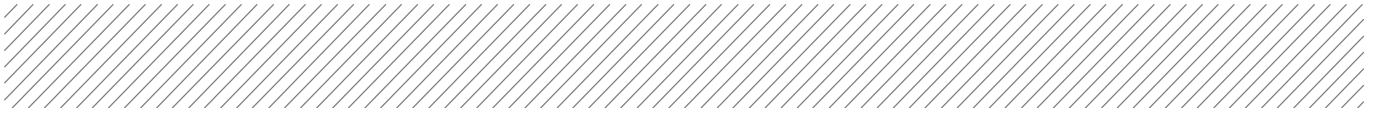


Figure 4 Powerline

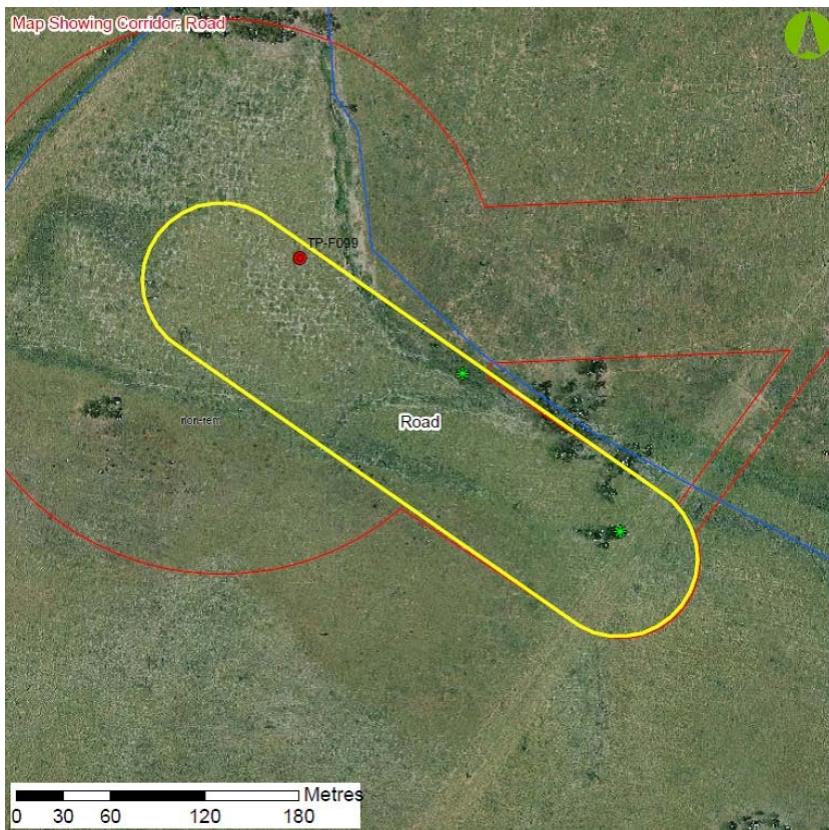


Figure 5 Road corridor

Floristics

Canopy species are lacking within the corridor itself, however some canopy species are present within the pad area. Species present within FV301 include *Eucalyptus populnea* (Poplar Box), *Callitris glaucophylla* (White Cypress Pine), *Angophora floribunda* (Rough-barked Apple) and some smaller *Allocasuarina leuhmannii* (Bull Oak) saplings. The mid-storey is generally lacking within the open corridor and FV301 due to past clearing within the area. Groundcover is dominated by *Pennisetum ciliare* (Buffel Grass), with scattered patches of *Melinis repens* (Red Natal) and a number of *Chloris* species.

A total of two Type A restricted species were identified within the road corridor, the details and locations of which are given below in Table 3.1.

Table 3.1.1 Species of conservation significance for Road corridor and adjoining pads

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)
<i>Brachychiton populneus</i>	0688910	7141988
<i>Brachychiton populneus</i>	0688809	7142089

Habitat Values

The corridor has undergone high levels of disturbance due to past clearing for agricultural purposes, and as such is considered to be of low habitat value.

FV301 is predominantly cleared however a small creek runs through the pad and contains scattered riparian vegetation with several mature trees present. These trees contained hollows which were being utilised by Eastern Rosellas (*Platycercus eximius*) during the time of surveys. The presence of fallen timber, rocks, flowing water and hollow bearing mature trees indicates that this area represents high habitat value.

Several fauna species were recorded within these areas during surveys, including: Emu (*Dromaius novaehollandiae*), Australian Magpie (*Gymnorhina tibicen*), Pale-headed Parrot (*Platycercus adscitus*), Eastern Rosellas (*Platycercus eximius*), Sulfur-crested Cockatoo (*Cacatua galerita*), Richard's Pipit (*Anthus novaeseelandiae*), Feral Pig (*Sus scrofa*), Torresian Crow (*Corvus orru*), Eastern Grey Kangaroo (*Macropus giganteus*) and European Rabbits (*Oryctolagus cuniculus*).

3.2 Corridor F186 including FV302 and TP-F098

General

Corridor F186 and adjoining pads (FV302 and TP-F098) runs east from corridor F181 along the boundary of a state forest.

Vegetation mapping of the area shows remnant vegetation as RE 11.10.9/11.10.11 which is classified as 'not of concern'. During field surveys, it was noted that the vegetation mapping for the area is correct.

The majority of vegetation within the corridor and pads has previously undergone a high level of clearing. This is evident by the lack of canopy trees, cleared tracks, stumps, and scattered piles of timber still present in areas. Vegetation still remains on the northern edge of the corridor and along the escarpment running through FV302.

The escarpment, creek-line and remnant patches of vegetation all represent diverse areas in terms of flora species and habitat value.

No ESAs were identified within the corridor and adjoined pads, the closest being over 1 kilometre away in the southern portion of Lot 25 WT22.

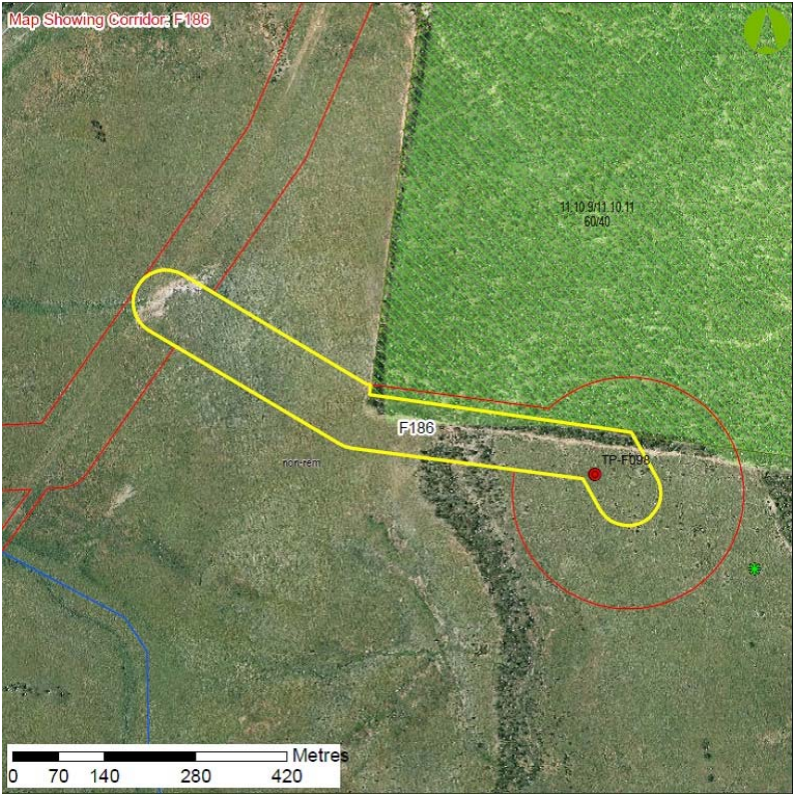


Figure 6 Corridor F186

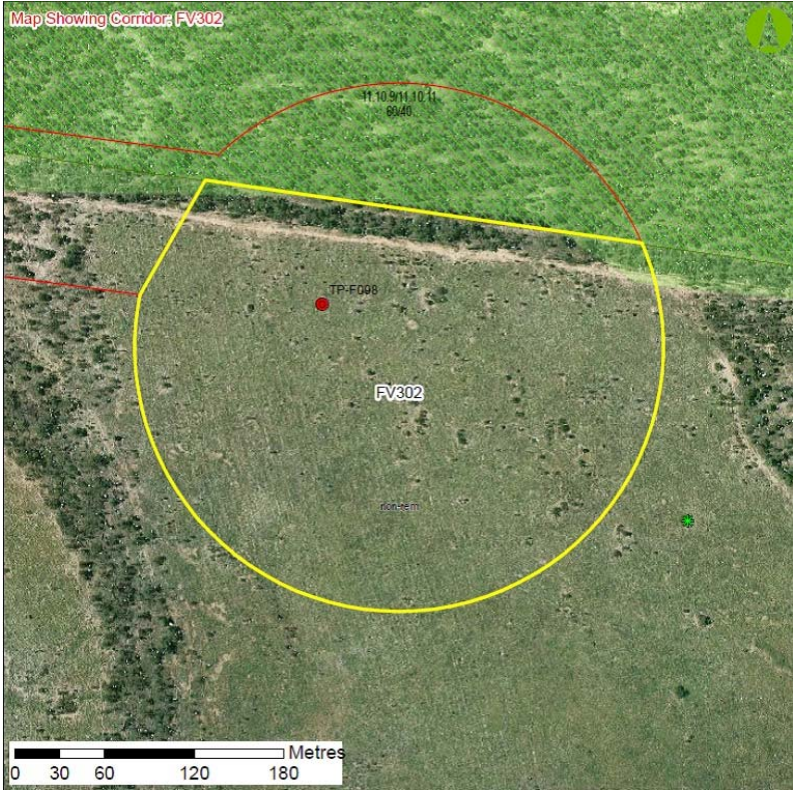


Figure 7 Well pad FV302

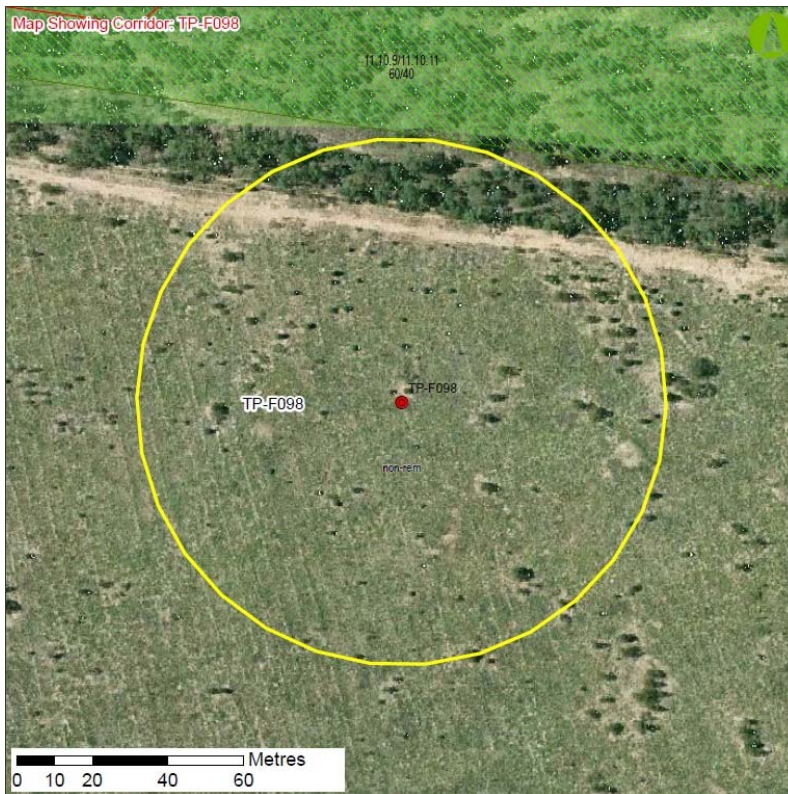


Figure 8 TP-F098

Floristics

FV302 has a sandstone ridge running north – south along the western edge of the pad area. This ridge-line is dominated by *Angophora leiocarpa* (Smooth-barked Apple) and *Acacia decora* (Pretty Wattle). The northern edge of the pad area is located within State Forest. This area is dominated by *Callitris glaucophylla* (White Cypress Pine) and scattered *Eucalyptus crebra* (Narrow Leaved Ironbark). Groundcover is dominated by *Pennisetum ciliare* (Buffel Grass), *Sporobolus creber* (Western Rats Tail Grass), and *Aristida vagans* (Three-awned Speargrass).

No Type A restricted plants were located within this corridor or adjoining pads. One *Brachychiton rupestris* (Narrow-leaved Bottle Tree) is located just outside the pad boundary.


Habitat Values

FV302 has been partially cleared in the past, however due to the presence of a ridgeline, many mature tree species remain. This area contains rocky gullies, small escarpments, healthy under-storey and mature hollow bearing trees. The State Forest also contains high levels of fallen timber. Due to the presence of key habitat attributes it is considered that FV302 is of high habitat value.

Several fauna species were recorded within these areas during surveys, including: Emu (*Dromaius novaehollandiae*), Australian Magpie (*Gymnorhina tibicen*), Pale-headed Parrot (*Platyercus adscitus*), Eastern Rosellas (*Platyercus eximius*), Sulfur-crested Cockatoo (*Cacatua galerita*), Richard's Pipit (*Anthus novaeseelandiae*), Feral Pig (*Sus scrofa*), Torresian Crow (*Corvus orru*), Eastern Grey Kangaroo (*Macropus giganteus*) and European Rabbits (*Oryctolagus cuniculus*).

Conclusion

The pipeline corridors occur across a variety of landscape and vegetation types. While most the corridors occur in previously disturbed areas, species of conservation significance occur in multiple corridors (ie Type A restricted plants).



The proposed development within corridor F186 and adjoining pads traverses an area mapped as RE 11.10.9/11.10.11 ('No concern at present'). The RE mapping was confirmed as correct during these investigations.

Multiple watercourses occur within, or in close proximity to, development areas. The watercourses within the proposed development areas have limited fringing riparian vegetation, and subsequently have low to moderate ecological and habitat value.

Two Type A restricted plant species were observed within the proposed development areas located in the road corridor.

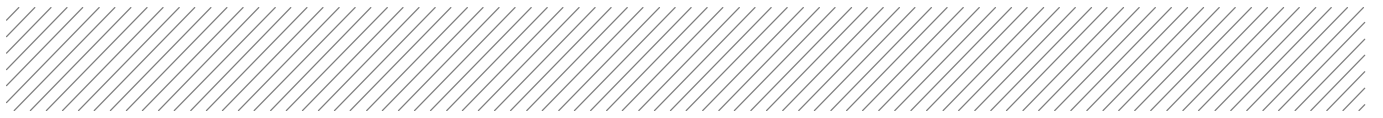
No species protected under the provisions of the EPBC Act were observed within the proposed development areas during these investigations.



4 References

Eddie, C (2007) Field Guide to Trees and Shrubs of Eastern Queensland Oil and Gas Fields, First Edition, Santos Ltd, Adelaide.

Regional Ecosystem Mapping, Version 6.0, Queensland Government Department of Environment and Resource Management (DERM).



Appendix A

Flora Species List

Scientific Name	Common Name
<i>Abutilon leucopetalum</i>	Abutilon
<i>Acacia brachycarpa</i>	other black wattle
<i>Acacia decora</i>	Pretty Wattle
<i>Acacia excelsa</i>	Iron wood
<i>Acacia farnesiana</i>	Prickly mimosa/ Needle bush
<i>Acacia salicina</i>	Sally Wattle
<i>Acanthospermum hispidulum</i>	Star burr
<i>Achyranthes aspera</i>	two spine burr
<i>Acroptilon maculosa</i>	Knap Weed
<i>Aeschynomene paniculata</i>	Panicle Joint Vetch
<i>Allocasuarina leuhmannii</i>	Bull Oak
<i>Alloteropsis semialata</i>	Cockatoo Grass
<i>Alphitonia excelsa</i>	Red Ash
<i>Alstonia constricta</i>	Bitter Bark
<i>Alternanthera dentata</i>	Joy Weed
<i>Alternanthera nodiflora</i>	Common Joy Weed
<i>Alternanthera pungens</i>	Kaki Burr
<i>Alysicarpus rugosa</i>	Chain pea
<i>Angophora floribunda</i>	Rough-barked Apple
<i>Angophora leiocarpa</i>	Smooth-barked Apple
<i>Apophyllum anomalum</i>	Warrior bush
<i>Aristida caput medusae</i>	Curly Head Wire Grass
<i>Aristida holathera</i>	Tall Wire Grass
<i>Aristida inaequiglumis</i>	Feathertop three awn
<i>Aristida ingrata</i>	Purple Aristida
<i>Aristida jerichoensis</i>	Jericho wire grass
<i>Aristida jerichoensis var. subspinulifera</i>	Jericho wire grass
<i>Aristida latifolia</i>	Hairy Aristida
<i>Aristida leptopoda</i>	Wire Grass
<i>Aristida muricata</i>	Wire Grass
<i>Aeschynomene indica</i>	Budda pea
<i>Atalaya hemiglauca</i>	Whitewood
<i>Bidens pilosa</i>	Cobblers Pegs
<i>Bothriochloa bladhii</i>	Forest Blue Grass
<i>Bothriochloa decipiens var. decipiens</i>	Pitted Bluegrass
<i>Bothriochloa pertusa</i>	Indian Couch
<i>Brachiaria decumbens</i>	Signal Grass
<i>Brachychiton populneus</i>	Kurrajong
<i>Bracteantha bracteata</i>	Everlasting Daisy
<i>Bursaria spinosa</i>	Prickly Pine
<i>Callitris glaucophylla</i>	White Cypress Pine
<i>Calocephalus platycephalus</i>	Billy Buttons
<i>Calotis cuneifolia</i>	Purple Burr Daisy
<i>Calotis hispidula</i>	Bogan Flea
<i>Calotis lappulacea</i>	Yellow Burr Daisy

<i>Calotis multicaulis</i>	Woolly head burr daisy
<i>Canthium oleifolium</i>	Hat stand, Wild Lemon
<i>Capparis loranthifolia</i>	Nipan, Wait a while
<i>Cardamine hirsuta</i>	Flickweed
<i>Carex inversa</i>	Nut Sedge
<i>Carissa ovata</i>	Currant Bush
<i>Cassinia laevis</i>	Cough Bush
<i>Cenchrus setiger</i>	Birdwood Grass
<i>Chamaesyce australis</i>	Hairy Caustic Weed
<i>Chamaesyce drummondii</i>	Caustic Weed
<i>Cheilanthes sieberi</i>	Mulga Fern
<i>Chenopodium carinatum</i>	Keeled Goosefoot
<i>Chloris divaricata</i>	Windmill Chloris
<i>Chloris inflata</i>	Purple Top Rhodes
<i>Chloris ventricosa</i>	Tall Chloris
<i>Chondrilla juncea</i>	Skeleton Weed
<i>Chrysocephalum apiculatum</i>	Yellow Buttons
<i>Cirsium vulgare</i>	Spear Thistle, Black Thistle
<i>Cleome viscosa</i>	Tickweed
<i>Commelina diffusa</i>	Wandering Jew
<i>Conyza bonariensis</i>	Fleabane
<i>Conyza canadensis var. pusilla</i>	Fleabane
<i>Corymbia tessellaris</i>	Moreton Bay Ash
<i>Cotula australis</i>	Carrot Weed
<i>Crotalaria dissitiflora</i>	Grey Rattlepod
<i>Crotalaria dissitiflora</i>	Grey Rattlepod
<i>Cymbopogon bombycinus</i>	Lemon Grass
<i>Cymbopogon obtectus</i>	Fluffy Tops
<i>Cymbopogon refractus</i>	Barbwire Grass
<i>Cynodon dactylon</i>	Green Couch
<i>Cyperus difformis</i>	sedge 2 - difformis, Dirty Dora
<i>Cyperus gracilis</i>	Bunchy Sedge
<i>Desmodium brachypodium</i>	Desmodium
<i>Dianella caerulea</i>	Blue Flax-lily
<i>Dianella longifolia</i>	Dianella
<i>Dichanthium sericeum</i>	Queensland Blue Grass
<i>Digitaria ammophila</i>	Digitaria
<i>Digitaria coenicola</i>	Digitaria
<i>Dodonaea viscosa subsp. spatulata</i>	Sticky Hopbush
<i>Echinochloa colona</i>	Awnless Barnyard Grass
<i>Echinochloa crus-galli</i>	Barnyard Grass, Japanese Millet
<i>Elaeodendron australis</i>	Peach Leaf
<i>Eleusine indica</i>	Crowsfoot Grass
<i>Enneapogon avenaceus</i>	Bottle Washer
<i>Enteropogon acicularis</i>	Curly Windmill Grass
<i>Enteropogon ramosus</i>	Twirly Windmill Grass

<i>Eragrostis australiensis</i>	Swamp Cane Grass
<i>Eragrostis basedowii</i>	Neat Lovegrass
<i>Eragrostis brownii</i>	Browns Lovegrass
<i>Eragrostis eriopoda</i>	Woolly Butt
<i>Eremochloa bimaculata</i>	poverty grass
<i>Eremophila mitchellii</i>	False Sandalwood
<i>Eriachne helmsii</i>	Wooly butt
<i>Eucalyptus chloroclada</i>	Dirty Gum
<i>Eucalyptus melanophloia</i>	Silver Leaved Ironbark
<i>Eulalia fulva</i>	Silky Brown Top Grass
<i>Evolvulus alsinoides</i>	Speed Well
<i>Fimbristylis dichotoma</i>	Fimbristylis
<i>Glycine falcata</i>	Glycine
<i>Gomphrena celosioides</i>	Gomphrena Weed
<i>Goodenia grandiflora</i>	Goodenia
<i>Goodenia rotundifolia</i>	Goodenia
<i>Goodenia strangfordii</i>	Goodenia
<i>Heteropogon contortus</i>	Black Spear Grass
<i>Hibiscus trionum</i>	Bladder Ketmia
<i>Hydrocotyle sp.</i>	Pennywort
<i>Hyptis capitata</i>	Knob Weed
<i>Hyptis spicigera</i>	Bush mint
<i>Hyptis suaveolens</i>	Hyptis
<i>Indigofera linifolia</i>	Little Red Pea
<i>Indigofera spicata</i>	Creeping Indigo, Purple Indigo
<i>Jacksonia scoparia</i>	Jacksonia
<i>Juncus polyanthemos</i>	Sharp Rush
<i>Juncus usitatus</i>	Juncus
<i>Lepidium sagittulatum</i>	Pepper Cress
<i>Lomandra longifolia</i>	Lomandra
<i>Ludwigia peploides</i>	Water primrose
<i>Macroptilium lathyroides</i>	Phasey bean
<i>Maireana villosa</i>	Silky Bluebush
<i>Marsdenia australis</i>	Marsdenia
<i>Marsdenia lanceolata</i>	Marsdenia
<i>Medicago polymorpha</i>	Burr Medic
<i>Megathyrsus maximus var maximus</i>	Guinea Grass
<i>Melia azedarach</i>	White Cedar
<i>Melinis repens</i>	Red Natal
<i>Monachather paradoxa</i>	Mulga oats
<i>Neptunia gracilis</i>	Native Sensitive Weed
<i>Opuntia stricta</i>	Prickly Pear
<i>Opuntia tomentosa</i>	Velvety Tree Pear
<i>Oxalis stricta</i>	Yellow Wood Sorrel
<i>Panicum decompositum</i>	Hairy Panic
<i>Panicum effusum</i>	Inquisitive Grass

<i>Panicum laevinode</i>	Panic grass
<i>Paspalidium caespitosum</i>	Brigalow Grass
<i>Paspalidium distichum</i>	Water Couch
<i>Paspalidium jubiflorum</i>	Warrego Grass
<i>Paspalum dilatatum</i>	Paspalum
<i>Paspalum paniculatum</i>	Paspalum
<i>Pennisetum ciliare</i>	Buffel Grass
<i>Petalostigma pubescens</i>	Quinine
<i>Phyllanthus fuernrohrii</i>	Phyllanthus
<i>Pimelea microcephala</i>	Pussy Tail
<i>Pittosporum spinescens</i>	Wallaby Apple
<i>Plectranthus parviflorus</i>	Native Coleus
<i>Podolepis jaceoides</i>	Showy Copper Wire Daisy
<i>Portulaca oleracea</i>	Pig Weed
<i>Pterocaulon sphacelatum</i>	Apple Bush
<i>Rhynchosia minima</i>	Rhynchosia
<i>Rhynchosia pterochaeta</i>	Rusty heads
<i>Richardia brasiliensis</i>	Mexican clover
<i>Rumex brownii</i>	Swamp Dock
<i>Sclerolaena birchii</i>	Galvanised Burr
<i>Senna barclayana</i>	Bean bush, Pepper Senna
<i>Setaria incrassata</i>	Purple Pigeon Grass
<i>Sicyos australis</i>	Wild Cucumber
<i>Sida acuta</i>	Spiny head Sida
<i>Sida cordifolia</i>	Flannel weed
<i>Sida fibulifera</i>	Creeping Sida
<i>Sida rhombifolia</i>	Paddy's lucerne
<i>Sida trichopoda</i>	High Sida
<i>Solanum americanum</i>	American Nightshade
<i>Solanum esuriale</i>	Brown Potato Bush
<i>Solanum nigrum</i>	Black nightshade
<i>Sonchus oleraceus</i>	Sow Thistle
<i>Sorghum halepense</i>	Johnson Grass
<i>Sporobolus actinocladus</i>	Ray Grass
<i>Sporobolus australasicus</i>	Drop Seed Grass
<i>Sporobolus creber</i>	Western Rats Tail Grass
<i>Stylosanthes scabra</i> cv. <i>Seca</i>	Seca Stylo
<i>Tagetes minuta</i>	Stinking Rodger
<i>Themeda quadrivalvis</i>	Grader Grass
<i>Tragus australianus</i>	Burr Grass
<i>Trianthema portulacastrum</i>	Black Pigweed
<i>Trianthema triquetra</i>	Red Spinach
<i>Tripogon loliiformis</i>	Five minute grass
<i>Urochloa mosambicensis</i>	Urochloa
<i>Urochloa panicoides</i>	Liverseed grass
<i>Verbena aristigera</i>	Fine Leaf Verbena

<i>Verbena bonariensis</i>	Bunchy Verbena, Purpletop Verbena
<i>Verbena litoralis</i>	Tall Verbena
<i>Verbena officinalis</i>	Common Verbena, Native Verbena
<i>Verbena tenuisecta</i>	Mayne's Curse
<i>Verbesina encelioides</i>	Crownbeard
<i>Xanthium occidentale</i>	Noogoora Burr
<i>Xanthium spinosum</i>	Bathurst Burr



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