

Aurecon Australia Pty Ltd
 ABN 54 005 139 873
 Level 14, 32 Turbot Street
 Brisbane QLD 4000
 Locked Bag 331
 Brisbane QLD 4001
 Australia

T +61 7 3173 8000
 F +61 7 3173 8001
 E brisbane@aurecongroup.com
 W aurecongroup.com



Memorandum

To	Paul Wybrew	From	Aurecon C/o Jane Stark
Copy		Reference	225678
Date	30 January 2012	Pages (including this page)	9
Subject	Addendum to Lot 8 on AB200 Report		

Mr Wybrew

This memorandum relates to the ground-truthing of the proposed development areas shown in Figure 1.1 and Figure 1.2 (page 5-6). This memorandum documents the results of ecological investigations of the following areas:

- FV11-35 Well Pad Area and Powerline
- Powerline and three (3) geotechnical survey locations (6399-TP-84, 6399-TP-85, 6399-RM-25)

These ecological investigations were undertaken on 15-17 March 2011 by five (5) Aurecon ecologists (Grant Paterson, Vanessa Boettcher, Sarah Stone, Dan Pederson and Luke Foster).

A report specific to additional proposed development areas within Lot 8 on AB200 has been previously prepared and submitted to Santos (Lot 8 on AB200 Ecological Assessment Report Water to Grade Pipeline Corridor Investigations; Document Reference 0020-GLNG-4-1.3-0033).

This memorandum should be treated as an addendum to the report listed above. This memorandum is specific to the ecology of the section of the proposed development areas shown in Figure 1.1. For additional ecological information related to the proposed development that is in addition to that covered by this report, please refer to the appropriate Lot-specific report.

Ecological Assessment

1. FV11-35 Well Pad Area and Powerline

General

The proposed development area for FV11-35 and the associated powerline is located in the western region of Lot 8 on AB200 (Figure 1.1). The area has been actively grazed and the majority of the area is mapped as non-remnant vegetation. The southern section of FV11-35 is mapped as Regional Ecosystem (RE) 11.10.1/11.9.5a on the Department of Environment and Resource Management (DERM) Certified RE Mapping (DERM 2011, version 6.1). RE 11.10.1/11.9.5a is listed as No concern at present/Endangered (Biodiversity status). During field investigations, it was noted that this area did not contain *Acacia harpophylla* (Brigalow) but was dominated by *Eucalyptus* and *Callitris* species.

The area is currently located within a 'Category B' Environmentally Sensitive Area (ESA), due to the mapped Endangered RE community (Biodiversity status).

There are no mapped watercourses within the proposed development area, with the nearest watercourse located approximately 300 m to the east.

Floristics

The vegetation within the development area is dominated by *Pennisetum ciliare* (Buffel Grass) with scattered native species including *Heteropogon contortus* (Black Spear Grass). Scattered regrowth on the western side of the powerline and the southern section of FV11-35 is dominated by *Eucalyptus melanophloia* (Silver Leaved Ironbark), *Eucalyptus populnea* (Poplar Box) and *Callitris glaucophylla* (White Cypress Pine).

The canopy layer is relatively tall with an average height of 23 m. The dominant species within the canopy layer are *Eucalyptus chloroclada* (Baradine Red Gum), *Eucalyptus populnea* (Poplar Box) and *Corymbia clarksoniana* (Clarkson's Bloodwood).

No species of conservation significance (ie endangered, vulnerable or near threatened [EVNT] species protected under the provisions of the NC Act and/or critically endangered, endangered or vulnerable under the provisions of the *Environment Protection and Biodiversity Conservation Act 1999* [EPBC Act]) were recorded within the proposed development area.

Furthermore, no species of harvestable importance (ie Type A restricted plants protected under the provisions of the NC Act) were recorded during these investigations.

A list of flora species recorded within the proposed development area is provided on page 7 of this memorandum.

Habitat features

Habitat features recorded within the proposed development area include:

- Dense groundcover vegetation (ie grassy tussocks)
- Limited woody debris (ie fallen/felled timber, including hollow-bearing logs)
- Scattered stands of mature trees suitable for perching, foraging and shelter
- Buffel dominated grassland

The proposed development area contains a limited range of habitat features. Although the vegetation within the development area is structurally diverse, the level of disturbance is relatively high. With a high level of disturbance and a lack of habitat values (such as hollows, rocky areas and high quality watercourses), the habitat value of the area is considered to be low overall.

Six (6) fauna species were recorded within the proposed development area, including: Wallaroo (*Macropus robustus*), Noisy Miner (*Manorina melanocephala*), Torresian Crow (*Corvus orru*), Australian Magpie (*Cracticus tibicen*), Pale Headed Rosella (*Platycercus adscitus*) and Nankeen Kestrel (*Falco cenchroides*).

No threatened fauna species under the provisions of the NC Act, or the EPBC Act were identified.

2. Powerline, 6399-TP-84, 6399-TP-85 and 6399-RM-25

General

The powerline and three (3) geotechnical survey locations are located on the northern boundary of Lot 8 on AB200. The area has been partially grazed on the lower slopes, with remnant vegetation occurring on the upper slopes and towards the creek.

The proposed development area bisects two (2) areas mapped as Regional Ecosystems (REs) on the DERM Certified RE Mapping (DERM 2011, version 6.1). These areas are currently mapped as RE 11.9.5 (Biodiversity status: Endangered) and RE 11.10.7 (Biodiversity status: No concern at present) respectively. These vegetation types were confirmed during field investigations.

The proposed development area also contains vegetation dominated by *Acacia harpophylla* (Brigalow) which is characteristic of the threatened Brigalow ecological community and may therefore be referable under the provisions of the EPBC Act.

No DERM mapped watercourses occur within the proposed development area. A stream order six (6) watercourse is located approximately 150 m to the east of the powerline. This watercourse has high habitat value and is also classified as a referable wetland (DERM).

Due to the presence of the mapped Endangered RE (RE 11.9.5), the area is located within a Category B ESA (refer to Figure 1.2).

Floristics

The proposed development area contains areas of cleared paddock and stands of mature vegetation. The mature vegetation on the western and eastern edge of the development area contains *Acacia harpophylla* (Brigalow), *Eucalyptus populnea* (Poplar Box), *Eucalyptus chloroclada* (Baradine Red Gum), and *Eucalyptus melanophloia* (Silver-leaved Ironbark). The shrub layer in the areas of mature vegetation is dominated by *Dodonaea viscosa* (Sticky Hopbush), *Eremophila mitchellii* (False Sandalwood), *Acacia decora* (Pretty wattle) and *Geijera parviflora* (Wilga).

The central sections of the development area are situated within historically cleared areas (cleared for agricultural purposes, such as grazing). These areas lack a mature canopy layer and are dominated by *Pennisetum ciliare* (Buffel Grass), and a range of native species including *Sporobolus creber* (Western Rat's Tail Grass) and *Lomandra longifolia* (Lomandra).

The areas of Brigalow within the development area are considered to be characteristic of the threatened Brigalow ecological community (height of up to 18 m), protected under the provisions of the EPBC Act. As such, works within this vegetation community may therefore be referable under the provisions of the EPBC Act.

No species of harvestable importance (ie Type A restricted plants protected under the provisions of the NC Act) were recorded during these investigations.

A list of flora species recorded within the proposed development area is provided on page 7 of this memorandum.

Habitat values

Habitat features recorded within the proposed development area include:

- Dense groundcover vegetation (ie grassy tussocks) in cleared areas
- High level of woody debris (ie fallen/felled timber, including hollow-bearing logs) particularly within the vegetated areas
- Stands of mature vegetation
- Buffel dominated grassland
- High level of leaf litter
- Fissured tree bark
- Rocky crevices and stream banks
- High level watercourse habitat
- Hollow bearing trees along creek
- Dead stags

The proposed development area contains a high range of habitat features. Structural diversity within the different vegetation communities is also high, and provides a range of key habitat attributes suitable for

native fauna species. The habitat value of the area is considered to be of high value within the vegetated areas, and low – moderate within the cleared areas.

A total of ten (10) fauna species were recorded during surveys within the realignment area in section E as outlined in Table 2.1. A variety of macropod scats were also recorded within the area.

Table 2.1 Incidental fauna species recorded within the proposed development area

Common name	Scientific name
Birds	
Australian magpie	<i>Cracticus tibicen</i>
Noisy Friarbird	<i>Philemon corniculatus</i>
Noisy Miner	<i>Manorina melanocephala</i>
Pheasant Coucal	<i>Centropus phasianinus</i>
Pied Currawong	<i>Strepera graculina</i>
Rainbow Lorikeet	<i>Trichoglossus haematodus</i>
Striated Pardalote	<i>Pardalotus striatus</i>
Sulphur-crested Cockatoo	<i>Cacatua galerita</i>
Torresian Crow	<i>Corvus orru</i>
Willie Wagtail	<i>Rhipidura leucophrys</i>

No threatened fauna species (ie species protected under the provisions of the NC Act and/or the EPBC Act) were recorded during field investigations.

3. References

Department of Environment and Resource Management (DERM) (September 2011). Regional Ecosystem Map – version 6.1 under the *Vegetation Management Act 1999*.

Sattler, PS and Williams, RD (eds) (1999) *The Conservation Status of Queensland's Bioregional Ecosystems*. Environmental Protection Agency, Brisbane.



Map by: PIC P:\GIS\Projects\215648_Fairview_Eco_Assessment\215648_Fairview_D97.mxd 25/01/2012 15:50

Legend

- | | | |
|----------------------------|---|---|
| ☆ EVNT and Type A Species | ESA Mapping (Including Buffer Areas) | Regional Ecosystem (VM Act Status) |
| ▭ Corridors - Ground Truth | ▨ Category A | ▭ Endangered - Dominant |
| ● Geotech Borehole | ▨ Category B | ▭ Endangered - Sub-dominant |
| ▭ Cadastre | ▨ Category C | ▭ Of Concern - Dominant |
| — Watercourse | | ▭ Of Concern - Sub-dominant |
| | | ▭ Least Concern |

Source:
Cadastr: DERM, 2011.
Regional Ecosystems: Version 6, The State of Queensland
(Department of Environment and Resource Management),
Nov 2009.



A1 scale: 1:2,500
0 25 50 100 150 200 Meters

Date: 25/01/2012 Version: 1 Job No: 215648
Coordinate system: GDA_1994_MGA_Zone_55

Santos Upstream Ecological Assessment

Figure 1.1: Location of Proposed Pipeline Corridors Investigated



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Legend

- | | | |
|---|---|---|
| ☆ EVNT and Type A Species | ESA Mapping (Including Buffer Areas) | Regional Ecosystem (VM Act Status) |
| Yellow outline Corridors - Ground Truth | Category A (Purple hatched) | Endangered - Dominant (Purple) |
| Red dot Geotech Borehole | Category B (Green hatched) | Endangered - Sub-dominant (Pink) |
| Grey outline Cadastre | Category C (Orange hatched) | Of Concern - Dominant (Orange) |
| Blue line Watercourse | | Of Concern - Sub-dominant (Light Orange) |
| | | Least Concern (Green) |

Source:
Cadastrre: DERM, 2011.
Regional Ecosystems: Version 6, The State of Queensland
(Department of Environment and Resource Management),
Nov 2009.



A1 scale: 1:3,000
0 25 50 100 150 200 Meters

Date: 25/01/2012 Version: 1 Job No: 215648
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Santos Upstream Ecological Assessment

Figure 1.2: Location of Proposed Pipeline Corridors Investigated

Memorandum

Botanical species list

Scientific Name	Common Name
<i>Acacia decora</i>	Pretty Wattle
<i>Acacia excelsa</i>	Iron wood
<i>Acacia harpophylla</i>	Brigalow
<i>Acacia leiocalyx</i>	Black Wattle
<i>Acacia leiocalyx subsp. leiocalyx</i>	Grey Wattle
<i>Acacia longispicata</i>	Slender Flowered Wattle
<i>Achyranthes aspera</i>	Two Spine Burr
<i>Alectryon oleifolius</i>	Boonaree
<i>Alphitonia excelsa</i>	Red Ash
<i>Alternanthera dentata</i>	Joy Weed
<i>Angophora floribunda</i>	Rough-barked Apple
<i>Argemone ochroleuca</i>	Mexican Poppy
<i>Aristida caput-medusae</i>	Curly Head Wire Grass
<i>Atalaya hemiglauca</i>	Whitewood
<i>Babingtonia densifolia</i>	Babingtonia
<i>Bidens pilosa</i>	Cobblers Pegs
<i>Bothriochloa bladhii subsp. bladhii</i>	Forest Blue 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 lappulacea</i>	Yellow Burr Daisy
<i>Capparis mitchellii</i>	Bumble fruit
<i>Carissa ovata</i>	Currant Bush
<i>Cassinia laevis</i>	Cough Bush
<i>Casuarina cristata</i>	Belah
<i>Casuarina cunninghamiana</i>	River She-oak
<i>Cheilanthes sieberi</i>	Mulga Fern
<i>Chloris pectinata</i>	Comb Chloris
<i>Commelina diffusa</i>	Wandering jew
<i>Conyza bonariensis</i>	Fleabane

Scientific Name	Common Name
<i>Corymbia clarksoniana</i>	Clarkson's Bloodwood
<i>Corymbia tessellaris</i>	Moreton Bay Ash
<i>Corymbia trachyphloia</i>	small fruited bloodwood
<i>Cymbopogon refractus</i>	Barbwire Grass
<i>Cyperus gracilis</i>	Bunchy Sedge
<i>Datura stramonium</i>	Thorn apple
<i>Daucus glochidiatus</i>	Wild carrot
<i>Desmodium varians</i>	Tree Foil
<i>Dianella revoluta</i>	Blue Flax-lily
<i>Dodonaea viscosa</i>	Sticky Hopbush
<i>Enneapogon avenaceus</i>	Bottle Washer
<i>Enteropogon ramosus</i>	Twirly Windmill Grass
<i>Entolasia stricta</i>	Wiry Panic
<i>Eragrostis brownii</i>	Browns Lovegrass
<i>Eremophila debilis</i>	Winter Apple
<i>Eremophila longifolia</i>	Creek Wilga
<i>Eremophila mitchellii</i>	False Sandalwood
<i>Eucalyptus chloroclada</i>	Dirty Gum
<i>Eucalyptus melanophloia</i>	Silver Leaved Ironbark
<i>Eucalyptus populnea</i>	Poplar Box
<i>Euchiton sphaericus</i>	Cudweed
<i>Geijera parviflora</i>	Wilga
<i>Glycine clandestina</i>	Glycine
<i>Glycine tomentella</i>	Hairy Glycine
<i>Gnaphalium sp.</i>	Cudweed
<i>Goodenia rotundifolia</i>	Goodenia
<i>Grevillea striata</i>	Beefwood
<i>Heteropogon contortus</i>	Black Spear Grass
<i>Hovea planifolia</i>	Hovea
<i>Hydrocotyle laxiflora</i>	Pennywort
<i>Imperata cylindrica</i>	Blady Grass
<i>Juncus usitatus</i>	Juncus
<i>Lepidium africanus</i>	Pepper Cress
<i>Lepidium sagittulatum</i>	Pepper Cress
<i>Leptochloa digitata</i>	Cane Grass
<i>Lomandra hystrix</i>	Creek Mat Rush

Scientific Name	Common Name
<i>Lomandra longifolia</i>	Lomandra
<i>Lomandra multiflora</i>	Lomandra
<i>Lotus australis</i>	Lotus, Birdsfoot Trefoil
<i>Marsilea drummondii</i>	Nardoo
<i>Melaleuca viminalis</i>	Weeping bottlebrush
<i>Melinis repens</i>	Red Natal
<i>Opuntia tomentosa</i>	Velvety Tree Pear
<i>Pennisetum ciliare</i>	Buffel Grass
<i>Persicaria decipiens</i>	Slender Knotweed
<i>Podolepis jaceoides</i>	Showy Copper Wire Daisy
<i>Portulaca pilosa</i>	Hairy Pigweed
<i>Pratia concolour</i>	Poison Pratia
<i>Psydrax oleifolia</i>	Canthium
<i>Pterocaulon sphacelatum</i>	Apple Bush
<i>Rapistrum rugosum</i>	Turnip Weed
<i>Rumex brownii</i>	Swamp Dock
<i>Santalum lanceolatum</i>	Sandalwood
<i>Senecio lautus</i>	Fire Weed
<i>Senna artemisioides</i>	Senna
<i>Senna pleurocarpa</i>	Bean Bush
<i>Sida acuta</i>	Spiny Head Sida
<i>Sida rhombifolia</i>	Paddy's Lucerne
<i>Sida subspicata</i>	Queensland Hemp
<i>Sporobolus creber</i>	Western Rats Tail Grass
<i>Themeda avenacea</i>	Wild Oats Grass
<i>Themeda triandra</i>	Kangaroo Grass
<i>Verbena bonariensis</i>	Bunchy Verbena
<i>Verbena officinalis</i>	Common Verbena
<i>Verbena tenuisecta</i>	Mayne's Curse
<i>Wahlenbergia communis</i>	Large Bluebells
<i>Wahlenbergia gracilis</i>	Sprawling Bluebell
<i>Wahlenbergia sp.</i>	Bluebells