Roma Ecological Assessment Report – Lot 4 RP858912 Santos Ltd

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Revision 2

aurecon

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Contents

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 Roma gas fields.

The Roma gas fields are located near the township of Roma and are characterised by undulating terrain with small elevated areas including the Thomby and Grafton Range. The dominant vegetation types within the Roma gas fields include Eucalypt and/or Brigalow woodlands, Blue grass or Mitchell grass downs, and smaller areas of White Cypress Pine and Mulga (Eddie 2007). The Roma gas fields are located within the Balonne River catchment.

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 listed below and shown in Figure 1:

- Water Pipeline corridor,
- Corridor R4 (partial)
- Geotechnical survey locations situated within the above corridors and shown in Figure 1

These areas are collectively referred to as the 'proposed development area', and are located entirely within Lot 4 RP858912. Note that the subject of this report is solely related to Lot 4 RP858912 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 4 RP858912 (Figure 1), 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.

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Legend

- Notable Species
- Geotech Borehole Locations
- 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\13W\T18_Fairview_Overview.mxd 09/06/2011 09:01

A3 scale: 1:10,000

0 500 m

Job No: 215648

Coordinate system: GDA 1994 MGA Zone 55

Santos Lot 4 on RP858912

2. Methodology

2.1 Desktop methodology

Proposed development areas have been projected on a range of maps provided by Santos. These maps include Regional Ecosystem (RE) Mapping (version 6.0; Department of Environment and Resource Management [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 RE classifications used in this report are based on the 'biodiversity status' of the vegetation and not the '*Vegetation Management Act 1999* (VM Act) status' of the vegetation.

2.2 Field methodology

The proposed development areas were assessed by two (2) Aurecon ecologists (Luke Foster and Karen Bowland) on the 17 June 2011. These assessments were to determine the existing vegetation communities and habitat value of the proposed clearing within the development areas as well as to verify the RE mapping as produced by DERM.

GIS environmental constraints layers (e.g. RE Mapping, ESA mapping etc) and high resolution aerial photography were uploaded onto a toughbook (C5 mobile clinical assistant CFT-001 – Motion computing), with an integrated GPS used to locate surveys areas. 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 GPS co-ordinates provided in this report are accurate, a margin of error approximately +/- 15 m is expected due to the limitations of the devices used and the recording environment.

The corridors were 100 m wide and of varying lengths and the geotechnical survey locations were also assessed as part of the survey areas (a 50 m buffer zone around each survey location was assessed).

The ground-truthing of the proposed development areas 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* [NC Act] or endangered, vulnerable or rare species under the *Environment Protection and Biodiversity Conservation Act 1999* [EPBC Act]) 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 Water pipeline corridor

General

The water pipeline corridor heads in a west-south-west direction across lot 4 (RP858912) continues into Lot 2 (RP858912). The Bend Road runs along the northern boundary of this lot and intersects the start of this corridor. 7699-TP-15 adjoins the corridor on the northern boundary of the lot. The proposed water pipeline can be seen in Figure 3.1.

The majority of the corridor has been subjected to severe disturbance in the form of extensive clearing and various agricultural practices. Grazing was evident at the time of surveys. A small farm access track traversed this corridor.

No remnant vegetation under RE mapping is present within the corridor and associated well pads.

No mapped ESAs are present within the proposed water pipeline corridor and associated pads. The closest ESA is situated more than 1 km north of the corridor.

Existing vegetation (canopy layer) is made up of scattered paddock trees. A number of EPBC listed *Acacia harpophylla* (Brigalow) were recorded within the corridor.

Parts of the corridor exhibited signs of erosion, most likely due to water run-off from neighbouring cropped areas.

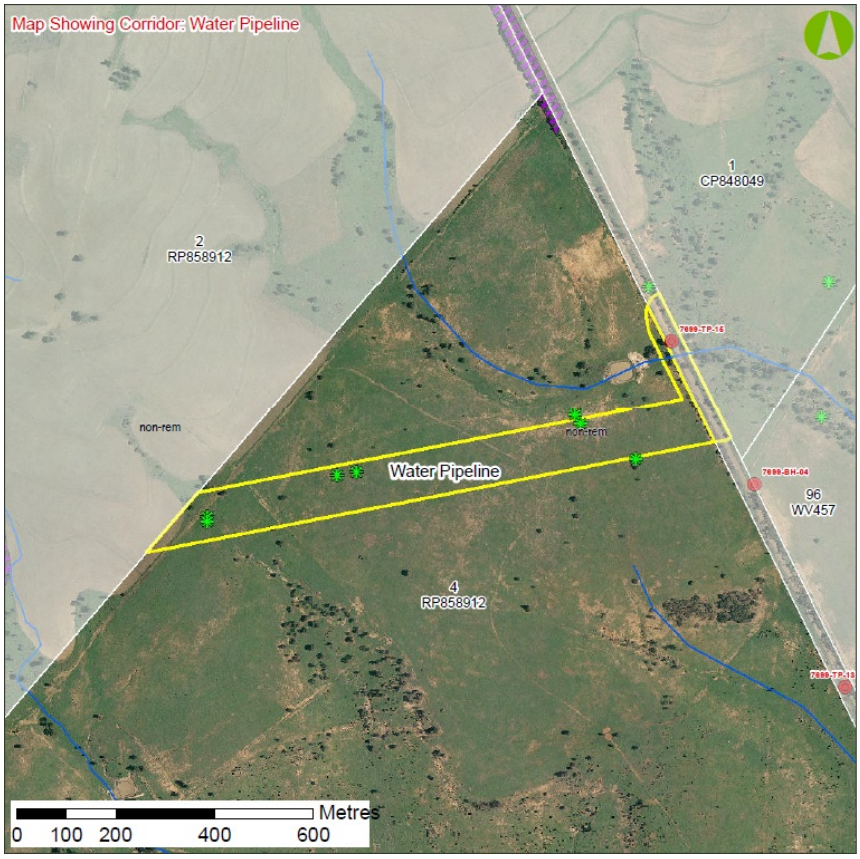

Figure 3.1 Proposed water pipeline within Lot 4 RP858912

Floristics

Due to the cleared and agricultural nature of Lot 4 RP858912, the remaining vegetation is scarce and is predominantly made up of non-native species.

The scarcely scattered paddock trees present within the corridor are made up of *Casuarina cristata* (Belah), *Brachychiton* species and a small number of *Acacia harpophylla* (Brigalow). Shrubs species are generally scarce; the scattered few include *Acacia excelsa* (Ironwood) and *Eremophila mitchellii* (False Sandalwood). Patches of *Enchylaena tomentose* (Ruby Saltbush) and *Sclerolaena birchii* (Galvanised Burr) are also present.

Ground cover is dominated by *Pennisetum ciliare* (Buffel Grass) throughout the corridor. Small pockets of native grass species present include *Sporobolus creber* (Western Rats Tail Grass) and *Bothriochloa bladhii* subsp. *Bladhii* (Forest Blue Grass).

Three (3) Type A restricted plants were located within the water pipeline corridor. The details and locations of these plants are given below in Table 3.1.

Table 3.1 Location of type A restricted plants (*Nature Conservation Act 1992*)

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)
Brachychiton populneus	699563	7072508
Brachychiton populneus	699601	7072514
Brachychiton rupestris	700053	7072614

Acacia harpophylla (Brigalow) which is listed as an endangered community EPBC Act was recorded in two (2) locations within the corridor. The details and locations of these are given below in Table 3.2.

Table 3.2 Location of significant species (*EPBC Act 1999*)

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)
Acacia harpophylla	699300	7072415
Acacia harpophylla	699300	7072424

Habitat values

The cleared areas within this corridor and associated pads are considered to have low habitat value. This is due to the lack of suitable habitat attributes.

The scattered paddock trees present within the corridor represent potential habitat for generalist species.

Eleven (11) incidental fauna sightings were made during surveys, species recorded include: Australian Magpie *(Gymnorhina tibicen),* Sulfur-crested Cockatoo *(Cacatua galerita),* Richard's Pipit *(Anthus novaeseelandiae),* Torresian Crow (*Corvus orru*), Eastern Grey Kangaroo (*Macropus giganteus*), Galah (*Cacatua roseicapilla),* Grey Butcher Bird *(Cracticus torquatus),* Pied Butcher Bird *(Cracticus nigrogularis),* Apostle Bird *(Struthidea cinerea)*, Striated Pardelote (*Pardalotus striatus*) and Variegated Fairy Wren (*Malurus lamberti*).

No EVNT fauna was observed within the proposed water pipeline corridor and associated pads.

3.2 Corridor R4 (partial)

General

Corridor R4 runs south-east along the northern boundary of Lot 4 RP858912 along the Bend Road. This corridor is only partially located within corridor R4, and the remainder will be assessed in the appropriate report (Lot 1 CP848049). 7699-TP-15 is partially located within this corridor. Corridor R4 and associated pad 7699-TP-15 can be seen in Figure 3.2 and Figure 3.3 respectively.

The majority of Lot 4 has been cleared for grazing; however corridor R4 is situated along the roadside which still contains scattered canopy trees. The remaining vegetation is relatively narrow and as such is still highly disturbed due to the surrounding cleared land.

No RE mapping exists for the vegetation present within the corridor. Pad 799-TP-15 is mapped as non-remnant.

There are no mapped ESAs within corridor R4, however there is a mapped ESA (RE 11.9.5 'endangered', and RE 11.3.25/11.3.2 'of concern') approximately 1km north of the corridor.

Acacia harpophylla (Brigalow) which is listed *EPBC* Act as an endangered community occurs along the road side vegetation along the road side vegetation

No watercourses intersect this corridor. However a stream order 1 water course intersects 7699-TP-15. At the time of surveys this creek was dry, possibly due to a farm dam located 50 m west of the pad area.

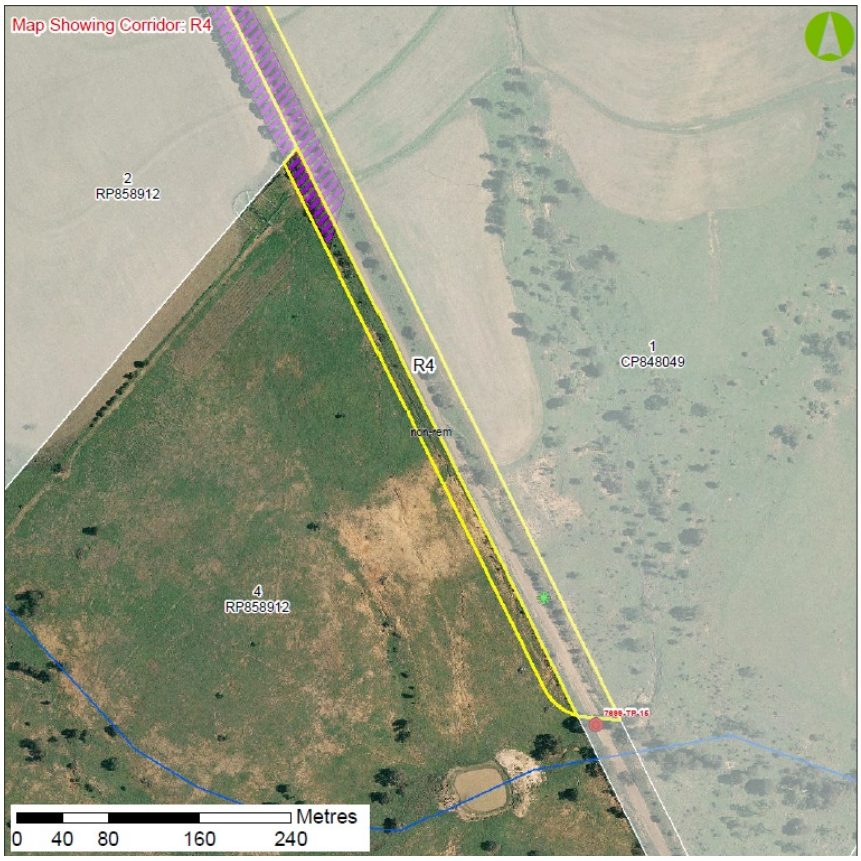

Figure 3.2 Proposed corridor R4 within Lot 4 RP858912

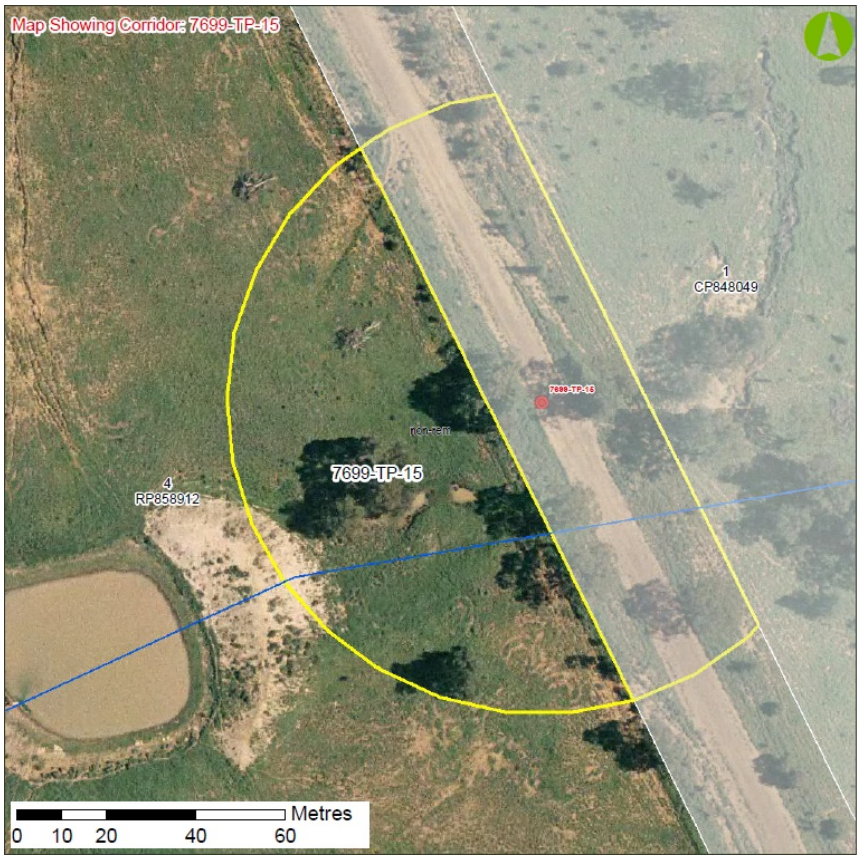

Figure 3.3 Proposed 7699-TP-15 within Lot 4 RP858912

Floristics

This corridor is located within roadside vegetation which is made up of a number of native species. Canopy species present include *Acacia harpophylla* (Brigalow), *Casuarina cristata* (Belah) and *Eucalyptus populnea* (Poplar Box). Mid-storey species include *Acacia leiocalyx* (Black Wattle), *Geijera parviflora* (Wilga), and *Canthium oleifolium* (Hatstand). Ground cover species are a mixture of native and introduced species including *Themeda triandra* (Kangaroo Grass), *Sporobolus creber* (Western Rats Tail Grass), *Xanthium occidentale* (Noogoora Burr), and *Bothriochloa bladhii subsp. Bladhii* (Forest Blue Grass). Pasture species such as *Sorghum* sp. also have encroached from neighbouring cultivation.

No mapped ESAs occur within the corridor; however there are scattered *Acacia harpophylla* (Brigalow) throughout the road side vegetation.

One (1) Type A restricted species was located within corridor R4. The details and location of this record is shown below in Table 3.3.

Table 3.3 Location of type A restricted plants (*Nature Conservation Act 1992*)

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)
Brachychiton populneus	700190	7072889

As mentioned above, *Acacia harpophylla* (Brigalow) which is listed as an endangered community under the EPBC Act is scattered throughout the roadside vegetation present within this corridor. Coordinates of the approximate start and end of the road side population is shown below in Table 3.4.

Table 3.4 Location of EVNT species

Species	Easting (GDA 94, Zone 55J)	Northing (GDA 94, Zone 55J)
Acacia harpophylla	699993	7073242

Habitat values

The vegetation present alongside the road and within the corridor represents moderate habitat value. This is due to the presence of some vegetative structure, fallen timber and dense vegetation in parts.

The narrowness of the vegetation restricts the fauna species that potentially may utilise the area.

The road-side vegetation within this corridor gradually joins up with a larger area of vegetation to the east, which indicates that due to the scarcity of vegetation within the area, the present road-side vegetation potentially may be used as a fauna corridor.

A number of incidental fauna species were recorded during surveys. These were identified either by sight, calls, tracks or scats. The species recorded include: Australian Magpie *(Gymnorhina tibicen),* Sulfur-crested Cockatoo *(Cacatua galerita),* Richard's Pipit *(Anthus novaeseelandiae),* Torresian Crow (*Corvus orru*), Galah (*Cacatua roseicapilla),* Grey Butcher Bird *(Cracticus torquatus),* Pied Butcher Bird *(Cracticus nigrogularis),* Apostle Bird *(Struthidea cinerea)*, Striated Pardelote (*Pardalotus striatus*) Variegated Fairy Wren (*Malurus lamberti*), Noisy Minor (*Manorina melanocephala*), Red Rump Parrot (*Psephotus haematonotus*), Weebill (*Smicrornis brevirostris*), Silvereye (*Zosterops lateralis*), Yellow Thornbill (*Acanthiza nana*), and feral cat (*Felis catus*).

No EVNT fauna species were identified within the corridor.

3.3 Road Corridor

General

The road corridor runs in a southern direction along the eastern edge of Lot 4 (RP858912). The majority of the road corridor is situated within the limits of the existing Bend Road corridor, and partially within Lot 4 (RP858912). Four (4) test pits are located close to this corridor, these being

The road corridor and associated test pits are situated in an existing road corridor and as such disturbance is high. A thin strip of vegetation is present alongside the road, however this varies in thickness. The eastern and western edges of the road corridor and associated pads are located within cultivated land.

RE mapping lists the corridor as non-remnant vegetation as the corridor is situated within cultivated land and cleared land, with only small patches of vegetation present along the roadside.

There are no Mapped ESAs within the corridor; however the nearest ESA is approximately 1 km north east of the corridor.

One stream order 1 water course runs parallel with the road corridor; this was dry at the time of surveys.

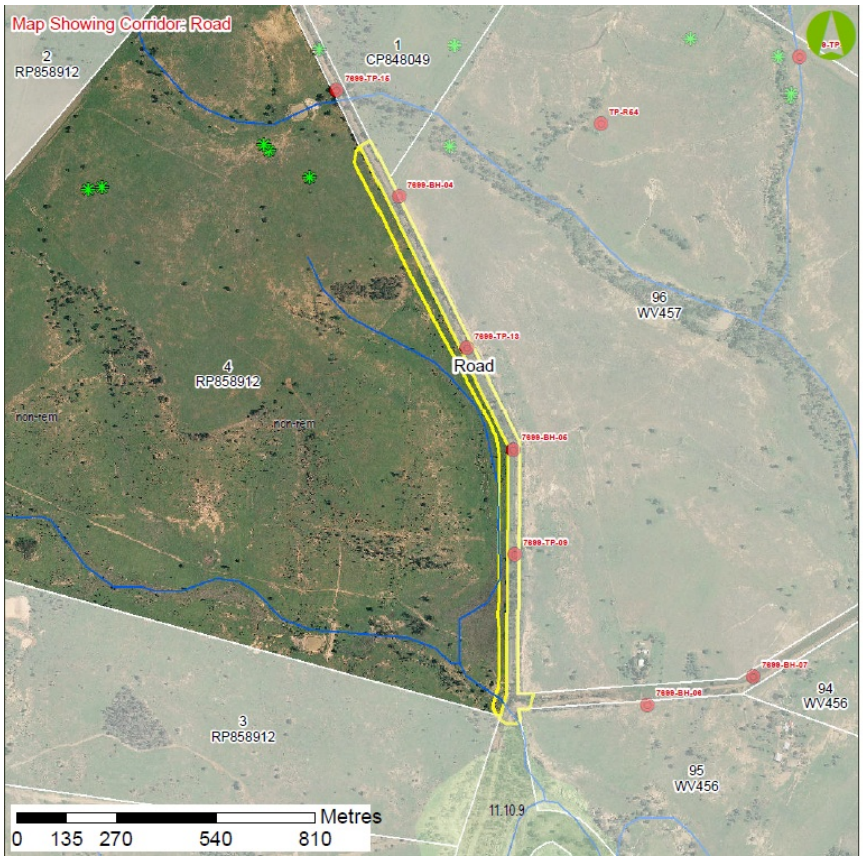

Figure 3.4 Proposed Road corridor within Lot 4 RP858912

Floristics

The majority of vegetation present within the corridor has been cleared for cultivation and grazing. Some vegetation remains along the Bend Road; however much of this is regrowth.

The roadside vegetation which is made up of a number of native and introduced species. Canopy species present include *Acacia harpophylla* (Brigalow), *Casuarina cristata* (Belah) and *Eucalyptus populnea* (Poplar Box). Mid-storey species include *Acacia leiocalyx* (Black Wattle), *Geijera parviflora* (Wilga), and *Canthium oleifolium* (Hatstand). Ground cover species are a mixture of native and introduced species including *Themeda triandra* (Kangaroo Grass), *Sporobolus creber* (Western Rats Tail Grass), and *Bothriochloa bladhii subsp. Bladhii* (Forest Blue Grass). Scattered mature *Opuntia tomentose* (Velvety Tree Pear) are present throughout the corridor.

Crop species such as *Sorghum* bicolour. also have encroached from neighbouring cultivation.

No mapped ESAs occur within the corridor; however there are scattered *Acacia harpophylla* (Brigalow) which is listed as an EVNT species under both the NC and EPBC Acts, throughout the road side vegetation.

No Type A restricted plants were identified during surveys.

Habitat values

The vegetation present alongside the road and within the corridor represents moderate to high habitat value. This is due to the presence of some vegetative structure, fallen timber and dense vegetation in parts.

The narrowness of the vegetation restricts the fauna species that potentially may utilise the area.

A number of incidental fauna species were recorded during surveys. These were identified either by sight, calls, tracks or scats. The species recorded include: Australian Magpie *(Gymnorhina tibicen),* Sulfur-crested Cockatoo *(Cacatua galerita),* Richard's Pipit *(Anthus novaeseelandiae),* Torresian Crow (*Corvus orru*), Galah (*Cacatua roseicapilla),* Grey Butcher Bird *(Cracticus torquatus),* Pied Butcher Bird *(Cracticus nigrogularis),* Apostle Bird *(Struthidea cinerea)*, Striated Pardelote (*Pardalotus striatus*) Variegated Fairy Wren (*Malurus lamberti*), Noisy Minor (*Manorina melanocephala*), Red Rump Parrot (*Psephotus haematonotus*), Weebill (*Smicrornis brevirostris*), Silvereye (*Zosterops lateralis*), Yellow Thornbill (*Acanthiza nana*), and feral cat (*Felis catus*).

No EVNT fauna species were identified within the corridor.

4. Conclusion

The corridors and associated pads within Lot 4 (RP858912) occur predominantly across cleared and landscapes and vegetation types. While most of the vegetation is cleared, small pockets along the roadsides remain and within these are found areas of moderate habitat value.

Multiple Type A restricted plant species were observed within the proposed development areas.

Acacia harpophylla (Brigalow) which is protected under the provisions of the EPBC Act was observed within the proposed development areas during these investigations.

5. 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

Appendix A

Flora Species List			
Scientific Name	Common Name	R4	Water pipeline
Cheilanthes aspera	Bristly cloak fern		
Cheilanthes sieberi	Mulga Fern		
Alstonia constricta	Bitter Bark		
Carissa ovata	Currant Bush		
Gomphocarpus physocarpus	Balloon Cotton Bush		
Marsdenia lanceolata	Marsdenia		
Bidens pilosa	Cobblers Pegs		
Bracteantha bracteata	Everlasting Daisy		
Calotis lappulacea	Yellow Burr Daisy		
Calotis scabiosifolia	Rough Daisy Burr		
Cirsium vulgare	Spear Thistle, Black Thistle		
Pterocaulon sphacelatum	Apple Bush		
Sonchus oleraceus	Sow Thistle		
Tagetes minuta	Stinking Rodger		
Xanthium occidentale	Noogoora Burr		
Calotis cuneifolia	Purple Burr Daisy		
Chrysocephalum apiculatum	Yellow Buttons		
Conyza bonariensis	Fleabane		
Pandorea pandorana	Wonga Vine		
Lepidium sagittulatum	Pepper Cress		
Capsella bursa-pastoris	Shepherd's purse		
Harrisia spp	Harrisia cactus		
Opuntia tomentosa	Velvety Tree Pear		
Opuntia stricta	Prickly Pear		
Apophyllum anomalum	Warrior bush		
Capparis loranthifolia	Nipan, Wait a while		
Capparis spinosa	Capparis midsize		
Allocasuarina luehmannii	Bull Oak		
Casuarina cristata	Belah		
Chenopodium desertorum	Desert Goosefoot		
Maireana microphylla	Small-leaf Bluebush		
Maireana villosa	Silky Bluebush		
Salsola kali	Roly Poly		
Sclerolaena birchii	Galvanised Burr		
Enchylaena tomentosa	Ruby Saltbush		
Cucumis myriocarpus	Paddy melon		
Cyperus difformis	sedge 2 - difformis, Dirty Dora		

Flora Species List			
Scientific Name	Common Name	R4	Water pipeline
Fimbristylis dichotoma	Fimbristylis		
Euphorbia peplus	Petty Spurge		
Crotalaria dissitiflora	Grey Rattlepod		
Desmodium varians	Tree Foil		
Glycine tomentella	Hairy Glycine		
Medicago polymorpha	Burr Medic		
Tephrosia supina	Tephrosia		
Acacia deanei	Dean's Wattle		
Acacia excelsa	Iron wood		
Acacia harpophylla	Brigalow		
Acacia leiocalyx	Black Wattle		
Acacia macradenia	Zigzag Wattle		
Acacia salicina	Sally Wattle		
Goodenia glabra	Smooth Goodenia		
Juncus usitatus	Juncus		
Lomandra hystrix	Creek Mat Rush		
Lomandra multiflora	Lomandra		
Abutilon oxycarpum	Chinese Lantern		
Malvastrum americanum	Spiny Malvastrum		
Sida platycalyx	Sida		
Sida rohlenae	Shrub Sida		
Sida subspicata	Queensland Hemp		
Owenia acidula	Emu Apple		
Eremophila mitchellii	False Sandalwood		
Eucalyptus chloroclada	Baradine Red Gum		
Eucalyptus melanophloia	Silver Leaved Ironbark		
Eucalyptus orgadophila	Mountain Coolibah		
Eucalyptus populnea	Poplar Box		
Jasminum didymum subsp. racemosum	Native Jasmine		
Oxalis stricta	Yellow Wood Sorrel		
Phyllanthus gunnii	Phyllanthus		
Pittosporum angustifolium	Native Apricot		
Aristida caput medusae	Many-headed Wire Grass		
Aristida holathera	Tall Wire Grass		
Aristida jerichoensis	Jericho wire grass		
Austrostipa verticillata	Slender Bamboo Grass		
Bothriochloa bladhii subsp. bladhii	Forest Blue Grass		
Bothriochloa decipiens var. decipiens	Pitted Bluegrass		
Bothriochloa ewartiana	Desert Blue Grass		
Chloris gayana	Rhodes Grass		

Flora Species List			
Scientific Name	Common Name	R4	Water pipeline
Chloris pectinata	Comb Chloris		
Dichanthium sericeum	Queensland Blue Grass		
Digitaria ammophila	Digitaria		
Enneapogon avenaceus	Bottle Washer		
Enteropogon acicularis	Curly Windmill Grass		
Enteropogon ramosus	Twirly Windmill Grass		
Eragrostis brownii	Browns Lovegrass		
Eragrostis sororia	Woodland Lovegrass		
Melinis repens	Red Natal		
Panicum buncei	Native Panic		
Panicum decompositum	Hairy Panic		
Panicum simile	Two-coloured Panic		
Pennisetum ciliare	Buffel Grass		
Sorghum alum	Silk Sorghum		
Sorghum plumosa	Plume sorghum		
Sporobolus caroli	Desert Sporobolus, Fairy Grass		
Sporobolus creber	Western Rats Tail Grass		
Themeda avenacea	Wild Oats Grass		
Themeda triandra	Kangaroo Grass		
Urochloa mosambicensis	Urochloa, Sabi Grass		
Aristida calycina	Dark Wiregrass		
Aristida muricata	Wire Grass		
Chloris divaricata	Windmill Chloris		
Eragrostis leptostachya	Lovegrass		
Paspalum dilatatum	Paspalum		
Rumex brownii	Swamp Dock		
Emex australis	Goathead Burr		
Grevillea striata	Beefwood		
Ranunculus lappaceus	Australian Buttercup		
Canthium oleifolium	Hat stand, Wild Lemon		
Psydrax odorata subsp. australiana	Canthium		
Geijera parviflora	Wilga		
Exocarpus cupressifolia	Bush Cherry		
Alectryon diversifolius	Scrub Boonaree		
Atalaya hemiglauca	Whitewood		
Solanum brownii	Violet Nightshade		
Solanum ellipticum	Potato Bush		
Solanum nigrum	Blackberry nightshade		
Brachychiton populneus	Kurrajong		
Verbena bonariensis	Bunchy Verbena, Purpletop Verbena		

Flora Species List			
Scientific Name	**Common Name**	**R4**	**Water pipeline**
Verbena officinalis	Common Verbena, Native Verbena		
Verbena tenuisecta	Mayne's Curse		
Zygophyllum howittii	Red twinleaf		