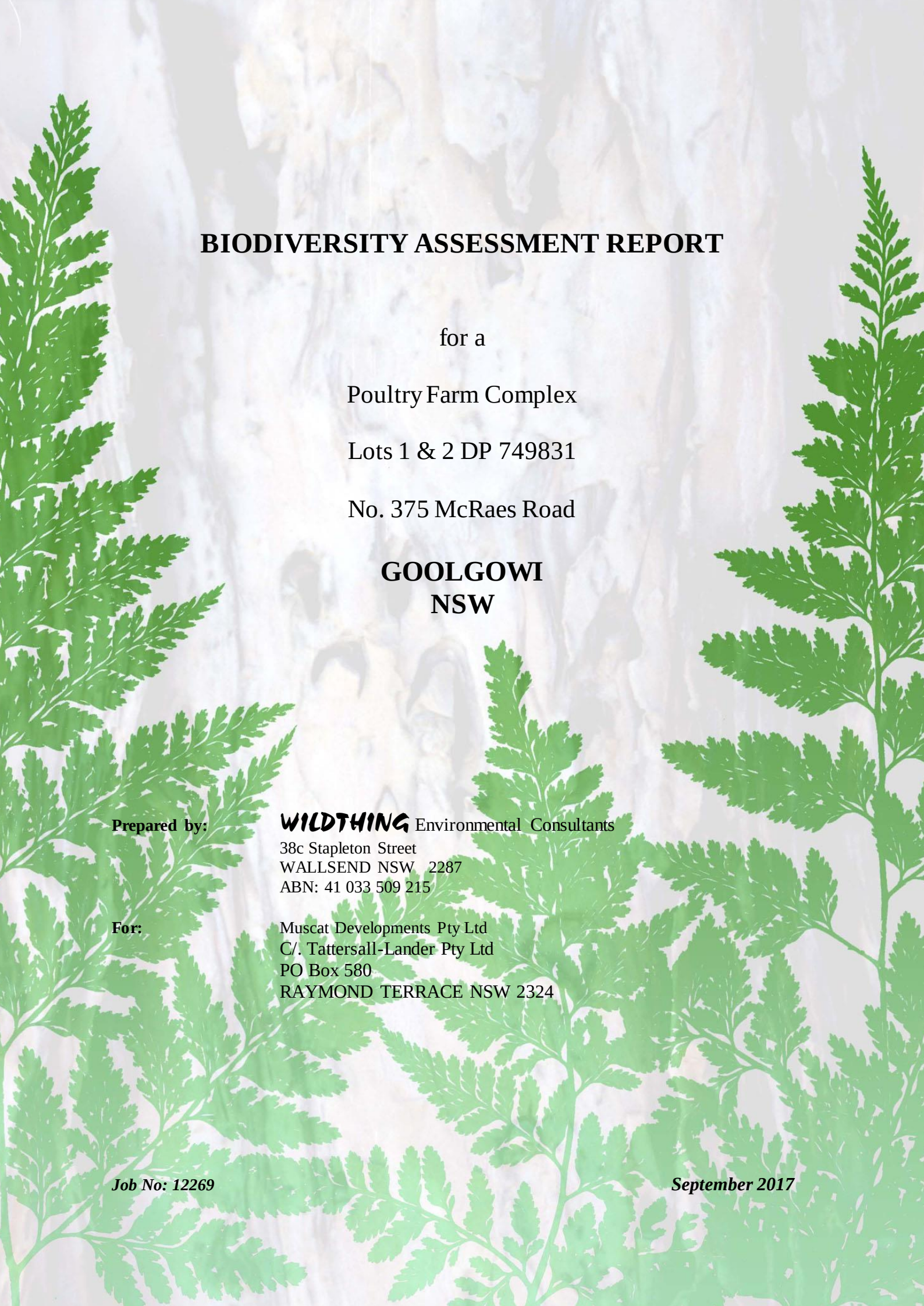




BIODIVERSITY ASSESSMENT REPORT

for a

Poultry Farm Complex

Lots 1 & 2 DP 749831

No. 375 McRaes Road

**GOOLGOWI
NSW**

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Disclaimer

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EXECUTIVE SUMMARY

This Biodiversity Assessment Report (BAR) has been undertaken within Lots 1 & 2 DP 749831 No. 375 McRaes Road, Goolgowi NSW for a proposed Poultry Farm Complex. The proposal is a state Significant Development (SSD) project, under the Environmental Planning and Assessment Act 1979 (EP&A Act). In accordance with the SEARs, the BAR uses the Framework for Biodiversity Assessment (FBA). Considerations have also been given to State Environmental Planning Policy (SEPP) 44 - 'Koala Habitat Protection', Fisheries Management Act 1994 and the Environmental Protection and Biodiversity Conservation Act 1999. The report has been undertaken to ascertain whether or not the development would have a significant effect upon any populations, ecological communities, or habitats of threatened flora and fauna species.

Location of Site

The proposed development site is located approximately 17km south-west of the town of Goolgowi and occurs just to the east of the Mid Western Highway. The 615.9ha site was composed of two parcels of land:

- Lot 1 DP 749831 (409.2ha)
- Lot 2 DP 749831 (206.7ha)

The Proposal

The development of each farm will be staged and have the following general associated activities undertaken:

- Storage Dams of around 300ML;
- Bulk Earthworks;
- Landscaping Mounds to mitigate noise and odour;
- Machinery and Supply Sheds;
- Water storage reservoirs;
- 2 Dwellings;
- Gas tanks, feed silos, odour exhaust stacks;
- Associated infrastructure.

The proposed Poultry Farm Complex has an approximate footprint of 170ha within the 615.9ha site and has been positioned within cropping land to avoid the removal of native vegetation with the exception of an individual tree. A specimen of *Eucalyptus socialis* (Red Mallee) will likely require removal to upgrade of the access road along the northern boundary of the site. Given the impact of the development has been identified as a single tree, OEH has indicated that with the removal of one tree the assessment does not require the use of the credit calculator associated with the FBA to determine whether an offset requirement is necessary.

Vegetation within the site

Approximately 560ha of the 615.9ha site has been significantly modified by historic land clearing and long term agricultural activities particularly broad-scale-cropping. At the time of the survey the majority of the site was used for irrigated wheat cropping. Despite the disturbance patches of remnant native vegetation were present around parts of the periphery of the site. A total of five vegetation assemblages were identified within the site:

- Belah Woodland (PCT 57 - Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including the Cobar Peneplain Bioregion) (approximately 51ha);

- Red Mallee Woodland (PCT 193 - Red Mallee - White Mallee extremely tall tree mallee on silty-loam-clay soils of central south-western NSW)(1.67ha);
- Belah Woodland (Derived Grassland)(PCT 57 - Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including the Cobar Peneplain Bioregion) (6.5ha);
- Cultivated Crops (560ha);
- Aquatic Vegetation (Wah Wah Channel and constructed dams);

Threatened Ecological Communities

No Threatened Ecological Communities were identified within the site at the time of the survey. Areas of Myall Woodland were found to be present outside the site to the south-west along McRaes Road. One specimen of *Acacia pendula* (Weeping Myall) was present in the far north-east of the site. This remnant tree was surrounded by cropping and was unlikely to be consistent with the Myall Woodland or Weeping Myall Woodlands definition of an Endangered Ecological Community.

Endangered Populations

No listed Endangered Populations were recorded within the site during the survey or were mapped within the site on the BioNet Atlas (OEH, 2017). Areas of woodland within the site contained suitable habitat for the *Climacteris affinis* (White-browed Treecreeper) population in Carrathool local government area south of the Lachlan River and Griffith local government area. Only marginal transitory habitat was considered to be present for the *Calyptrorhynchus lathamii* (Glossy Black-cockatoo – Riverina Population).

Threatened Flora Species

No threatened flora species were recorded within the survey area during fieldwork. Areas of woodland and derived grassland were considered to contain marginal habitat for all seven addressed flora species:

- *Swainsona murrayana* (Slender Darling Pea);
- *Austrostipa metatoris* (A spear-grass);
- *Austrostipa wakoolica* (A Spear Grass);
- *Brachsycome papillosa* (Mossgiel Daisy);
- *Solanum karsense* (Menindee Nightshade)
- *Lepidium monoplocoides* (Winged Pepper-cress);
- *Leptorhynchus orientalis* (Lanky Buttons).

Threatened Fauna Species

Three threatened fauna species were recorded within the site during fieldwork, being:

- *Pomatostomus temporalis temporalis* (Grey-crowned Babbler);
- *Circus assimilis* (Spotted Harrier);
- *Chalinolobus picatus* (Little Pied-bat).

Due to the similarity of calls within the Genus *Nyctophilus*, the precautionary principle has been applied and further consideration was given to the threatened *Nyctophilus corbeni* (Corben's Long-eared Bat). Of the remaining 27 threatened fauna species assessed in the report, the site was found to contain habitat of varying quality for 24.

Habitat for the majority of these threatened species would largely be confined to the areas of woodland and derived grassland. Wah Wah Channel provides suitable habitat for the above listed amphibian and waterbird species. As the development will almost entirely be located outside any suitable habitat and taking into consideration the recommendations of management and protection of areas of native vegetation on site the proposal is unlikely to have a significant impact on the addressed threatened species such that a local population would be placed at risk of extinction.

SEPP 44 – ‘Koala Habitat Protection’

Assessment of the site under SEPP 44 – ‘Koala Habitat Protection’ revealed that the site supported one tree species, *Eucalyptus populnea* (Bimblebox) recognised under Schedule 2 of SEPP 44 as a Koala feed tree. Only three isolated specimens were present within the site, therefore the site would not be considered to constitute Potential Koala Habitat and accordingly no further provisions of this policy would apply.

Fisheries Management Act 1994 (FM Act)

As a result of the presence of Wah Wah Irrigation Channel flowing through the site considerations have been made to Part 7A of the Fisheries Management Act 1994 (FM Act) in relation to a number of listed threatened aquatic species, populations and endangered ecological communities. No Endangered Aquatic Community was identified on site. Targeted surveys for threatened fauna species were not undertaken however suitable habitat was found to be present for a small number of addressed species. The proposal Poultry Farm Complex is not likely to have any significant impact on the waters of Wah Wah Channel therefore effect any nearby threatened aquatic species, populations or endangered ecological communities.

Commonwealth Environment Protection and Biodiversity Conservation (EPBC) Act (1999).

Considerations have been made to the Commonwealth Environment Protection and Biodiversity Conservation (EPBC) Act (1999). It was determined that the proposal should have no significant impact on a matter of National Environmental Significance.

Impact Assessment

The proposed Poultry Farm Complex has been positioned within cropping land to avoid the removal of native vegetation, therefore the potential for conflict between the poultry farm development and the existing native flora and fauna is considered low. The proposed Poultry Farm Complex following direct and potential impacts/losses:

- The footprint of the development proposal will be situated on approximately 170ha of cropping land;
- The north-western access road upgrade is likely to result in the removal of one native tree, Tree No. 40 (Tag 140) a specimen of *Eucalyptus socialis* (Red Mallee) to upgrade of the access road along the northern boundary of the site.

The proposed Poultry Farm Complex may also result in the following indirect and potential impacts;

- Increased spread of weeds;
- Increased spread of pest fauna species;
- Edge effects;
- Increase in noise from machinery, vehicles etc;
- Increase in dust;
- Increase in artificial lighting. Increased lighting may be the result of security lighting.

A number of mitigation measures have been specified to minimise the impact of the loss of habitat. The measures will include:

- Protection of remaining native vegetation within the site;
- Protection of native fauna within the site;
- Rehabilitation of native vegetation within the site;

To help ensure these mitigation measures are carried out, an Ecological Management Plan should be developed to address any likely impacts during construction and ensure the long-term viability of the nearby surrounding environment. An existing PVP (Property Vegetation Management Plan) agreement between the landholder and the Local Land Services (LLS) exists within the site (Murrumbidgee CMA, 2011). The PVP has allowed the removal of 47 paddock trees for cropping which has been offset by the protection of woodland in the south-west of the site.

Conclusion

In conclusion, based on the level of existing site disturbance within the intended development disturbance footprint, the risk of adverse effects between the development and the existing native flora and fauna is considered low. Taking into consideration the recommendations of management and protection of areas of native vegetation within the site, the proposal is unlikely to significantly impact any habitat important to the long-term survival of the addressed threatened species, endangered population or endangered ecological communities in the locality.

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1.0 INTRODUCTION

This Biodiversity Assessment Report (BAR) has been undertaken to seek approval for a Poultry Farm Complex at Lots 1 & 2 DP 749831 No. 375 McRaes Road, Goolgowi NSW. This BAR addresses the specific matters raised in the Secretary's Environmental Assessment Requirements (SEARs) that are relevant to biodiversity. In accordance with the SEARs, the BAR uses the Framework for Biodiversity Assessment (FBA). Considerations have also been given to SEPP 44 Koala Habitat Protection, the Fisheries Management Act 1994 and the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

1.1 LOCATION OF THE SITE

The proposed development site is located approximately 17km south-west of the town of Goolgowi and occurs just to the east of the Mid Western Highway (Figure 1). The unsealed McRaes Road formed the southern boundary of the site.

1.2 DEFINITION OF THE SITE

The 615.9ha site was composed of two parcels of land:

- Lot 1 DP 749831 (409.2ha)
- Lot 2 DP 749831 (206.7ha)

1.3 ZONING OF SITE UNDER THE CARRATHOOL LOCAL ENVIRONMENTAL PLAN 2012

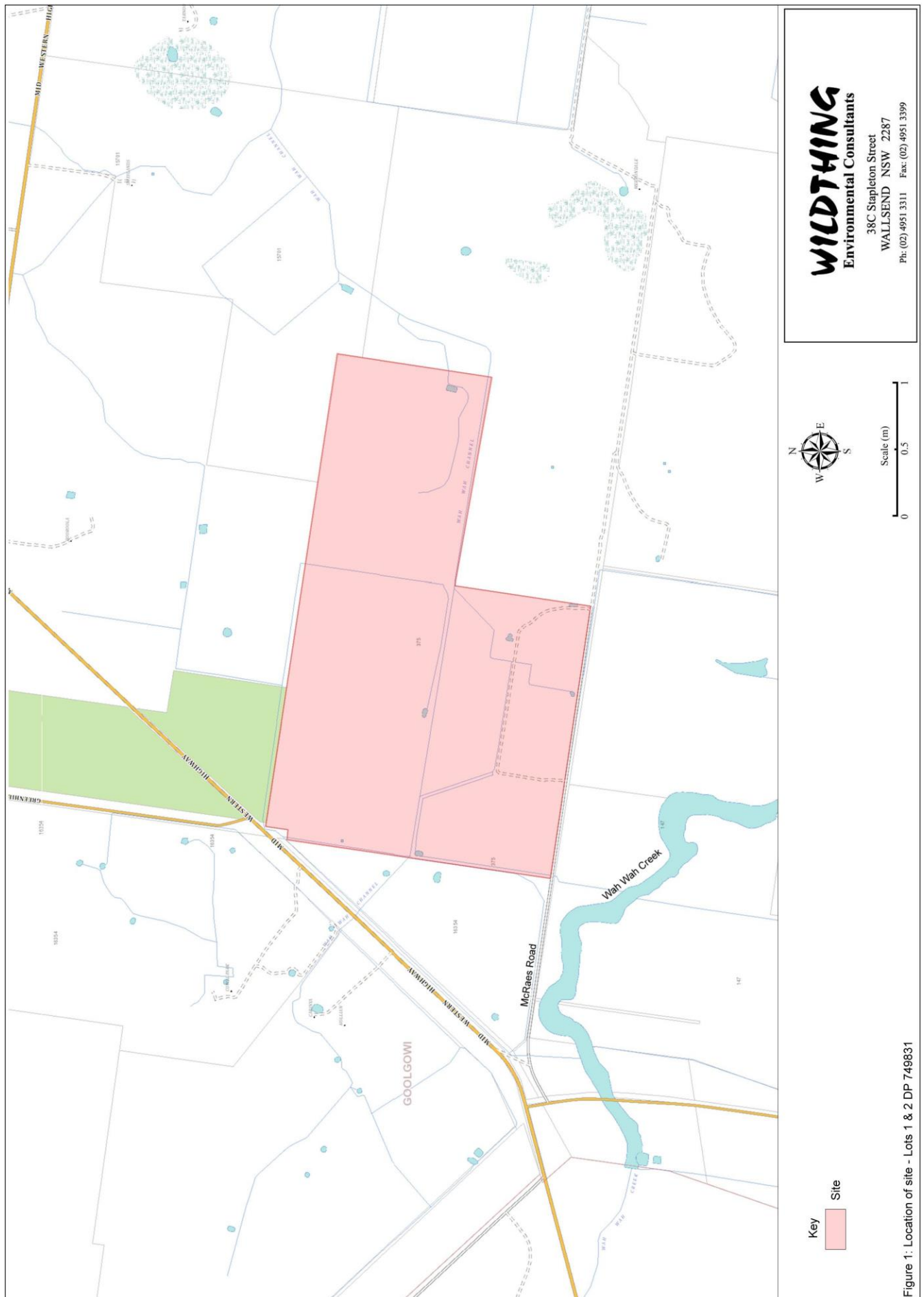
The entire study area is zoned RU1 Primary Production. The objective of this direction is to protect the agricultural production value of rural land. A review of the Terrestrial Biodiversity Map under Part 6 Clause 6.3 of the Carrathool LEP found no areas of Terrestrial Biodiversity were indicated within the site or were bordering the site.

1.4 DESCRIPTION OF THE PROPOSAL

The proposed Poultry Farm Complex comprises 5 farms, each with a carrying capacity of 1.2 million birds in 20 Intensive Agricultural Industries – Poultry Tunnel Ventilated Sheds. The development of each farm will have the following general associated activities undertaken:

- Storage Dams of around 300ML;
- Bulk Earthworks;
- Landscaping Mounds to mitigate noise and odour;
- Machinery and Supply Sheds;
- Water storage reservoirs;
- 2 Dwellings;
- Gas tanks, feed silos, odour exhaust stacks;
- Associated infrastructure.

The development of each farm will be a staged construction.





2.0 LEGISLATIVE CONTEXT & SEARS

Environmental impact statements (EIS's) are prepared to assess the impacts of major projects, including State Significant Development (SSD) projects, under the *Environmental Planning and Assessment Act 1979* (EP&A Act). This Biodiversity Assessment Report (BAR) forms part of the EIS being prepared for the Poultry Farm Complex and assesses the biodiversity impacts of the project. Also considered in this report was the Commonwealth Environment Protection and Biodiversity Conservation Act (1999), the Fisheries Management Act 1994 & SEPP 44 – Koala Habitat Protection.

Fieldwork undertaken by Wildthing Environmental Consultants was carried out under the following NPWS Scientific Investigation Licence SL100345 and under Animal Care and Ethics Approval: Animal Research Authority Issue by the Director General of NSW Agriculture (File No. TRIM 13/251) for the Fauna Survey for Biodiversity and Impact Assessment.

2.1 SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS (SEARS)

EIS's are subject to a range of legislative and policy requirements as set out in the Secretary's Environmental Assessment Requirements (SEARs) (issued November 2016).

The SEARs require the BAR to address the following:

- The likely biodiversity impacts of the development, having regard to OEH's requirements.
- Details of the biodiversity offsets to compensate for significant residual impacts required to offset the development in accordance with the Framework for Biodiversity Assessment (FBA) (OEH 2014).

Given the impact has been identified as a single tree, OEH has indicated that with the removal of one tree the assessment does not require the use of the credit calculator associated with the FBA to determine whether an offset requirement is necessary.

A copy of the SEARs and additional correspondence for the Goolgowi Poultry Farm Complex is contained in Appendix A.

2.2 EXISTING CONSERVATION OBLIGATION (PROPERTY VEGETATION MANAGEMENT PLAN - PVP)

An existing PVP (Property Vegetation Management Plan) agreement between the landholder and the Local Land Services (LLS) exists within the site (Murrumbidgee CMA, 2011). The PVP has allowed the removal of 47 paddock trees for cropping which has been offset by the protection of woodland in the south-west of the site.

A copy of the subject PVP is contained within Appendix G.

3.0 LANDSCAPE FEATURES

3.1 IDENTIFIED FEATURES

The FBA requires the assessment of landscape features to help describe the biodiversity values of the site and construction footprint and assess the impacts of the project.

3.1.1 BIOREGION & IBRA SUBREGION

Bioregion

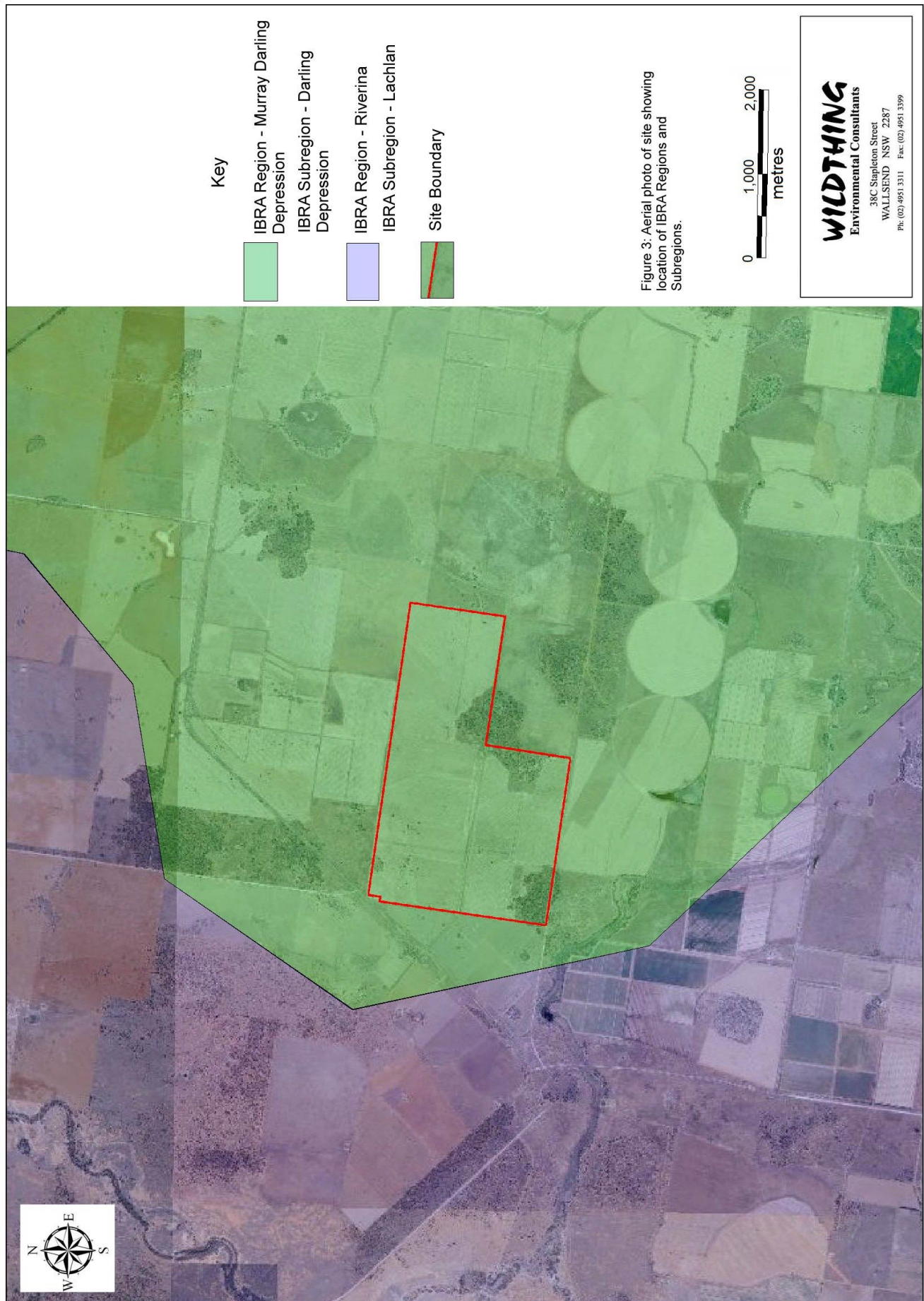
The site occurs within the Murray Darling Depression IBRA Region (Interim Biogeographic Regionalisation for Australia) Bioregion (Figure 3). The Murray Darling Depression Bioregion lies in the Murray Basin on Tertiary and Quaternary sediments deposited from a shallow sea, lakes and rivers. The landscape is characterised by dunefields, sandplains and undulating plains of brown calcareous soils. There is very little structured drainage but numerous lakes, swamps and depressions are present, some of which are driven by saline groundwater.

IBRA Subregion

The site occurs within the Darling Depression IBRA (Interim Biogeographic Regionalisation for Australia) subregion (Figure 3). This subregion occurs on Quaternary aeolian sands and lake sediments. Isolated Devonian quartz sandstone outcrops. Landforms consist of extensive sandplains, dunefields piled against Cobar Peneplain ranges, freshwater overflow lakes fed by rare floods in the Darling River and Stony ridges and ranges.

3.1.2 NSW LANDSCAPE REGIONS (MITCHELL LANDSCAPES)

The site falls within the Hsp Hillston Sandplains Mitchell landscape (Figure 4). Hsp Hillston Sandplains MDD Ivanhoe – Nangara Hillston Sandplains landscape includes parts of three land systems: Lysmoyle, Karwarn and Nombinnie. Level to undulating sandplain of Quaternary aeolian sands and limited alluvium, relief 2 to 4m. Calcareous red earth and solonized brown soils with deep siliceous sands on hummocks. Extensive dense mallee and broombush communities. *Eucalyptus socialis* (Red mallee), *Eucalyptus dumosa* (White mallee), *Melaleuca uncinata* (Broombush), *Acacia triptera* (Spur-wing Wattle) with *Casuarina cristata* (Belah), *Alectryon oleifolius* (Rosewood), *Apophyllum anomalum* (Warrior Bush), *Eremophila mitchellii* (Budda), *Callitris glaucophylla* (White Cypress Pine), *Hakea leucoptera* (Needlewood), *Dodonea* sp. (Hopbush), *Eremophila stuartii* (Turpentine), occasional ironbark (*Eucalyptus* sp.) and *Brachychiton populneus* (Kurrajong) and *Austrostipa variabilis* (Variable spear grass), *Medicago* sp (Medics) and forbs.





3.2 TOPOGRAPHY AND SOILS

The topography of the site and surrounding lands is flat with the majority approximately 100m asl. The site largely consisted of alkaline brown calcareous soils. Nodules of limestone which are the product of solonisation were observed within areas of disturbed soil.

3.3 DRAINAGE

The site and surrounds was located within the Wah Wah Creek catchment and Greater Murrumbidgee River Catchment. Wah Wah Creek was located approximately 320m to the south-west of the site (Figure 1). The site also occurs within the Murrumbidgee Irrigation Area with the Wah Wah Irrigation Water Channel Running through the middle of the site from east to west. A number of smaller internal irrigation channels were also present.

3.4 VEGETATION

Approximately 560ha of the 615.9ha site has been significantly modified by historic land clearing and long term agricultural activities particularly broad-scale-cropping. At the time of the survey the majority of the site was used for irrigated wheat cropping. Some dryland Oats were also planted around the edges. Other disturbance have also resulted from the construction Wah Wah Channel and the presence of a dwelling and associated farm sheds in the south. Despite the disturbance patches of remnant native vegetation were present around parts of the periphery of the site. Woodland patches primarily composed of the canopy species *Casuarina cristata* (Belah) occupied approximately 51ha of the site within the south-west corner and south-east. Other smaller areas of native vegetation included approximately 1.7ha of woodland in the north-west dominated by *Eucalyptus socialis* (Red Mallee).

4.0 METHODOLOGY

4.1 VEGETATION APPRAISAL METHODOLOGY

The initial determination of the basic vegetation community boundaries was undertaken through the review of an orthophoto covering the site. Following this, a detailed ground survey was conducted, in accordance with the Department of Environment and Conservation's (NSW) Threatened Biodiversity Survey and Assessment Guidelines – Working Draft (Department of Environment and Conservation, 2004). This involved 4 vegetation plots 20×20m in area. Within the plot survey the height of each primary structural layer and relative cover abundance of the species within was recorded, along with location, elevation, slope, aspect and general soil type.

In addition to the above, flora searches for threatened species were undertaken across the site in the manner described by Cropper (1993) as the 'Random Meander Technique'. This involved walking in a random manner throughout the entire study site, visiting the full range of potential habitats and checking every plant species seen. A list of all flora species identified on site has been provided in Appendix B and the results of transect and plot surveys can be seen in Appendix C.

4.2 HABITAT APPRAISAL METHODOLOGY

Habitat may be defined as the physical and biological environment required for the survival of a specific population of a species. In modern usage habitat has also come to be regarded as an association of landform and plant life, which provides sustenance and shelter for a particular fauna assemblage.

The methodology of the habitat appraisal used the vegetation community data combined, where relevant, with geomorphological features and the occurrence of particular plant species or forms (i.e. tree hollows) to provide a basis for a subjective habitat assessment aimed at placing the ecological status of the site within a local perspective.

4.2.1 GENERAL HABITAT FOR NATIVE SPECIES

From the vegetation appraisal and a general inspection of the site and surrounds, a subjective assessment of the general habitat value of this site was made. Considered in this assessment were:

- occurrence of that habitat type in the general vicinity;
- degree of disturbance and degradation;
- area occupied by that habitat on site;
- continuity with similar habitat adjacent to the site, or connection with similar habitat off site by way of corridors; and
- structural and floral diversity.

4.2.2 HABITAT FOR SIGNIFICANT SPECIES

The site was evaluated as potential habitat for each of the threatened species reported on the Office of Environment and Heritage (OEH) and the Department of Environment and Energy (DoEE) databases from within 10km of the site and those listed on the SEARS. This evaluation was based on home-range, feeding, roosting, breeding, movement patterns and corridor requirements for fauna and hydrology, soil types, aspect and structural formation for flora species.

4.2.3 TREE SURVEY

All trees outside the main remnant areas of native vegetation within the site were tagged and located. Details of these trees including, diameter at breast height (dbh), Height and fauna attributes such as hollows are contained within Appendix D. The presence of activity in the form of scratches on the trunks of trees and scats around the base were also noted. The trees had been previously tagged and numbered with cattle tags.

It must be noted that observations made from ground level may fail to record a small number of hollows that are obscured. Some entrances may also not lead to a cavity. The internal dimensions of the hollows are also impossible in many cases to determine from the ground.

4.3 FAUNA APPRAISAL METHODOLOGY

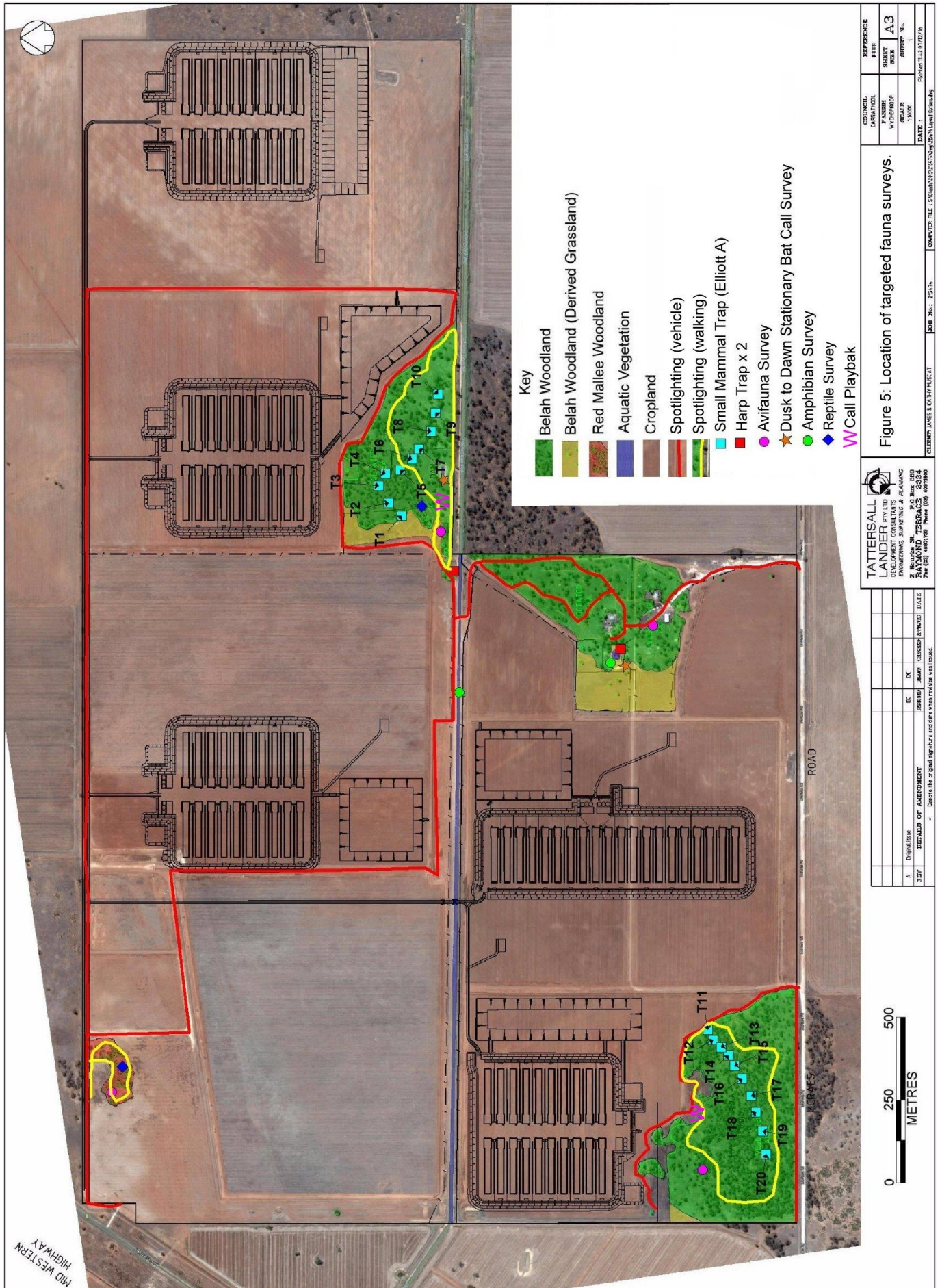
The fauna survey was initiated with the production of a Fauna Species List and an assessment of the potential use of the study area by any threatened species identified in the OEH and DoEE database searches. Subsequently, the confirmation and supplementation of the Fauna Species List, by way of on-site observation, trapping and recording, was carried out as described below. The survey was carried out using the Department of Environment and Conservation's (NSW) Threatened Biodiversity Survey and Assessment Guidelines – Working Draft (Department of Environment and Conservation, 2004).

4.3.1 SMALL TERRESTRIAL MAMMAL TRAPPING

Terrestrial mammal trapping was undertaken using 20 Elliott Type A traps (8x10x33cm). The traps were left in place for three consecutive nights giving a total of 60 small terrestrial trap nights. The traps were hidden in thick grass, under shrubs or around trees and were camouflaged with vegetation where the ground cover was sparse. The baits used for the traps were a mixture of rolled oats, peanut butter and honey mixture, and Good-O's (dry dog food). The traps were checked early each morning and, where necessary, reset and rebaited. The location of the small terrestrial traps is shown in Figure 5.

4.3.2 HARP TRAPPING

Two monofilament harp traps were set for two nights giving a total of 4 harp trap nights within the site. The harp trapping was undertaken in order to sample the use of the site by sub-canopy microchiropteran bat species, such as *Nyctophilus corbeni* (Corben's Long-eared Bat). The traps were



positioned in a potential flyway and were checked early each morning. The location of harp traps is shown in Figure 5.

4.3.3 MICROCHIROPTERAN BAT CALL SURVEY

Bat echo-location calls were recorded using an Anabat detector in areas which were considered likely to be used by bats. These positions were selected to sample potential hunting sites for bats, including flyways, clearings and ecotones. Echolocation surveys used a combination of set point and hand held mobile surveys. Mobile Surveys were conducted for 2.5 hours (150 minutes) over two nights. Stationary call activated microchiropteran bat detection were also undertaken from dawn to dusk for two nights. The transformed calls were analysed using an Anabat V Zero Crossing Analysis Interface feeding into a computer and identified by comparison with sample bat calls. The bat calls recorded by Wildthing Environmental Consultants were analysed in-house by Mungo Worth. The location of the bat call surveys is shown in Figure 5.

4.3.4 AMPHIBIAN SURVEY

The amphibian survey included a combination of diurnal and nocturnal census methods. Diurnal searches were undertaken for two half-person hour periods. Systematic searches involved searches within appropriate habitat for basking or sheltering individuals. Appropriate cover such as logs was turned over for resting individuals. Nocturnal surveys were undertaken for two person hours. The surveys were undertaken in suitable habitat and involved listening for the characteristic call of male frogs. Playback of frog calls was undertaken in an attempt to elicit a response from threatened amphibian species in particular *Litoria raniformis* (Southern Bell Frog) and *Crinia sloanei* (Sloane's Froglet). Frog searches were also augmented by recording any frog calls heard within the site. The location of the amphibian surveys is shown in Figure 5.

4.3.5 REPTILE SURVEY

Searches for reptiles involved a combination of diurnal and nocturnal searches. Diurnal searches for reptiles involved searching in likely habitat (i.e. leaf litter, dead logs and long grass) during the morning and afternoon survey period. Nocturnal searches were conducted for reptile species active at night such as geckos and some species of snakes and involved searching in likely habitats with the aid of a spotlight. The location of the reptile surveys is shown in Figure 5.

4.3.6 DIURNAL AVIFAUNA SURVEY

The diurnal avifauna survey involved transects targeting potential habitat within the site for species such as *Daphoenositta chrysoptera* (Varied Sittella), *Pomatostomus temporalis temporalis* (Grey-crowned Babbler) and *Climacteris picumnus victoriae* (Brown Treecreeper). Surveys were conducted at peak activity periods (i.e. dawn and dusk) for three periods for half an hour. A total of 2.0 hours of targeted diurnal bird surveys were undertaken. Incidental observations and secondary indications (i.e.

distinctive feathers and nests) of avifauna were also recorded. The location of the diurnal avifauna surveys is shown in Figure 5.

4.3.7 NOCTURNAL AVIFAUNA AND MAMMAL CALL PLAYBACK SURVEY

During the nocturnal avifauna and mammal survey pre-recorded calls of *Ninox connivens* (Barking Owl), *Tyto novaehollandiae* (Masked Owl), *Burhinus grallarius* (Bush Stone-curlew) and *Pedionomus torquatus* (Plains Wanderer) were broadcast through an amplification system designed to project the sound for at least 1km under still night conditions. An initial listening period of 10 minutes was undertaken, followed by 5 minutes of calls (repeated in four different directions). A period of two minutes of quiet listening was then employed after each 5-minute bracket of calls. At the conclusion of the call playback survey, spotlighting was carried out in the vicinity of the call playback site. The location of the nocturnal avifauna and mammal call playback surveys is shown in Figure 5.

4.3.8 SPOTLIGHTING SURVEY

Spotlighting was undertaken over two nights on foot and by vehicle using 100watt hand-held spotlights. The spotlighting undertaken was completed by two persons and involved moving at a slow pace around the study area and stopping every 2 minutes, allowing the observer to hear movements of animals. A total of 8-person hours of spotlighting was conducted during the survey. The location of the spotlighting surveys is shown in Figure 5.

4.4 DATE, TIMES, ACTIVITIES & WEATHER CONDITIONS

A summary of the time spent on site during fieldwork and the prevailing weather conditions at the time is contained below in Table 1.

Table 1: Date, time, activities and weather conditions of the survey.

DATE	TIME (24HR)	SURVEY EFFORT (EXPRESSED IN PERSON HOURS)	ACTIVITY	WEATHER
Monday 12/12/16	1630-1815	3.5 (two persons)	Site inspection Tree survey Incidental observations	1/8 cloud, 34°C, WSW 13km/h
	2000-2230	6 (two persons)	Elliott trap deployment Set harp trap Bat call survey (dawn – dusk) Spotlighting survey Amphibian Survey	1/8 cloud, 25°C, Calm, 7/8 moon
Tuesday 13/12/16	0530-0630	2 (two persons)	Check traps Harp trap and Anabat retrieval Avifauna survey Reptile survey	0/8 cloud, 14°C, Calm
	0745-1230	4 (two persons)	Tree survey & vegetation surveys Vegetation survey Water quality measurements	1/8 cloud, 23 °C, N 7km/h
	1545-1745	4	Set harp trap Avifauna survey Amphibian Survey Bat call survey	7/8 cloud, 35°C, WNW 37km/h
	1900-2200	4	Spotlighting survey	6/8 cloud, 35°C, WNW 24km/h
14/12/16	0520-1850	3 (two persons)	Check traps Harp trap and Anabat retrieval Avifauna survey	8/8 cloud, 20°C, Calm
	0830-1200	7	Vegetation survey and mapping Reptile survey Water quality measurements and surveys within Channel	8/8 cloud, Light rain, 21°C, WSW 20km/h
	1530-1845	6.5	Vegetation survey and mapping	7/8 cloud, 27°C, NNW 22km/h
15/12/16	0500-0800	3.0	Check traps and trap retrieval Avifauna survey Vegetation survey	4/8 cloud, 21°C, Calm

4.5 IDENTIFYING SUBJECT SPECIES AND ENDANGERED ECOLOGICAL COMMUNITIES

The following threatened species, endangered populations and communities listed in Table 2 have been recorded on the Atlas of NSW Wildlife (OEH, 2017) and the Department of Environment and Energy (DoEE) databases for within 10km of the study area.

Table 2: Threatened species, endangered populations and ecological communities considered.

Scientific Name	Common Name	TSC Act 1995	EPBC Act 1999
Flora			
<i>Leptorhynchus orientalis</i>	Lanky Buttons	E1	
<i>Swainsona murrayana</i>	Slender Darling Pea	V	V
* <i>Austrostipa metatoris</i>	A spear-grass	V	V
* <i>Austrostipa wakoolica</i>	A spear-grass	E1	E
* <i>Brachsycome papillosa</i>	Mossgiel Daisy	V	V
* <i>Lepidium monophloeoides</i>	Winged Pepper-cress	E	E
* <i>Solanum karsense</i>	Menindee Nightshade	V	V
* <i>Swainsona murrayana</i>	Slender Darling-pea	V	V
Fish			
* <i>Galaxias rostratus</i>	Flathead Galaxias	CE	CE
* <i>Maccullochella peelii</i>	Murray Cod		V
* <i>Macquaria australasica</i>	Macquarie Perch	E1	E
Amphibians			
<i>Crinia sloanei</i>	Sloane's Froglet	V	
* <i>Litoria raniformis</i>	Southern Bell Frog	E1	V
Birds			
* <i>Actitis hypoleucos</i>	Common Sandpiper		M
* <i>Calidris acuminata</i>	Sharp-tailed Sandpiper		M
<i>Calidris ferruginea</i>	Curlew Sandpiper	E1	CE & M
* <i>Calidris melanotos</i>	Pectoral Sandpiper		M
* <i>Pandion haliaetus</i>	Osprey		M
* <i>Gallinago hardwickii</i>	Latham's Snipe		M
* <i>Tringa nebularia</i>	Common Greenshank		M
* <i>Rostratula benghalensis australis</i>	Australian Painted Snipe	E1	V & M
* <i>Numenius madagascariensis</i>	Eastern Curlew		CE & M
<i>Botaurus poiciloptilus</i>	Australasian Bittern	E1	E
<i>Grus rubicunda</i>	Brolga	V	
<i>Ardeotis australis</i>	Australian Bustard	E1	
<i>Stictonetta naevosa</i>	Freckled Duck	V	
<i>Burhinus grallarius</i>	Bush Stone-curlew	E1	
<i>Pedionomus torquatus</i>	Plains-wanderer	E1	CE
* <i>Leipoa ocellata</i>	Malleefowl	E1	V
<i>Polytelis swainsonii</i>	Superb Parrot	V	V
* <i>Pezoporus occidentalis</i>	Night Parrot	Presumed extinct	E
<i>Lophochroa leadbeateri</i>	Major Mitchell's Cockatoo	E1	V
<i>Epthianura albifrons</i>	White-fronted Chat	V	
<i>Grantiella picta</i>	Painted Honeyeater	V	V
<i>Daphoenositta chrysoptera</i>	Varied Sittella	V	
<i>Climacteris picumna victoriae</i>	Brown Treecreeper	V	
<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler	V	
<i>Hamirostra melanosternon</i>	Black-breasted Buzzard	V	
<i>Falco hypoleucos</i>	Grey Falcon	E1	
<i>Falco subniger</i>	Black Falcon	V	
<i>Circus assimilis</i>	Spotted Harrier	V	

Scientific Name	Common Name	TSC Act 1995	EPBC Act 1999
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V	
<i>Hieraaetus morphnoides</i>	Little Eagle	V	
<i>Tyto novaehollandiae</i>	Masked Owl	V	
<i>Stagonopleura guttata</i>	Diamond Firetail	V	
* <i>Motacilla flava</i>	Yellow Wagtail		M
* <i>Apus pacificus</i>	Fork-tailed Swift		M
Mammals			
* <i>Phascolarctos cinereus</i>	Koala	V	V
<i>Chalinolobus picatus</i>	Little Pied Bat	V	
<i>Myotis macropus</i>	Southern Myotis	V	
* <i>Nyctophilus corbeni</i>	Corben's Long-eared Bat	V	V
Endangered Populations			
<i>Climacteris affinis</i> White-browed Treecreeper population in Carrathool local government area south of the Lachlan River and Griffith local government area			
Endangered/Threatened Ecological Communities			
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions EPBC Act (Endangered)			
Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia EPBC Act (Endangered)			
<i>Allocasuarina luehmannii</i> Woodland in the Riverina and Murray-Darling Depression bioregions (Endangered Ecological Community – TSC Act)			
Weeping Myall Woodlands EPBC Act (Endangered)			
Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions (Endangered Ecological Community – TSC Act)			
Sandhill Pine Woodland in the Riverina, Murray–Darling Depression and NSW South Western Slopes Bioregions (Endangered Ecological Community – TSC Act).			
Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions (Endangered Ecological Community – TSC Act).			
E1/E=Endangered Species V=Vulnerable Species E4A=Critically Endangered M=Migratory Species			

5.0 RESULTS

5.1 NATIVE VEGETATION

The majority of the site has been developed for agricultural purposes with approximately 560ha of the 615ha site was found to be utilised for broad scale cropping. Despite the disturbance remnant patches of native vegetation were present around parts of the periphery of the site. A total of five vegetation assemblages were delineated. The delineation of these vegetation communities was based on structure and flora species composition. Vegetation communities present within the site:

- Belah Woodland (approximately 51ha);
- Red Mallee Woodland (1.67ha);
- Belah Woodland (Derived Grassland);
- Cultivated Crops (560ha);
- Aquatic Vegetation;

A description of the five vegetation communities is shown below. A vegetation map of the site is shown in Figure 6*. A full list of the flora species recorded during the fieldwork is listed in Appendix B. The results and locations of the plot based surveys can be seen in Appendix C.

*Note on Vegetation Community Distribution Map. A map of vegetation of any area seeks to describe the distribution of the plant species in that area by defining a number of vegetation units (assemblages or communities), which are relatively internally homogenous. Whilst such mapping is a convenient tool, it greatly oversimplifies the real situation. Plants rarely occur in defined communities with distinct boundaries. Accordingly vegetation units used for the accompanying map should be viewed as indicative of their extent rather than being precise edges of communities.

Belah Woodland

PCT - 57

Biometric Type – CW105; LA106; MR515; WE124.

Name - (most similar) - Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including the Cobar Peneplain Bioregion

Vegetation Formation – Semi-arid Woodlands (Shrubby sub-formation);

Vegetation Class – Semi-arid Sand Plain Woodlands.

Approximately 51ha of Belah Woodland was mapped within the subject site (Figures 7, 8, 9, 10, 11, 12 & 13). A 22.5ha area of Belah Woodland was present in the far south-west and two areas 13.5ha & 14.72ha in the east. The two areas in the east formed part of a larger fragment extending outside the site (52ha in total) which was surrounded by cropping land. The mid-high woodland was dominated by a canopy of *Casuarina cristata* (Belah) and to a lesser extent *Casuarina pauper* (Black Oak). Common species within the mid-storey/shrub layer were *Alectryon oleifolius* subsp. *canescens* (Western Rosewood), *Geijera parviflora* (Wilga) and *Apophyllum anomalum* (Warrior Bush).

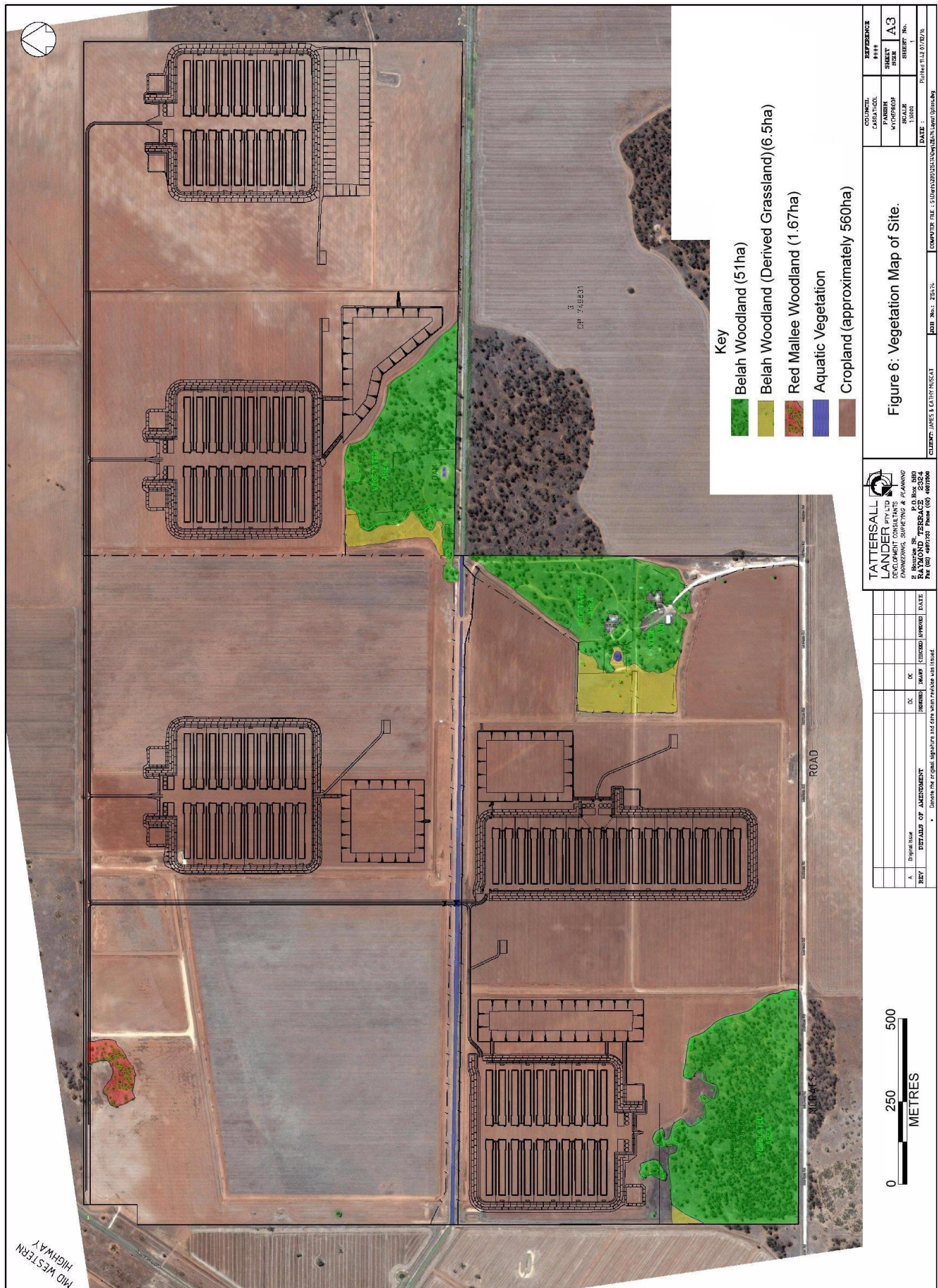




Figure 7: Belah Woodland within east of subject site.



Figure 8: Belah Woodland within east of subject site (High infestation of *Sisymbrium* sp. Mustard).



Figure 9: Belah Woodland around residence within south-east of site.



Figure 10: Belah Woodland within south-west of subject site.



Figure 11: Belah Woodland within south-west of subject site.



Figure 12: Belah Woodland within south-west of subject site.



Figure 13: Belah Woodland within south-west of site.

Common native groundcovers included grasses; *Austrostipa scabra* subsp. *scabra* (Speargrass), Chenopods; *Enchylaena tomentosa* (Ruby Saltbush), *Sclerolaena diacantha* (Grey Copperburr), *Rhagodia spinescens* (Spiny Saltbush), Other native ground covers included *Rhodanthe floribunda* (Common White Sunray), *Calotis cuneifolia* (Blue Burr-daisy), *Sida corrugata* (Corrugated Sida), *Boerhavia dominii* (Tarvine) and *Vittadinia cuneata* var. *cuneata* (Fuzzweed).

The weed species *Sisymbrium* sp. (Musturd) formed dense low thickets over large areas of this community. Other common introduced species included *Lactuca serriola* (Prickly Lettuce), *Sonchus asper* (Prickly Sowthistle), *Bromus diandrus* (Great Brome), *Echium plantagineum* (Patterson's Curse) and *Trifolium angustifolium* (Narrow-leaved Clover).

Red Mallee Woodland

PCT - 193

Biometric Type – CW199; LA209; WE147.

Name - (most similar) - Red Mallee - White Mallee extremely tall tree mallee on silty-loam-clay soils of central south-western NSW

Vegetation Formation – Semi-arid Woodlands (Shrubby sub-formation)

Vegetation Class – Sand Plain Mallee Woodlands

Approximately 1.67ha of Mallee Woodland was located just below the northern boundary access road of the subject site in the far west (Figures 14, 15 & 16). The canopy of this community reached a height of up to 10m and was dominated by one species, *Eucalyptus socialis* (Red Mallee). The mid-storey was sparse with *Alectryon oleifolius* (Western Rosewood) being present. The shrub layer was also very sparse with *Geijera parviflora* (Wilga) one of the few species present. Many of the understorey plants had dried off making them difficult to identify. Native grasses present included *Austrostipa scabra* subsp. *scabra* (Speargrass) and *Rytidosperma* sp. (Wallaby Grass). Native groundcovers included *Enchylaena tomentosa* (Ruby Saltbush), *Sida corrugata* (Corrugated Sida), *Calotis cuneifolia* (Blue Burr-daisy), *Boerhavia dominii* (Tarvine) and *Oxalis perennans* (Oxalis). *Malva preissiana* (Australian Hollyhock) was also common within this area.

Patches of the introduced *Sisymbrium* sp. (Mustard) were quite dense in areas. Other common weed species noted included *Lactuca serriola* (Prickly Lettuce), *Bromus diandrus* (Great Brome), *Cirsium vulgare* (Spear Thistle), *Echium plantagineum* (Patterson's Curse), *Avena fatua* (Wild Oats), *Marrubium vulgare* (Horehound), *Solanum nigrum* (Blackberry Nighshade) and *Malva parviflora* (Small-flowered Mallow).



Figure 14: Red Mallee Woodland north-west of site.



Figure 15: Red Mallee Woodland north-west of site.



Figure 16: Red Mallee Woodland north-west of site.

Belah Woodland (Derived Grassland)

PCT - 57

Biometric Type – CW105; LA106; MR515; WE124.

Name - (most similar) - Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including the Cobar Peneplain Bioregion (Derived Grassland).

Vegetation Formation – Semi-arid Woodlands (Shrubby sub-formation);

Vegetation Class – Semi-arid Sand Plain Woodlands.

Approximately 6.5ha of Belah Woodland (Derived Grassland) was found to neighbour areas of Belah Woodland (Figure 17). These areas were most likely the result of past clearing of Belah Woodlands. These areas were highly modified and were composed of a mixture of native and introduced species. Common native species included *Chloris truncata* (Windmill Grass), *Rytidosperma* sp., *Vittadinia cuneata* var. *cuneata* (Fuzzweed), *Enchylaena tomentosa* (Ruby Saltbush), *Salsola australis*, *Sclerolaena muricata* (Black Roly Poly) and *Sclerolaena birchii* (Galvanised Burr)

Introduced species included *Cirsium vulgare* (Spear Thistle), *Echium plantagineum* (Patterson's Curse), *Avena fatua* (Wild Oats), *Hordeum leporinum* (Barley Grass), *Lactuca serriola* (Prickly Lettuce) and *Sisymbrium* sp.



Figure 17: Belah Woodland (Derived Grassland) within eastern portion of site.

Cultivated Crops

Broad-scale cultivated crops occupied approximately 560ha of the site (Figures 18 & 19). The majority of the cropping area was irrigated and was composed of *Triticum* sp (Wheat) at the time of the survey. A small amount of dryland cropping in the form of *Avena sativa* (Oats) was being conducted around the periphery of the larger irrigated area (Figure 20). A very small number of scattered trees were recorded within the cropping areas and included remnant specimens of *Eucalyptus socialis* (Red Mallee), *Callitris glaucophylla* (White Cypress), *Eucalyptus populnea* (Bimblebox) and *Acacia pendula* (Weeping Myall).

Aquatic Vegetation

Areas of aquatic vegetation were located within and along the Wah Wah Channel (Figures 21 & 22), other minor irrigation channels and the few constructed dams (Figures 23 & 24). Common native aquatic flora species located along Wah Wah Channel running through the site included *Phragmites australis* (Austalian Reed), *Pratia concolor* (Poison Pratia), *Typha domingensis* (Narrow-leaf Cumbungi), *Potamogeton tricarinatus* (Floating Pondweed) and *Juncus usitatus* (Common Rush). Introduced aquatic species included *Cyperus eragrostis* (Umbrella Sedge) and *Polypogon monspeliensis* (Annual Beardgrass).

Common species within the constructed dam near the residence in the south were *Typha domingensis* (Narrow-leaf Cumbungi) and *Juncus usitatus* (Common Rush). The remaining smaller dams contained few flora species.



Figure 18: Mature Irrigated Wheat Crop within east of site.



Figure 19: Mature Irrigated Wheat Crop along northern boundary of site.



Figure 20: Dryland Oats Crop within south-west of site.



Figure 21: Wah Wah Channel within eastern portion of site.



Figure 22: Vegetation within Wah Wah Channel.



Figure 23: Constructed dam in the south of the site just north of the residence.



Figure 24: Constructed dam in the east of the site containing few flora species.

5.1.1 ENDANGERED ECOLOGICAL COMMUNITIES

Four Endangered Ecological Communities listed under the TSC Act are known to occur within the local area. A further two Endangered Ecological Communities listed under the EPBC Act have also been considered:

- *Allocasuarina luehmannii* Woodland in the Riverina and Murray-Darling Depression bioregions (Endangered Ecological Community – TSC Act)
- Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions (Endangered Ecological Community – TSC Act)
- Sandhill Pine Woodland in the Riverina, Murray–Darling Depression and NSW South Western Slopes Bioregions (Endangered Ecological Community – TSC Act).
- Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions (Endangered Ecological Community – TSC Act).
- Weeping Myall Woodlands EPBC Act (Endangered)
- Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions EPBC Act (Vulnerable)

No Endangered Ecological Communities were identified within the site at the time of the survey. Areas of Myall Woodland were found to be present outside the site to the south-west along McRaes Road. One specimen of *Acacia pendula* (Weeping Myall) Tree No. 120 (Tag 220)(Appendix D) was recorded in the far north-east of the site (Figure 25). This remnant tree was surrounded by cropping and was unlikely to be consistent with the Myall Woodland or Weeping Myall Woodlands definition of an Endangered Ecological Community. This specimen of *A. pendula* is outside the development footprint and will not be impacted.



Figure 25: One specimen of *Acacia pendula* (Weeping Myall) Tree No. 120 (Tag 220)(Appendix D)

5.1.2 GROUNDWATER DEPENDENT ECOSYSTEMS

Groundwater Dependent Ecosystems (GDE's) are ecosystems that are fully or partially dependent on groundwater to maintain ecosystem function. No groundwater dependent ecosystems were likely to be present within the site.

5.1.3 THREATENED AND RARE FLORA SPECIES

Field surveys identified 106 plant species occurring within the site. Seven threatened and rare plant species (ROTAP - Briggs & Leigh, 1996) were considered to have potential habitat as a result of a 10km search of the study area of the OEH Wildlife Atlas and the Department of the Environment & Energy (DoEE) databases (Table 3).

Table 3: Threatened and Rare Flora species recorded within the locality.

FLORA SPECIES	TSC	EPBC	ROTAP
<i>Leptorhynchos orientalis</i> (Lanky Buttons)	E1		
<i>Swainsona murrayana</i> (Slender Darling Pea)	V	V	3VCi
<i>Austrostipa wakoolica</i> (A Spear Grass)	E1	E	2E
* <i>Austrostipa metatoris</i> (A spear-grass)	V	V	
<i>Solanum karsense</i> (Menindee Nightshade)	V	V	
* <i>Brachyscome papillosa</i> (Mossgiel Daisy)	V	V	
* <i>Lepidium monolocoides</i> (Winged Pepper-cress)	E1	E	3ECi

ROTAP – key contained in Appendix B.

None threatened flora species were recorded within the site during fieldwork. No nearby records of these species were present on the NSW Wildlife Atlas (OEH, 2017). Areas of Belah and Red Mallee Woodland and Derived Grassland contained marginal habitat for all of the addressed species.

A species-specific habitat assessment for the addressed threatened flora species has been provided in Section 5.2.4 of this report.

No ROTAP species were recorded within the site.

5.1.4 WEEDS

One priority weed species were identified on site and are listed below in Table 4. The site lies within the Riverina Local Land Services Region.

Table 4: Priority Weed species found on site.

WEED SPECIES	LEGAL REQUIREMENTS	ADDITIONAL SIGNIFICANCE
<i>Lycium ferocissimum</i> (African Boxthorn)	Mandatory Measure	N

T – Listed as a Threatening Process under the NSW TSC Act 1995.

N – Weed of National Significance.

*Priorities under the Biosecurity Act 2015

General Biosecurity Duty - any person dealing with plant matter must take measures to prevent, minimise or eliminate the biosecurity risk (as far as is reasonably practicable).

Regional Recommended Measure - Land managers should mitigate the risk of new weeds being introduced to their land.

Information on the control of these species as contained within the NSW DPI *Noxious and environmental weed control handbook* (2014). Other weed species recorded within the site included *Echium plantagineum* (Patterson's Curse), *Heliotropium europaeum* (Common Heliotrope) and *Sisymbrium erysimoides* (Smooth Mustard).

5.2 HABITAT APPRAISAL

5.2.1 HABITAT DESCRIPTION AND DISTRIBUTION

The vegetation and landforms present within the study area offered habitat for a variety of native species. The main habitat types within the study area were Dry Woodland, Freshwater, Grassy Open Areas and Cropping areas.

Dry Woodland

Dry Woodland in the form of Belah Woodland and Red Mallee Woodland occupied approximately 53ha of the site. Dry Woodland would provide suitable habitat opportunities for a variety of species. Frugivorous, nectivorous, granivorous and insectivorous birds and microchiropteran bat species would all find potential foraging resources within this complex. The relatively large number of hollow-bearing trees would provide nesting and roosting sites for a variety of avifauna and other hollow dependant species such as arboreal mammals, tree-roosting bats and birds. Hunting opportunities exist for birds of prey, given that the variable tree coverage and understorey vegetation has created a myriad of ecotones and habitat densities. Such habitat is suitable for terrestrial species including small and medium sized mammals, macropods, reptiles and potentially for some frog species adapted to drier areas. No preferred species of Koala feed trees listed under SEPP 44 Koala Habitat Protection were recorded within this area of habitat.

Freshwater Wetland

Areas containing Freshwater habitat were found along Wah Wah Channel and to a lesser extent the constructed dams. These areas contained preferred habitat for a number of amphibian species, habitat for fish species would largely be restricted to Wah Wah Channel. Suitable habitat was present for a number of reptile and waterbird species. These areas would also act as a water source for other native animals such as macropods and offer hunting habitat for microchiropteran bats that prefer to hunt above or around water bodies.

Cleared Open Areas

The cleared open areas of habitat provide opportunity for a variety of avifauna, including predominantly terrestrial species preferring open spaces, seed eating birds and several birds of prey, which may hunt over this area in search of potential prey species. Macropods may also frequent such areas whilst grazing. Some species of bats may also forage over this cleared area for insects. However, the lack of vegetative cover often limits the value of such areas as this for many species, particularly reptiles and small mammals which are vulnerable to predation in open spaces.

Cropping Areas

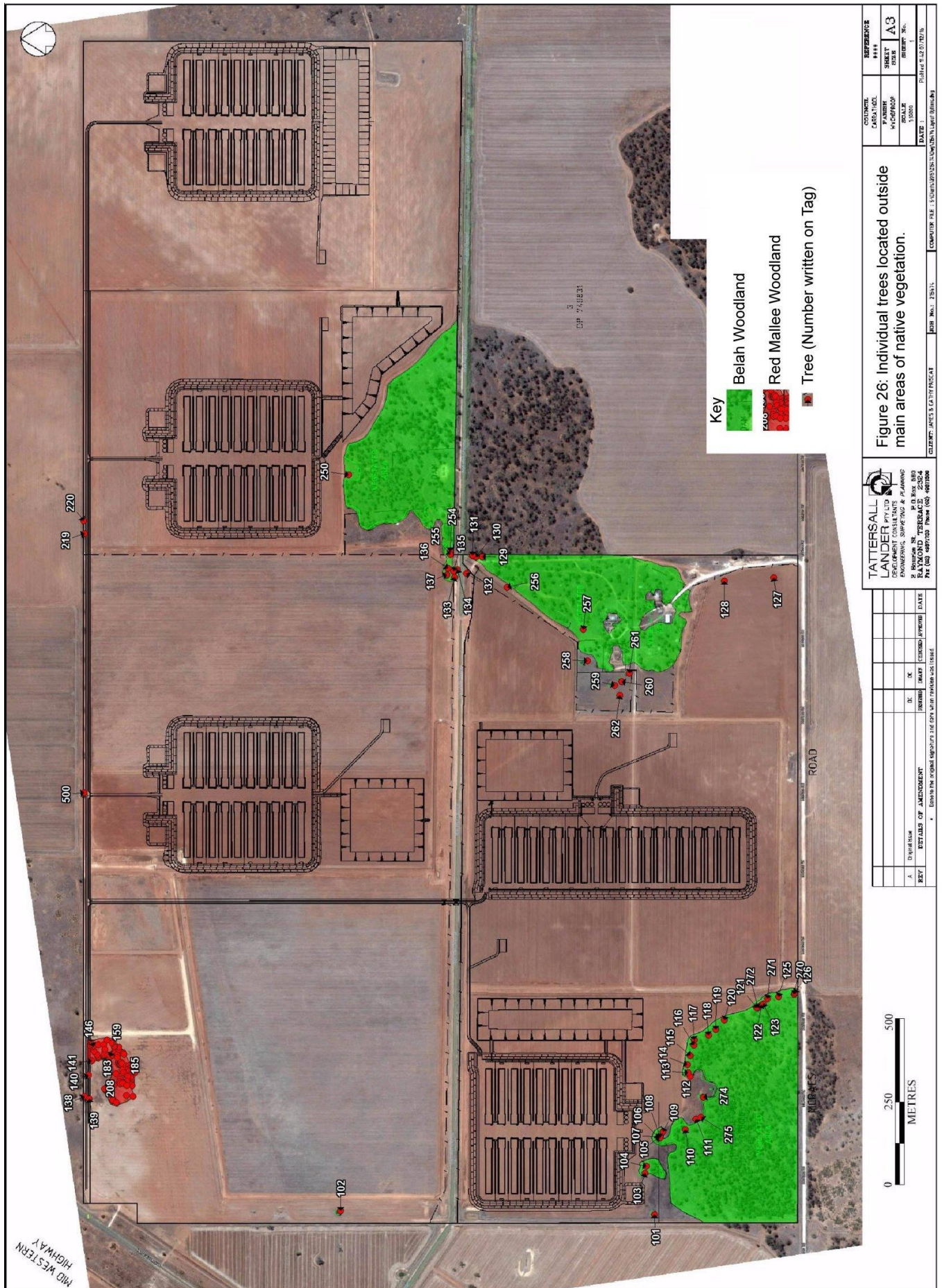
The cropping areas would provide limited habitat opportunities for some avifauna, mammal and reptile species. Several birds of prey, may hunt over these areas.

In general, the habitats within the study area offer a range of habitat opportunities for a range of native species. The cropping area proposed to be affected by the proposal are regarded as less ecologically significant areas capable of offering few suitable resources to both resident and transitory species.

5.2.2 TREE SURVEY

A total of 139 trees were identified as a result of a survey of trees occurring outside or on the periphery of the main remnants of woodland within the site. A number of the trees were found to contain hollows suitable for roosting or nesting avifauna species, arboreal mammals, reptiles, amphibians and tree roosting microchiropteran bat species. The locations of each tree are shown in (Figures 26 & 27). Detailed results of the tree survey are contained in Appendix D.

The proposal has been located to avoid the removal of trees, however an up grade of the access road along the northern boundary will require the removal of one tree Tree No. 40 (Tag 140) a specimen of *Eucalyptus socialis* (Red Mallee)(Figure 28).



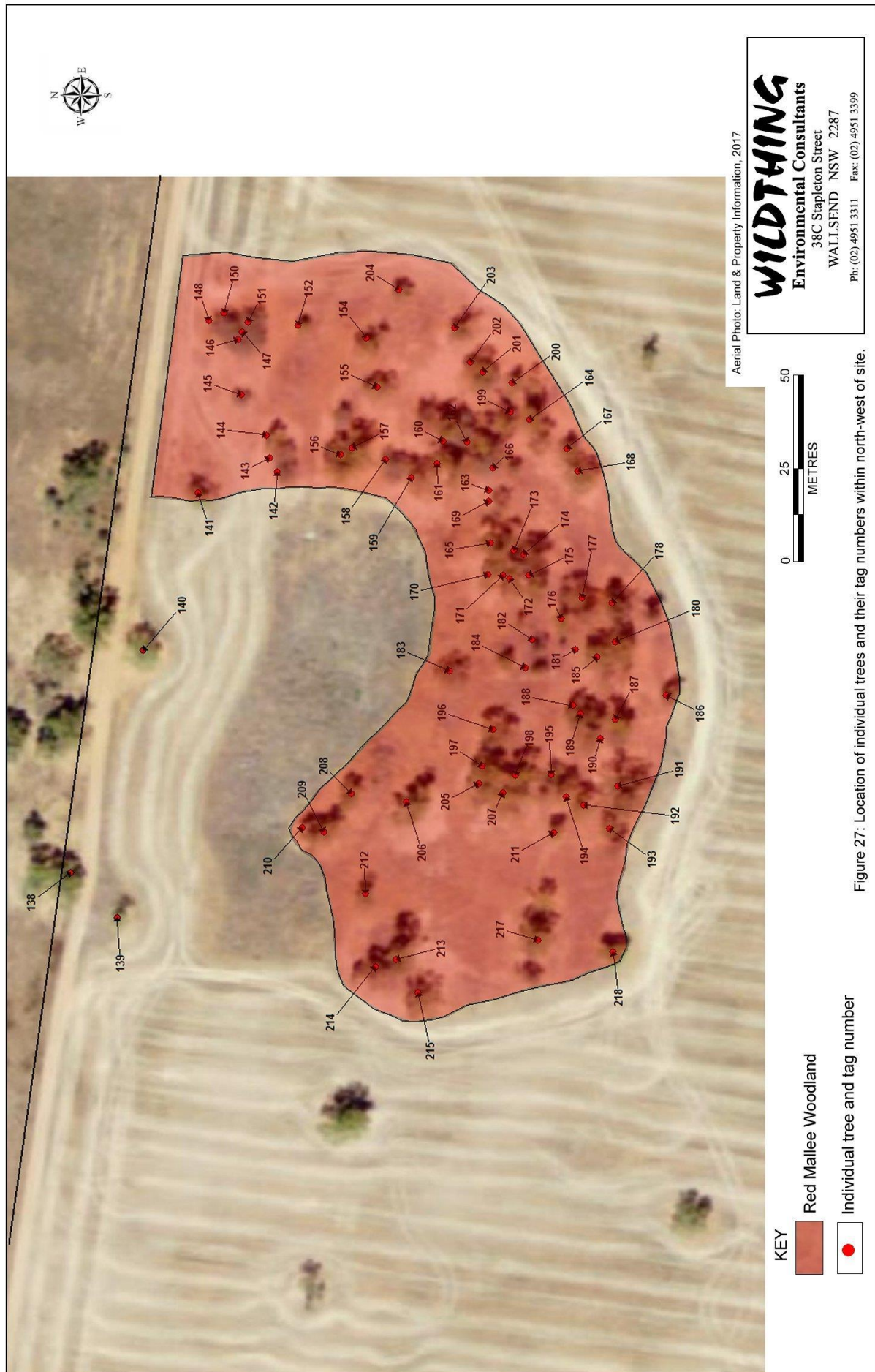




Figure 28: Photos showing Tree No. 40 (Tag 140) – *E. socialis* which may require removal.

5.2.3 HABITAT FRAGMENTATION & CORRIDORS

Native vegetation occurring within the site was subject to a high degree of fragmentation. The two areas 13.5ha & 14.72ha of Belah Woodland in the east formed part of a larger isolated fragment extending outside the site (52ha in total) which was surrounded by cropping land. The 22.5ha area of Belah Woodland in the south-west was connected to a smaller area of Belah Woodland in the south and larger areas of Myall Woodland and other communities associated with Wah Wah Creek. The area of Red Mallee Woodland in the north-west was associated with larger areas of native grassland to the north including areas beyond the Mid Western Highway.

The proposal which will be situated within cropping land is unlikely to result in a further fragmentation or reduction of connectivity for flora and fauna species present within the locality.

5.2.4 HABITAT FOR SIGNIFICANT SPECIES

An assessment of habitat attributes on site has been undertaken for the threatened species listed in Section 3.5. The results of the assessment are displayed in Table 5. Those species identified in this assessment as having potential habitat available on site have been considered further under Section 5A of the EPA Act in Section 8.0 of this report.

Table 5: Habitat Assessment for Significant Species

SPECIES	STATUS	HABITAT DESCRIPTION AND LOCALLY KNOWN POPULATIONS	LIKELYHOOD OF OCCURRENCE WITHIN THE SITE
<i>Leptorhynchus orientalis</i> Lanky Buttons	TSC Act – E1	Recorded from several Hay Plain and southern Riverina localities, including Willanthry east of Hillston, Zara-Wanganella via Hay, McKinley Road SW of Hillston, and “Morundah” navy land west of Buckingbong SF. A large population has most recently been recorded from Cowl Cowl Station SSW of Hillston along a TSR. Grows in woodland or grassland, sometimes on the margins of swamps. Communities include a Bimble Box plain in red-brown soil, dense <i>Acacia pendula</i> woodland with herbaceous understorey on red clay to clay-loam, open grassland areas on red soils, and red clay plains at the edge of a Canegrass swamp.	Low Suitable habitat was present within woodland and areas of derived grassland.
<i>Swainsona murrayana</i> Slender Darling Pea	TSC Act - V EPBC Act – V ROTAP – 3VCi	Found throughout central and western NSW. Found in a variety of vegetation types including bladder saltbush, black box and grassland communities on level plains, floodplains and depressions and is commonly associated Maireana species. Can be found in remnant grasslands or grassy woodlands that have been intermittently grazed or cultivated. Flowers in spring to early summer.	Low Suitable habitat was present within woodland and areas of derived grassland. No nearby local records.
<i>Austrostipa metatoris</i> A spear-grass	TSC Act - V EPBC Act – V ROTAP – 3V	Occurs in central NSW, most commonly in the Murray Valley. Other scattered records occur at Lake Cargelligo, east of Goolgowi, Condobolin and south west of Nymagee. Inhabits sandy areas of the Murray Valley including sandhills, sand ridges, undulating plains and open flat mallee country with red to red-brown clay-loam to sandy-loam soils. Associated species include <i>Eucalyptus populnea</i> , <i>E. intertexta</i> , <i>Callitris glaucophylla</i> , <i>Casuarina cristata</i> , <i>Santalum acuminatum</i> and <i>Dodonaea viscosa</i> . Flowers in response to rain.	Low-Moderate Suitable habitat was present within woodland and areas of derived grassland.
<i>Austrostipa wakoolica</i> A spear-grass	TSC Act – E1 EPBC Act – E	Confined to the floodplains of the Murray River tributaries of central-western and south-western NSW, with localities including Manna State Forest, Matong, Lake Tooim, Merran Creek, Tulla, Cunninyeuk and Mairjimmy State Forest. Grows on floodplains of the Murray River tributaries, in open woodland on grey, silty clay or sandy loam soils; habitats include the edges of a lignum swamp with box and mallee; creek banks in grey, silty clay; mallee and lignum sandy-loam flat; open Cypress Pine forest on low sandy range; and a low, rocky rise.	Low Marginal habitat was present within woodland and areas of derived grassland.
<i>Brachyscome papillosa</i> Mossgiel Daisy	TSC Act - V EPBC Act – V ROTAP – 3V	Occurs primarily in the Riverina Bioregion with scattered sites across the region. Additional records occur in the Willandra Lakes World Heritage Area north-western outlier at Byrnedale Station, and one site on the South	Low Suitable habitat was present within woodland and areas of derived grassland.

SPECIES	STATUS	HABITAT DESCRIPTION AND LOCALLY KNOWN POPULATIONS	LIKELIHOOD OF OCCURRENCE WITHIN THE SITE
		Western Slopes at Ganmain Reserve. Recorded primarily on clay soils on Bladder Saltbush (<i>Atriplex vesicaria</i>) and Leafless Bluebush (<i>Maireana aphylla</i>) plains, as well as grassland and in Inland Grey Box (<i>Eucalyptus macrocarpa</i>) - Cypress Pine (<i>Callitris</i> spp.) woodland.	No nearby local records.
<i>Lepidium monoplacoides</i> Winged Pepper-cress	TSC Act - V EPBC Act – V ROTAP – 3V	Inhabits seasonally moist top waterlogged sites, on heavy fertile soils with a mean annual rainfall of around 300-500mm. Vegetation is typically open woodland dominated by <i>Allocasuarina luehmannii</i> (Bulloak) and/or eucalypts, particularly <i>Eucalyptus largiflorens</i> (Black Box) or <i>Eucalyptus populnea</i> (Poplar Box), and a ground layer consisting of tussock grasses. Recorded in a wetland-grassland community	Low Suitable habitat was present within woodland and areas of derived grassland. No nearby local records.
<i>Solanum karsense</i> Menindee Nightshade	TSC Act - V EPBC Act – V	Menindee Nightshade is the only species of <i>Solanum</i> endemic to NSW and is restricted to the far south-western plains, extending up the Darling River to the Menindee and Wilcannia districts. Mainly restricted to the area between the Darling and Lachlan Rivers. Grows in occasionally flooded depressions with heavy soil, including level river floodplains of grey clay with Black Box and Old Man Saltbush, and open treeless plains with solonized brown soils.	Low Marginal habitat was present within woodland and areas of derived grassland.
<i>Swainsona murrayana</i> Slender Darling-pea	TSC Act - V EPBC Act – V	Recent records are from the South-Western Plains in the Lockhart-Jerilderie-Deniliquin area and further north up to Hay and West Wyalong. often grows in heavy soils, especially depressions, and is also found on grey and red to brown clay and clay-loam soils in <i>Atriplex vesicaria</i> (Bladder Saltbush) herbland, <i>Eucalyptus largiflorens</i> (Black Box) woodland and grassland communities and is frequently associated with <i>Maireana</i> species.	Low Suitable habitat was present within woodland and areas of derived grassland.
Fish			
<i>Galaxias rostratus</i> Flathead Galaxias	EPBC Act – CE	They have been recorded in the Macquarie, Lachlan, Murrumbidgee and Murray Rivers in NSW. Flathead Galaxias are found in still or slow-moving water bodies such as wetlands and lowland streams.	Low Marginal habitat was present within Wah Wah Channel.
<i>Maccullochella peelii</i> Murray Cod	EPBC Act - V	Inhabits clear rocky streams in the upper western slopes of NSW to slow-flowing, turbid lowland rivers and billabongs of the Murray-Darling Basin.	Low Suitable habitat was present within Wah Wah Channel.
<i>Macquaria australasica</i> Macquarie Perch	EPBC Act - V	The Macquarie Perch is a riverine, schooling species. It prefers clear water and deep, rocky holes with lots of cover. As well as aquatic vegetation, additional cover may comprise of large boulders, debris and overhanging banks	Low Only marginal habitat was present.

SPECIES	STATUS	HABITAT DESCRIPTION AND LOCALLY KNOWN POPULATIONS	LIKELIHOOD OF OCCURRENCE WITHIN THE SITE
Amphibians			
<i>Crinia sloanei</i> Sloane's Froglet	TSC Act-V	Recorded from widely scattered sites in the floodplains of the Murray-Darling Basin, with the majority of records in the Darling Riverine Plains, NSW South Western Slopes and Riverina bioregions in New South Wales. It is typically associated with periodically inundated areas in grassland, woodland and disturbed habitats.	Low-Moderate Suitable habitat occurs along Wah Wah Channel and around the dams.
<i>Litoria raniformis</i> Southern Bell Frog, Growling Grass Frog	TSC Act-E EPBC Act-V	Usually found in or around permanent or ephemeral Black Box/Lignum/Nitre Goosefoot swamps, Lignum/Typha swamps and River Red Gum swamps or billabongs along floodplains and river valleys. They are also found in irrigated rice crops, particularly where there is no available natural habitat. The species is known to exist only in isolated populations in the Coleambally Irrigation Area, the Lowbidgee floodplain and around Lake Victoria.	Low Suitable habitat occurs within the Wah Wah Irrigation Channel.
Birds			
<i>Actitis hypoleucos</i> Common Sandpiper	EPBC Act - M	Shallow pebbly, muddy or sandy edges of rivers and streams, coastal and inland; dams, lakes, sewage ponds, margins of tidal rivers, waterways in mangroves or saltmarsh; mudflats; rocky or sandy beaches.	Low Marginal habitat occurs within the Wah Wah Irrigation Channel.
<i>Calidris acuminata</i> Sharp-tailed Sandpiper	EPBC Act - M	Tidal mudflats, saltmarshes, mangroves; shallow fresh, brackish or saline inland wetlands; sewage ponds and irrigated pastures.	Low Marginal habitat occurs within the Wah Wah Irrigation Channel.
<i>Calidris ferruginea</i> Curlew Sandpiper	TSC Act-E EPBC Act - M	Tidal mudflats; saltmarsh; fresh, brackish or saline wetlands; sewage ponds.	Unlikely No suitable habitat was likely to be present.
<i>Calidris melanotos</i> Pectoral Sandpiper	EPBC Act - M	Tidal mudflats; saltmarsh; fresh, brackish or saline wetlands; sewage ponds.	Unlikely No suitable habitat was likely to be present.
<i>Pandion haliaetus</i> Osprey	EPBC Act - M	Eastern Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They require extensive areas of open fresh, brackish or saline water for foraging. breeding range of the Eastern Osprey extends around the northern coast of Australia (including many offshore islands) from Albany in Western Australia to Lake Macquarie in NSW; with a second isolated breeding population on the coast of South Australia, extending from Head of Bight east to Cape Spencer and Kangaroo Island.	Unlikely No suitable habitat was present.

SPECIES	STATUS	HABITAT DESCRIPTION AND LOCALLY KNOWN POPULATIONS	LIKELIHOOD OF OCCURRENCE WITHIN THE SITE
<i>Gallinago hardwickii</i> Latham's Snipe	EPBC Act-M	Utilises a variety of habitats, such as soft wet ground or shallow water with tussock and other green and dead vegetation, and scrub or open wetland from sea-level to alpine bogs (Pizzey & Knight, 2001).	Low - Moderate Suitable habitat occurs within the Wah Wah Irrigation Channel.
<i>Tringa nebularia</i> Common Greenshank	EPBC Act-M	Inhabits inland wetlands and sheltered coastal habitats of varying salinity.	Unlikely No suitable habitat was likely to be present.
<i>Rostratula benghalensis australis</i> Australian Painted Snipe	TSC Act-E EPBC Act-V & M	Margins of swamps and streams, chiefly those covered with low and stunted vegetation.	Low Suitable habitat occurs within the Wah Wah Irrigation Channel.
<i>Numenius madagascariensis</i> Eastern Curlew	EPBC Act – CE & M	Estuaries, tidal mudflats, sandspits, saltmarshes, mangroves; occasionally fresh or brackish lakes.	Unlikely No suitable habitat was present.
<i>Botaurus poiciloptilus</i> Australasian Bittern	TSC Act-E EPBC Act-E	Favours permanent fresh-waters dominated by sedges, rushes, reeds or cutting grasses (eg. <i>Phragmites</i> , <i>Scirpus</i> , <i>Eleocharis</i> , <i>Juncus</i> , <i>Typha</i> , <i>Baumea</i> and <i>Gahnia</i>).	Low Suitable habitat occurs within the Wah Wah Irrigation Channel.
<i>Grus rubicunda</i> Brolga	TSC Act-V	During the breeding season (July - December), this species inhabits shallow freshwater marshes (<0.5m deep) with emergent vegetation or freshwater meadows (0.3m deep) dominated by annual herbs and rushes. In the non-breeding season, Brolgas congregate near deep (<2m) permanent freshwater marshes.	Low The site contains marginal habitat.
<i>Ardeotis australis</i> Australian Bustard	TSC Act-E	Mainly occurs in inland Australia. In NSW mainly found in the north-west corner and less commonly in lower western and central plains regions. Occasionally seen as far east as the Riverina region. Inhabits tussock and hummock grasslands, as well as low shrublands and low open grassy woodlands, sometimes in pastoral land, golf courses and near dams. Breeds on bare ground and low sandy ridges or stony rises in ecotones between grassland and protective shrubland cover, roosting on the ground among shrubs, long grasses and under trees.	Low The site contains marginal habitat.
<i>Stictonetta naevosa</i> Freckled Duck	TSC Act-V	Occurs in south-eastern and south-western Australia, and has a wide distribution throughout NSW. Typically inhabits permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral swamps to more permanent waters such as lakes, dams and sewage ponds.	Low Suitable habitat occurs within the Wah Wah Irrigation Channel and the constructed dam near the residence.
<i>Burhinus grallarius</i> Bush Stone-curlew	TSC Act-E	This species inhabits dry open forest and woodland with an open grassy understorey that has not been overgrazed. It prefers woodland with many fallen branches where it roosts during the day. It has also been known to utilise coastal scrub, mangrove fringes, golf courses and plantations. This	Moderate Areas of woodland and derived grassland contain suitable habitat.

SPECIES	STATUS	HABITAT DESCRIPTION AND LOCALLY KNOWN POPULATIONS	LIKELIHOOD OF OCCURRENCE WITHIN THE SITE
		species has been recorded within the adjoining property (Lot 3) to the east (NPWS, 2011).	
<i>Pedionomus torquatus</i> Plains-wanderer	TSC Act - E1 EPBC Act - CE	Most common in an area of the western Riverina bounded by Hay and Narrandera on the Murrumbidgee River in the north, the Cobb Highway in the west, the Billabong Creek in the south and Urana in the east, however is patchy even within this area. Inhabits semi-arid, lowland native grasslands that typically occur on hard red-brown soils. Habitat structure thought to play an important role, with preferred habitat comprising 50% bare ground, 10% fallen litter, and 40% herbs, forbs and grasses. It is a ground dwelling bird, cryptic and difficult to observe during the day.	Low Areas of woodland and derived grassland contain marginal habitat.
<i>Leipoa ocellata</i> Malleefowl	TSC ACT - E1 EPBC Act - V	Primary location in NSW is in the south west around Mallee Cliffs NP, with some other scattered records near the area and north of the Murray River in South Australia. Habitat is mallee communities, preferably tall, dense and floristically rich mallee found at higher rainfall (300-450) mean annually. Prefers light sandy to sandy loam soils and habitats with a dense but discontinuous canopy and dense and diverse shrub and herb layers.	Low Areas of woodland contain marginal habitat.
<i>Polytelis swainsonii</i> Superb Parrot	TSC Act - V EPBC Act - V	This Parrot species inhabits River Red Gum, Black Box, Yellow Box and River Oak, mostly near a river. Also known to use mallee, stubbles, pastures and gardens. This species nest in a hollow on a tall tree.	Moderate Areas of woodland contain suitable habitat.
<i>*Pezoporus occidentalis</i> Night Parrot	EPBC Act - E	Listed as Extinct in NSW. Inhabits arid and semi-arid areas that are characterised by dense, low vegetation.	Unlikely No recent records within NSW.
<i>Lophochroa leadbeateri</i> Major Mitchell's Cockatoo	TSC ACT - V	Occurs across arid and semi-arid inland from south-western QLD to north-west Victoria, through South Australia and south-west Northern Territory and across to some parts of the west coast. Inhabits a range of inland treed and treeless habitats within reach of water. Feeds for seeds if native and exotic melons, saltbushes, wattles and cypress pines. Nests in tree hollows, at least 1km apart from one another.	Moderate Areas of woodland and derived grassland contain marginal habitat.
<i>Epthianura albifrons</i> White-fronted Chat	TSC Act-V	Occurs mostly in the southern half of NSW, occurring in damp open habitats along the coast, and near waterways in the western part of the state	Low-Moderate Suitable habitat was present.
<i>Grantiella picta</i> Painted Honeyeater	TSC Act - V EPBC Act - V	The greatest concentrations and almost all breeding occur 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. Inhabits Boree, Brigalow and Box-Gum Woodlands and	Moderate Areas of woodland contained foraging habitat in the form of Mistletoe.

SPECIES	STATUS	HABITAT DESCRIPTION AND LOCALLY KNOWN POPULATIONS	LIKELIHOOD OF OCCURRENCE WITHIN THE SITE
		Box-Ironbark Forests.	
<i>Daphoenositta chrysoptera</i> Varied Sittella	TSC Act-V	Open eucalypt woodland/forest, mallee, inland acacia, coastal tea-tree scrubs, golf courses, orchards and parks.	Moderate Areas of woodland contain suitable habitat.
<i>Stagonopleura guttata</i> Diamond Firetail	TSC Act-V	Widely distributed in NSW, with a concentration of records from the Northern, Central and Southern Tablelands, the Northern, Central and South-Western Slopes and the North West Plains and Riverina. Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Eucalyptus pauciflora Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland.	Moderate Areas of woodland and derived grassland contained suitable habitat.
<i>Climacteris picumnus victoriae</i> Brown Treecreeper	TSC Act-V	Occupies Eucalypt woodlands, particularly open woodlands lacking a dense understorey, River Red Gums on watercourses and around lakeshores. It is sedentary and nests in tree hollows within permanent territories.	Moderate Areas of woodland contain suitable habitat.
<i>Pomatostomus temporalis</i> subsp. <i>temporalis</i> Grey-crowned Babbler	TSC Act-V	Open forest, woodland, scrubland, farmland and outer suburbs. Prefers woodlands with regenerating trees, tall shrubs, and an intact ground cover of grass and forbs.	High – Recorded within the site. Areas of woodland and derived grassland contain suitable habitat.
<i>Hamirostra melanosternon</i> Black-breasted Buzzard	TSC Act-V	Lives in a range of inland habitats, especially along timbered watercourses which is the preferred breeding habitat. Also hunts over grasslands and sparsely timbered woodlands.	Low - Moderate Areas of woodland and derived grassland contain marginal habitat.
<i>Falco hypoleucos</i> Grey Falcon	TSC Act-E	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions. Occasionally found in open woodlands near the coast.	Low - Moderate Areas of woodland and derived grassland contain marginal habitat.
<i>Falco subniger</i> Black Falcon	TSC Act-V	Found along tree-lined watercourses and in isolated woodlands, mainly in arid and semi-arid areas. It roosts in trees at night and often on power poles by day.	Moderate - High Suitable hunting and nesting habitat was present within the site.
<i>Circus assimilis</i> Spotted Harrier	TSC Act-V	Occurs throughout the Australian mainland, except in densely forested or wooded habitats of the coast, escarpment and ranges. Occurs in grassy open woodland including acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands.	High – Recorded within the site. Suitable hunting and nesting habitat was present within the site.
<i>Haliaeetus leucogaster</i> White-bellied Sea-Eagle	TSC Act - V	Considered to be a migratory species, however any movements are likely to be nomadic rather than migratory, in response to food availability	Low Marginal hunting habitat was present

SPECIES	STATUS	HABITAT DESCRIPTION AND LOCALLY KNOWN POPULATIONS	LIKELIHOOD OF OCCURRENCE WITHIN THE SITE
			within Wah Wah Channel.
<i>Hieraaetus morphnoides</i> Little Eagle	TSC Act-V	The Little Eagle occupies habitats rich in prey within open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used (Marchant and Higgins 1993; Aumann 2001a). For nest sites it requires a tall living tree within a remnant patch, where pairs build a large stick nest in winter and lay in early spring.	Moderate - High Suitable hunting and nesting habitat was present within the site.
<i>Tyto novaehollandiae</i> Masked Owl	TSC Act-V	A range of wooded habitats that contain mature trees with large hollows for roosting and nesting, and more open areas for hunting.	Low Suitable hunting, roosting and nesting habitat was present.
<i>Motacilla flava</i> Yellow Wagtail	EPBC Act-M	Very limited information available on this species. Habitat includes salt works, paddocks, and marshes. Open country near swamps, salt marshes, sewerage ponds, grassed surrounds to airfields, bare ground; occasionally on drier inland plains.	Low Suitable habitat was present.
<i>Apus pacificus</i> Fork-tailed Swift	EPBC Act-M	Inhabits the airspace over open country from semi deserts to coasts.	Moderate Due to the non-specific habitat requirements habitat was present within airspace above the study area.
Mammals			
<i>Phascolarctos cinereus</i> Koala	TSC Act – V EPBC Act - V	Inhabits eucalypt woodland and forest containing suitable food trees. Key food trees in the local area include <i>Eucalyptus camaldulensis</i> (River Red Gum) and <i>E. coolabah</i> (Coolabah).	Unlikely Only three specimens of <i>Eucalyptus populnea</i> (Bimble box) a preferred Koala Feed Tree Species were present over the entire site. No local records.
<i>Chalinolobus picatus</i> Little Pied Bat	TSC Act – V	Occurs in dry open forest, open woodland, mulga woodlands, chenopod shrublands, cypress pine forest and mallee and Bimbil box woodlands. Roosts in caves, rock outcrops, mine shafts, tunnels, tree hollows and buildings. Can tolerate high temperatures and dryness but need access to nearby open water.	High – Recorded within the site. Suitable hunting and roosting habitat was present.
<i>Myotis macropus</i> Southern Myotis	TSC Act – V	Various habitats of the coast and adjacent ranges with suitable waterbodies for hunting; caves or similar structures for roosting. It occasionally uses tree hollows.	Moderate Suitable hunting and marginal roosting habitat was present.
<i>Nyctophilus corbeni</i> Corben's Long-eared Bat	TSC Act – V EPBC Act - V	Tall eucalypt forests, mallee and woodlands. Seems to prefer semi-arid areas. Roosts in tree hollows and under loose bark.	Moderate - High Suitable hunting and roosting habitat was present.

SPECIES	STATUS	HABITAT DESCRIPTION AND LOCALLY KNOWN POPULATIONS	LIKELIHOOD OF OCCURRENCE WITHIN THE SITE
<i>Climacteris affinis</i> (White-browed Treecreeper) population in Carrathool local government area south of the Lachlan River and Griffith local government area.	TSC – Endangered Population.	In NSW, occupies a broad area of western NSW, west from a line from Balranald to Lake Cargelligo then Lightning Ridge. Occurs in a range of semi-arid and arid tall shrublands and woodlands across the southern half of Australia. In NSW, the species occupies a variety of habitats including Mulga, Brigalow, Gidgee, Belah, Buloke and White Cypress. The species may also occur in habitats adjacent to those detailed above, including Coolibah, River Red Gum and Black Box.	Moderate Areas of woodland contain suitable habitat.
<i>Calyptorhynchus lathami</i> (Glossy Black-cockatoo – Riverina Population)	TSC – Endangered Population.	Largely restricted to hills and low ridges where suitable stands of its food plant, Drooping She-Oak (<i>Allocasuarina verticillata</i>), remain within the Narrandera Range and to the north-west in the Brobenah Hills, McPhersons Range, Cocoparra Range, Lachlan Range and Jimberoo State Forests, and the Naradhan Range.	Low Only marginal transitory habitat was considered to be present. No preferred food tree species were recorded.

5.3 FAUNA APPRAISAL RESULTS

A full list of fauna species observed during the survey is contained in Appendix E.

5.3.1 SMALL TERRESTRIAL MAMMAL TRAPPING

During this component of the survey one species of mammal, the introduced *Mus musculus* (House Mouse) was captured. The results of the small terrestrial mammal survey are shown in Table 6.

Table 6: Small Terrestrial Mammal Trapping Results.

DATE	TRAP NO	SPECIES	SEX
Trapping period 12 – 15 April 2013			
Wednesday 14/12/16	T7	<i>Mus musculus</i> (House Mouse)	Female
Thursday 15/12/16	T15	<i>M. musculus</i>	Male

5.3.2 HARP TRAPPING

During the harp trapping component of the survey no specimens were captured.

5.3.3 MICROCHIROPTERAN BAT CALL DETECTION

Three species of microchiropteran bat, *Chalinolobus gouldii* (Gould's Wattled Bat), *Chalinolobus picatus* (Little Pied-bat) and *Scotorepens balstoni* (Inland Broad-nosed Bat) were positively identified during the bat call survey. A number of calls attributed to the Genus *Nyctophilus* were likely to be either *N. geoffroyi* (Lesser Long-eared Bat), *N. gouldi* (Gould's Long-eared Bat) or the threatened *Nyctophilus corbeni* (Corben's Long-eared Bat). Calls attributed to the Genus *Vespadaus* were likely to be either *Vespadelus darlingtoni* (Large Forest Bat), *Vespadelus regulus* (Southern Forest Bat) or *Vespadelus vulturnus* (Little Forest Bat).

Chalinolobus picatus is listed as vulnerable under the TSC Act (1995) and as a consequence has been further assessed within Section 8.0 of this report. As *N. corbeni* is also a listed threatened species the precautionary principle has been applied and further consideration has also been given to this species. The locations of these threatened microchiropteran bat species within the site are shown in Figure 29.

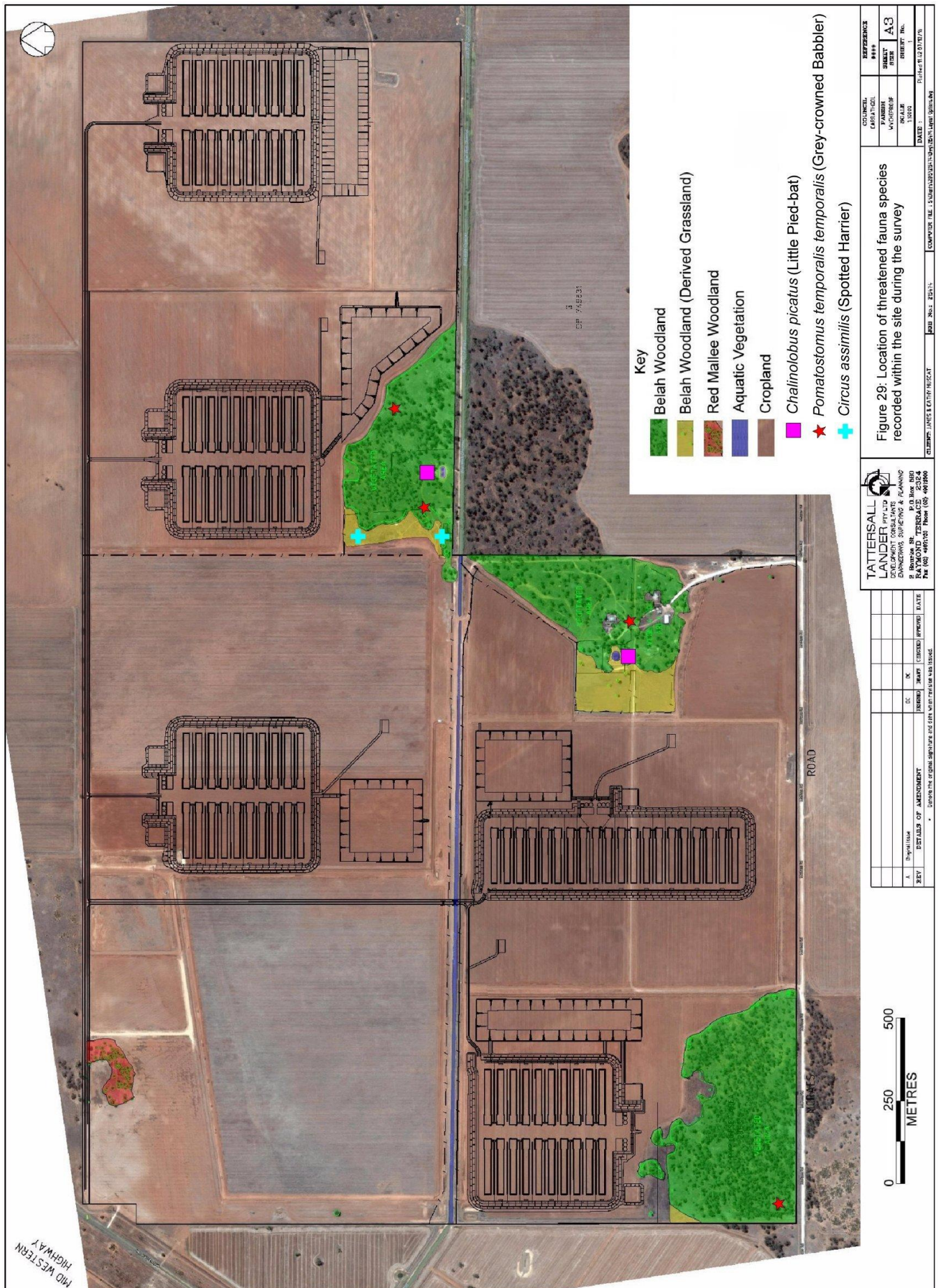
5.3.4 AMPHIBIAN SURVEY

Only one species of frog *Limnodynastes fletcheri* (Barking Frog) was recorded within the site during the survey. The species was recorded within Wah Wah Channel.

This amphibian species is not listed as threatened according to State or National legislation.

5.3.5 REPTILE SURVEY

Five species of reptile were identified within the study area during targeted and incidental surveys: *Gehyra variegata* (Common Dtella), *Pogona barbata* (Bearded Dragon), *Cryptoblepharus pannosus* (Ragged Snake-eyed Skink), *Egernia striolata* (Tree Skink) and *Morethia boulengeri* (Boulenger's



Skink). Specimens of *C. pannosus* and *E. striolata* were observed on a number of trees containing hollows or cracks. One specimen of *P. barbata* was observed in the north of the site within the area of Red Mallee Woodland. Specimens of *M. boulengeri* were found to be common within the understorey within areas of woodland. A number of specimens of *G. variegata* were recorded on trees during the spotlighting survey.

None of these reptile species are regarded as threatened according to State or National legislation.

5.3.6 DIURNAL AVIFAUNA SURVEY

An array of avifauna species was found to be present within the various habitats across site.

Within the Woodland areas avifauna species commonly encountered included *Malurus cyaneus* (Superb Fairy-wren), *Corcorax melanorhamphos* (White-winged Chough), *Todiramphus sancta* (Sacred Kingfisher), *Nymphicus hollandicus* (Cockatiel), *Philemon corniculatus* (Noisy Miner) and *Myiagra inquieta* (Restless Flycatcher).

Common species observed within the cropping/grassland areas included *Rhipidura leucophrys* (Willy Wagtail), *Grallina cyanoleuca* (Magpie Lark), *Vanellus miles* (Masked Lapwing), *Anthus novaeseelandiae* (Australasian Pipit) and *Ocyphaps lophotes* (Crested Pigeon).

Species encountered along the Wah Wah Channel included *Anas superciliosa* (Pacific Black Duck), *Egretta novaehollandiae* (White-faced Heron) and *Acrocephalus stentoreus* (Clamorous Reed Warbler).

Birds of prey recorded included *Haliastur sphenurus* (Whistling Kite), *Elanus axillaris* (Black-shouldered Kite), *Falco cenchroides* (Australian Kestrel) and *Circus assimilis* (Spotted Harrier).

Two threatened avifauna species *Circus assimilis* (Spotted Harrier) and *Pomatostomus temporalis* (Grey-crowned Babbler) are listed as vulnerable under the state legislation and have been further assessed within Section 8.0 of this report.

All birds observed within the study area during this and the previous surveys are indicated in the Vertebrate Species List contained in Appendix E.

5.3.7 NOCTURNAL AVIFAUNA SURVEY

Podargus strigoides (Tawny Frogmouth) was spotlight and also observed and heard calling from within the site. *Aegotheles cristatus* (Australian Owlet Nightjar) was also recorded within woodland habitat during the spotlighting survey.

None of these nocturnal avifauna species are regarded as threatened according to State or National legislation.

5.3.8 SPOTLIGHTING SURVEY

A small number of *Trichosurus vulpecula* (Common Brushtail Possum) were recorded within Belah Woodland in the far south-west corner of the site. *Macropus giganteus* (Eastern Grey Kangaroo) was also observed during spotlighting. The introduced species *Oryctolagus cuniculus* (European Rabbit), *Lepus capensis* (European Hare) and *Vulpes vulpes* (Red Fox) were also recorded during the spotlighting survey.

No listed threatened mammal species were recorded during the survey.

5.3.9 INCIDENTAL OBSERVATIONS AND SECONDARY INDICATIONS

A number of incidental observations and secondary indications of fauna were observed during the survey and included:

- A small number of diggings attributed to *Tachyglossus aculeatus* (Echidna) were found on the side of some ant nests within woodland areas.
- A number of specimens of *Macropus giganteus* (Eastern Grey Kangaroo) and likely *Macropus fuliginosus* (Western Grey Kangaroo) were observed within the site;
- *Vulpes vulpes* (Red Fox) was observed within the site on a number of occasions;
- Diggings and scats belonging to *Oryctolagus cuniculus* (European Rabbit) were common within the site.

The occurrence of the Red Fox and European Rabbit are listed as a Key threatening processes under the NSW Threatened Species Conservation Act, 1995 and have been further addressed in Section 8.0 of this report.

5.3.10 SURVEY LIMITATIONS

As with all reports of this type the main survey limitation is considered to be the short period of time in which the fieldwork was carried out during one season. Limitations to the likelihood of detecting certain subject species were also encountered during this survey. Such limitations were generally related to the seasonal detectability of species, be it as a result of known flowering periods for flora or migratory movements by fauna. Another pertinent limitation was the dry hot weather experienced at the time of the survey, which may have had an impact on the diversity of species recorded within the site.

These limitations have been overcome by applying the precautionary principle in all cases where the survey methodology may have given a false negative result. This precautionary principle was achieved by recognising that most threatened species are rare and therefore unlikely to be encountered during a survey even if they may utilise the site at other times. These species have been assessed on the basis of the presence of their habitat and the likely significance of that habitat to a viable local population.

6.0 IMPACT ASSESSMENT

6.1 AVOIDANCE

The proposed Poultry Farm Complex has been positioned within cropping land to avoid the removal of native vegetation. The potential for conflict between the poultry farm development and the existing native flora and fauna is considered low.

6.2 DIRECT IMPACTS

The proposed Poultry Farm Complex following direct and potential impacts/losses:

- The footprint of the development proposal will be situated on approximately 170ha of cropping land.
- The north-western access road upgrade is likely to result in the removal of one native tree, Tree No. 40 (Tag 140) a specimen of *Eucalyptus socialis* (Red Mallee) to upgrade of the access road along the northern boundary of the site.

6.3 INDIRECT IMPACTS

The proposed Poultry Farm Complex may result in the following indirect and potential impacts;

- Increased spread of weeds;
- Increased spread of pest fauna species;
- Edge effects;
- Increase in noise from machinery, vehicles etc;
- Increase in dust;
- Increase in artificial lighting. Increased lighting may be the result of security lighting.

7.0 MITIGATION MEASURES

A number of mitigation measures have been specified to minimise the impact of the loss of habitat.

The measures will include:

- Protection of remaining native vegetation within the site;
- Rehabilitation of native vegetation within the site;
- Reduction of ongoing impacts such as noise and artificial lighting.

7.1 PROTECTION OF REMAINING NATIVE VEGETATION/HABITAT

To protect and enhanced native vegetation occurring within the site the following measures are required to be implemented:

- The individual tree Tree No. 40 (Tag 140) is to be clearly marked prior to removal to avoid additional trees being mistakenly removed;
- Other isolated native tree species occurring within proximity to the development will require tempory fencing around their dripline to avoid disturbances such as compaction;

- The extent of all areas of native vegetation are to be clearly defined on the ground and permanently fenced to ensure they are not subject to disturbance during construction and future land practices within the site;
- Control of the Rabbit Population.
- Weed Control – weed control is to be undertaken within areas of remaining native vegetation.

7.2 PROTECTION OF NATIVE FAUNA

To protect native fauna within the site the following measures are required to be implemented:

- Feral animals particularly Foxes, Rabbits and Feral Cats, are to be controlled within the site. Feral Animal control will be required to be undertaken with the co-operation of neighbouring land owners.
- Fencing around areas of native vegetation should allow for the movement of native fauna such as Kangaroos. No barbed wire is to be used;
- Artificial lighting is to be kept to a minimum;
- It is recommended that low speed limits be set along the access roads to help avoid collision with any native fauna particularly Kangaroos.

To help ensure these mitigation measures are carried out, an Ecological Management Plan should be developed to address any likely impacts during construction and ensure the long-term viability of the nearby surrounding environment.

8.0 CONSIDERATIONS UNDER SECTION 5A OF THE EPA ACT

Considerations of the effects of the proposed development under the guidelines of Section 5A of the Environmental Planning and Assessment Act (1979) for the concerned threatened species is given below. The species dealt with are those identified during the fieldwork and those identified as having potential habitat available on site in Section 4.2.4.

For the purposes of the Environmental Planning and Assessment Act 1979 and, in particular, in the administration of sections 78, 79 and 112, the following factors have been taken into account in deciding whether there is likely to be a significant effect on this threatened species, populations or ecological communities, or their habitats:

- a) *in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.*

Threatened Flora

No threatened flora species were recorded within the site during the survey. Areas of native woodland and derived grassland within the site were found to contain suitable habitat for the seven flora species assessed:

- *Swainsona murrayana* (Slender Darling Pea);
- *Austrostipa metatoris* (A spear-grass);
- *Austrostipa wakoolica* (A Spear Grass);
- *Brachsycome papillosa* (Mossgiel Daisy);
- *Solanum karsense* (Menindee Nightshade)
- *Lepidium monoplacoides* (Winged Pepper-cress);
- *Leptorhynchus orientalis* (Lanky Buttons).

There were no nearby records of any of these seven species on the BioNet Atlas (OEH, 2017). As the development will almost entirely be located outside any suitable habitat and taking into consideration the recommendations of management and protection of areas of native vegetation on site, the proposal is unlikely to have a significant impact on any of the above listed flora species on site such that a local population would be placed at risk of extinction.

Threatened Fauna

Three threatened fauna species were recorded within the site during fieldwork, being:

- *Pomatostomus temporalis temporalis* (Grey-crowned Babbler);
- *Circus assimilis* (Spotted Harrier);
- *Chalinolobus picatus* (Little Pied-bat).

Due to the similarity of calls within the Genus *Nyctophilus*, the precautionary principle has been applied and further consideration has also been given to the threatened *Nyctophilus corbeni* (Corben's Long-eared Bat).

***Pomatostomus temporalis temporalis* (Grey-crowned Babbler);**

At least two groups of *Pomatostomus temporalis* subsp. *temporalis* (Grey-crowned Babblers) were observed and heard calling a number of times within the site. A small number of unkempt Grey-crowned Babbler nest/roost's were also recorded within areas of Belah Woodland near the residence. A number of local records for this species were present on the Bionet Wildlife Atlas (OEH, 2017). Suitable foraging nesting/roosting habitat were present within Belah and Red Mallee Woodland. The home range of any group of Grey-crowned Babblers would also include similar habitat occurring outside the site. As the development will almost entirely be located outside any suitable habitat (within cropping land) and taking into consideration the recommendations of management and protection of areas of native vegetation on site the proposal is unlikely to have a significant impact on *P. temporalis* subsp. *temporalis* such that a local population would be placed at risk of extinction.

***Circus assimilis* (Spotted Harrier)**

The Spotted Harrier was observed within the site on a number of occasions. At least one juvenile was also recorded indicating that breeding had likely occurred nearby. A number of local records of this species were present on the Bionet Wildlife Atlas (OEH, 2017). No large nests were recorded within the site. The site, particularly the areas of woodland and derived grassland contained suitable hunting habitat for this bird of prey. Areas of Belah Woodland also contained suitable nesting habitat.

As the development will almost entirely be located outside any suitable habitat (within cropping land) and taking into consideration the recommendations of management and protection of areas of native vegetation on site the proposal is unlikely to have a significant impact on the Spotted Harrier such that a local population would be placed at risk of extinction.

***Chalinolobus picatus* (Little Pied-bat) and *Nyctophilus corbeni* (Corben's Long-eared Bat)**

Chalinolobus picatus (Little Pied-bat) was positively recorded within the site as a result of the bat call survey. Due to the similarity of calls within the Genus *Nyctophilus*, the precautionary principle has been applied to include *Nyctophilus corbeni* (Corben's Long-eared Bat) as being possibly present within the site. No specimens of either species were captured during the harp trapping component of the survey. The majority of the site particularly areas of woodland and derived grassland and to a lesser extent cropland contained suitable hunting habitat for these microchiropteran bat species. A large amount of suitable roosting habitat in the form of tree hollows was present with areas of Belah Woodland and to a lesser extent Red Mallee Woodland. No hollow-bearing trees area required to be

removed for the proposal. It is unlikely that the proposal will have a significant impact on either of these microchiropteran bat species such that a local population would be placed at risk of extinction.

No further threatened fauna species were recorded within the site. Of the remaining 27 threatened fauna species assessed, the site was found to contain habitat of varying quality for 24:

- *Crinia sloanei* (Sloane's Froglet);
- *Litoria raniformis* (Southern Bell Frog);
- *Rostratula benghalensis australis* (Australian Painted Snipe);
- *Botaurus poiciloptilus* (Australasian Bittern);
- *Grus rubicunda* (Brolga);
- *Ardeotis australis* (Australian Bustard);
- *Stictonetta naevosa* (Freckled Duck);
- *Burhinus grallarius* (Bush Stone-curlew);
- *Pedionomus torquatus* (Plains Wanderer);
- *Leipoa ocellate* (Mallee Fowl);
- *Polytelis swainsonii* (Superb Parrot);
- *Lophochroa leadbeateri* (Major Mitchell's Cockatoo);
- *Epthianura albifrons* (White-fronted Chat);
- *Grantiella picta* (Painted Honeyeater);
- *Daphoenositta chrysoptera* (Varied Sittella);
- *Stagonopleura guttata* (Diamond Firetail);
- *Climacteris picumnus victoriae* (Brown Treecreeper);
- *Hamirostra melanosternon* (Black-breasted Buzzard);
- *Falco hypoleucos* (Grey Falcon);
- *Falco subniger* (Black Falcon);
- *Haliaeetus leucogaster* (White-bellied Sea-Eagle);
- *Hieraaetus morphnoides* (Little Eagle);
- *Tyto novaehollandiae* (Masked Owl);
- *Myotis macropus* (Southern Myotis).

Habitat for the majority of these species would largely be confined to the areas of woodland and derived grassland. Wah Wah Channel provides suitable habitat for the above listed amphibian and waterbird species. As the development will almost entirely be located outside any suitable habitat and taking into consideration the recommendations of management and protection of areas of native vegetation on site the proposal is unlikely to have a significant impact on the addressed threatened species such that a local population would be placed at risk of extinction.

b) *in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.*

Two endangered populations; *Climacteris affinis* (White-browed Treecreeper) population in Carrathool local government area south of the Lachlan River and Griffith local government area and the

Calyptorhynchus lathami (Glossy Black-cockatoo) – Riverina Population) are known to occur within the region.

Areas of Belah Woodland within the site contained suitable foraging and nesting habitat for the White-browed Treecreeper. The Riverina population of the Glossy Black-cockatoo hills is largely restricted to the low ridges where suitable stands of its food plant, *Allocasuarina verticillata* (Drooping She-Oak) are present such as Cocoparra Range approximately 57km to the east. The site would only provide maginal foraging and transitory habitat for this Cockatoo species.

As the development will almost entirely be located outside any suitable habitat and taking into consideration the recommendations of management and protection of areas of native vegetation on site the proposal is unlikely to have a significant impact on the addressed endangered populations such that a local population would be placed at risk of extinction.

- c) *in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:*
- (i) *is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
 - (ii) *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.*

No Endangered Ecological Communities were identified within the site at the time of the survey. Areas of the Endangered Ecological Community Weeping Myall Woodland were found to be present outside the site to the south-west along McRaes Road. One specimen of *Acacia pendula* (Weeping Myall) Tree No. 120 (Tag 220)(Appendix D) was recorded in the far north-east of the site. As this remnant tree was surrounded by cropping and was unlikely to be consistent with the Myall Woodland or Weeping Myall Woodlands definition of an Endangered Ecological Community. The specimen of *A. pendula* is located outside the development footprint and will not be impacted.

- d) *in relation to the habitat of a threatened species, population or ecological community:*
- (i) *the extent to which habitat is likely to be removed or modified as a result of the action proposed, and*
 - (ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*
 - (iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.*

The proposed Poultry Farm Complex (approximately 170ha footprint) has been positioned within cropping land to avoid the removal of native vegetation. The north-western access road upgrade is

likely to result in the removal of one native tree, Tree No. 40 (Tag 140) a specimen of *Eucalyptus socialis* (Red Mallee) to upgrade of the access road along the northern boundary of the site.

No areas of habitat important to the long-term survival of any threatened species, population or ecological community will be modified, fragmented or isolated as a result of the proposal.

e) *whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).*

None of the site has been designated 'critical habitat' under Part 3 of the TSC Act.

f) *whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.*

A Recovery Plan under the TSC Act (1995) has been completed for the Large Forest Owls (includes the Masked Owl), *Leipoa ocellate* (Mallee Fowl) and *Burhinus grallarius* (Bush Stone-curlew). National recovery plans have been completed for *Litoria raniformis* (Southern Bell Frog) and *Pedionomus torquatus* (Plains Wanderer). The proposal is unlikely to compromise any of these recovery plans.

No Recovery Plan has been developed for the remaining addressed species. However, the OEH has prepared Priority Action Statements (PAS) to promote the recovery of these species and the abatement of key threatening processes in NSW. The Priority Action Statements identified a number of broad strategies to help these species recover in NSW. It is considered that the proposal does not significantly conflict with the PAS for any of these species.

g) *whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The 'Key Threatening Processes' currently listed under Schedule 3 of the TSC Act that are relevant to the site have been listed below in Table 7.

Table 7: Key Threatening Processes.

Key Threatening Process	Applicability in regards to the site
Clearing of Native Vegetation.	Clearing of native vegetation will be confined to the removal of one remnant specimen of Red Mallee.
Loss of Hollow-bearing Trees.	No hollow-bearing trees are required to be removed as a result of the proposal.
Competition and grazing by the feral European Rabbit <i>Oryctolagus cuniculus</i>	The European Rabbit was recorded within the site. It is recommended that the Rabbit be controlled as part of future management within the site.

Key Threatening Process	Applicability in regards to the site
Invasion of native plant communities by exotic perennial grasses.	Exotic grasses were found to be present within the site and included species such as Wild Oats. It is recommended that exotic perennial grasses be controlled within the remaining areas of native vegetation within the site.
High frequency fire resulting in the disruption of life cycle processors in plants and animals and loss of vegetation structure and composition.	It is difficult to ascertain the disruption and structural changes, if any, past fires have caused the site. The proposal is unlikely to increase the frequency of fires on site.
Predation by the feral <i>Felis catus</i> (Cat).	A deceased Feral Cat was found within the site during fieldwork. This species would be considered to have an impact on native fauna in the local area. The proposal is not likely to result in an increase in numbers of this introduced species.
Predation by the European Red Fox <i>Vulpes vulpes</i>	The European Red Fox was recorded within the site on a number of occasions. The Red Fox would be considered to have an impact on native fauna in the local area. The proposal is not likely to result in an increase in numbers of this introduced species.
Predation, habitat degradation, competition and disease transmission by Feral Pigs <i>Sus scrofa</i>	No feral pigs were recorded within the site.
Competition from feral honeybees <i>Apis mellifera</i>	The proposal is unlikely to have any impact on the Feral Honeybee occurrence within the local area.
Removal of dead wood and dead trees	No dead wood or dead trees are required to be removed as a result of the proposal.
Infection of native plants by <i>phytophthora cinnamomi</i> .	This infection is not known to occur on site.
Infection of Frogs by amphibian chytrid fungus causing the disease chytridiomycosis.	It is possible that this fungus has an impact on frogs in the local area. The proposal is unlikely to increase infection from this fungus.
Aggressive exclusion of birds by Noisy Miners <i>Manorina melanocephala</i>	The Noisy Miner was not recorded within the site. The proposal is unlikely to significantly increase the impacts associated with this species.
Bushrock Removal	No significant areas of bushrock were present within the site.
Predation by <i>Gambusia holbrooki</i> Mosquito Fish or Plague Minnow	Mosquito Fish were observed to be present within the Wah Wah Channel running through the site. The proposal is not likely to have any impact on numbers of Mosquito Fish.
Competition and habitat degradation by Feral Goats <i>Capra hircus</i> .	No Feral Goats were recorded within the site.
Introduction and establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae	Although having the potential to infect the study area evidence of this recent fungus infection was not observed during fieldwork.
Infection by <i>Psittacine circoviral</i> (beak and feather) disease affecting endangered psittacine species.	The proposal is unlikely to increase infection by this disease.

9.0 CONSIDERATIONS UNDER SEPP 44 – ‘KOALA HABITAT PROTECTION’

The principal aim of State Environment Planning Policy 44 - Koala Habitat Protection is to encourage the proper conservation and management of areas of natural vegetation that provide habitat for Koalas to ensure a permanent free-living population over their present range and to reverse the current trend of Koala population decline.

This policy applies to areas of more than one hectare or an area which has together with any adjoining land in the same ownership an area of more than 1 hectare whether or not the development application applies to the whole, or only part of the land. In addressing SEPP44 there are two questions to be considered regarding the occurrence of ‘Potential’ and ‘Core’ Koala Habitat on site.

9.1 FIRST CONSIDERATION - IS THE LAND ‘POTENTIAL KOALA HABITAT’?

‘Potential Koala Habitat’ is defined in SEPP44 as, “...an area of native vegetation where trees of the type listed in Schedule 2 (Koala feed tree species) constitute at least 15% of the total number of trees in the upper or lower strata of the tree component”.

Three largely isolated specimens of *Eucalyptus populnea* (Bimblebox) a ‘Koala Feed Trees’, were identified within the site and would not comprised over 15% of the total trees present within the site therefore would not be considered to constitute Potential Koala Habitat and accordingly no further provisions of this policy apply to the site.

No koalas were identified during site surveys or within the site or nearby within the Bionet Atlas (OEH, 2017) nor was there any recent evidence such as scats and scratches to suggest recent use of the site by koalas.

10.0 AQUATIC ECOLOGY

10.1 AQUATIC HABITAT WITHIN THE STUDY AREA

No natural watercourses were noted onsite. Suitable habitat for a number of aquatic species was present within the constructed Wah Wah Irrigation Channel which cuts through the site from east the west and a small number of dams. A number of minor constructed irrigation channels were also connected to the main Wah Wah Channel. The nearest natural Water Course to the site is Wah Wah Creek which occurs approximately 300m to the SW of the site below McRaes Road.

10.2 AQUATIC SURVEY & ASSESSMENT

10.2.1 WATER QUALITY

Water quality was assessed within the Wah Wah Channel that flowed through the centre of the site. Water measurements were also taken within the dam near the residence in the south. Physical water quality measurements were sampled in situ at each site on 14 December 2016. Water quality was measured using a Horiba U 50 Water Meter. Parameters measured included pH, temperature, Oxidation Reduction Potential (ORP), Dissolved Oxygen (mg/L DO), Dissolved Oxygen (DO%), Conductivity (dS/m), Turbidity TDU, Total Dissolved Solids (TDS) and Salinity. The water parameters are shown in Table 8.

Table 8: Surface water quality measurements within the site.

Water parameter	Channel GDA 94 E – 367661 N - 6233100	Constructed Dam Near residence
Temperature 0C	22.63	25.25
pH	7.85	8.17
Oxidation Reduction Potential (ORP) pHmV	-57	-76
Dissolved Oxygen (mg/L DO)	5.75	8.95
Dissolved Oxygen (DO%),	68.4	110
Conductivity (mS/m),	1.20	0.583
Turbidity TDU	49	8.9
Total Dissolved Solids g/L TDS	0.765	0.388
Salinity ppt	0.6	0.3

The areas of surface water within Wah Wah Channel and the dam were found to be in relatively good condition.

10.2.2 AQUATIC VERTEBRATES WITHIN THE SITE

With the exception of amphibians, no targeted surveys were conducted for aquatic vertebrates such as fish within the site. Observation within the Wah Wah Channel found the introduced *Cyprinus carpio* (European Carp) and *Gambusia holbrooki* (Mosquitofish) to be common.

10.3 FISHERIES MANAGEMENT ACT (FM ACT)

The objectives of the Fisheries Management Act (FM Act) are to conserve, develop and share the fishery resources of the state for the benefit of present and future generations. Part 7A of the Fisheries Management Act 1994 (FM Act 1994) provides for the listing of threatened species, populations and endangered ecological communities. Table 9 lists the threatened species and endangered populations that may occur in the local area.

Table 9: Threatened Species and Populations that may occur within 10km of the proposal.

SPECIES	FM ACT 1994	HABITAT PREFERRED	HABITAT PRESENT
<i>Maccullochella macquariensis</i> (Trout Cod)	E	Occurring within the Murray-Darling drainage system. The site is adjacent to the reach of the Murray River containing the only remnant wild population of in NSW.	Suitable habitat is unlikely to be present.
<i>Craterocephalus fluviatilis</i> (Murray Hardyhead)	E	Known from the lower reaches of the Murray drainage system. It has suffered serious population decline in NSW, such that no populations are currently known in this State.	Marginal habitat was present within Wah Wah Channel.
<i>Notopala sublineata</i> (River Snail)	E	Was once common and widely distributed in the Murray-Darling system. This species was thought to be extinct in the lower Murray before being found in irrigation pipes in 1992.	Marginal habitat was present within Wah Wah Channel.
<i>Bidyanus bidyanus</i> (Silver Perch)	V	Has been recorded widely throughout the Murray-Darling Basin. Only one remnant natural population is known, which occurs downstream of Torrumbarry Weir in the Murray River.	Marginal habitat was present within Wah Wah Channel.
<i>Macquaria australasica</i> (Macquarie Perch)	V	Occurs naturally in western flowing drainages from the Lachlan River southward into Victoria.	Suitable habitat is unlikely to be present.
<i>Nannoperca australis</i> Southern (Pygmy Perch)	V	This species prefers slow-flowing waters, and still, vegetated habitats in small streams, lakes, billabongs and wetlands. Historical records show this species was common in NSW in the Murrumbidgee catchment upstream from Narrandra and in tributaries of the Murray River.	Suitable habitat is unlikely to be present.

SPECIES	FM ACT 1994	HABITAT PREFERRED	HABITAT PRESENT
<i>Ambassis agassizii</i> (Olive Perchlet)	EP	Rivers, creeks, ponds, reservoirs, drainage ditches and swamps.	Marginal habitat was present within Wah Wah Channel.
<i>Mogurnda adspersa</i> (Purple Spotted Gudgeon)	EP	Rivers Creeks and billabongs, usually in quite or slow flowing sections over rocks or among vegetation.	Suitable habitat is unlikely to be present.
<i>Maccullochella peelii peelii</i> (Murray Cod)	V EPBC Act.	Rivers Creeks and billabongs.	Marginal habitat was present within Wah Wah Channel.

E=Endangered Species

V=Vulnerable Species

EP=Endangered Population

10.3.1 SEVEN-PART TEST FOR THREATENED AQUATIC SPECIES

- a) *in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.*

No threatened aquatic species were recorded within the site during fieldwork. Four species of threatened fish and one snail listed above were considered to have suitable habitat within Wah Wah Channel:

- *Craterocephalus fluviatilis* (Murray Hardyhead);
- *Maccullochella peelii peelii* (Murray Cod);
- *Bidyanus bidyanus* (Silver Perch);
- *Nannoperca australis* (Southern Pygmy Perch);
- *Notopala sublineata* (River Snail).

Although a small number of aquatic species were recorded during fieldwork no targeted surveys for these species were completed during the survey.

The Poultry Farm Development is unlikely to have any impact on the Wah Wah Channel. Water falling on hard surfaces within the development will be contained in large storage dams.

The proposal is unlikely to have an adverse effect on any of the addressed species.

- b) *in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.*

Both the western populations of *Ambassis agassizii* (Olive Perchlet) and *Mogurnda adspersa* (Purple Spotted Gudgeon) are listed as endangered and occur in the drainages of the Murray Darling Basin. Neither of these species were considered to have suitable habitat within the site.

- c) *in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:*
- (i) *is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or*
 - (ii) *is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.*

No endangered or critically endangered community was identified within the site.

- d) *in relation to the habitat of a threatened species, population or ecological community:*
- (i) *the extent to which habitat is likely to be removed or modified as a result of the action proposed, and*
 - (ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*
 - (iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.*

The proposal is not likely to habitat any direct or indirect impacts on threatened species, populations or ecological communities listed under the Fisheries Management Act.

- e) *whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).*

None of the site has been designated 'critical habitat'.

- f) *whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan.*

A Recovery Plan has been completed for a number of the subject species. The proposal is unlikely to significantly compromise this plan.

- g) *whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

The proposed poultry farm is unlikely to cause or increase any 'Key Threatening Processes' currently listed on the schedules of the FM Act within the site.

11.0 CONSIDERATIONS UNDER THE COMMONWEALTH ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

Considerations have been made to the Commonwealth Environment Protection and Biodiversity Conservation (EPBC) Act 1999. Assessments have been made to determine whether or not the proposal or activity has, will have, or is likely to have a significant impact on a matter of National Environmental Significance. The matters of National Environmental Significance and the appropriate responses are listed below:

- *World Heritage properties;*

The proposed development is not considered to affect any World Heritage properties.

- *wetlands recognised under the Ramsar convention as having international significance;*

No RAMSAR Wetlands occur within the vicinity of the site.

- *listed threatened species and communities;*

No nationally threatened communities were considered to be present within the study area.

Twenty-three nationally threatened species were recorded on the DoEE database as occurring or having potential habitat available within 10km of the site, these being:

- *Swainsona murrayana* (Slender Darling Pea)
- *Austrostipa metatoris* (A spear-grass)
- *Austrostipa wakoolica* (A spear-grass)
- *Brachysycome papillosa* (Mossgiel Daisy)
- *Lepidium monoplocoides* (Winged Pepper-cress)
- *Solanum karsense* (Menindee Nightshade)
- *Swainsona murrayana* (Slender Darling-pea)
- *Galaxias rostratus* (Flathead Galaxias)
- *Maccullochella peelii* (Murray Cod)
- *Macquaria australasica* (Macquarie Perch)
- *Litoria raniformis* (Southern Bell Frog)
- *Calidris ferruginea* (Curlew Sandpiper)
- *Rostratula benghalensis australis* (Australian Painted Snipe)
- *Numenius madagascariensis* (Eastern Curlew)
- *Botaurus poiciloptilus* (Australian Bittern)
- *Pedionomus torquatus* (Plains-wanderer)
- *Leipoa ocellata* (Malleefowl)
- *Polytelis swainsonii* (Superb Parrot)
- *Pezoporus occidentalis* (Night Parrot)
- *Lophochroa leadbeateri* (Major Mitchell's Cockatoo)
- *Grantiella picta* (Painted Honeyeater)
- *Phascolarctos cinereus* (Koala)
- *Nyctophilus corbeni* (Corben's Long-eared Bat)

Under the EPBC Act Policy Statement 1.1 – Significant Impact Guidelines (DEWHA, 2009) an action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

- 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;
- fragment an existing important population into two or more populations;
- adversely affect habitat critical to the survival of a species;
- 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;
- result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;
- introduce disease that may cause the species to decline; or
- interfere substantially with the recovery of the species.

Only one nationally listed species *Nyctophilus corbeni* (Corben's Long-eared Bat) was considered to be present within the site. This species was addressed as a precaution due to the similarity of the calls between the Genus *Nyctophilus*. The proposal is not likely to have any significant impact on foraging and roosting habitat for this microchiropteran bat species.

Of the remaining nationally listed species suitable habitat in the form of woodland, derived grassland or Wah Wah Irrigation channel was considered to be present for all addressed species with the exception of *G. rostratus*, *M. australasica*, *N. madagascariensis*, *C. ferruginea* and *P. cinereus*. The proposal is unlikely to have a significant impact under the EPBC Act on any of the addressed species.

- *migratory species protected under international agreements;*

Eleven nationally listed migratory species were recorded on the DoEE on-line database as occurring or having potential habitat available within 10km of the study area, these being:

Migratory Terrestrial Species:

- *Motacilla flava* (Yellow Wagtail)
- *Myiagra cyanoleuca* (Satin Flycatcher)

Migratory Wetland Species:

- *Actitis hypoleucos* (Common Sandpiper)
- *Calidris acuminata* (Sharp-tailed Sandpiper)
- *Calidris ferruginea* (Curlew Sandpiper)
- *Calidris melanotos* (Pectoral Sandpiper)
- *Gallinago hardwickii* (Latham's Snipe)
- *Numenius madagascariensis* (Eastern Curlew)
- *Pandion haliaetus* (Osprey)
- *Tringa nebularia* (Common Greenshank)

Migratory Marine Birds

- *Apus pacificus* (Fork-tailed Swift)

Under the EPBC Act Policy Statement 1.1 – Significant Impact Guidelines (Department of the Environment, Water, Heritage and the Arts, 2009) an action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species.
- Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or
- Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

No migratory species were recorded within the site during fieldwork. Considering the small impact on habitat in the locality it is unlikely that these listed migratory species would be significantly impacted by the proposed Poultry Farm.

- *nuclear activities;*

The proposal does not involve any type of nuclear activity.

- *the Commonwealth marine environment;*

The proposal does not involve the modification of the Commonwealth marine environment.

12.0 CONCLUSION

Flora, fauna and habitat studies have been undertaken over approximately 615.9ha of land (the site) composed of two parcels of land Lots 1 & 2 DP 749831 for a proposed Poultry Farm Complex off the Mid Western Highway 17km south-west of the town of Goolgowi.

The development will comprise five farms, each with a carrying capacity of 1.2 million birds in 20 Intensive Agricultural Industries – Poultry Tunnel Ventilated Sheds and associated infrastructure. The proposed Poultry Farm Complex has an approximate footprint of 170ha and has been positioned within cropping land to avoid the removal of native vegetation with the exception of an individual tree, a specimen of *Eucalyptus socialis* (Red Mallee) will likely require removal to upgrade of the access road along the northern boundary of the site.

The topography of the site and surrounding lands is flat and largely consisted of alkaline brown calcareous soils. Approximately 560ha of the 615.9ha site has been significantly modified by historic land clearing and long term agricultural activities particularly broad-scale-cropping. At the time of the survey the majority of the site was used for irrigated wheat cropping. The Wah Wah Channel which provided irrigation water for the site cut through the middle of the site. Despite the disturbance patches of remnant native vegetation were present around parts of the periphery of the site. Woodland patches primarily composed of the canopy species *Casuarina cristata* (Belah) occupied approximately 51ha of the site within the south-west corner and south-east. Other smaller areas of native vegetation included approximately 1.7ha of woodland in the north-west dominated by *Eucalyptus socialis* (Red Mallee).

No Endangered Ecological Communities or threatened plant species were recorded within the site. Areas of native native woodland and derived grassland within the site were found to contain suitable habitat for the seven of the addressed threatened flora species.

Three threatened fauna species were recorded within the site during fieldwork, being *Pomatostomus temporalis temporalis* (Grey-crowned Babbler), *Circus assimilis* (Spotted Harrier) and *Chalinolobus picatus* (Little Pied-bat). Due to the similarity of calls within the Genus *Nyctophilus*, the precautionary principle has been applied and further consideration has also been given to the possibility of the threatened *Nyctophilus corbeni* (Corben's Long-eared Bat) also utilising the site. Of the remaining 27 threatened fauna species assessed, the site was found to contain habitat of varying quality for 24 species.

Habitat for the majority of the addressed threatened fauna species would largely be confined to the areas of woodland and derived native grassland. Wah Wah Channel provides suitable habitat for the addressed threatened amphibian and waterbird species. As the development will almost entirely be

located outside any suitable habitat the proposal is unlikely to have a significant impact on the addressed threatened species such that a local population would be placed at risk of extinction.

As a result of the presence of Wah Wah Irrigation Channel flowing through the site considerations have been made to Part 7A of the Fisheries Management Act 1994 (FM Act) in relation to a number of listed threatened aquatic species, populations and endangered ecological communities. No Endangered Aquatic Community was identified on site. Targeted surveys for threatened fauna species were not undertaken however suitable habitat was found to be present for a small number of addressed species. The proposal Poultry Farm Complex is not likely to have any significant impact on the waters of Wah Wah Channel therefore effect any nearby threatened aquatic species, populations or endangered ecological communities.

Three largely isolated specimens of *Eucalyptus populnea* (Bimblebox) a 'Koala Feed Tree' under SEPP 44 Koala Habitat Protection were identified within the site, however would not comprise over 15% of the total trees present. Therefore, the site would not be considered to constitute Potential Koala Habitat and accordingly no further provisions of this policy apply to the site.

Considerations have been made to the Commonwealth Environment Protection and Biodiversity Conservation (EPBC) Act (1999). It was determined that the proposal should have no significant impact on a matter of National Environmental Significance.

In conclusion, as the proposed Poultry Farm Complex will be positioned within cropping land and will avoid all areas of native vegetation with the exception of one tree the potential for conflict between the development and the existing native flora and fauna is considered low. Taking into consideration the recommendations of management and protection of areas of native vegetation within the site, the proposal is unlikely to significantly impact any habitat important to the long-term survival of the addressed threatened species, endangered population or endangered ecological communities in the locality.

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APPENDIX A

SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS

Secretary's Environmental Assessment Requirements

Section 78A(8A) of the *Environmental Planning and Assessment Act 1979*

State significant development

Application Number	SSD 8036
Development	Intensive Livestock Agriculture – Poultry Farm Complex
Location	375 McRaes Road, Goolgowi, Carrathool Local Government Area (Lot 1 and 2 DP 749831)
Applicant	Muscat Developments Pty Ltd
Date of Issue	November 2016
General Requirements	The Environmental Impact Statement (EIS) must meet the minimum form and content requirements in clauses 6 and 7 of Schedule 2 the <i>Environmental Planning and Assessment Regulation 2000</i>. The EIS must include: • a detailed description of the development including: – the full scope of proposed works; – need and justification for the proposed development; – likely staging of the development; – likely interactions between the development and existing, approved and proposed developments in the vicinity of the site; and – plans of any proposed works. • consideration of all relevant environmental planning instruments, including identification and justification of any inconsistencies with these instruments; • risk assessment of the potential environmental impacts of the development; identifying key issues for further assessment; • detailed assessment, where relevant, of the key issues below, and any other potential significant issues identified in the risk assessment, must include: – a description of the existing environment, using adequate baseline data; – consideration of potential cumulative impacts due to other development in the vicinity; and – measures to avoid, minimise and if necessary, offset the predicted impacts, including detailed contingency plans for adaptive management of any significant risks to the environment. • consolidated summary of all the proposed environmental management and monitoring measures, highlighting commitments included in the EIS. The EIS must be accompanied by a report from a qualified quantity surveyor providing: • a detailed calculation of the capital investment value (CIV) of the proposal (as defined in clause 3 of the <i>Environmental Planning and Assessment Regulation 2000</i>), including details of all assumptions and components from which the CIV calculation is derived; • an estimate of the jobs that will be created by the development during the construction and operational phases; and • certification that the information provided is accurate at the date of preparation.
Key issues	The EIS must include an assessment of the potential impacts of the proposal (including cumulative impacts) and develop appropriate measures to avoid, mitigate, manage and/or offset these impacts. The EIS must address the

	following specific matters: • strategic context – including: – justification for the proposal and suitability of the site; – demonstration that the proposal is generally consistent with all relevant planning strategies and environmental planning instruments, and justification for any inconsistencies; – details of any proposed consolidation or subdivision of land; and – a land use conflict assessment including reference to separation distances and best management practices. • air quality and odour – including: – a quantitative odour and air quality impact assessment in accordance with the relevant Environment Protection Authority (EPA) guidelines, including appropriate consideration of impacts on nearby residents; – evidence of appropriate meteorological data for use in air dispersion modelling; – a description of all potential air quality impacts (odour and dust) on surrounding receptors including the cumulative impacts from the proposal and other proposed or existing poultry broiler farms in the locality; – inclusion of 'worst case' emission scenarios and sensitivity analyses; – a contingency plan to address unpredicted operational odour impacts; and – a description and appraisal of air quality and odour impact monitoring, emission control techniques and mitigation measures. • transport and road traffic – including: – a quantitative traffic impact assessment prepared in accordance with the relevant Council, Austroads and Roads and Maritime Services guidelines; – details of all daily and peak traffic and transport movement likely to be generated during construction and operation of the proposed development including a description of haul routes, vehicle types, vehicle access routes and impacts on nearby intersections; – an assessment of predicted impacts on road safety and the capacity of the transport network to accommodate the development, including an appraisal of any impact mitigation measures and required infrastructure upgrades and consideration of cumulative impacts using SIDRA or a similar model; – details of access to the site from the road network including intersection location, design and sight distances; and – detailed plans for the layout of the internal roads and parking in accordance with the relevant Australian standards. • soils and water – including: – an accurate description of operational water demands, a breakdown of water supplies (including any water licensing requirements), a description of measures to minimise water use and evidence of an adequate and secure water supply; – a detailed site water balance; – a contingency plan for water supply in the event of drought conditions; – an assessment of the impacts to surface and groundwater resources and impacts to any groundwater dependant ecosystems; – a flood impact assessment of the development as a result of any proposed changes to the landform and building areas; – details of any works proposed to intercept, connect or infiltrate groundwater sources; – a description of surface, groundwater and stormwater management, including on site detention, flood impact mitigation and measures to treat or reuse water; – an assessment of any potential existing soil contamination in
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	accordance with <i>Managing Land Contamination Planning Guidelines: SEPP55 – Remediation of Land</i> (DUAP, 1998); and – a description and appraisal of impact mitigation, management, maintenance and monitoring measures. • waste and wastewater management – including: – identification and classification of waste streams that would be generated at the site in accordance with the <i>Waste Classification Guidelines</i> (EPA, 2014); – a description of waste handling, transport, identification, receipt, processing, stockpiling and quality control; – a description of proposed management and disposal of wastewater, leachate and effluent; – details on containment and monitoring of wastewater and waste streams; – the measures that would be implemented to ensure that the proposed development is consistent with the aims, objectives and guidelines in the <i>NSW Waste Avoidance and Resource Recovery Strategy 2014-21</i>; and – a description and appraisal of waste impact mitigation, contingencies and management. • biodiversity – including: – an assessment of biodiversity impacts in accordance with the <i>Framework for Biodiversity Assessment</i> (OEH, 2014) and the <i>NSW Biodiversity Offsets Policy for Major Projects</i> (OEH, 2014), including the GIS data files used in the assessment; and – accurate predictions of any vegetation clearing on or off the site, including buildings, access roads and servicing and support infrastructure. • noise and vibration – including: – a quantitative noise and vibration impact assessment in accordance with the relevant Environment Protection Authority guidelines; – a description of all potential noise and vibration sources during construction and operation, including traffic noise; and – a description of noise and vibration monitoring and mitigation measures. • hazards and risk – including: – a preliminary risk screening completed in accordance with <i>State Environmental Planning Policy No. 33 – Hazardous and Offensive Development</i> and Applying SEPP 33 (DoP, 2011), with a clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development; and – should preliminary screening indicate that the project is 'potentially hazardous,' a Preliminary Hazard Analysis (PHA) must be prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6 - <i>Guidelines for Hazard Analysis</i> (DoP, 2011) and <i>Multi-Level Risk Assessment</i> (DoP, 2011). • animal welfare, bio-security and disease management – including: – details of how the proposed development would comply with relevant codes of practice and guidelines; – a biosecurity assessment between other nearby poultry farms and any potential waterbird habitat(s); – details of all disease control measures; and – a detailed description of the contingency measures that would be implemented for the disposal of livestock during operation and in the event of disease outbreak. • visual impacts – including: – a description of the visual catchment and visual impacts including lighting impacts on surrounding receivers and public areas; and – an appraisal of visual impact mitigation measures.
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	• socio-economic – including: – an analysis of the economic and social impacts of the development, particularly of any benefits to the community. • infrastructure – including details of any upgrades or extension to existing services infrastructure. • contributions – including consideration of relevant Carrathool Contributions Plans and/or details of any Voluntary Planning Agreement. • bushfire and incident management.
Plans and Documents	The EIS must include all plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the Environmental Planning and Assessment Regulation 2000. These documents should be included as part of the EIS rather than as separate documents.
Consultation	During the preparation of the EIS, you must consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners. In particular you must consult with: • Carrathool Shire Council; • Environment Protection Authority; • Office of Environment and Heritage; • Department of Primary Industries; • Roads and Maritime Services; • Essential Energy; • WaterNSW; • SafeWork; • Riverina Local Land Services; and • Local community and other stakeholders. The EIS must describe the consultation process and the issues raised, and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, an explanation should be provided.
Further consultation after 2 years	If you do not lodge a development application and EIS for the development within 2 years, you must consult further with the Secretary in relation to the preparation of the EIS.
References	The assessment of the key issues listed above must take into account relevant guidelines, policies, strategies and plans. While not exhaustive, Attachment 1 contains a list that may be relevant to the assessment of this proposal.

ATTACHMENT 1 **Technical and Policy Guidelines**

The following guidelines may assist in the preparation of the Environmental Impact Statement. This list is not exhaustive and not all of these guidelines may be relevant to your proposal.

Many of these documents can be found on the following websites:

<http://www.planning.nsw.gov.au>
<http://www.bookshop.nsw.gov.au>
<http://www.publications.gov.au>

Policies, Guidelines and Plans

Plans and Documents

The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the Environmental Planning and Assessment Regulation 2000. Provide these as part of the EIS rather than as separate documents.

In addition, the EIS must include the following:

1. An existing site survey plan drawn at an appropriate scale illustrating:
 - the location of the land, boundary measurements, area (sq.m) and north point;
 - the existing levels of the land in relation to buildings and roads;
 - location and height of existing structures on the site;
 - location and height of adjacent buildings and private open space; and
 - all levels to be to Australian Height Datum (AHD).
2. A locality/context plan drawn at an appropriate scale should be submitted indicating:
 - significant local features such as heritage items;
 - the location and uses of existing buildings, shopping and employment areas; and
 - traffic and road patterns, pedestrian routes and public transport nodes.
3. Drawings at an appropriate scale illustrating:
 - detailed plans, sections and elevations of the existing building, which clearly show all proposed internal and external alterations and additions.

Documents to be Submitted

- Documents to submit include:
- 1 hard copy and 1 electronic copy of all the documents and plans for review prior to exhibition; and
 - Other copies as determined by the Department once the development application is lodged

Air Quality

Protection of the Environment Operations (Clean Air) Regulation 2010
 Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (EPA, 2005)
 Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (EPA, 2005)
 Assessment and Management of Odour from Stationary Sources in NSW (EPA, 2006)
 Meat chicken farm calculator (EPA, 2011)

Odour	Technical Framework: Assessment and Management of Odour from Stationary Sources in NSW (DEC)
	Technical Notes: Assessment and Management of Odour from Stationary Sources in NSW (DEC)
Traffic	Guide to Traffic Generating Development (RTA)
	Road Design Guide (RTA)
Soil and Water	
Soil	Managing Urban Stormwater: Soils & Construction (Landcom)
	Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC & NHMRC)
	National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPC)
	State Environmental Planning Policy No. 55 – Remediation of Land
Surface Water	Managing Land Contamination - Planning Guidelines SEPP 55 – Remediation of Land (DUAP and EPA)
	National Water Quality Management Strategy: Water quality management - an outline of the policies (ANZECC/ARMCANZ)
	National Water Quality Management Strategy: Policies and principles - a reference document (ANZECC/ARMCANZ)
	National Water Quality Management Strategy: Implementation guidelines (ANZECC/ARMCANZ)
	National Water Quality Management Strategy: Australian Guidelines for Fresh and Marine Water Quality (ANZECC/ARMCANZ, 2000)
	National Water Quality Management Strategy: Australian Guidelines for Water Quality Monitoring and Reporting (ANZECC/ARMCANZ, 2000)
	Using the ANZECC Guideline and Water Quality Objectives in NSW (EPA, 2006)
	State Water Management Outcomes Plan
	NSW Government Water Quality and River Flow Environmental Objectives (DECC)
	Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (DEC)
	Sorting and Handling Liquids: Environmental Protection – Participants Manual (DECC)
	Managing Urban Stormwater: Council Handbook. Draft (EPA)
	Managing Urban Stormwater: Treatment Techniques (EPA, 1997)
	Managing Urban Stormwater: Source Control. Draft (EPA)
	Managing Urban Stormwater: Soils & Construction (Landcom, 2004)
	Technical Guidelines: Bunding & Spill Management (DECC)
	National Water Quality Management Strategy Guidelines for Groundwater Protection in Australia (ARMCANZ/ANZECC, 1995)
	NSW State Groundwater Policy Framework Document (DLWC, 1997)
	NSW State Groundwater Quality Protection Policy (DLWC, 1998)
Groundwater	NSW State Groundwater Dependent Ecosystems Policy (DLWC, 2002)
	Managing Urban Stormwater: Soils and Construction (Landcom, 2004)
Stormwater	Managing Urban Stormwater: Treatment Techniques (Draft) (EPA, 1997)
Wastewater	Environmental Guidelines: Use of Effluent by Irrigation (EPA, 2004)
	Environmental Guidelines: Storage and Handling of Liquids (EPA, 2007)
Waste	
	NSW Waste Avoidance and Resource Recovery Strategy 2014-21 (EPA, 2014)
	Waste Classification Guidelines (EPA, 2014)
	Environmental Guidelines: Assessment Classification and Management of Non-Liquid and Liquid Waste (NSW EPA)
	Environmental Guidelines: Use and Disposal of Biosolids Products (EPA, 1997)

Biodiversity	NSW Biodiversity Offsets Policy for Major Projects (OEH, 2014) Framework for Biodiversity Assessment – NSW Biodiversity Offsets Policy for Major Projects (2014, OEH) Principles for the use of Biodiversity Offsets in NSW (DECC, 2008); State Environmental Planning Policy No 44 – Koala Habitat Protection (SEPP 44) The NSW State Groundwater Dependent Ecosystem Policy (DLWC)
Noise and Vibration	NSW Industrial Noise Policy (EPA, 2000) and Industrial Noise Policy Application Notes NSW Road Noise Policy (EPA, 2011) Assessing Vibration: a Technical Guide (EPA, 2006) Interim Construction Noise Guidelines (EPA, 2009)
Hazards and Risk	State Environmental Planning Policy No. 33 – Hazardous and Offensive Development Applying SEPP 33 – Hazardous and Offensive Development Application Guidelines (DUAP) Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis
Animal Welfare and Biosecurity	National Farm Biosecurity Manual – Poultry Production (2009) National Farm Biosecurity Manual for Chicken Growers (Australian Chicken Meat Federation 2009) Best Practice Management for Meat Chicken Production in New South Wales Manual 1 - Site Selection & Development (DPI 2012) Best Practice Management for Meat Chicken Production in New South Wales Manual 2 - Meat Chicken Growing Management (DPI 2012)
Greenhouse Gas	AGO Factors and Methods Workbook (AGO) Guidelines for Energy Savings Action Plans (DEUS, 2005)

ATTACHMENT 2
Public Authority Responses to Request for Key Issues



Department of
Primary Industries

OUT16/18204

Mr Thomas Piovesan
Industry Assessments
NSW Department of Planning and Environment
GPO Box 39
SYDNEY NSW 2001

Thomas.piovesan@planning.nsw.gov.au

Dear Mr Piovesan

**Carrathool Intensive Poultry Farm (SSD TBA)
Request for Secretary's Environmental Assessment Requirements**

I thank you for your email of 20 April 2016 to the Department of Primary Industries in respect to the above matter. Comment has been sought from relevant divisions of DPI. Any further referrals to DPI can be sent by email to landuse.enquiries@dpi.nsw.gov.au.

DPI has reviewed the request and recommends that the following matters are also required to be addressed in the SEARs:

- The SEARs should require consideration of the following:
 - NSW Aquifer Interference Policy (2012)
 - Guidelines for controlled activities on waterfront land
 - Relevant water sharing plan(s) under the *Water Management Act 2000*
- The SEARs should require a land use conflict risk assessment particularly relating to separation distances and management practices to minimise odour, dust and noise for sensitive receptors referencing the "Land Use Conflict Risk Assessment Guide":
http://www.dpi.nsw.gov.au/data/assets/pdf_file/0018/412551/Land-use-conflict-risk-assessment-LUCRA-guide.pdf.

It is further recommended that the EIS be required to include:

- Annual volumes of surface water and groundwater proposed to be taken by the activity (including through inflow and seepage) from each surface and groundwater source as defined by the relevant water sharing plan.
- Assessment of any volumetric water licensing requirements (including those for ongoing water take following completion of the project).
- The identification of an adequate and secure water supply for the life of the project. Confirmation that water can be sourced from an appropriately authorised and reliable supply. This is to include an assessment of the current market depth where water entitlement is required to be purchased.
- A detailed and consolidated site water balance.

NSW Department of Primary Industries
Level 11, 323 Castlereagh Street Sydney NSW 2000
Tel: 02 9934 0804 landuse.enquiries@dpi.nsw.gov.au ABN: 72 189 919 072

- Assessment of impacts on surface and ground water sources (both quality and quantity), related infrastructure, adjacent licensed water users, basic landholder rights, watercourses, riparian land, and groundwater dependent ecosystems, and measures proposed to reduce and mitigate these impacts.
- Clear identification of "waterfront land" (as defined in the Water Management Act 2000) and an assessment of impacts of works and activities on waterfront land.
- Full technical details and data of all surface and groundwater modelling required to support the EIS.
- Proposed surface and groundwater monitoring activities and methodologies.
- Assessment of any potential cumulative impacts on water resources, and any proposed options to manage the cumulative impacts.
- Consideration of relevant policies and guidelines.
- A statement of where each element of the SEARs is addressed in the EIS (i.e. in the form of a table).

Further detailed generic assessment requirements from DPI Water that may assist the proponent are included at Attachment A.

Should you require further information please contact Tim Baker, Senior Water Regulation Officer on (02) 68417403, Tim.Baker@dpi.nsw.gov.au.

Yours sincerely



Mitchell Isaacs
Director, Planning Policy & Assessment Advice
11/5/2016

Attachment A

**Carrathool Intensive Poultry Farm (SSD TBA)
Request for Secretary's Environment Assessment Requirements
Detailed comments – DPI Water**

DPI Water General Assessment Requirements for general projects

The following detailed assessment requirements are provided to assist in adequately addressing the assessment requirements for this proposal.

For further information visit the DPI Water website, www.water.nsw.gov.au

Key Relevant Legislative Instruments

This section provides a basic summary to aid proponents in the development of an Environmental Impact Statement (EIS), and should not be considered a complete list or comprehensive summary of relevant legislative instruments that may apply to the regulation of water resources for a project.

The EIS should take into account the objects and regulatory requirements of the *Water Act 1912* (WA 1912) and *Water Management Act 2000* (WMA 2000), and associated regulations and instruments, as applicable.

Water Management Act 2000 (WMA 2000)

Key points:

- Volumetric licensing in areas covered by water sharing plans
- Works within 40m of waterfront land
- SSD & SSI projects are exempt from requiring water supply work approvals and controlled activity approvals as a result of the *Environmental Planning & Assessment Act 1979* (EP&A Act).
- No exemptions for volumetric licensing apply as a result of the *EP&A Act*.
- Basic landholder rights, including harvestable rights dams
- Aquifer interference activity approval and flood management work approval provisions have not yet commenced and are regulated by the *Water Act 1912*
- Maximum penalties of \$2.2 million plus \$264,000 for each day an offence continues apply under the *WMA 2000*

Water Act 1912 (WA 1912)

Key points:

- Volumetric licensing in areas where no water sharing plan applies
- Monitoring bores
- Aquifer interference activities that are not regulated as a water supply work under the *WMA 2000*.
- Flood management works
- No exemptions apply to licences or permits under the *WA 1912* as a result of the *EP&A Act*.
- Regulation of water bore driller licensing.

Water Management (General) Regulation 2011

Key points:

- Provides various exemptions for volumetric licensing and activity approvals
 - Provides further detail on requirements for dealings and applications.
-

Water Sharing Plans – these are considered regulations under the *WMA 2000*

Access Licence Dealing Principles Order 2004

Harvestable Rights Orders

Water Sharing Plans

It is important that the proponent understands and describes the ground and surface water sharing plans, water sources, and management zones that apply to the project. The relevant water sharing plans can be determined spatially at www.ourwater.nsw.gov.au. Multiple water sharing plans may apply and these must all be described.

The *Water Act 1912* applies to all water sources not yet covered by a commenced water sharing plan.

The EIS is required to:

- Demonstrate how the proposal is consistent with the relevant rules of the Water Sharing Plan including rules for access licences, distance restrictions for water supply works and rules for the management of local impacts in respect of surface water and groundwater sources, ecosystem protection (including groundwater dependent ecosystems), water quality and surface-groundwater connectivity.
- Provide a description of any site water use (amount of water to be taken from each water source) and management including all sediment dams, clear water diversion structures with detail on the location, design specifications and storage capacities for all the existing and proposed water management structures.
- Provide an analysis of the proposed water supply arrangements against the rules for access licences and other applicable requirements of any relevant WSP, including:
 - Sufficient market depth to acquire the necessary entitlements for each water source.
 - Ability to carry out a “dealing” to transfer the water to relevant location under the rules of the WSP.
 - Daily and long-term access rules.
 - Account management and carryover provisions.
- Provide a detailed and consolidated site water balance.
- Further detail on licensing requirements is provided below.

Relevant Policies and Guidelines

The EIS should take into account the following policies (as applicable):

- NSW Guidelines for Controlled Activities on Waterfront Land (NOW, 2012)
- NSW Aquifer Interference Policy (NOW, 2012)
- Risk Assessment Guidelines for Groundwater Dependent Ecosystems (NOW, 2012)
- Australian Groundwater Modelling Guidelines (NWC, 2012)
- NSW State Rivers and Estuary Policy (1993)
- NSW Wetlands Policy (2010)
- NSW State Groundwater Policy Framework Document (1997)
- NSW State Groundwater Quality Protection Policy (1998)
- NSW State Groundwater Dependent Ecosystems Policy (2002)
- NSW Water Extraction Monitoring Policy (2007)

DPI Water policies can be accessed at the following links:

<http://www.water.nsw.gov.au/Water-management/Law-and-policy/Key-policies/default.aspx>
<http://www.water.nsw.gov.au/Water-licensing/Approvals/Controlled-activities/default.aspx>

An assessment framework for the NSW Aquifer Interference Policy can be found online at:
<http://www.water.nsw.gov.au/Water-management/Law-and-policy/Key-policies/Aquifer-interference>.

Licensing Considerations

The EIS is required to provide:

- Identification of water requirements for the life of the project in terms of both volume and timing (including predictions of potential ongoing groundwater take following the cessation of operations at the site – such as evaporative loss from open voids or inflows).
- Details of the water supply source(s) for the proposal including any proposed surface water and groundwater extraction from each water source as defined in the relevant Water Sharing Plan/s and all water supply works to take water.
- Explanation of how the required water entitlements will be obtained (i.e. through a new or existing licence/s, trading on the water market, controlled allocations etc.).
- Information on the purpose, location, construction and expected annual extraction volumes including details on all existing and proposed water supply works which take surface water, (pumps, dams, diversions, etc).
- Details on all bores and excavations for the purpose of investigation, extraction, dewatering, testing and monitoring. All predicted groundwater take must be accounted for through adequate licensing.
- Details on existing dams/storages (including the date of construction, location, purpose, size and capacity) and any proposal to change the purpose of existing dams/storages
- Details on the location, purpose, size and capacity of any new proposed dams/storages.
- Applicability of any exemptions under the *Water Management (General) Regulation 2011* to the project.

Water allocation account management rules, total daily extraction limits and rules governing environmental protection and access licence dealings also need to be considered.

The Harvestable Right gives landholders the right to capture and use for any purpose 10% of the average annual runoff from their property. The Harvestable Right has been defined in terms of an equivalent dam capacity called the Maximum Harvestable Right Dam Capacity (MHRDC). The MHRDC is determined by the area of the property (in hectares) and a site-specific run-off factor. The MHRDC includes the capacity of all existing dams on the property that do not have a current water licence. Storages capturing up to the harvestable right capacity are not required to be licensed but any capacity of the total of all storages/dams on the property greater than the MHRDC may require a licence.

For more information on Harvestable Right dams, including a calculator, visit:

<http://www.water.nsw.gov.au/Water-licensing/Basic-water-rights/Harvesting-runoff/Harvesting-runoff>

Dam Safety

Where new or modified dams are proposed, or where new development will occur below an existing dam, the NSW Dams Safety Committee should be consulted in relation to any safety issues that may arise. Conditions of approval may be recommended to ensure safety in relation to any new or existing dams.

See www.damsafety.nsw.gov.au for further information.

Surface Water Assessment

The predictive assessment of the impact of the proposed project on surface water sources should include the following:

- Identification of all surface water features including watercourses, wetlands and floodplains transected by or adjacent to the proposed project.
- Identification of all surface water sources as described by the relevant water sharing plan.
- Detailed description of dependent ecosystems and existing surface water users within the area, including basic landholder rights to water and adjacent/downstream licensed water users.
- Description of all works and surface infrastructure that will intercept, store, convey, or otherwise interact with surface water resources.
- Assessment of predicted impacts on the following:
 - flow of surface water, sediment movement, channel stability, and hydraulic regime,
 - water quality,
 - flood regime,
 - dependent ecosystems,
 - existing surface water users, and
 - planned environmental water and water sharing arrangements prescribed in the relevant water sharing plans.

Groundwater Assessment

To ensure the sustainable and integrated management of groundwater sources, the EIS needs to include adequate details to assess the impact of the project on all groundwater sources.

Where it is considered unlikely that groundwater will be intercepted or impacted (for example by infiltration), a brief site assessment and justification for the minimal impacts may be sufficient, accompanied by suitable contingency measures in place in the event that groundwater is intercepted, and appropriate measures to ensure that groundwater is not contaminated.

Where groundwater is expected to be intercepted or impacted, the following requirements should be used to assist the groundwater assessment for the proposal.

- The known or predicted highest groundwater table at the site.
- Works likely to intercept, connect with or infiltrate the groundwater sources.
- Any proposed groundwater extraction, including purpose, location and construction details of all proposed bores and expected annual extraction volumes.
- Bore construction information is to be supplied to DPI Water by submitting a "Form A" template. DPI Water will supply "GW" registration numbers (and licence/approval numbers if required) which must be used as consistent and unique bore identifiers for all future reporting.

- A description of the watertable and groundwater pressure configuration, flow directions and rates and physical and chemical characteristics of the groundwater source (including connectivity with other groundwater and surface water sources).
- Sufficient baseline monitoring for groundwater quantity and quality for all aquifers and GDEs to establish a baseline incorporating typical temporal and spatial variations.
- The predicted impacts of any final landform on the groundwater regime.
- The existing groundwater users within the area (including the environment), any potential impacts on these users and safeguard measures to mitigate impacts.
- An assessment of groundwater quality, its beneficial use classification and prediction of any impacts on groundwater quality.
- An assessment of the potential for groundwater contamination (considering both the impacts of the proposal on groundwater contamination and the impacts of contamination on the proposal).
- Measures proposed to protect groundwater quality, both in the short and long term.
- Measures for preventing groundwater pollution so that remediation is not required.
- Protective measures for any groundwater dependent ecosystems (GDEs).
- Proposed methods of the disposal of waste water and approval from the relevant authority.
- The results of any models or predictive tools used.

Where potential impact/s are identified the assessment will need to identify limits to the level of impact and contingency measures that would remediate, reduce or manage potential impacts to the existing groundwater resource and any dependent groundwater environment or water users, including information on:

- Any proposed monitoring programs, including water levels and quality data.
- Reporting procedures for any monitoring program including mechanism for transfer of information.
- An assessment of any groundwater source/aquifer that may be sterilised from future use as a water supply as a consequence of the proposal.
- Identification of any nominal thresholds as to the level of impact beyond which remedial measures or contingency plans would be initiated (this may entail water level triggers or a beneficial use category).
- Description of the remedial measures or contingency plans proposed.
- Any funding assurances covering the anticipated post development maintenance cost, for example on-going groundwater monitoring for the nominated period.

Groundwater Dependent Ecosystems

The EIS must consider the potential impacts on any Groundwater Dependent Ecosystems (GDEs) at the site and in the vicinity of the site and:

- Identify any potential impacts on GDEs as a result of the proposal including:
 - the effect of the proposal on the recharge to groundwater systems;
 - the potential to adversely affect the water quality of the underlying groundwater system and adjoining groundwater systems in hydraulic connections; and
 - the effect on the function of GDEs (habitat, groundwater levels, connectivity).
- Provide safeguard measures for any GDEs.

Watercourses, Wetlands and Riparian Land

The EIS should address the potential impacts of the project on all watercourses likely to be affected by the project, existing riparian vegetation and the rehabilitation of riparian land. It is recommended the EIS provides details on all watercourses potentially affected by the proposal, including:

- Scaled plans showing the location of:
 - wetlands/swamps, watercourses and top of bank;
 - riparian corridor widths to be established along the creeks;
 - existing riparian vegetation surrounding the watercourses (identify any areas to be protected and any riparian vegetation proposed to be removed);
 - the site boundary, the footprint of the proposal in relation to the watercourses and riparian areas; and
 - proposed location of any asset protection zones.
- Photographs of the watercourses/wetlands and a map showing the point from which the photos were taken.
- A detailed description of all potential impacts on the watercourses/riparian land.
- A detailed description of all potential impacts on the wetlands, including potential impacts to the wetlands hydrologic regime; groundwater recharge; habitat and any species that depend on the wetlands.
- A description of the design features and measures to be incorporated to mitigate potential impacts.
- Geomorphic and hydrological assessment of water courses including details of stream order (Strahler System), river style and energy regimes both in channel and on adjacent floodplains.

Landform rehabilitation

Where significant modification to landform is proposed, the EIS must include:

- Justification of the proposed final landform with regard to its impact on local and regional surface and groundwater systems;
- A detailed description of how the site would be progressively rehabilitated and integrated into the surrounding landscape;
- Outline of proposed construction and restoration of topography and surface drainage features if affected by the project; and
- An outline of the measures to be put in place to ensure that sufficient resources are available to implement the proposed rehabilitation.

Consultation and general enquiries

General licensing enquiries can be made to Advisory Services: water.enquiries@dpi.nsw.gov.au, 1800 353 104.

Assessment or state significant development enquiries or requests for review or consultation should be directed to water.referrals@dpi.nsw.gov.au.

A consultation guideline and further information is available online at:
www.water.nsw.gov.au/water-management/law-and-policy/planning-and-assessment

End Attachment A



Department of
Primary Industries
Water

Contact: Tracie Scarfone
Phone: 02 6951 2510
Fax: 02 69512568
Email: tracie.scarfone@dpi.nsw.gov.au

The General Manager
Department of Planning
PO Box 39
Sydney NSW 2000

Our ref: Mx 123
File No:
Your Ref:

Attention: Patrick Copas

2nd May 2016

Dear Thomas,

Re: Request for Secretary's Environmental Assessment Requirements for intensive poultry complex at 375 McRaes Road, Goolgowi, Carrathool LGA.

DPI Water has reviewed the supporting documentation accompanying the request for Secretary's Environmental Assessment Requirements (SEARs) and provides the following comments below, and further detail in **Attachment A**.

It is recommended that the EIS be required to include:

Access to surface and groundwater resources

- Annual volumes of surface water and groundwater proposed to be taken by the activity (including through inflow and seepage) from each surface and groundwater source as defined by the relevant water sharing plan.
- Assessment of any volumetric water licensing requirements (including those for ongoing water take following completion of the project).
- Assessment of the impact and approvals (Works and Use Approvals under the WMA 2000) required for the taking or storage of water.
- The identification of an adequate and secure water supply for the life of the project. Confirmation that water can be sourced from an appropriately authorised and reliable supply. This is to include an assessment of the current market depth where water entitlement is required to be purchased.
- A detailed and consolidated site water balance.
- A detailed assessment against the NSW Aquifer Interference Policy (2012) using DPI Water's assessment framework.

Impact on surface and groundwater resources

- Assessment of impacts on surface and ground water sources (both quality and quantity), related infrastructure, adjacent licensed water users, basic landholder rights, watercourses, riparian land, and groundwater dependent ecosystems, and measures proposed to reduce and mitigate these impacts.

www.water.nsw.gov.au

2198 Irrigation Way, Yanco, PO Box 156 Leeton NSW 2705 Australia t 1800 353 104 | e water.enquiries@dpi.nsw.gov.au

2

- Full technical details and data of all surface and groundwater modelling, and an independent peer review.
- Proposed surface and groundwater monitoring activities and methodologies.
- Proposed management and disposal of produced or incidental water

Flooding

DP Water is responsible for the management and licensing of flood work approvals.

If the proposal is for an earthwork, embankment or levee, wherever situated or proposed to be constructed that is reasonably likely to affect the flow of water to or from a river or lake then the assessment is required to address potential impacts detailed further in attachment A.

Impact on waterfront land and water resource dependents

- Clear identification of "waterfront land" (as defined in the WMA 2000) and an assessment of impacts of works and activities on waterfront land. (Works on waterfront land may be subject to Controlled Activity Approval (CAA) under the *Water Management Act 2000*.)
- Details of the final landform of the site, including final void management (where relevant) and rehabilitation measures.
- Assessment of any potential cumulative impacts on water resources, and any proposed options to manage the cumulative impacts.
- Consideration of relevant policies and guidelines.
- A statement of where each element of the SEARs is addressed in the EIS (i.e. in the form of a table).

Please direct any questions or correspondence to **Tracie Scarfone**,
tracie.scarfone@dpi.nsw.gov.au.

Yours sincerely



Tracie Scarfone
Senior Water Regulation Officer
Water Regulatory Operations, Water Regulatory Operations South
NSW Department of Primary Industries – Water

ATTACHMENT A

DPI Water General Assessment Requirements

The following detailed assessment requirements are provided to assist in adequately addressing the assessment requirements for this proposal.

For further information visit the DPI Water website, www.water.nsw.gov.au

Key Relevant Legislative Instruments

This section provides a basic summary to aid proponents in the development of an Environmental Impact Statement (EIS), and should not be considered a complete list or comprehensive summary of relevant legislative instruments that may apply to the regulation of water resources for a project.

The EIS should take into account the objects and regulatory requirements of the *Water Act 1912* (WA 1912) and *Water Management Act 2000* (WMA 2000), and associated regulations and instruments, as applicable.

Water Management Act 2000 (WMA 2000)

Key points:

- Volumetric licensing in areas covered by water sharing plans
- Works within 40m of waterfront land
- SSD & SSI projects are exempt from requiring water supply work approvals and controlled activity approvals as a result of the *Environmental Planning & Assessment Act 1979* (EP&A Act).
- No exemptions for volumetric licensing apply as a result of the EP&A Act.
- Basic landholder rights, including harvestable rights dams
- Aquifer interference activity approval and flood management work approval provisions have not yet commenced and are regulated by the *Water Act 1912*
- Maximum penalties of \$2.2 million plus \$264,000 for each day an offence continues apply under the WMA 2000

Water Act 1912 (WA 1912)

Key points:

- Volumetric licensing in areas where no water sharing plan applies
- Monitoring bores
- Aquifer interference activities that are not regulated as a water supply work under the WMA 2000.
- Flood management works
- No exemptions apply to licences or permits under the WA 1912 as a result of the EP&A Act.
- Regulation of water bore driller licensing.

Water Management (General) Regulation 2011

Key points:

- Provides various exemptions for volumetric licensing and activity approvals
- Provides further detail on requirements for dealings and applications.

Water Sharing Plans – these are considered regulations under the WMA 2000

Access Licence Dealing Principles Order 2004

Harvestable Rights Orders

Water Sharing Plans

It is important that the proponent understands and describes the ground and surface water sharing plans, water sources, and management zones that apply to the project. The relevant water sharing plans can be determined spatially at www.ourwater.nsw.gov.au. Multiple water sharing plans may apply and these must all be described.

The *Water Act 1912* applies to all water sources not yet covered by a commenced water sharing plan.

The EIS is required to:

- Demonstrate how the proposal is consistent with the relevant rules of the Water Sharing Plan including rules for access licences, distance restrictions for water supply works and rules for the management of local impacts in respect of surface water and groundwater sources, ecosystem protection (including groundwater dependent ecosystems), water quality and surface-groundwater connectivity.
- Provide a description of any site water use (amount of water to be taken from each water source) and management including all sediment dams, clear water diversion structures with detail on the location, design specifications and storage capacities for all the existing and proposed water management structures.
- Provide an analysis of the proposed water supply arrangements against the rules for access licences and other applicable requirements of any relevant WSP, including:
 - Sufficient market depth to acquire the necessary entitlements for each water source.
 - Ability to carry out a "dealing" to transfer the water to relevant location under the rules of the WSP.
 - Daily and long-term access rules.
 - Account management and carryover provisions.
- Provide a detailed and consolidated site water balance.
- Further detail on licensing requirements is provided below.

Relevant Policies and Guidelines

The EIS should take into account the following policies (as applicable):

- NSW Guidelines for Controlled Activities on Waterfront Land (NOW, 2012)
- NSW Aquifer Interference Policy (NOW, 2012)
- Risk Assessment Guidelines for Groundwater Dependent Ecosystems (NOW, 2012)
- Australian Groundwater Modelling Guidelines (NWC, 2012)
- NSW State Rivers and Estuary Policy (1993)
- NSW Wetlands Policy (2010)
- NSW State Groundwater Policy Framework Document (1997)
- NSW State Groundwater Quality Protection Policy (1998)
- NSW State Groundwater Dependent Ecosystems Policy (2002)
- NSW Water Extraction Monitoring Policy (2007)

DPI Water policies can be accessed at the following links:

<http://www.water.nsw.gov.au/Water-management/Law-and-policy/Key-policies/default.aspx>
<http://www.water.nsw.gov.au/Water-licensing/Approvals/Controlled-activities/default.aspx>

An assessment framework for the NSW Aquifer Interference Policy can be found online at: <http://www.water.nsw.gov.au/Water-management/Law-and-policy/Key-policies/Aquifer-interference>.

Licensing Considerations

The EIS is required to provide:

- Identification of water requirements for the life of the project in terms of both volume and timing (including predictions of potential ongoing groundwater take following the cessation of operations at the site – such as evaporative loss from open voids or inflows).
- Details of the water supply source(s) for the proposal including any proposed surface water and groundwater extraction from each water source as defined in the relevant Water Sharing Plan/s and all water supply works to take water.
- Explanation of how the required water entitlements will be obtained (i.e. through a new or existing licence/s, trading on the water market, controlled allocations etc.).
- Information on the purpose, location, construction and expected annual extraction volumes including details on all existing and proposed water supply works which take surface water, (pumps, dams, diversions, etc).
- Details on all bores and excavations for the purpose of investigation, extraction, dewatering, testing and monitoring. All predicted groundwater take must be accounted for through adequate licensing.
- Details on existing dams/storages (including the date of construction, location, purpose, size and capacity) and any proposal to change the purpose of existing dams/storages
- Details on the location, purpose, size and capacity of any new proposed dams/storages.
- Applicability of any exemptions under the *Water Management (General) Regulation 2011* to the project.

Water allocation account management rules, total daily extraction limits and rules governing environmental protection and access licence dealings also need to be considered.

The Harvestable Right gives landholders the right to capture and use for any purpose 10 % of the average annual runoff from their property. The Harvestable Right has been defined in terms of an equivalent dam capacity called the Maximum Harvestable Right Dam Capacity (MHRDC). The MHRDC is determined by the area of the property (in hectares) and a site-specific run-off factor. The MHRDC includes the capacity of all existing dams on the property that do not have a current water licence. Storages capturing up to the harvestable right capacity are not required to be licensed but any capacity of the total of all storages/dams on the property greater than the MHRDC may require a licence.

For more information on Harvestable Right dams, including a calculator, visit:

<http://www.water.nsw.gov.au/Water-licensing/Basic-water-rights/Harvesting-runoff/Harvesting-runoff>

Dam Safety

Where new or modified dams are proposed, or where new development will occur below an existing dam, the NSW Dams Safety Committee should be consulted in relation to any safety issues that may arise. Conditions of approval may be recommended to ensure safety in relation to any new or existing dams.

See www.damsafety.nsw.gov.au for further information.

Surface Water Assessment

The predictive assessment of the impact of the proposed project on surface water sources should include the following:

- Identification of all surface water features including watercourses, wetlands and floodplains transected by or adjacent to the proposed project.
- Identification of all surface water sources as described by the relevant water sharing plan.
- Detailed description of dependent ecosystems and existing surface water users within the area, including basic landholder rights to water and adjacent/downstream licensed water users.
- Description of all works and surface infrastructure that will intercept, store, convey, or otherwise interact with surface water resources.
- Assessment of predicted impacts on the following:
 - flow of surface water, sediment movement, channel stability, and hydraulic regime,
 - water quality,
 - flood regime,
 - dependent ecosystems,
 - existing surface water users, and
 - planned environmental water and water sharing arrangements prescribed in the relevant water sharing plans.

Flooding

If the proposal is for an earthwork, embankment or levee, wherever situated or proposed to be constructed that is reasonably likely to affect the flow of water to or from a river or lake then the assessment is required to address potential impacts detailed below;

- the contents of any relevant floodplain management plan or any other relevant Government policy,
- the need to maintain the natural flood regimes in wetlands and related ecosystems and the preservation of any habitat, animals (including fish) or plants that benefit from periodic flooding,
- the effect or likely effect on water flows in downstream river sections,
- any geographical features, or other matters, of Aboriginal interest that may be affected by a controlled work,
- the effect or likely effect of a controlled work on the passage, flow and distribution of any flood waters,
- the effect or likely effect of a controlled work on existing dominant flood ways or exits from flood ways, rates of flow, flood water levels and the duration of inundation, the protection of the environment

Groundwater Assessment

To ensure the sustainable and integrated management of groundwater sources, the EIS needs to include adequate details to assess the impact of the project on all groundwater sources including:

- Works likely to intercept, connect with or infiltrate the groundwater sources.
- Any proposed groundwater extraction, including purpose, location and construction details of all proposed bores and expected annual extraction volumes.
- Bore construction information is to be supplied to DPI Water by submitting a "Form A" template. DPI Water will supply "GW" registration numbers (and licence/approval numbers if required) which must be used as consistent and unique bore identifiers for all future reporting.
- A description of the watertable and groundwater pressure configuration, flow directions and rates and physical and chemical characteristics of the groundwater source (including connectivity with other groundwater and surface water sources).
- Sufficient baseline monitoring for groundwater quantity and quality for all aquifers and GDEs to establish a baseline incorporating typical temporal and spatial variations.
- The predicted impacts of any final landform on the groundwater regime.
- The existing groundwater users within the area (including the environment), any potential impacts on these users and safeguard measures to mitigate impacts.
- An assessment of groundwater quality, its beneficial use classification and prediction of any impacts on groundwater quality.
- An assessment of the potential for groundwater contamination (considering both the impacts of the proposal on groundwater contamination and the impacts of contamination on the proposal).
- Measures proposed to protect groundwater quality, both in the short and long term.
- Measures for preventing groundwater pollution so that remediation is not required.
- Protective measures for any groundwater dependent ecosystems (GDEs).
- Proposed methods of the disposal of waste water and approval from the relevant authority.
- The results of any models or predictive tools used.

Where potential impact/s are identified the assessment will need to identify limits to the level of impact and contingency measures that would remediate, reduce or manage potential impacts to the existing groundwater resource and any dependent groundwater environment or water users, including information on:

- Any proposed monitoring programs, including water levels and quality data.
- Reporting procedures for any monitoring program including mechanism for transfer of information.
- An assessment of any groundwater source/aquifer that may be sterilised from future use as a water supply as a consequence of the proposal.
- Identification of any nominal thresholds as to the level of impact beyond which remedial measures or contingency plans would be initiated (this may entail water level triggers or a beneficial use category).
- Description of the remedial measures or contingency plans proposed.

- Any funding assurances covering the anticipated post development maintenance cost, for example on-going groundwater monitoring for the nominated period.

Groundwater Dependent Ecosystems

The EIS must consider the potential impacts on any Groundwater Dependent Ecosystems (GDEs) at the site and in the vicinity of the site and:

- Identify any potential impacts on GDEs as a result of the proposal including:
 - the effect of the proposal on the recharge to groundwater systems;
 - the potential to adversely affect the water quality of the underlying groundwater system and adjoining groundwater systems in hydraulic connections; and
 - the effect on the function of GDEs (habitat, groundwater levels, connectivity).
- Provide safeguard measures for any GDEs.

Watercourses, Wetlands and Riparian Land

The EIS should address the potential impacts of the project on all watercourses likely to be affected by the project, existing riparian vegetation and the rehabilitation of riparian land. It is recommended the EIS provides details on all watercourses potentially affected by the proposal, including:

- Scaled plans showing the location of:
 - wetlands/swamps, watercourses and top of bank;
 - riparian corridor widths to be established along the creeks;
 - existing riparian vegetation surrounding the watercourses (identify any areas to be protected and any riparian vegetation proposed to be removed);
 - the site boundary, the footprint of the proposal in relation to the watercourses and riparian areas; and
 - proposed location of any asset protection zones.
- Photographs of the watercourses/wetlands and a map showing the point from which the photos were taken.
- A detailed description of all potential impacts on the watercourses/riparian land.
- A detailed description of all potential impacts on the wetlands, including potential impacts to the wetlands hydrologic regime; groundwater recharge; habitat and any species that depend on the wetlands.
- A description of the design features and measures to be incorporated to mitigate potential impacts.
- Geomorphic and hydrological assessment of water courses including details of stream order (Strahler System), river style and energy regimes both in channel and on adjacent floodplains.
- Works on waterfront land may be subject to Controlled Activity Approval (CAA) under the *Water Management Act 2000*. Further information can be obtained from the Office of Water's website:
www.water.nsw.gov.au Water licensing > Approvals > Controlled activities

Drill Pad, Well and Access Road Construction

- Any construction activity within 40m of a watercourse, should be designed by a suitably qualified person, consistent with the NSW *Guidelines for Controlled Activities on Waterfront Land* (July 2012).
- Construction of all wells must be undertaken in accordance with the *Minimum Construction Requirements for Water Bores in Australia* (3rd edition 2012) by a driller holding a bore drillers' licence valid in New South Wales.
- The length of time that a core hole is maintained as an open hole should be minimised.

Landform rehabilitation (including final void management)

Where significant modification to landform is proposed, the EIS must include:

- Justification of the proposed final landform with regard to its impact on local and regional surface and groundwater systems;
- A detailed description of how the site would be progressively rehabilitated and integrated into the surrounding landscape;
- Outline of proposed construction and restoration of topography and surface drainage features if affected by the project;
- Detailed modelling of potential groundwater volume, flow and quality impacts of the presence of an inundated final void (where relevant) on identified receptors specifically considering those environmental systems that are likely to be groundwater dependent;
- An outline of the measures to be put in place to ensure that sufficient resources are available to implement the proposed rehabilitation; and
- The measures that would be established for the long-term protection of local and regional aquifer systems and for the ongoing management of the site following the cessation of the project.

Consultation and general enquiries

General licensing enquiries can be made to Advisory
Services: water.enquiries@dpi.nsw.gov.au, 1800 353 104.

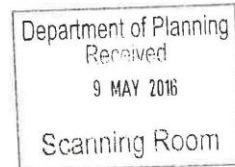
Assessment or state significant development enquiries, or requests for review or consultation should be directed to the Strategic Stakeholder Liaison Unit, water.referrals@dpi.nsw.gov.au.

A consultation guideline and further information is available online at:
www.water.nsw.gov.au/water-management/law-and-policy/planning-and-assessment

End Attachment A



Our reference: EF13/5557; DOC16/192967-0101
Contact: Jason Price 02 6969 0700



The Planning Officer
Industry Assessments
Department of Planning and Environment
GPO Box 39
SYDNEY NSW 2001

Dear Mr Piovesan

Re Proposed poultry farm at 375 McRaes Road Goolgowi

Thank you for your electronic mail dated 20 April 2016 to the Environment Protection Authority (EPA) requesting our information requirements for the Environmental Impact Statement (EIS) to be prepared for the proposed poultry broiler farm located within Lot 1 & 2 DP 749831 McRaes Road Goolgowi.

We have considered the details of the proposal as described in the information supplied by the proponent and have identified the information required by the EPA to be included in the EIS, which is detailed at Attachment 'A'.

The key information requirement for the project is to identify the potential air quality impacts (odour and dust) from this proposal on surrounding receptors, including the cumulative impacts from this proposal and other proposed or existing poultry broiler farms in the Goolgowi area and where necessary detail satisfactory management and mitigation measures for potential adverse air quality impacts.

In carrying out the assessment the proponent should refer to the relevant guidelines identified at Attachment 'B'.

If you have any further enquiries about this matter please contact Jason Price by telephoning 02 6969 0700.

Yours sincerely

DARREN WALLETT
Head, Griffith Unit
Environment Protection Authority

PO BOX 397 Griffith NSW 2680
Suite 7, 130-140 Banna Avenue Griffith NSW
Tel: (02) 6969 0700 Fax: (02) 6969 0710
ABN 30 841 387 271
www.epa.nsw.gov.au

ATTACHMENT 'A'

Potential environmental impacts of the project

The following potential environmental impacts of the project need to be assessed, quantified and reported on.

- (a) Air;
- (b) Noise;
- (c) Water;
- (d) Land; and
- (e) Waste and chemicals.

The Environmental Impact Statement (EIS) should address how the required environmental goals outlined below will be met for each potential impact.

The EIS should describe mitigation and management options that will be used to prevent, control, abate or mitigate identified potential environmental impacts associated with the project and to reduce risks to human health and prevent the degradation of the environment.

This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.

Potential impacts on air quality

The goal of the project in relation to air quality should be to ensure sensitive receptors are protected from any adverse impacts from odour and airborne particulate matter.

Odour is the primary concern for the proposed development and the potential emissions from (but not necessarily limited to) aged birds and bedding material. Details would need to be provided on the proposed measures to manage odour and dust from all sources.

The Environment Protection Authority (EPA) expects that a cumulative assessment for dust and odour, that includes the all proposed broiler farms around Goolgowi that model as having an odour impact on sensitive receptors, is undertaken in accordance with our guideline the "Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales" (EPA, 2005), in conjunction with analyses of local meteorologic and terrain data in order to make informed decisions about design and management options for the proposed development.

This assessment should also identify all existing and potential sensitive receptors in proximity to the proposed development. Their location can be relevant to the level of assessment.

The EPA has developed a Level 1 odour assessment calculator (in Excel format) to assist poultry growers and their consultants to plan for meat chicken (broiler) farm developments. The calculator uses the formulae defined in section 5 of the Technical Notes in the "Assessment and management of odour from stationary sources in NSW" to calculate required setback distances for a particular site. If a site cannot accommodate the calculated setback distance, Level 2 or 3 assessments may be required. The calculator can found on the EPA website at - <http://www.environment.nsw.gov.au/resources/air/PoultryOdourCalcualtor.xls>.

Emissions from any plant must meet the design criteria detailed in the *Protection of the Environment Operations (Clean Air) Regulation 2010*. Details need to be provided on the proposed air pollution control techniques from any air emission points, including proposed measures to manage and monitor efficiency and performance.

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Emissions from any plant must meet the design criteria detailed in the *Protection of the Environment Operations (Clean Air) Regulation 2010*. Details need to be provided on the proposed air pollution control techniques from any air emission points, including proposed measures to manage and monitor efficiency and performance.

Potential impacts of noise

The goals of the project should include design, construction, operation and maintenance of the facility in accordance with relevant EPA policy, guidelines and criteria, and in order to minimise potential impacts from noise.

We expect that potential noise sources are assessed in accordance with the "NSW Industrial Noise Policy" (EPA, 2000), and where required mitigation measures are proposed (e.g. appropriate equipment chosen to minimise noise levels). All residential or noise sensitive premises likely to be impacted by the development must be identified and included in the assessment.

The proposed development will result in increased traffic movements. The potential noise impacts associated with any traffic increases need to be assessed in accordance with the "NSW Road Noise Policy" (EPA, 2011).

Potential impacts on water quantity and quality

The goals of the project should include the following.

- No pollution of waters (including surface and groundwater), except to the extent authorised by the EPA (i.e. in accordance with an Environment Protection Licence) and appropriate consideration should be given to a flood risk assessment.
- Polluted water (including process waters, wash down waters, polluted stormwater or sewage) must be captured and retained on the site through an appropriate collection and storage system. Where it is safe and practicable to do so, the polluted water should be treated and beneficially reused; and
- It is acceptable in terms of the achievement or protection of the NSW Water Quality and River Flow Objectives.

The EIS should document the measures that will achieve the above goals.

Details of the site drainage and any natural or artificial waters within or adjacent to the development must be identified and where applicable measures proposed to mitigate potential impacts of the development on these waters. The EIS should provide details of the proposed design and construction of water management systems for the proposal to ensure surface and ground waters are protected from contaminants.

Potential impacts on land

The goals of the project should include the following.

- No pollution of land, except to the extent authorised by the EPA (ie in accordance with an Environment Protection Licence); and
- The potential impact of land erosion from the development is mitigated.

The EIS should document the measures that will achieve the above goals.

Waste and chemicals

The goals of the project should include the following.

- It is in accordance with the principles of the waste hierarchy and cleaner production;
- Where potential impacts associated with the handling, processing and storage of all materials used at the premises are identified, these be mitigated by the development;
- The beneficial reuse of all wastes generated at the premises are maximised where it is safe and practical to do so; and

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- No waste disposal occurs on site except in accordance with an Environment Protection Licence; and
- Environmental risks from hazardous chemicals and chemical waste are minimised.

The EIS needs to identify the proposed type, quantity and location of waste and chemicals to be stored on site. Spill management measures, including items such as bunding, and emergency procedures should be clearly outlined.

ATTACHMENT 'B'

Guidance Material

Air quality

- Protection of the Environment Operations (Clean Air) Regulation 2010
- Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (EPA, 2005)
- Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (EPA, 2005)
- Assessment and Management of Odour from Stationery Sources in NSW (EPA, 2006)
- Meat chicken farm calculator (EPA, 2011);
<http://www.environment.nsw.gov.au/resources/air/PoultryOdourCalculator.xls>

Noise and vibration

- NSW Industrial Noise Policy (EPA, 2000)
- NSW Road Noise Policy (EPA, 2011)
- Assessing Vibration: a technical guideline (EPA, 2006)
- Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration (ANZECC, 1990)
- Interim Construction Noise Guidelines (EPA, 2009)

Water quality

- National Water Quality Management Strategy: Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC/ARMCANZ, 2000)
- National Water Quality Management Strategy: Australian Guidelines for Water Quality Monitoring and Reporting (ANZECC/ARMCANZ, 2000)
- Using the ANZECC Guidelines and Water Quality Objectives in NSW (EPA, 2006)

Groundwater

- The NSW State Groundwater Policy Framework Document (DLWC, 1997)
- The NSW State Groundwater Quality Protection Policy (DLWC, 1998)
- The NSW State Groundwater Dependent Ecosystems Policy (DLWC, 2002)
- National Water Quality Management Strategy Guidelines for Groundwater Protection in Australia (ARMCANZ/ANZECC, 1995)

Stormwater

- Managing Urban Stormwater: Soils and Construction (Landcom, 2004)
- Managing Urban Stormwater: Treatment Techniques (Draft) (EPA, 1997)

Wastewater

- Environmental Guidelines: Use of Effluent by Irrigation (EPA, 2004)
- Environmental Guidelines: Storage and Handling of Liquids (EPA, 2007)

Waste

- Waste Classification Guidelines (EPA, 2008)
- Environmental Guidelines: Use and Disposal of Biosolids Products (EPA, 1997)
- Environmental Guidelines: Composting and Related Organics Processing Facilities (EPA, 2004)
- Environmental Guidelines: Solid Waste Landfills (EPA, 1996)
- Storing and Handling Liquids: Environmental Protection (EPA, 2007)



Office of
Environment
& Heritage

Mr Thomas Piovesan
Industry Assessments
Department of Planning and Environment
GPO Box 39
SYDNEY NSW 2001

Your reference: DOC16/196688
Our reference: Michael Todd (03) 5021 8915
Contact:



Dear Mr Piovesan

**RE: SEARs for Proposed Intensive Livestock Agriculture – Poultry Farm, 375 McRaes Road-
Goolgowi, Carrathool LGA (Lot 1 and 2 DP 749831)**

I refer to your email dated 20 April 2016 seeking input into the Department of Planning and Environment Secretary's Environmental Assessment Requirements (SEARs) for the preparation of an Environmental Impact Statement (EIS) for the proposed Intensive Livestock Agriculture- Poultry Farm at 375 MacRaes Road, Goolgowi, within Carrathool Shire.

OEH has reviewed the available supporting documentation and provides SEARs for the proposed development in Attachments A and B and guidance material in Attachment C (please note that both Attachments A and B include biodiversity matters that will need to be addressed). The assessment must include all ancillary infrastructure, water storage areas, new vehicle tracks, and access to the Mid Western Highway.

OEH recommends the EIS needs to appropriately address the following:

1. Biodiversity and offsetting
2. Aboriginal cultural heritage
3. Water and soils
4. Cumulative impact



Please note that the NSW Biodiversity Offsets Policy for Major Projects www.environment.nsw.gov.au/resources/biodiversity/140672biopolicy.pdf is now being implemented. The policy provides a standard method for assessing impacts of major projects on biodiversity and determining offsetting arrangements. The policy is underpinned by the Framework for Biodiversity Assessment (FBA) www.environment.nsw.gov.au/resources/biodiversity/140675fba.pdf which contains the assessment methodology that is adopted by the policy to quantify and describe the impact assessment requirements and offset guidance that applies to Major Projects. The FBA must be used by a proponent to assess all biodiversity values on the development site.

Based on the information provided, the proposed site appears to contain scattered trees within cultivation but some areas where the understorey has not been ploughed may occur. In these areas it is important to consider whether the vegetation meets the definition of woodland or open woodland communities that occur in the vicinity. Trees in an open woodland may be up to 100 metres apart, and still meet the definition of native vegetation that can be allocated to a NSW Plant Community Type (PCT). PCT boundaries mapped for the assessment must include the understorey and trees. Maps containing separate polygons for trees and understorey within an area of woodland or open woodland are not correct.

At this point in time, there is no appropriate regional-scale map that shows all vegetation communities within the area of the proposal. The M305 (VIS 917) dataset maps woody vegetation while not considering shrublands, grasslands or wetlands, and so may give some indication of vegetation present. Vegetation data and NPWS estate boundaries suitable for use in geographic information systems can be downloaded from OEHS Spatial Data Online <http://mapdata.environment.nsw.gov.au/geonetwork/srv/en/main.home>

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Second Floor, Government Offices
512 Dean Street Albury NSW 2640
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Please note that we make the following recommended amendments to the Policies, Guidelines and Plans listed in the draft SEARs provided with the application:

- Delete reference to the document titled '*Principles for the use of Biodiversity Offsets in NSW (DECC, 2008)*' – these have been replaced by the NSW Biodiversity Offsets Policy for Major Projects.
- No documents are listed in relation to Aboriginal cultural heritage – Attachment C includes a number that may be required to address this component of the assessment.

If you have any questions regarding this matter please contact Michael Todd on (03) 5021 8915 or at michael.todd@environment.nsw.gov.au.

Yours sincerely

 3/5/16

PETER EWIN
Senior Team Leader Planning
South West Region
Regional Operations
Office of Environment and Heritage

ATTACHMENT A - Environmental Assessment Requirements
ATTACHMENT B - Project specific Environmental Assessment Requirements
ATTACHMENT C - Guidance Material

Attachment A – Standard Environmental Assessment Requirements

Biodiversity	
1.	Biodiversity impacts related to the proposed Poultry Farm are to be assessed and documented in accordance with the <u>Framework for Biodiversity Assessment</u> , unless otherwise agreed by OEH, by a person accredited in accordance with s142B(1)(c) of the <i>Threatened Species Conservation Act 1995</i> .
Aboriginal cultural heritage	
2.	The EIS must identify and describe the Aboriginal cultural heritage values that exist across the whole area that will be affected by the Poultry Farm and document these in the EIS. This may include the need for surface survey and test excavation. The identification of cultural heritage values should be guided by the <u>Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW (DECCW, 2011)</u> and consultation with OEH regional officers.
3.	Where Aboriginal cultural heritage values are identified, consultation with Aboriginal people must be undertaken and documented in accordance with the <u>Aboriginal cultural heritage consultation requirements for proponents 2010 (DECCW)</u> . The significance of cultural heritage values for Aboriginal people who have a cultural association with the land must be documented in the EIS.
4.	Impacts on Aboriginal cultural heritage values are to be assessed and documented in the EIS. The EIS must demonstrate attempts to avoid impact upon cultural heritage values and identify any conservation outcomes. Where impacts are unavoidable, the EIS must outline measures proposed to mitigate impacts. Any objects recorded as part of the assessment must be documented and notified to OEH.
Historic heritage	
5.	The EIS must provide a heritage assessment including but not limited to an assessment of impacts to <i>State and local heritage</i> including conservation areas, natural heritage areas, places of Aboriginal heritage value, buildings, works, relics, gardens, landscapes, views, trees should be assessed. Where impacts to State or locally significant heritage items are identified, the assessment shall: - outline the proposed mitigation and management measures (including measures to avoid significant impacts and an evaluation of the effectiveness of the mitigation measures) generally consistent with the NSW Heritage Manual (1996), - be undertaken by a suitably qualified heritage consultant(s) (note: where archaeological excavations are proposed the relevant consultant must meet the NSW Heritage Council's Excavation Director criteria), - include a statement of heritage impact for all heritage items (including significance assessment), - consider impacts including, but not limited to, vibration, demolition, archaeological disturbance, altered historical arrangements and access, landscape and vistas, and architectural noise treatment (as relevant), and - where potential archaeological impacts have been identified develop an appropriate archaeological assessment methodology, including research design, to guide physical

archaeological test excavations (terrestrial and maritime as relevant) and include the results of these test excavations.
Water and soils
6. The EIS must map the following features relevant to water and soils including: a. Acid sulfate soils (Class 1, 2, 3 or 4 on the Acid Sulfate Soil Planning Map). b. Rivers, streams, wetlands, estuaries (as described in Appendix 2 of the <u>Framework for Biodiversity Assessment</u>). c. Groundwater. d. Groundwater dependent ecosystems. e. Proposed intake and discharge locations.
7. The EIS must describe background conditions for any water resource likely to be affected by the <u>Poultry Farm</u>, including: a. Existing surface and groundwater. b. Hydrology, including volume, frequency and quality of discharges at proposed intake and discharge locations. c. Water Quality Objectives (as endorsed by the NSW Government http://www.environment.nsw.gov.au/ieo/index.htm) including groundwater as appropriate that represent the community's uses and values for the receiving waters. d. Indicators and trigger values/criteria for the environmental values identified at (c) in accordance with the <u>ANZECC (2000) Guidelines for Fresh and Marine Water Quality</u> and/or local objectives, criteria or targets endorsed by the NSW Government.
8. The EIS must assess the impacts of the <u>Poultry Farm</u> on water quality, including: a. The nature and degree of impact on receiving waters for both surface and groundwater, demonstrating how the <u>development</u> protects the Water Quality Objectives where they are currently being achieved, and contributes towards achievement of the Water Quality Objectives over time where they are currently not being achieved. This should include an assessment of the mitigating effects of proposed stormwater and wastewater management during and after construction. b. Identification of proposed monitoring of water quality.
9. The EIS must assess the impact of the <u>Poultry Farm</u> on hydrology, including: a. Water balance including quantity, quality and source. b. Effects to downstream rivers, wetlands, estuaries, marine waters and floodplain areas. c. Effects to downstream water-dependent fauna and flora including groundwater dependent ecosystems. d. Impacts to natural processes and functions within rivers, wetlands, estuaries and floodplains that affect river system and landscape health such as nutrient flow, aquatic connectivity and access to habitat for spawning and refuge (eg river benches). e. Changes to environmental water availability, both regulated/licensed and unregulated/rules-based sources of such water.

f. Mitigating effects of proposed stormwater and wastewater management during and after construction on hydrological attributes such as volumes, flow rates, management methods and re-use options. g. Identification of proposed monitoring of hydrological attributes.
Flooding and coastal erosion
10. The EIS must map the following features relevant to flooding as described in the Floodplain Development Manual 2005 (NSW Government 2005) including: a. Flood prone land b. Flood planning area, the area below the flood planning level. c. Hydraulic categorisation (floodways and flood storage areas).
11. The EIS must describe flood assessment and modelling undertaken in determining the design flood levels for events, including a minimum of the 1 in 10 year, 1 in 100 year flood levels and the probable maximum flood, or an equivalent extreme event.
12. The EIS must model the effect of the proposed Poultry Farm (including fill) on the flood behaviour under the following scenarios: a. Current flood behaviour for a range of design events as identified in 11 above. This includes the 1 in 200 and 1 in 500 year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change.
13. Modelling in the EIS must consider and document: a. The impact on existing flood behaviour for a full range of flood events including up to the probable maximum flood. b. Impacts of the development on flood behaviour resulting in detrimental changes in potential flood affectation of other developments or land. This may include redirection of flow, flow velocities, flood levels, hazards and hydraulic categories. c. Relevant provisions of the NSW Floodplain Development Manual 2005.
14. The EIS must assess the impacts on the proposed Poultry Farm on flood behaviour, including: a. Whether there will be detrimental increases in the potential flood affectation of other properties, assets and infrastructure. b. Consistency with Council floodplain risk management plans. c. Compatibility with the flood hazard of the land. d. Compatibility with the hydraulic functions of flow conveyance in floodways and storage in flood storage areas of the land. e. Whether there will be adverse effect to beneficial inundation of the floodplain environment, on, adjacent to or downstream of the site. f. Whether there will be direct or indirect increase in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses. g. Any impacts the development may have upon existing community emergency management arrangements for flooding. These matters are to be discussed with the SES and Council. h. Whether the proposal incorporates specific measures to manage risk to life from flood. These matters are to be discussed with the SES and Council.

- i. Emergency management, evacuation and access, and contingency measures for the development considering the full range of flood risk (based upon the probable maximum flood or an equivalent extreme flood event). These matters are to be discussed with and have the support of Council and the SES.
- j. Any impacts the development may have on the social and economic costs to the community as consequence of flooding.

Attachment B – Project specific Environmental Assessment Requirements

Biodiversity
15. Impacts on the following species, populations and ecological communities will require further consideration and provision of the information specified in s9.2 of the Framework for Biodiversity Assessment: • <i>Falco subniger</i> (Black Falcon) – nest trees only • <i>Falco hypoleucos</i> (Grey Falcon)– nest trees only • <i>Hamirostra melanosternon</i> (Black-breasted Buzzard) – nest trees only • <i>Calyptorhynchus lathami</i> (Glossy Black-cockatoo Riverina population) • <i>Climacteris affinis</i> (White-browed Treecreeper Population in Carrathool local government area south of the Lachlan River and Griffith local government area) • Myall woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes Bioregion

Attachment C – Guidance material

Title	Web address
Relevant Legislation	
Commonwealth Environment Protection and Biodiversity Conservation Act 1999	www.austlii.edu.au/au/legis/cth/consol_act/epabca1999588/
Environmental Planning and Assessment Act 1979	www.legislation.nsw.gov.au/maintop/view/inforce/act+203+1979+cd+0+N
Fisheries Management Act 1994	www.legislation.nsw.gov.au/maintop/view/inforce/act+38+1994+cd+0+N
Marine Parks Act 1997	www.legislation.nsw.gov.au/maintop/view/inforce/act+64+1997+cd+0+N
National Parks and Wildlife Act 1974	www.legislation.nsw.gov.au/maintop/view/inforce/act+80+1974+cd+0+N
Protection of the Environment Operations Act 1997	www.legislation.nsw.gov.au/maintop/view/inforce/act+156+1997+cd+0+N
Threatened Species Conservation Act 1995	www.legislation.nsw.gov.au/maintop/view/inforce/act+101+1995+cd+0+N
Water Management Act 2000	www.legislation.nsw.gov.au/maintop/view/inforce/act+92+2000+cd+0+N
Wilderness Act 1987	www.legislation.nsw.gov.au/viewtop/inforce/act+196+1987+FIRST+0+N
Biodiversity	
NSW Biodiversity Offsets Policy for Major Projects (OEH 2013)	www.environment.nsw.gov.au/resources/biodiversity/140672biopoly.pdf
Framework for Biodiversity Assessment (OEH 2013)	www.environment.nsw.gov.au/resources/biodiversity/140675fba.pdf
OEH Threatened Species Website	www.environment.nsw.gov.au/threatenedspecies/
NSW BioNet (Atlas of NSW Wildlife)	www.bionet.nsw.gov.au/
Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - Working Draft (DEC 2004)	www.environment.nsw.gov.au/resources/nature/TBSAGuidelinesDraft.pdf
Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna - Amphibians (DECCW 2009)	www.environment.nsw.gov.au/resources/threatenedspecies/09213amphibians.pdf
NSW guide to surveying threatened plants (OEH 2016)	www.environment.nsw.gov.au/resources/threatenedspecies/160129-threatened-plants-survey-guide.pdf
OEH threatened species survey and assessment guideline information	www.environment.nsw.gov.au/threatenedspecies/surveyassessmentguidelines.htm
Fisheries NSW policies and guidelines	www.dpi.nsw.gov.au/fisheries/habitat/publications/policies-guidelines-and-manuals/fish-habitat-conservation
List of national parks	www.environment.nsw.gov.au/NationalParks/parksearchatoz.aspx

Title	Web address
Guidelines for developments adjoining land and water managed by the Department of Environment, Climate Change and Water (DECCW 2010)	www.environment.nsw.gov.au/resources/protectedareas/080290devadjoindecc.pdf
VIS Classification - NSW Plant Community Type (PCT) database	www.environment.nsw.gov.au/research/Vegetationinformationsystem.htm
Interim Vegetation Mapping Standard and VIS Plot	www.environment.nsw.gov.au/research/VISplot.htm
OEH Spatial Data Online Access	mapdata.environment.nsw.gov.au/geonetwork/srv/en/main.home
Heritage	
The Burra Charter (The Australia ICOMOS charter for places of cultural significance)	australia.icomos.org/wp-content/uploads/The-Burra-Charter-2013-Adopted-31.10.2013.pdf
Statements of Heritage Impact 2002 (HO & DUAP)	www.environment.nsw.gov.au/resources/heritagebranch/heritage/hmstatementsofhi.pdf
NSW Heritage Manual (DUAP) (scroll through alphabetical list to 'N')	www.environment.nsw.gov.au/Heritage/publications/index.htm#M-Q
Aboriginal Cultural Heritage	
Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW 2010)	www.environment.nsw.gov.au/resources/cultureheritage/commconsultation/09781ACHconsultreq.pdf
Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW 2010)	www.environment.nsw.gov.au/resources/cultureheritage/10783FinalArchCoP.pdf
Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW (OEH 2011)	www.environment.nsw.gov.au/resources/cultureheritage/20110263ACHguide.pdf
Aboriginal Site Recording Form	www.environment.nsw.gov.au/resources/parks/SiteCardMainV1_1.pdf
Aboriginal Site Impact Recording Form	www.environment.nsw.gov.au/resources/cultureheritage/120558asirf.pdf
Aboriginal Heritage Information Management System (AHIMS) Registrar	www.environment.nsw.gov.au/contact/AHIMSRegistrar.htm
Care Agreement Application form	www.environment.nsw.gov.au/resources/cultureheritage/20110914TransferObject.pdf
Water and Soils	
Acid sulphate soils	
Acid Sulfate Soils Planning Maps via 'The NSW Natural Resource Atlas'	www.nratlas.nsw.gov.au/

Title	Web address
Acid Sulfate Soils Manual (Stone et al. 1998)	Manual available for purchase from: www.landcom.com.au/whats-new/the-blue-book.aspx Chapters 1 and 2 are on DPI's Guidelines Register at: Chapter 1 Acid Sulfate Soils Planning Guidelines: www.planning.nsw.gov.au/rdaguidelines/documents/NSW%20Acid%20Sulfate%20Soils%20Planning%20Guidelines.pdf Chapter 2 Acid Sulfate Soils Assessment Guidelines: www.planning.nsw.gov.au/rdaguidelines/documents/NSW%20Acid%20Sulfate%20Soils%20Assessment%20Guidelines.pdf
Acid Sulfate Soils Laboratory Methods Guidelines (Ahern et al. 2004)	www.advancedenvironmentalmanagement.com/Reports/Savannah/Appendix%2015.pdf This replaces Chapter 4 of the Acid Sulfate Soils Manual above.
Flooding	
Floodplain development manual	www.environment.nsw.gov.au/floodplains/manual.htm
NSW Climate Impact Profile	NSW Climate Impact Profile
Climate Change Impacts and Risk Management	Climate Change Impacts and Risk Management: A Guide for Business and Government, AGIC Guidelines for Climate Change Adaptation
Water	
Water Quality Objectives	www.environment.nsw.gov.au/ieo/index.htm
ANZECC (2000) Guidelines for Fresh and Marine Water Quality	www.environment.gov.au/water/publications/quality/australian-and-new-zealand-guidelines-fresh-marine-water-quality-volume-1
Applying Goals for Ambient Water Quality Guidance for Operations Officers – Mixing Zones	http://deccnet/water/resources/AWQGuidance7.pdf
Approved Methods for the Sampling and Analysis of Water Pollutant in NSW (2004)	www.environment.nsw.gov.au/resources/legislation/approvedmethods-water.pdf

Thomas Piovesan

From: Shane Wilson <SWilson@carrathool.nsw.gov.au>
Sent: Tuesday, 8 November 2016 1:48 PM
To: Thomas Piovesan
Cc: records
Subject: RE: SSD 8036 - Request for Input on Secretary's Environmental Assessment Requirements - Intensive Poultry Farm - 375 McReas Road, Goolgowi

Hi Thomas

Council has no specific requests that will need to be included within the SEAR's.

Regards

Shane Wilson

Director Development Services
Carrathool Shire Council
Phone 02 6965 1900
Mobile 0429 651 306
Fax 02 6965 1379

From: Julia Fielder
Sent: Tuesday, 8 November 2016 1:05 PM
To: Shane Wilson
Subject: FW: SSD 8036 - Request for Input on Secretary's Environmental Assessment Requirements - Intensive Poultry Farm - 375 McReas Road, Goolgowi

From: thomas.piovesan@planning.nsw.gov.au [mailto:thomas.piovesan@planning.nsw.gov.au]
Sent: Tuesday, 8 November 2016 1:04 PM
To: Mail
Subject: FW: SSD 8036 - Request for Input on Secretary's Environmental Assessment Requirements - Intensive Poultry Farm - 375 McReas Road, Goolgowi

Good afternoon

I refer to my earlier email below. Would it be possible to receive an update on the request for input into these SEARs or the details of the officer they have been allocated to?

Any questions, please contact me.

Kind regards

Thomas Piovesan
Planning Officer (Industry)
Industry Assessments
NSW Department of Planning and Environment
Level 22, 320 Pitt Street | GPO Box 39 | SYDNEY NSW 2001
T: 02 9274 6356 E: thomas.piovesan@planning.nsw.gov.au





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From: Thomas Piovesan
Sent: Friday, 28 October 2016 12:10 PM
To: 'council@carrathool.nsw.gov.au' <council@carrathool.nsw.gov.au>
Subject: SSD 8036 - Request for Input on Secretary's Environmental Assessment Requirements - Intensive Poultry Farm - 375 McRaes Road, Goolgowi

Good afternoon

The Department of Planning and Environment has received a request for Secretary's Environmental Assessment Requirements (SEARs) for a State significant development application (**SSD 8036**).

The project site is located at 375 McRaes Road, Goolgowi. The proposal is State significant development as it meets the criteria under Clause 1 of *State Environmental Planning Policy (State and Regional Development) 2011* as it is an intensive livestock agriculture facility with a Capital Investment Value of over \$30 million. Consequently, the Minister for Planning is the consent authority.

The proposed development involves the construction and operation of an intensive poultry farm comprising of:
-five farms each with:

- storage dams with a 300ML capacity each;
- bulk earthworks;
- landscaping mounds;
- machinery and supply sheds;
- water storage reservoirs;
- two dwellings;
- gas tanks, feed silos and exhaust stacks; and
- associated infrastructure.

Please find attached a copy of the SEARs request received for the application.

The files can also be viewed on the Departments website at the link below.

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=8036

It would be greatly appreciated if the Department can receive your input for the SEARs for the preparation of an Environmental Impact Statement by close of business **Wednesday 9 November 2016**.

If you have any questions, or have any difficulty in viewing the attached documents, please contact me on the details below.

Kind regards

Thomas Piovesan
Planning Officer (Industry)
Industry Assessments
NSW Department of Planning and Environment
Level 22, 320 Pitt Street | GPO Box 39 | SYDNEY NSW 2001
T: 02 9274 6356 E: thomas.piovesan@planning.nsw.gov.au



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Transport
Roads & Maritime
Services

3 May 2016

SWT16/00040
SF2016/060936
MM

The Manager
Department of Planning & Environment
GPO Box 39
SYDNEY NSW 2001

Attention: Thomas Piovesan

SEAR-375 - PROPOSED INTENSIVE LIVESTOCK DEVELOPMENT, GOOLGOWI POULTRY FARM, - LOT 1 DP749831 LOT 2 DP749831, MID WESTERN HIGHWAY (HW6) AND MCRAES ROAD, GOOLGOWI.

I refer to the Department's correspondence forwarded to Roads and Maritime Services requesting the provision of key issues and assessment requirements to be included in the Environmental Assessment Requirements for the subject development.

From review of the information provided it is understood that the proposal is for the establishment of an intensive poultry production complex on the subject site with a capacity to house up to approximately 7 million birds, plus ancillary infrastructure. It is noted that the development is to be arranged into 6 Poultry Production Units (PPUs), each with 20 sheds. The subject site is located with frontage to the Mid Western Highway (HW6) which is a Classified Regional Road and McRaes Road. The frontage of the subject site to the Mid Western Highway is located within a 110 km/h speed zone. The Mid Western Highway is an approved Road Train Route.

Roads and Maritime is interested in the characteristics of the cumulative traffic generation resultant from the total development, including the peak traffic volumes, and in the potential impact of the development on the safety and efficiency of the road network, particularly intersections with the Mid Western Highway. Given the scale of the development proposal a Traffic Impact Assessment is required to be submitted with the Development Application. In particular the TIA shall address the impacts of traffic generated by this development upon the surrounding road network, particularly any proposed access connection to the public road network, during the lifetime of the project.

The development site has frontage to both the Mid Western Highway, which is a Classified Road & McRaes Road which is a local road. It is noted that access is proposed directly to the Mid Western Highway. In this regard the provisions of Clause 101 of State Environmental Planning Policy (Infrastructure) need to be addressed. The reasoning and justification for access directly to the highway and not via McRaes Road is to be addressed in the submitted documentation.

The draft Secretary's Environmental Assessment Requirements attached to the referral refers to "The Guide to Traffic Generating Development (RTA)" and the "Road Design Guide (RTA)" as reference documents. This should be updated. For guidance in the preparation of the Traffic

Impact Assessment the applicant is referred to the Austroads publications, particularly the Austroads Guide to Traffic Management Part 12: Traffic Impacts of Development and the "Guide to Traffic Generating Developments" prepared by the RTA. Roads and Maritime notes the items to be addressed in the draft Secretary's Environmental Assessment Requirements however highlights the need to consider the peak traffic volumes and the need for a transport management plan to address the movement of vehicles, particularly heavy vehicles, during the various stages of the growing process for each of the 6 PPUs.

Roads and Maritime emphasises the need appropriately consider and minimise the impacts of the development on the existing road infrastructure and maintain the safety, efficiency and standard of maintenance along the existing road network through the design, construction and operation of the development.

Any enquiries regarding this correspondence may be referred to the Manager, Land Use for Roads and Maritime Services (South West Region), Maurice Morgan, phone (02) 69371611.

Yours faithfully



Per:
Mr Lindsay Tanner
Regional Manager
South West Region

APPENDIX B FLORA LIST

Introduced species are indicated by an asterisk (“*”).

The following standard abbreviations are used to indicate subspecific taxa:

- ssp.** - subspecies
- var.** - variety
- x** - hybrid between the two indicated species

Threatened Species Conservation Act 1995 (TSC Act)

- V** Vulnerable
- E1** Endangered
- E2** Endangered Population
- E4A** Critically Endangered Population

Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

- V** Vulnerable
- E** Endangered
- CE** Critically Endangered

ROTAP (Rare or Threatened Australian Plants)

Distribution

- 1.** – Known from only one collection
- 2.** – Geographic range in Australia less than 100km
- 3.** – Geographic range in Australia greater than 100km.
- +** - Also occurs overseas.

Conservation Status

- E.** – Endangered. Species at risk of disappearing from the wild within 20 years. Includes populations of 100 or less individual plants.
- V.** – Vulnerable. Species not presently endangered, but at risk over 20-50 years.
- R.** – Rare in Australia, but not currently under threat. Includes species within a very restricted area or small populations over a wide range.
- K.** – Poorly known. Accurate knowledge is inadequate.
- C.** – Reserved. The species has at least one population within a national park or other reserve.

Size of Reserved Populations

- a.** – 1000 plants or more known within a conservation reserve.
- i.** – Less than 1000 plants known within a conservation reserve.
- - Reserved population size not accurately known.
- t** - Total known population reserved.

SCIENTIFIC NAME	COMMON NAME	TSC ACT	EPBC ACT	ROTAP	NPW ACT
CONIFEROPSIDA (Conifers)					
Cupressaceae					
<i>Calitris glaucophylla</i>	White Cypress Pine				
MAGNOLIOPSIDA: Magnoliidae					
LILOPSIDA: (Monocotyledons)					
Cyperaceae					
* <i>Cyperus eragrostis</i>	Umbrella Sedge				
Juncaceae					
<i>Juncus usitatus</i>	Common Rush				
Poaceae					
<i>Austrostipa pubescens</i>					
<i>Austrostipa ramosissima</i>	Stout Bamboo Grass				
<i>Austrostipa scabra</i> subsp. <i>scabra</i>					
* <i>Avena fatua</i>	Wild Oats				
* <i>Avena sativa</i>	Oats				
* <i>Bromus catharticus</i>	Prairie Grass				
* <i>Bromus diandrus</i>	Great Brome				
* <i>Bromus hordeaceus</i>	Soft Brome				
<i>Chloris truncata</i>	Windmill Grass				
<i>Cynodon dactylon</i>	Common Couch				
<i>Dichanthium sericeum</i>	Queensland Bluegrass				
<i>Elymus scaber</i>					
<i>Enteropogon acicularis</i>					
* <i>Hordeum leporinum</i>	Barley Grass				
<i>Lachnagrostis filiformis</i>					
* <i>Lolium perenne</i>	Perennial Ryegrass				
* <i>Paspalum dilatatum</i>	Paspalum				
<i>Paspalum distichum</i>	Water Couch				
* <i>Pennisetum clandestinum</i>	Kikuyu				
<i>Phragmites australis</i>	Native Reed				
* <i>Phalaris aquatica</i>	Phalaris				
* <i>Polypogon monspeliensis</i>	Annual Beardgrass				
<i>Rytidosperma</i> sp.	Wallaby Grass				
<i>Triticum</i> sp.	Wheat				

SCIENTIFIC NAME	COMMON NAME	TSC ACT	EPBC ACT	ROTAP	NPW ACT
Potamogetonaceae					
<i>Potamogeton tricarlinatus</i>	Floating Pondweed				
Typhaceae					
<i>Typha domingensis</i>	Narrow-leaf Cumbungi				
Xanthorrhoeaceae					
* <i>Asphodelus fistulosus</i>	Onion Weed				
MAGNOLIIDAE (Dicotyledons)					
Aizoaceae					
* <i>Aptenia cordifolia</i>	Heart-leaved Ice Plant				
Amaranthaceae					
<i>Alternanthera denticulata</i>	Lesser Joyweed				
Apiaceae					
* <i>Foeniculum vulgare</i>	Fennel				
Asteraceae					
<i>Calotis cuneifolia</i>	Blue Burr-daisy				
* <i>Carthamus lanatus</i>	Saffron Thistle				
* <i>Centaurea solstitialis</i>	St Barnaby's thistle				
* <i>Cirsium vulgare</i>	Spear Thistle				
* <i>Conyza bonariensis</i>	Flax-leaved Fleabane				
<i>Euchiton sphaericus</i>	Common Cudweed				
* <i>Hypochaeris radicata</i>	Catsear, Flatweed				
* <i>Lactuca serriola</i>	Prickly Lettuce				
<i>Rhodanthe floribunda</i>	Common White Sunray				
* <i>Silybum marianum</i>	Variegated Thistle				
* <i>Sonchus aspera</i>	Prickly Sowthistle				
* <i>Sonchus oleraceus</i>	Common Sow Thistle				
* <i>Taraxacum officinale</i>	Dandelion				
<i>Vittadinia cuneata</i> var. <i>cuneata</i>	Fuzzweed				
* <i>Xanthium spinosum</i>	Bathurst Burr				
<i>Xerochrysum viscosum</i>	Sticky Everlasting				

SCIENTIFIC NAME	COMMON NAME	TSC ACT	EPBC ACT	ROTAP	NPW ACT
Boraginaceae					
* <i>Echium plantagineum</i>	Paterson's Curse				
* <i>Heliotropium europaeum</i>	Common Heliotrope				
Brassicaceae					
<i>Sisymbrium</i> sp.					
<i>Sisymbrium erysimoides</i>	Smooth Mustard				
<i>Sisymbrium orientale</i>	Indian Hedge Mustard				
Capparaceae					
<i>Apophyllum anomalum</i>	Warrior Bush				
Casuarinaceae					
<i>Casuarina cristata</i>	Belah				
<i>Casuarina pauper</i>	Black Oak				
Chenopodiaceae					
<i>Atriplex nummularia</i>	Old Man Saltbush				
<i>Atriplex semibaccata</i>	Creeping Saltbush				
<i>Atriplex stipitata</i>	Mallee Saltbush				
<i>Enchylaena tomentosa</i>	Ruby Saltbush				
<i>Maireana decalvans</i>	Black Cotton Bush				
<i>Maireana enchylaenoides</i>					
<i>Maireana pyramidata</i>	Black Bluebush				
<i>Rhagodia spinescens</i>	Spiny Saltbush				
<i>Salsola australis</i>	Prickly Saltwort				
<i>Sclerolaena birchii</i>	Galvanised Burr				
<i>Sclerolaena diacantha</i>	Grey Copperburr				
<i>Sclerolaena muricata</i>	Black Roly Poly				
Crassulaceae					
<i>Crassula sieberana</i>	Australian Stonecrop				
Cucurbitaceae					
* <i>Citrullus lanatus</i>	Bitter Melon				
Euphorbiaceae					
* <i>Euphorbia peplus</i>	Petty Spurge				

SCIENTIFIC NAME	COMMON NAME	TSC ACT	EPBC ACT	ROTAP	NPW ACT
Fabaceae Subfamily (Faboideae)					
* <i>Medicago polymorpha</i>	Burr Medic				
* <i>Medicago sativa</i>	Lucerne				
* <i>Trifolium angustifolium</i>	Narrow-leaf Clover				
Fabaceae (Subfamily Mimosoideae)					
<i>Acacia deanei</i>	Green Wattle				
Geraniaceae					
<i>Erodium cicutarium</i>	Common Stocks-bill				
<i>Erodium crinitum</i>	Blue Heronsbill				
<i>Geranium homeanum</i>	Cranesbill				
Lamiaceae					
* <i>Marrubium vulgare</i>	Horehound				
Lobeliaceae					
<i>Pratia concolor</i>	Poison Pratia				
Loranthaceae					
<i>Amyema cambagei</i>	Needle-leaved Mistletoe				
<i>Amyema linophylla</i>	Buloke Mistletoe				
Malvaceae					
<i>Brachychiton populneus</i> subsp. <i>populneus</i>	Kurrajong				
* <i>Malva parviflora</i>	Small-flowered Mallow				
<i>Malva preissiana</i>	Australian Hollyhock				
<i>Sida corrugata</i>	Corrugated Sida				
Myrtaceae					
<i>Eucalyptus populnea</i> subsp. <i>bimbil</i>	Bimble Box				
<i>Eucalyptus socialis</i>	Red Mallee				
<i>Eucalyptus</i> sp. (planted around dwelling)					
<i>Melaleuca</i> sp.		V			
Nyctaginaceae					
<i>Boerhavia domini</i>	Tarvine				

SCIENTIFIC NAME	COMMON NAME	TSC ACT	EPBC ACT	ROTAP	NPW ACT
Oxalidaceae					
<i>Oxalis perennans</i>	Wood-sorrel				
Pittosporaceae					
<i>Pittosporum angustifolium</i>	Butterbush				
Plantaginaceae					
* <i>Plantago lanceolata</i>	Plantain				
Plumbaginaceae					
* <i>Limonium lobatum</i>	Winged Sea Lavender				
Polygonaceae					
* <i>Polygonum aviculare</i>	Wireweed				
<i>Rumex brownii</i>	Swamp Dock				
* <i>Rumex crispus</i>	Curled Dock				
Rutaceae					
<i>Geijera parviflora</i>	Wilga				
Sapindaceae					
<i>Alectryon oleifolius</i>	Western Rosewood				
<i>Dodonaea viscosa</i> subsp. <i>angustissima</i>	Narrow-leaved Hopbush				
Solanaceae					
* <i>Lycium ferocissimum</i>	African Boxthorn				
* <i>Solanum nigrum</i>	Blackberry Nightshade				
Viscaceae					
<i>Korthalsella rubra</i> subsp. <i>geijericola</i>	Wilga Mistletoe				
Zygophyllaceae					
<i>Tribulus</i> sp.	Caltrop				

APPENDIX C

VEGETATION PLOT DATA

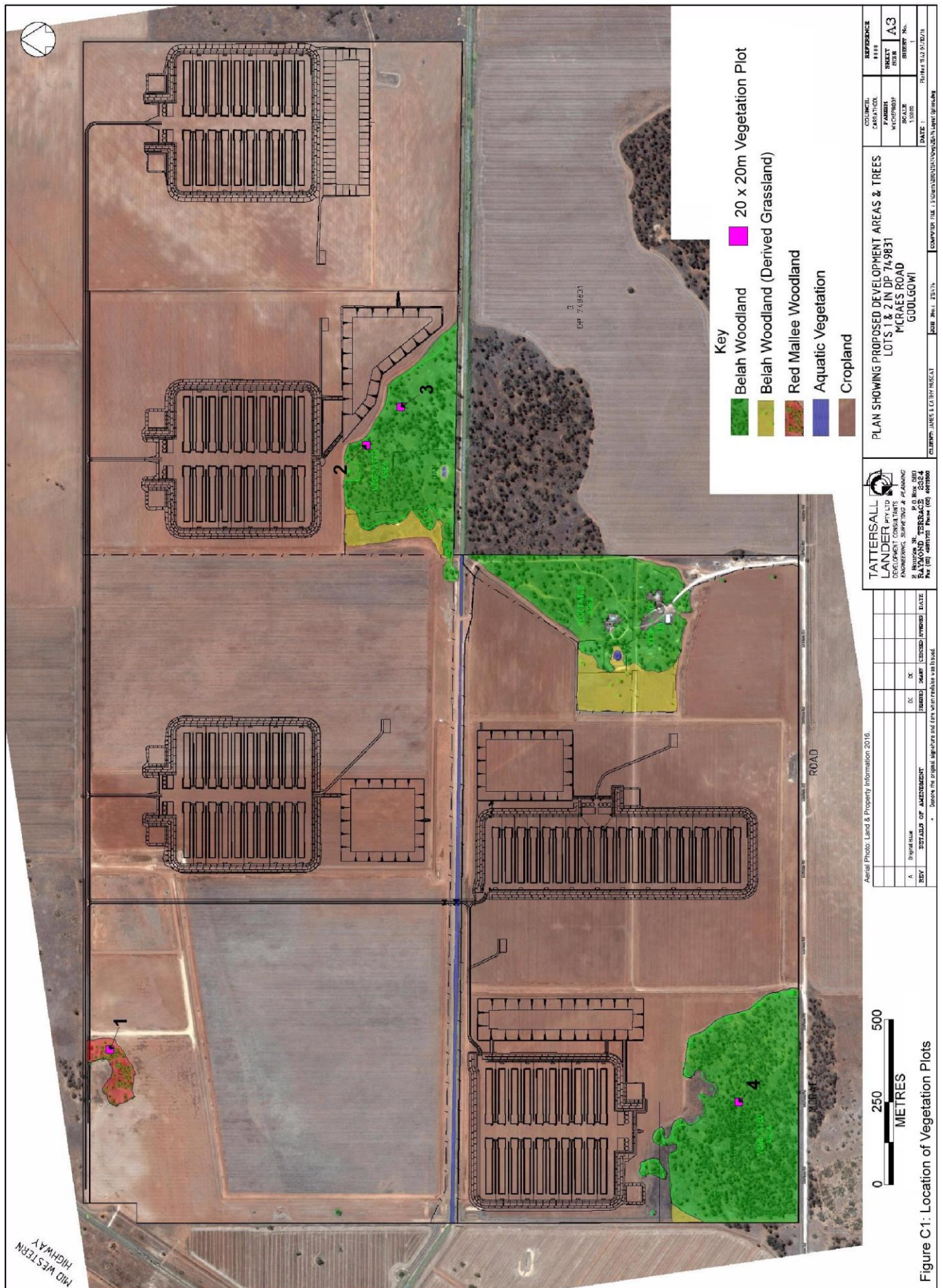
1.0 PLOT METHODOLOGY

Four plot-based vegetation surveys were undertaken within the site to provide additional detail on the flora assemblages present (Figure C1). The plot was 20 × 20m in area. All species observed within the plot were recorded, with the dominant species in each stratum being duly noted. A modified Braun-Blanquet 6-point scale (Braun-Blanquet 1927, with selected modifications sourced from Poore 1955 and Austin *et al.* 2000) was used to estimate cover-abundances of all plant species within each plot. The cover-abundance categories are shown in Table C1.

Table C1: Modified Braun-Blanquet Crown Cover-abundance Scale

Class	Cover - Abundance	Notes
1	Few individuals (less than 5% cover)	Herbs, sedges and grasses: < 5 individuals Shrubs and small trees: 5 or more individuals
2	Many individuals (less than 5% cover)	Herbs, sedges and grasses: 5 or more individuals Medium-large over hanging tree
3	5 – < 20% cover	-
4	20 – < 50% cover	-
5	50 – < 75% cover	-
6	75 – 100% cover	-

* - Introduced species



Plot 1

Red Mallee Woodland

PCT - 193

Biometric Type – CW199; LA209; WE147.

Name - (most similar) - Red Mallee - White Mallee extremely tall tree mallee on silty-loam-clay soils of central south-western NSW

Vegetation Formation – Semi-arid Woodlands (Shrubby sub-formation)

Vegetation Class – Sand Plain Mallee Woodlands

Date: 13 December 2016

Plot Size - 20 × 20m.

Location North- corner: E – 366492, N – 6234332

Aspect: Level

Soil: Alkaline brown calcareous.

Litter: 5%

Rock: 0%

Lichen: <5%



Native Over-storey

Eucalyptus socialis

Red Mallee

2

Native Mid-storey (>1m)

Alectryon oleifolius

Western Rosewood

1

Geijera parviflora

Wilga

1

Native Ground Cover (Shrubs <1m)

0

Native Grasses

<i>Enteropogon acicularis</i>	2
<i>Austrodanthonia</i> sp.	1

Native Ground Cover (Other)

<i>Rhodanthe floribunda</i>	Common White Sunray	1
<i>Enchylaena tomentosa</i>	Ruby Saltbush	2
<i>Malva preissiana</i>	Australian Hollyhock	1
<i>Salsola australis</i>	Prickly Saltwort	2

Exotic Plant Cover

<i>Sisymbrium</i> sp.	Mustard	3
<i>Lolium perenne</i>	Perennial Ryegrass	2
<i>Hordeum leporinum</i>	Barley Grass	2
<i>Avena fatua</i>	Wild Oats	2
<i>Centaurea solstitialis</i>	St Barnaby's Thistle	2
<i>Bromus diandrus</i>	Great brome	3
<i>Polygonum aviculare</i>	Wireweed	1

Native Species No. 9

Plot 2

Belah Woodland

PCT - 57

Biometric Type – CW105; LA106; MR515; WE124.

Name - (most similar) - Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including the Cobar Peneplain Bioregion

Vegetation Formation – Semi-arid Woodlands (Shrubby sub-formation);

Vegetation Class – Semi-arid Sand Plain Woodlands.

Date: 14 December 2016

Plot Size - 20 × 20m.

Location North- corner: E – 366492, N – 6234332

Aspect: Level

Soil: Alkaline brown calcareous.

Litter: 10%

Rock: 0%

Lichen: <5%



Native Over-storey

Casuarina cristata

Belah

2

Native Mid-storey (>1m)

Alectryon oleifolius

Western Rosewood

2

Geijera parviflora

Wilga

1

Native Ground Cover (Shrubs <1m)

0

Native Grasses

<i>Austrostipa scabra subsp. scabra</i>		2
<i>Austrodanthonia</i> sp.		1
<i>Chloris truncata</i>	Windmill Grass	1
Native Ground Cover (Other)		
<i>Enchylaena tomentosa</i>	Ruby Saltbush	2
<i>Sida corrugata</i>	Corrugated Sida	2
<i>Sclerolaena birchii</i>	Galvanised Burr	2
<i>Salsola australis</i>	Prickly Saltwort	2
<i>Maireana pyramidata</i>	Black Bluebush	2
Exotic Plant Cover		
<i>Sisymbrium</i> sp.	Mustard	4
<i>Lycium ferocissimum</i>	African Boxthorn	1
<i>Avena fatua</i>	Wild Oats	2
<i>Echium plantagineum</i>	Patterson's Curse	1
<i>Sonchus aspera</i>	Prickly Sowthistle	1

Native Species No. 11

Plot 3

Belah Woodland

PCT - 57

Biometric Type – CW105; LA106; MR515; WE124.

Name - (most similar) - Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including the Cobar Peneplain Bioregion

Vegetation Formation – Semi-arid Woodlands (Shrubby sub-formation);

Vegetation Class – Semi-arid Sand Plain Woodlands.

Date: 14 December 2016

Plot Size - 20 × 20m.

Location North- corner: E – 368315, N – 6233201

Aspect: Level

Soil: Alkaline brown calcareous.

Litter: 10%

Rock: 0%

Lichen: <5%



Native Over-storey

Casuarina cristata

Belah

3

Native Mid-storey (>1m)

Geijera parviflora

Wilga

1

Native Ground Cover (Shrubs <1m)

0

Native Grasses

<i>Chloris truncata</i>	Windmill Grass	1
<i>Austrodanthonia</i> sp.		1
<i>Austrostipa scabra</i> subsp. <i>scabra</i>		2
Native Ground Cover (Other)		
<i>Enchylaena tomentosa</i>	Ruby Saltbush	2
<i>Sclerolaena birchii</i>	Galvanised Burr	1
<i>Sida corrugata</i>	Corrugated Sida	1
<i>Salsola australis</i>	Prickly Saltwort	1
Exotic Plant Cover		
<i>Sisymbrium</i> sp.	Mustard	3
<i>Echium plantagineum</i>	Patterson's Curse	1
<i>Lycium ferocissimum</i>	African Boxthorn	1
<i>Avena fatua</i>	Wild Oats	2
<i>Sonchus aspera</i>	Prickly Sowthistle	1

Native Species No. 10

Plot 4

Belah Woodland

PCT - 57

Biometric Type – CW105; LA106; MR515; WE124.

Name - (most similar) - Belah/Black Oak - Western Rosewood - Wilga woodland of central NSW including the Cobar Peneplain Bioregion

Vegetation Formation – Semi-arid Woodlands (Shrubby sub-formation);

Vegetation Class – Semi-arid Sand Plain Woodlands.

Date: 14 December 2016

Plot Size - 20 × 20m.

Location North- corner: E – 368315, N – 6233201

Aspect: Level

Soil: Alkaline brown calcareous.

Litter: 10%

Rock: 0%

Lichen: <5%



Native Over-storey

Casuarina cristata

Belah

1

Native Mid-storey (>1m)

Alectryon oleifolius

Western Rosewood

2

Apophyllum anomalum

Warrior Bush

1

Native Ground Cover (Shrubs <1m)

0

Native Grasses

<i>Austrostipa scabra</i> subsp. <i>scabra</i>		2
<i>Austrodanthonia</i> sp.		1
<i>Chloris truncata</i>	Windmill Grass	1

Native Ground Cover (Other)

<i>Enchylaena tomentosa</i>	Ruby Saltbush	3
<i>Sclerolaena birchii</i>	Galvanised Burr	1
<i>Sclerolaena muricata</i>	Black Roly Poly	2
<i>Rhodanthe floribunda</i>	Common White Sunray	2
<i>Vittadinia cuneata</i> var. <i>cuneata</i>	Fuzzweed	2
<i>Sida corrugata</i>	Corrugated Sida	1
<i>Salsola australis</i>	Prickly Saltwort	1

Exotic Plant Cover

<i>Centaurea solstitialis</i>	St Barnaby's Thistle	1
<i>Sisymbrium</i> sp.	Mustard	2
<i>Sonchus aspera</i>	Prickly Sowthistle	1
<i>Avena fatua</i>	Wild Oats	2

Native Species No. 13

APPENDIX D

TREE DATA

Tree Data Key for Table D1.

- **DBH** – Diameter at Breast Height. Tree trunk diameter measured at breast height (1.4 metres above ground level). Fabric diameter tape used which assumes a circular cross section.
- **Tree Height** – Estimated with the use of an inclinometer and rangefinder (metres).
- **Coordinates - GDA - 1994**
- **Habitat/Hollows** –
 - Class 1** – very large sized hollow openings (i.e. >20cm) suitable for species such as Owls
 - Class 2** – large sized hollow openings (i.e. 15-20cm) suitable for species such as Owls and Possums
 - Class 3** – medium sized hollow-openings (i.e. 5-15cm) suitable for species such as Gliders and Possums
 - Class 4** – small sized hollow openings (i.e. <5cm) suitable for species such as microchiropteran bats.
- Spout** - Hollow opening towards sky offering little protection from the weather
- Arboreal Termite Nest** – provides potential nesting opportunities for hollow-dependent birds, such as kingfishers and kookaburras
- **Removal required** –
 - Y** – Yes
 - N** – No

Table D1: Details of trees within the site

Tree No.	Tag No.	Species	Easting GDA – 94	Northing GDA – 94	DBH (M)	Height (M)	Habitat/Hollows Present/Comments	Removal Required Y/N
1.	101	<i>Apophyllum anomalum</i> Warrior Bush	365780	6232768	0.35	6	1 x Class 3 1 x Class 4	N
2.	102	<i>Eucalyptus populnea</i> Bimblebox	365911	6233708	0.5	11		N
3.	103	<i>Geijera parviflora</i> Wilga	365907	6232780	2 x 0.4	10		N
4.	104	<i>Casuarina cristata</i> Belah	365928	6232773	0.55	13	1 x Class 3 1 x Class 4	N
5.	105	<i>C. cristata</i>	366011	6232722	0.5	12		N
6.	106	<i>C. cristata</i>	366010	6232724	0.35	12		N
7.	107	<i>G. parviflora</i>	366012	6232721	0.5	12		N
8.	108	Dead	366009	6232720	0.4	10		N
9.	109	<i>C. cristata</i>	366026	6232708	0.7	14	1 x Class 2 1 x Class 4 Hollowdown middle	N
10.	110	<i>G. parviflora</i>	366024	6232641	0.5	7		N
11.	111	<i>G. parviflora</i>	366051	6232605	2x0.4	8	1 x Class 3	N
12.	112	<i>C. cristata</i>	366182	6232605	0.55	8		N
13.	113	<i>C. cristata</i>	366194	6232609	0.6	14		N
14.	114	<i>A. anomalum</i>	366220	6232609	0.18	4		N
15.	115	<i>A. anomalum</i>	366245	6232596	0.2	5		N
16.	116	<i>C. cristata</i>	366275	6232581	2x0.45	13	1 x Class 4	N
17.	117	<i>C. cristata</i>	366291	6232577	0.5	14		N
18.	118	<i>C. cristata</i>	366300	6232533	2x0.5	17	2 x Class 4	N
19.	119	<i>C. cristata</i>	366314	6232509	0.4	14	Bird of prey nest	N
20.	120	Dead	366340	6232480	0.8	10	2 x Class 4	N
21.	121	<i>C. cristata</i>	366365	6232377	0.4	11	1 x Class 4	N
22.	122	Dead	366371	6232362	0.35	10	1 x Class 3	N
23.	123	<i>C. cristata</i>	366373	6232356	0.5	15		N
24.	124	No. not found						N
25.	125	<i>C. cristata</i>	366389	6232307	0.4	13		N

Tree No.	Tag No.	Species	Easting GDA – 94	Northing GDA – 94	DBH (M)	Height (M)	Habitat/Hollows Present/Comments	Removal Required Y/N
26.	126	<i>C. cristata</i>	366395	6232258	0.5	13		N
27.	127	<i>Callitris glaucophylla</i> White Cyprus	367655	6232152	0.5	12	Crested pigeon nest	N
28.	128	<i>C. glaucophylla</i>	367664	6232302	0.6	12		N
29.	129	<i>C. cristata</i>	367830	6233018	0.7	17	3 x Class 4	N
30.	130	<i>C. cristata</i>	367833	6233036	0.6	16		N
31.	131	<i>C. cristata</i>	367838	6233046	0.7	16	1 x Class 3 in trunk crack	N
32.	132	<i>C. cristata</i>	367787	6233071	0.7	13	1 x Class 3	N
33.	133	<i>C. cristata</i>	367779	6233108	0.65	13	1 x Class 3 going up trunk	N
34.	134	<i>C. cristata</i>	367801	6233097	0.6	12		N
35.	135	<i>C. cristata</i>	367799	6233109	0.7	13	2 x Class 4	N
36.	136	<i>C. cristata</i>	367809	6233125	0.6	12	2 x Class 3 2 x Class 4	N
37.	137	<i>C. cristata</i>	367789	6233130	0.8	11	2 x Class 2 up from base Long hollow scar	N
38.	138	<i>Eucalyptus socialis</i> Red Mallee	366355	6234428	0.3	10		N
39.	139	<i>E. socialis</i>	366345	6234415	2 x 0.2	8		N
40.	140	<i>E. socialis</i>	366417	6234408	2 x 0.25	7		Y
41.	141	<i>E. socialis</i>	366459	6234393	3 x 0.15	7		N
42.	142	<i>Alectryon oleifolius</i> subsp. <i>canescens</i> Rosewood	366466	6234371	0.3	5		N
43.	143	<i>A. oleifolius</i> subsp. <i>canescens</i>	366470	6234373	0.18	5		N
44.	144	<i>E. socialis</i>	366476	6234374	0.15	6		N
45.	145	<i>A. oleifolius</i> subsp. <i>canescens</i>	366487	6234381	0.2	4		N
46.	146	<i>A. oleifolius</i> subsp. <i>canescens</i>	366502	6234382	0.15	4		N

Tree No.	Tag No.	Species	Easting GDA – 94	Northing GDA – 94	DBH (M)	Height (M)	Habitat/Hollows Present/Comments	Removal Required Y/N
47.	147	<i>A. oleifolius</i> subsp. <i>canescens</i>	366504	6234381	0.15	4		N
48.	148	<i>A. oleifolius</i> subsp. <i>canescens</i>	366507	6234390	0.1	4		N
49.	149	<i>A. oleifolius</i> subsp. <i>canescens</i>	36650	6234382	0.15	4		N
50.	150	<i>A. oleifolius</i> subsp. <i>canescens</i>	366509	6234386	0.15	4		N
51.	151	<i>A. oleifolius</i> subsp. <i>canescens</i>	366504	6234380	0.1	5		N
52.	152	<i>E. socialis</i>	366506	6234366	0.15	7		N
53.	153							N
54.	154	<i>E. socialis</i>	366504	6234350	0.18	8	1 x Class 3	N
55.	155	<i>E. socialis</i>	366489	6234348	0.2	7	1 x Class 3	N
56.	156	<i>E. socialis</i>	366471	6234354	0.25	10		N
57.	157	<i>E. socialis</i>	366473	6234351	0.3	10		N
58.	158	<i>A. oleifolius</i> subsp. <i>canescens</i>	366470	6234342	0.2	6		N
59.	159	<i>E. socialis</i>	366465	6234335	0.3	12		N
60.	160	<i>E. socialis</i>	366472	6234329	0.25	9		N
61.	161	<i>E. socialis</i>	366469	6234328	0.25	11		N
62.	162	<i>E. socialis</i>	366475	6234320	0.3	8		N
63.	163	<i>E. socialis</i>	366462	6234314	0.3	8		N
64.	164	<i>E. socialis</i>	366477	6234305	0.3	10	1 x Class 3 near base	N
65.	165	<i>E. socialis</i>	366445	6234314	0.25	9		N
66.	166	<i>E. socialis</i>	366468	6234313	0.2	5		N
67.	167	<i>E. socialis</i>	366472	6234296	0.25	8		N
68.	168	<i>E. socialis</i>	366467	6234293	0.25	9	2 x Class 3 1 x Class 4	N
69.	169	<i>E. socialis</i>	366459	6234314	0.2	9		N
70.	170	<i>E. socialis</i>	366439	6234314	0.2	7		N
71.	171	<i>E. socialis</i>	366439	6234310	0.3	10		N

Tree No.	Tag No.	Species	Easting GDA – 94	Northing GDA – 94	DBH (M)	Height (M)	Habitat/Hollows Present/Comments	Removal Required Y/N
72.	172	<i>E. socialis</i>	366438	6234308	0.25	10	1 x Class 3	N
73.	173	<i>A. oleifolius</i> subsp. <i>canescens</i>	366443	6234307	0.25	10		N
74.	174	<i>E. socialis</i>	366444	6234305	0.2	9		N
75.	175	<i>E. socialis</i>	366439	6234303	0.25	9		N
76.	176	<i>E. socialis</i>	366430	6234295	0.3	9		N
77.	177	<i>E. socialis</i>	366430	6234291	0.25	11		N
78.	178	<i>E. socialis</i>	366431	6234283	0.3	10		N
79.	179	<i>E. socialis</i>	366431	6237272	0.2	9		N
80.	180	<i>E. socialis</i>	366422	6234283	0.15	8		N
81.	181	<i>E. socialis</i>	366419	6234290	0.18	8		N
82.	182	<i>E. socialis</i>	366421	6234304	0.15	9		N
83.	183	<i>E. socialis</i>	366411	6234326	0.25	7		N
84.	184	<i>E. socialis</i>	366411	6234302	0.3	6		N
85.	185	<i>E. socialis</i>	366414	6234285	0.28	8		N
86.	186	<i>E. socialis</i>	366407	6234268	0.3	8	1 x Class 3 spout	N
87.	187	<i>E. socialis</i>	366402	6234283	0.3	9		N
88.	188	<i>E. socialis</i>	366401	6234293	0.2	7	Birds nest	N
89.	189	<i>E. socialis</i>	366398	6234291	0.25	10		N
90.	190	<i>E. socialis</i>	366395	6234283	0.25	8	1 x Class 4	N
91.	191	<i>E. socialis</i>	366380	6234282	0.3	10		N
92.	192	<i>E. socialis</i>	366374	6234283	0.18	7		N
93.	193	<i>E. socialis</i>	366370	6234282	0.2	7		N
94.	194	<i>E. socialis</i>	366379	6234292	0.15	8		N
95.	195	<i>E. socialis</i>	366385	6234296	0.3	9		N
96.	196	<i>E. socialis</i>	366394	6234314	0.3	8		N
97.	197	<i>E. socialis</i>	366386	6234317	0.35	12		N
98.	198	<i>E. socialis</i>	366382	6234307	0.3	14		N
99.	199	<i>E. socialis</i>	366484	6234307	0.3	12	1 x Class 3 spout	N
100.	200	<i>E. socialis</i>	366491	6234306	0.25	8		N
101.	201	<i>A. oleifolius</i> subsp. <i>canescens</i>	366494	6234319	0.2	4		N

Tree No.	Tag No.	Species	Easting GDA – 94	Northing GDA – 94	DBH (M)	Height (M)	Habitat/Hollows Present/Comments	Removal Required Y/N
102.	202	<i>E. socialis</i>	366494	6234320	0.25	8		N
103.	203	<i>E. socialis</i>	366506	6234324	0.2	7		N
104.	204	<i>E. socialis</i>	366516	6234339	0.3	7		N
105.	205	<i>E. socialis</i>	366380	6234316	0.35	10		N
106.	206	<i>E. socialis</i>	366377	6234335	0.4	10		N
107.	207	<i>E. socialis</i>	366380	6234309	0.2	8	1 x Class 4	N
108.	208	<i>E. socialis</i>	366378	6234353	0.18	7		N
109.	209	<i>E. socialis</i>	366371	6234360	0.15	8		N
110.	210	<i>E. socialis</i>	366370	6234365	0.3	10		N
111.	211	<i>E. socialis</i>	366371	6234298	0.18	8	1 x Class 3	N
112.	212	<i>E. socialis</i>	366350	6234348	0.2	8		N
113.	213	<i>E. socialis</i>	366335	6234344	0.3	12		N
114.	214	<i>E. socialis</i>	366333	6234346	0.2	8		N
115.	215	<i>E. socialis</i>	366324	6234335	0.25	10		N
116.	216	<i>E. socialis</i>	366331	623430	0.2	8	1 x Class 3	N
117.	217	<i>E. socialis</i>	366342	6234303	0.3	9	1 x Class 3	N
118.	218	<i>E. socialis</i>	366336	6234283	0.2	8		N
119.	219	<i>E. populnea</i>	368053	6234200	0.5	14		N
120.	220	<i>Acacia pendula</i>	368092	6234198	0.25	8		N
121.	250	<i>A. oleifolius subsp. canescens</i>	368130	6233384	0.4	10		N
122.	253	<i>G. parviflora</i>	367945	6233159	0.4	8	1 x Class 3 1 x Class 4	N
123.	254	<i>C. pauper</i>	367860	6233111	0.7	9		N
124.	255	<i>G. parviflora</i>	367850	6233112	0.45	8		N
125.	256	<i>C. cristata</i>	367730	6232955	0.65	17		N
126.	257	<i>C. cristata</i>	367572	6232744	0.7	14	1 x Class 3	N
127.	258	<i>C. cristata</i>	367476	6232744	0.6	10		N
128.	259	<i>A. oleifolius subsp. canescens</i>	367392	6232672	0.4	8		N
129.	260	<i>C. cristata</i>	367400	6232650	0.75	16	1 x Class 4	N
130.	261	<i>C. cristata</i>	367423	6232624	0.55	14		N

Tree No.	Tag No.	Species	Easting GDA – 94	Northing GDA – 94	DBH (M)	Height (M)	Habitat/Hollows Present/Comments	Removal Required Y/N
131.	262	<i>A. oleifolius subsp. canescens</i>	367360	6232661	0.45	7	5 x Class 3 1 x Class 4	N
132.	270	<i>Geijera parviflora</i>	366390	6232260	0.5	9	1 x Class 3	N
133.	271	<i>C. cristata</i>	366387	6232341	0.5	14	2 x Class 3 2 x Class 4	N
134.	272	Dead	366364	6232374	0.7	15		N
135.	273	<i>A. anomalum</i>	266134	6232537	0.2	4	3 x Class 4	N
136.	274	<i>G. parviflora</i>	366115	6232574	0.4	7	1 x Class 4	N
137.	275	<i>A. anomalum</i>	366055	6232589	0.3	5	1 x Class 4	N
138.	277	<i>A. anomalum</i>	365846	6232691	0.3	5	1 x Class 3 2 x Class 4	N
139.	500	<i>E. populnea</i>	367272	6234306	0.6	12		N

APPENDIX E

VERTEBRATE FAUNA LIST

FAUNA LIST

Family sequencing and taxonomy follow for each fauna class:

Herpetofauna

Cogger (2000), Ehmann (Ed) (1997) and Barker, Grigg and Tyler (1995).

Birds

Pizzey and Knight (2012)(9th edn).

Mammals - Van Dyck & Strahan (Ed) (2008) and Churchill (2008).

Churchill, S. (2008). *Australian Bats*. (2nd edn.). Allen & Unwin Australia.

(?) - Indicates a species identified without certainty or to a Genus level only.

* - Indicates an introduced species.

The following symbols are used to indicate species recorded during previous surveys.

@ - Previous record (Wildthing Environmental Consultants, 2008a)

Threatened species addressed within this assessment appear in **bold** font.

Introduced species are indicated by an asterisk (“*”).

The following standard abbreviations are used to indicate subspecific taxa:

subsp. -subspecies

var.- variety

x - hybrid between the two indicated species

Threatened Species Conservation Act 1995 (TSC Act)

V Vulnerable

E1 Endangered

E2 Endangered Population

E4A Critically Endangered Population

Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

V Vulnerable

E Endangered

CE Critically Endangered Population

M Migratory

Observation Type

O - Observed (sighted)

W - Heard call

OW - Observed and heard call

X - In scat

P - Scat

T - Trapped or netted

H - Hair, feathers or skin

A - Stranded/Beached

G - Crushed cones

R - Road Kill

D - Dog Kill

Q - Camera

C - Cat Kill

V - Fox Kill

K - Dead

S - Shot

I - Fossil/subfossil

FB - Burrow

F - Tracks, scratching

Z - In raptor/owl Pellet

U - Ultrasonic recording

M - Miscellaneous

E - Nest/roost

B - Burnt

Y - Bones, teeth or shell

N - Not located

AR - Acoustic Recording

SCIENTIFIC NAME	COMMON NAME	TSC ACT	EPBC ACT	OBSERVATION TYPE
Phylum - Chordata				
Subphylum - Vertebrata				
Class - Actinopterygii				
Order Cypriniformes				
Family Cyprinidae				
<i>*Cyprinus carpio</i>	Carp			O
Order Cyprinodontiformes				
Family Poeciliidae				
<i>Gambusia holbrooki</i>	Mosquitofish			O
Class Amphibia - Amphibians				
Order Salientia - Frogs				
Family Myobatrachidae - 'Southern Frogs'				
<i>Limnodynastes fletcheri</i>	Barking Frog			W
Class Reptilia - Reptiles				
Order Squamata – Lizards and Snakes				
Suborder Sauria - Lizards				
Family Gekkonidae - Geckoes				
<i>Gehyra variegata</i>	Common Dtella			O
Family Agamidae - Dragons				
<i>Pogona barbata</i>	Eastern Bearded Dragon			O

SCIENTIFIC NAME	COMMON NAME	TSC ACT	EPBC ACT	OBSERVATION TYPE
Family Scinidae - Skinks				
<i>Cryptoblepharus pannosus</i>	Ragged Snake-eyed Skink			O
<i>Egernia striolata</i>	Tree Skink			O
<i>Morethia boulengeri</i>	Boulenger's Skink			O
Class Aves - Birds				
Family Phasianidae				
<i>Coturnix pectoralis</i>	Stubble Quail			O
Family Anatidae - Ducks, Swans and Geese				
<i>Anas superciliosa</i>	Pacific Black Duck			O
Family Columbidae - Pigeons, Doves				
<i>Ocyphaps lophotes</i>	Crested Pigeon			O
Family Podargidae - Frogmouths				
<i>Podargus strigoides</i>	Tawny Frogmouth			O
Family Aegothelidae - Owlet Nightjars				
<i>Aegotheles cristatus</i>	Australian Owlet Nightjar			O
Family Ardeidae - Herons, Egrets and Bitterns				
<i>Egretta novaehollandiae</i>	White-faced Heron			
Family Accipitridae - Osprey, Hawks, Eagles and Harriers				
<i>Circus assimilis</i>	Spotted Harrier	V		O
<i>Elanus axillaris</i>	Black-shouldered Kite			O
<i>Haliastur sphenurus</i>	Whistling Kite			O
Family Falconidae - Falcons				
<i>Falco cenchroides</i>	Australian Kestrel			O

SCIENTIFIC NAME	COMMON NAME	TSC ACT	EPBC ACT	OBSERVATION TYPE
Family Charadriidae Plover, Dotterels, Lapwings				
<i>Vanellus miles</i>	Masked Lapwing			OW
Family Cacatuidae - Cockatoos and Corellas				
<i>Eolophus roseicapillus</i>	Galah			OW
Family Psittacidae - Parrots, Rosellas and Lorikeets				
<i>Barnardius zonarius</i>	Australian Ringneck			O
<i>Northiella haematogaster</i>	Blue Bonnet			O
<i>Nymphicus hollandicus</i>	Cockatiel			O
<i>Psephotus haematonotus</i>	Red-rumped Parrot			O
Family Halcyonidae - Tree Kingfishers				
<i>Dacelo novaeguineae</i>	Laughing Kookaburra			OW
<i>Todiramphus sanctus</i>	Sacred Kingfisher			OW
Motacillidae – Pipits & Wagtails				
<i>Anthus novaeseelandiae</i>	Australasian Pipit			O
Family Maluridae				
<i>Malurus cyaneus</i>	Superb Fairy-wren			OW
Family Pardalotidae - Pardalotes, Gerygones, Scrubwrens, Heathwrens and Thornbills				
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill			O
<i>Hylacola pyrrhopygia</i>	Chestnut-rumped Heathwren			O
Family Meliphagidae - Honeyeaters				
<i>Lichenostomus virescens</i>	Singing Honeyeater			O
<i>Manorina melanocephala</i>	Noisy Miner			O
Family Pomatostomidae Australian Babblers				
<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler	V		OW

SCIENTIFIC NAME	COMMON NAME	TSC ACT	EPBC ACT	OBSERVATION TYPE
Family Monarchidae - Monarchs, Flycatchers and Magpie-Lark				
<i>Myiagra inquieta</i>	Restless Flycatcher			O
<i>Grallina cyanoleuca</i>	Magpie-lark			OW
Family Rhipiduridae - Fantails				
<i>Rhipidura leucophrys</i>	Willie Wagtail			OW
Family Campephagidae - Cuckoo-shrikes and Trillers				
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike			OW
Family Hirundinidae - Swallows and Martins				
<i>Cecropis ariel</i>	Fairy Martin			O
<i>Hirundo neoxena</i>	Welcome Swallow			O
Family Sylviidae - Old World Warblers				
<i>Acrocephalus stentoreus</i>	Clamorous Reed Warbler			OW
Family Artamidae - Wood-swallows, Butcherbirds, Magpie and Currawongs				
<i>Cracticus nigrogularis</i>	Pied Butcherbird			OW
<i>Cracticus tibicen</i>	Australian Magpie			OW
Family Corvidae - Crows, Raven				
<i>Corvus coronoides</i>	Australian Raven			OW
Corcoracidae - Chough and Apostlebird				
<i>Corcorax melanorhamphos</i>	White-winged Chough			OW
Family Estrildidae - Grassfinches				
<i>Neochima temporalis</i>	Red-browed Finch			O
<i>Taeniopygia bichenovii</i>	Double-barred Finch			O
<i>Taeniopygia guttata</i>	Zebra Finch			O

SCIENTIFIC NAME	COMMON NAME	TSC ACT	EPBC ACT	OBSERVATION TYPE
Family Sturnidae - Starlings and Mynas				
<i>*Sturnus vulgaris</i>	Common Starling			OW
Class Mammalia - Mammals				
Subclass Prototheria - Monotremes				
Order Monotremata				
Family Tachyglossidae - Echidna				
<i>Tachyglossus aculeatus</i>	Echidna			F
Subclass Marsupialia - Marsupials				
Order Dasyuromorphia – Carnivorous Marsupials				
Order Diprotodontia				
Suborder Phalangerida				
Superfamily - Phalangerioidea				
Family Phalangeridae - Brushtail Possums				
<i>Trichosurus vulpecula</i>	Common Brushtail Possum			O
Superfamily - Macropodoidae				
Family Macropodidae - Kangaroos, Wallabies				
<i>Macropus fuliginosus</i>	Western Grey Kangaroo			O
<i>Macropus giganteus</i>	Eastern Grey Kangaroo			O

SCIENTIFIC NAME	COMMON NAME	TSC ACT	EPBC ACT	OBSERVATION TYPE
Subclass Eutheria - Eutherian Mammals				
Order Chiroptera				
Suborder Microchiroptera				
Family Vespertilionidae - Plain-nosed Bats				
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat			U
<i>Chalinolobus picatus</i>	Little Pied Bat	V		U
<i>Nyctophilus corbeni</i>?	Corben's Long-eared Bat	V		U
<i>Nyctophilus geoffroyi</i> ?	Lesser Long-eared Bat			U
<i>Nyctophilus gouldi</i> ?	Gould's Long-eared Bat			U
<i>Scotorepens balstoni</i>	Inland Broad-nosed Bat			U
<i>Vespadelus darlingtoni</i> ?	Large Forest Bat			U
<i>Vespadelus regulus</i> ?	Southern Forest Bat			U
<i>Vespadelus vulturnus</i> ?	Little Forest Bat			U
Order Rodentia				
Family Muridae - Rodents				
<i>*Mus musculus</i>	House Mouse			T
Order Lagomorpha				
Family Leporidae				
<i>*Lepus capensis</i>	European Hare			O
<i>*Oryctolagus cuniculus</i>	European Rabbit			O
Order Carnivora				
Family Canidae				
<i>*Vulpes vulpes</i>	Red Fox			O

SCIENTIFIC NAME	COMMON NAME	TSC ACT	EPBC ACT	OBSERVATION TYPE
Family Felidae				
* <i>Felis catus</i>	Cat			O
Order Artiodactyla				
Family Bovidae				
* <i>Bos taurus</i>	Cattle			Y
* <i>Ovis aries</i>	Sheep			Y

APPENDIX F

PROTECTED MATTERS SEARCH EPBC ACT



EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

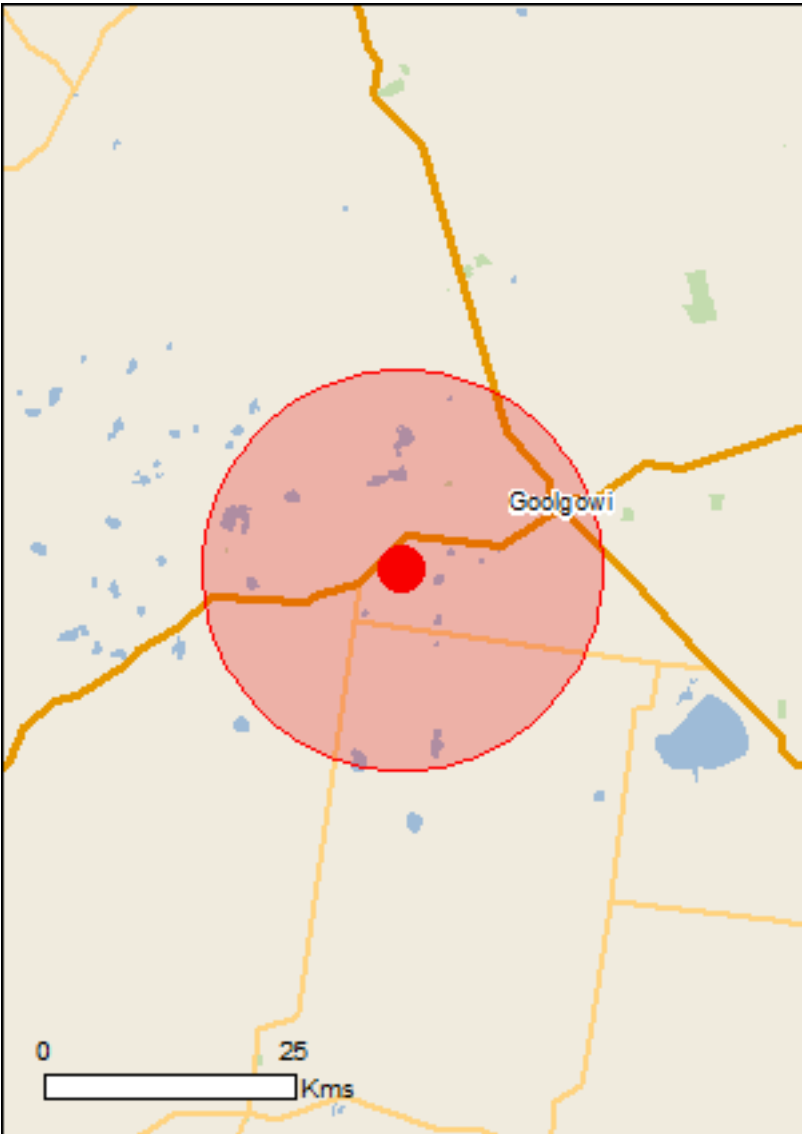
Report created: 19/09/17 09:55:52

- [Summary](#)
- [Details](#)

[Matters of NES](#)

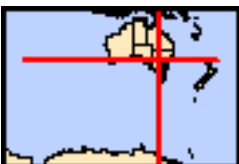
[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)
- [Caveat](#)
- [Acknowledgements](#)



This map may contain data which are
©Commonwealth of Australia
(Geoscience Australia), ©PSMA 2010

[Coordinates](#)
Buffer: 20.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	21
Listed Migratory Species:	11

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	2
Commonwealth Heritage Places:	None
Listed Marine Species:	16
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	20
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)		[Resource Information]
Name	Proximity	
Banrock station wetland complex	400 - 500km upstream	
Hattah-kulkyne lakes	200 - 300km upstream	
Riverland	400 - 500km upstream	
The coorong, and lakes alexandrina and albert wetland	500 - 600km upstream	

Listed Threatened Ecological Communities	[Resource Information]
--	--------------------------

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Endangered	Community may occur within area
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within area
Weeping Myall Woodlands	Endangered	Community likely to occur within area

Listed Threatened Species	[Resource Information]
---------------------------	--------------------------

Name	Status	Type of Presence
Birds		
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat likely to occur within area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Extinct within area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat known to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species

Name	Status	Type of Presence
habitat may occur within area		
Fish		
Galaxias rostratus		
Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow [84745]	Critically Endangered	Species or species habitat may occur within area
Maccullochella peelii		
Murray Cod [66633]	Vulnerable	Species or species habitat may occur within area
Macquaria australasica		
Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Frogs		
Litoria raniformis		
Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog [1828]	Vulnerable	Species or species habitat likely to occur within area
Mammals		
Nyctophilus corbeni		
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat may occur within area
Plants		
Austrostipa metatoris		
[66704]	Vulnerable	Species or species habitat may occur within area
Austrostipa wakoolica		
[66623]	Endangered	Species or species habitat may occur within area
Brachyscome papillosa		
Mossgiel Daisy [6625]	Vulnerable	Species or species habitat likely to occur within area
Lepidium monoplocoides		
Winged Pepper-cress [9190]	Endangered	Species or species habitat likely to occur within area
Solanum karsense		
Menindee Nightshade [7776]	Vulnerable	Species or species habitat may occur within area
Swainsona murrayana		
Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat likely to occur within area
Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca		
Satin Flycatcher [612]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land	[Resource Information]
The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.	
Name	
Commonwealth Land - Australian Telecommunications Commission	
Commonwealth Land - Australian Telecommunications Corporation	

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Extra Information

Invasive Species

[[Resource Information](#)]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Prosopis spp. Mesquite, Algaroba [68407]		Species or species habitat likely to occur

Name		Status	Type of Presence
Sagittaria platyphylla			within area
Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]			Species or species habitat likely to occur within area
Nationally Important Wetlands			[Resource Information]
Name			State
Lower Mirrool Creek Floodplain			NSW

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-34.029 145.566

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [Office of Environment and Heritage, New South Wales](#)
- [Department of Environment and Primary Industries, Victoria](#)
- [Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [Department of Environment, Water and Natural Resources, South Australia](#)
- [Department of Land and Resource Management, Northern Territory](#)
- [Department of Environmental and Heritage Protection, Queensland](#)
- [Department of Parks and Wildlife, Western Australia](#)
- [Environment and Planning Directorate, ACT](#)
- [Birdlife Australia](#)
- [Australian Bird and Bat Banding Scheme](#)
- [Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [Museum Victoria](#)
- [Australian Museum](#)
- [South Australian Museum](#)
- [Queensland Museum](#)
- [Online Zoological Collections of Australian Museums](#)
- [Queensland Herbarium](#)
- [National Herbarium of NSW](#)
- [Royal Botanic Gardens and National Herbarium of Victoria](#)
- [Tasmanian Herbarium](#)
- [State Herbarium of South Australia](#)
- [Northern Territory Herbarium](#)
- [Western Australian Herbarium](#)
- [Australian National Herbarium, Canberra](#)
- [University of New England](#)
- [Ocean Biogeographic Information System](#)
- [Australian Government, Department of Defence Forestry Corporation, NSW](#)
- [Geoscience Australia](#)
- [CSIRO](#)
- [Australian Tropical Herbarium, Cairns](#)
- [eBird Australia](#)
- [Australian Government – Australian Antarctic Data Centre](#)
- [Museum and Art Gallery of the Northern Territory](#)
- [Australian Government National Environmental Science Program](#)
- [Australian Institute of Marine Science](#)
- [Reef Life Survey Australia](#)
- [American Museum of Natural History](#)
- [Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

APPENDIX G

PROPERTY VEGETATION PLAN (PVP)

MURRUMBIDGEE

Catchment Management Authority

Clearing

PROPERTY VEGETATION PLAN

Native Vegetation Act 2003

Alan & Sue Willament

""Merrikee""

Googowi, NSW, 2652

This Property Vegetation Plan applies to the land described in Schedule 1, as shown on Map 1 in Schedule 4 of this agreement.

The Landholder is authorised to undertake the activities set out in Schedule 2 and agrees to carry out the management actions and management action details set out in Schedule 2. The Landholder agrees to comply with the requirements of Schedule 3.

Notes:

1. The Director-General of Department of Premier and Cabinet (or delegate) will notify the Registrar-General once all landholders and parties with a prescribed interest have consented to the registration of this PVP. Once notified by the Director-General, the Registrar-General is required to register this PVP. This PVP will then be binding on all current and future landholders.
2. This Plan does not exempt the landholder from any Council clearing consent requirements.
3. In order to carry out the works under this PVP, the Landholder may be required to obtain other approvals from other government agencies.

Susan Alice Turley-Willament	Date
Allen James Willament	Date
Greg Bugden General Manager of the Murrumbidgee Catchment Management Authority Delegate of the Minister for Climate Change and the Environment and Water	Date
Consent to register this plan in accordance with s. 31 of the <i>Native Vegetation Act 2003</i>	Date

Request No: 14636
File Reference: MDG 04650

SCHEDULE ONE — DESCRIPTION OF LAND TO WHICH THIS PVP APPLIES

Lot	DP	LGA	Parish	County
1	749831	CARRATHOOL	LIVINGSTONE	STURT
2	749831	CARRATHOOL	WYCHEPROOF	STURT

SCHEDULE TWO — AUTHORISED ACTIVITIES AND MANAGEMENT ACTIONS

AUTHORISED CLEARING (NOT INVOLVING INVASIVE NATIVE SCRUB AND/OR THINNING)

MANAGEMENT ACTIONS FOR AUTHORISED CLEARING (NOT INVOLVING INVASIVE NATIVE SCRUB AND/OR THINNING)

1. If clearing occurs in the Map Units, as identified in Authorised Clearing table, then the management actions and management action details described below must be undertaken in the specified Map Unit, as identified in Schedule 4,
2. The management actions and management action details are to be continued for, or completed within, the duration specified in the column “Duration of Management Action”.

Map Number (as per Schedule 4)	Map Unit	Management Action	Duration of Management Action	Management Action Details
Map 3	4A	Clearing	15 years from date contract is signed	The Landholder is authorised to clear 46 Scattered Paddock trees comprised of White Cypress Pine, (<i>Callitris glaucophylla</i>) Black Box (<i>Eucalyptus largiflorens</i>) River Red Gum (<i>Eucalyptus camaldulensis</i>) Grey Box (<i>Eucalyptus microcarpa</i>) Belah (<i>Casuarina cristata</i>) Rosewood (<i>Heterodendrum oliefolium</i>) and Wilga (<i>Geijera parviflora</i>) outlined in Map 2 as Scattered Paddock Trees that may be cleared in accordance with PVP Agreement. The total effective clearing area is 17 ha, and is for the purpose of irrigation development

REQUIRED OFFSETS FOR AUTHORISED CLEARING (NOT INVOLVING INVASIVE NATIVE SCRUB AND/OR THINNING)

Map Number (as per Schedule 4)	Map Unit	Offset on Map Unit	Details of Authorised Offset Type
Map 3	4B	Offset	Biodiversity – The Landholder is to manage the Offset Area, Map Unit Area 4B (28.88 ha) for conservation, in perpetuity.

Management actions for offsets

1. If clearing occurs in the Map Units, as identified in Authorised Clearing table, then the management actions and management action details described below must be undertaken in the specified Map Unit, as identified in Schedule 4,
2. The management action and management action details are to be continued for, or completed within, the duration specified in the column “Duration of Management Action”.

.....
Initials

Map Number (as per Schedule 4)	Map Unit	Management Action	Duration of Management Action	Management Action Details
Map 3	4B	Fencing	In perpetuity	The landholder is to erect and maintain a stock-proof fence to exclude stock from Offset Area 4B within 12 months of clearing the trees in Map Unit 4A. The fence is to be maintained in a stock proof condition for the duration of the agreement.
Map 3	4B	Weed control	In perpetuity	The landholder is required to make all reasonable attempts to suppress and control weed growth and spread within Map Unit 4B. This includes both noxious and environmental weeds for perpetuity. The landholder will not plant any non-local (exotic or non-indigenous) tree, shrubs, grass, groundcover or any other plant.
Map 3	4B	Strategic Grazing	In perpetuity	The landholder may strategically graze Map Unit 4B for no longer than 4 weeks per year between 1st May to the 1st October and provided 70% groundcover is maintained. The landholder is to exclude stock if sites are below these levels.
Map 3	4B	Retain regrowth	In perpetuity	The landholder is not to clear native vegetation, whether remnant or regrowth from Map Unit 4B, at any time, notwithstanding the following sections in the Native Vegetation Act 2003. 11(1)(a) – the operation and maintenance of rural infrastructure, 11(1)(i) – any activity reasonably considered necessary to remove or reduce and imminent risk of serious personal injury or damage to property
Map 3	4B	Biodiversity - Retain all hollow-bearing trees	In perpetuity	The landholder will retain all hollow-bearing trees within Map Unit 4B.
Map 3	4B	Biodiversity – Retention of rocks	In perpetuity	The landholder will retain all rocks within Map Unit 4B.
Map 3	4B	Permitted use of Routine Agricultural Management Activities (RAMAS)	In perpetuity	The following Routine Agricultural Management Activities (RAMAs) under Section 11 of the Native Vegetation Act 2003 and Clause 22 of the Native Vegetation Regulations 2005, are permitted in Map Unit 4B: - the maintenance of existing rural infrastructure i.e. fencelines and tracks; - the removal of noxious weeds under the Noxious Weeds Act 1993; - the control of noxious animals under the Rural Lands Protection Act 1998; - traditional Aboriginal cultural activities (except commercial activities); - the maintenance of public utilities (such as those associated with the transmission of electricity, the supply of water, the supply of gas and electronic communication) and - any activity reasonably considered necessary to remove or reduce an imminent risk of serious personal injury or damage to property. All other RAMA's are not permitted in this area.

.....
Initials

SCHEDULE THREE - STANDARD CONDITIONS

Commencement

1. This PVP will commence from the date at which it is signed by the Minister for Climate Change and the Environment (or delegate).

Words and phrases used

2. In this Schedule:

“CMA” means the Catchment Management Authority that is a party to this property vegetation plan (“PVP”);

“Landholder” means the landholder who is a party to this PVP and once this PVP is registered all future landholders;

“the works under this PVP” means the clearing, the management actions, the mitigating actions and all other works that the Landholder is authorised or required to take under this PVP;

“the Land” means the land to which this PVP applies; and

“DECCW” means the Department of Environment, Climate Change and Water and includes its successor departments or agencies.

Monitoring and auditing

3. The carrying out of any works under this PVP may be subject to auditing by officers of the CMA or DECCW who are authorised officers under the *Native Vegetation Act 2003*, as set out in sections 34 and 35.
4. Subject to reasonable notice, the Landholder will allow authorised officers of the CMA or DECCW access to the Land and allow those officers to do all things reasonably necessary for the purpose of monitoring or auditing compliance with this PVP.
5. Clauses 3 and 4 do not affect the powers of authorised officers of the CMA, DECCW or other government agencies to carry out investigations under the *Native Vegetation Act 2003*.

Registration of PVP on Title

6. For the purpose of sections 31(1) and 31(2) of the *Native Vegetation Act 2003*, the Landholder consents to the registration of this PVP in accordance with section 31 of the *Native Vegetation Act 2003*.

Dispute resolution

7. The parties agree to attempt to resolve any dispute in relation to this PVP by negotiation in the first instance. Such negotiation may involve agreeing on a variation to the PVP. However, this clause does not apply to a dispute relating to a possible breach of the *Native Vegetation Act 2003*.
8. Where appropriate, if negotiations are not successful, the CMA agrees to provide a written notice to the Landholder setting out the nature of any contravention and requesting the Landholder to take the steps specified in that notice, in the time specified in that notice, to rectify that contravention. This clause does not apply to a possible breach of the *Native Vegetation Act 2003*.
9. The Landholder agrees to comply with that notice in the time specified in the notice. Failure to comply with that notice is a breach of this plan. If the Landholder does not comply with the notice, the Minister (or delegate) may consider terminating this plan, in accordance with the procedure set out in section 30 of the *Native Vegetation Act 2003*. The CMA or DECCW may also take other action under that Act.
10. The landholder also agrees to provide access to the property to officers of the CMA and DECCW.

Note: The procedure for varying or terminating a PVP is set out in section 30 of the *Native Vegetation Act 2003* and clause 11 of the *Native Vegetation Regulation 2005*.

Subdivision

11. The Landholder agrees to notify the CMA of any proposal to subdivide the Land.

12. The Landholder agrees to submit to the CMA an application to vary this PVP to divide it into separate PVPs relating to the Land as subdivided in the same or similar terms to this PVP, if so requested by the CMA.

Apportionment of risk/indemnity

13. The parties agree to apportion risk as follows:

- (i) The CMA accepts the risk for the actions of CMA staff in entering the Land and carrying out functions associated with this PVP and for the actions of other visitors to the Land as organised by the CMA.
- (ii) All other risks associated with this PVP and the works under this PVP rest with the Landholder.

Disclosure of Information

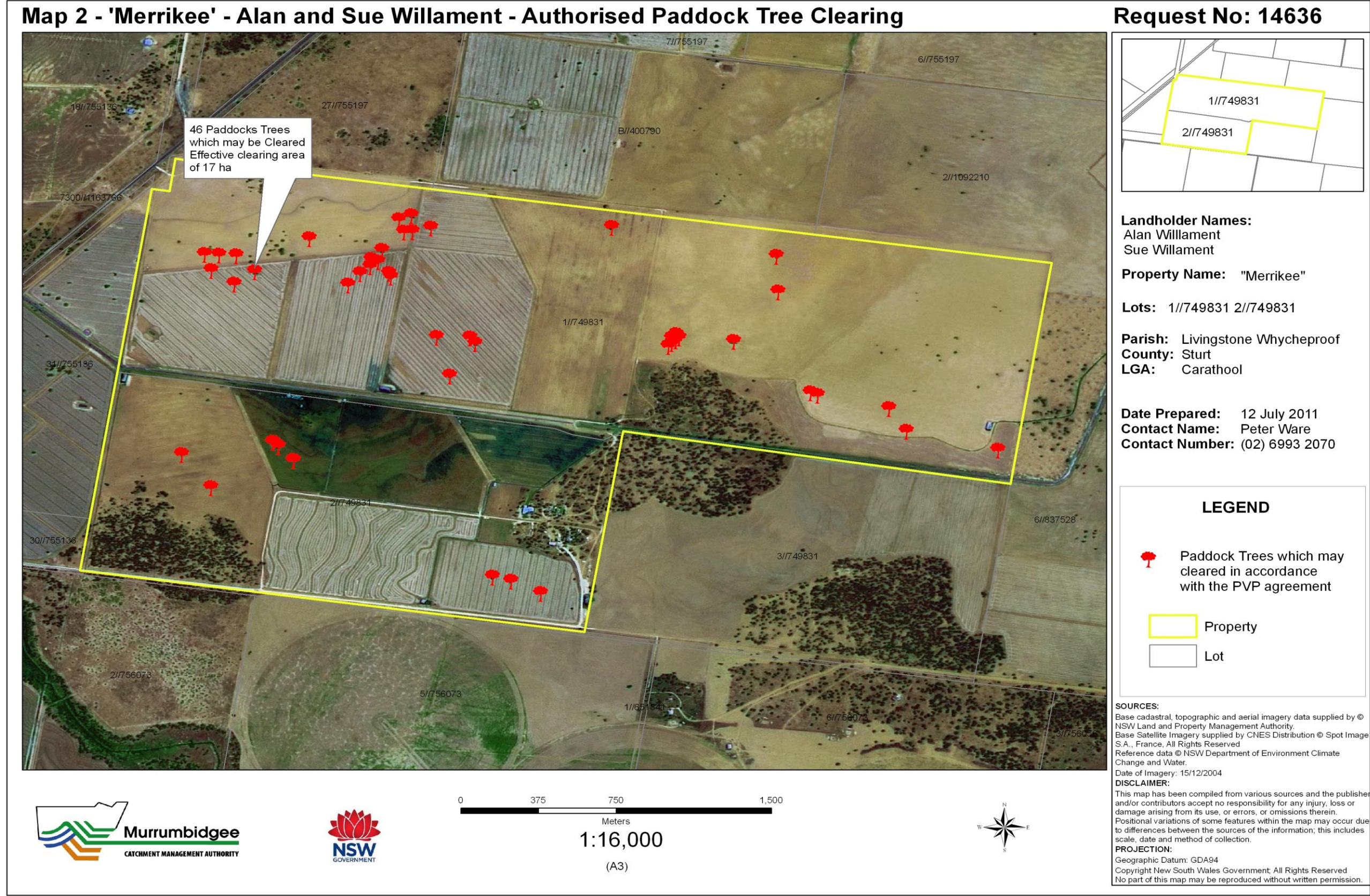
14. Subject to clause 15, personal information contained in this PVP will be treated in accordance with the *Privacy and Personal Information Protection Act 1998*, under which you have rights of access and correction.

15. Information contained in this PVP may be disclosed:

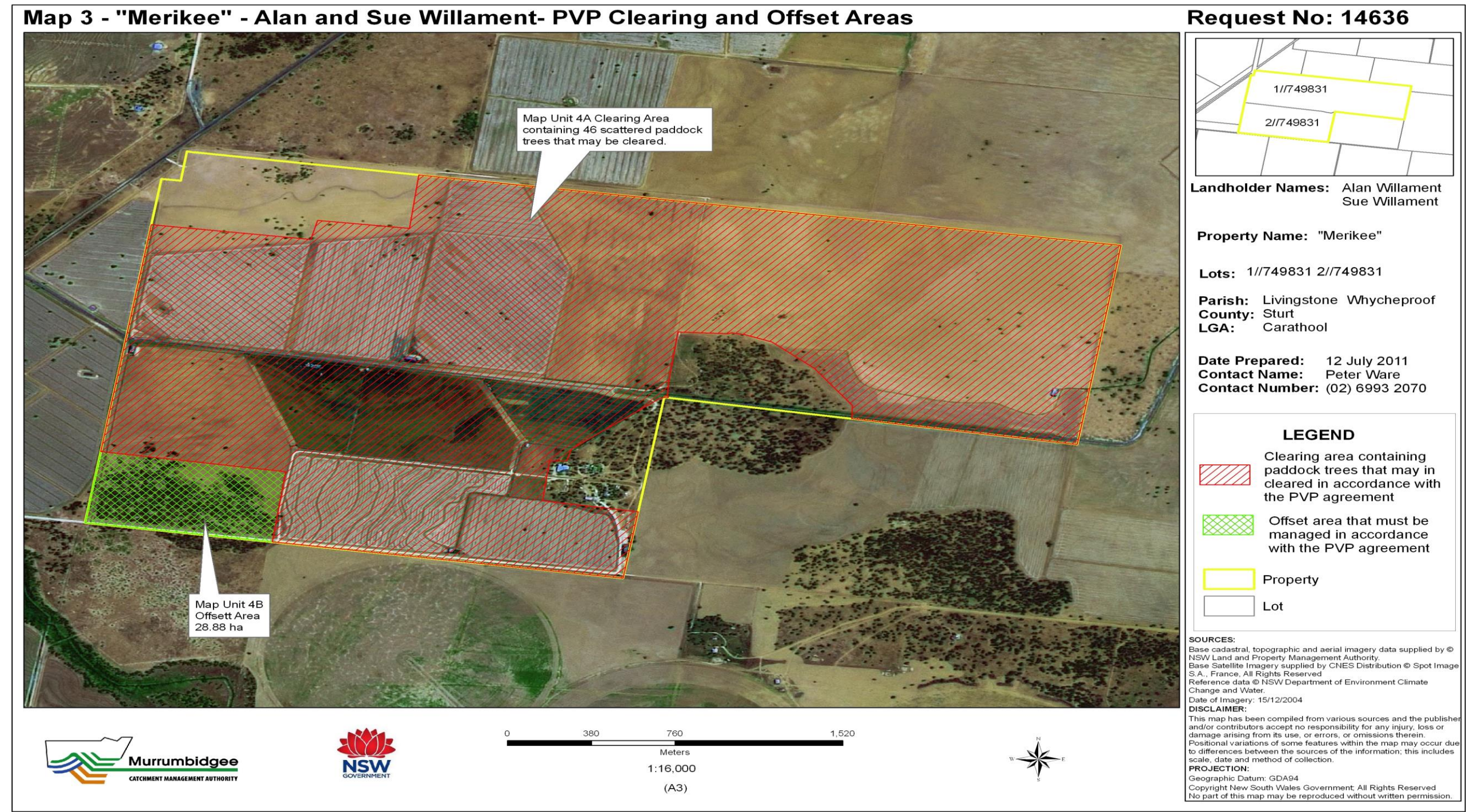
- (i) In the case of a PVP that allows broadscale clearing or that specifies a date for the definition of "regrowth", certain information from the PVP will be included on the register of PVPs and development consents, which will be publicly available on the Internet and available for inspection at the office of the CMA.
- (ii) to DECCW for compliance and statistical purposes.
- (iii) in circumstances where disclosure is otherwise required or authorised by law, including the Government Information (Public Access) Act 2009.

SCHEDULE FOUR — MAPS
Map 1 PVP Property Boundary.





Map 3 PVP Offset and Clearing Area



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Initials

APPENDIX H

EXPERIENCE AND QUALIFICATIONS

Since its inception in 1993, **Wildthing Environmental Consultants** have undertaken a diverse range of studies over a wide geographic range from southern Sydney through to south-eastern Queensland and the western plains of New South Wales. All of these studies have satisfied the relevant Local Council, State Government and Commonwealth Government legislation and assessment guidelines in accordance with the project specifications.

Curriculum Vitae

Name: Daryl Harman

Position: Senior Ecologist

Qualifications: **Bachelor of Applied Science, (Environmental Science).** Charles Sturt University Wagga Wagga. 1994-1997.
Certificate II in Bushland Regeneration, North Wagga TAFE, 1998.
Accredited BioBanking Assessor under the NSW Threatened Species Conservation Act 1995.

Fields of Competence:

- Flora and Fauna Impact Assessments
- Field Surveys involving Flora, Fauna and Habitat identification
- Ecological Constraints Assessments
- Environmental Management Plans
- Habitat Tree Identification and Clearance Supervision
- Nest Box Management Plans, Installation and Monitoring
- Geographic Information System Mapping
- Aquatic Fauna Surveys
- Plant identification.
- Fauna identification including invertebrates

Licences and other

- Scientific Investigation Licence, NSW National Parks and Wildlife Service.
- NSW Drivers Licence, Class C.
- Current with Lyssa virus injections.
- Current Whitecard to work on construction sites.
- Working at Heights card.

PROFESSIONAL EMPLOYMENT AND EXPERIENCE

Wildthing Environmental Consultants, Newcastle (2002–Present) -Ecologist

Details of work carried out:

- Assessments on Flora and Fauna including invertebrates
- Species Impact Statements
- Biobanking Reports
- Seven Part Test Assessments for Flora and Fauna.
- Environmental Management Plans.
- Environmental Mine Monitoring.
- Bushfire Protection and Attack Assessments.
- Habitat Tree Felling Supervision
- Nest Box installation, monitoring & maintenance.
- Aquatic Fauna Surveys

Total Earth Care Pty. Ltd Warriewood NSW (2001 – 2002) - Bush Regenerator. Working around various sites in the Greater Sydney area.
Johnstone Centre, Charles Sturt University, Wagga Wagga, NSW - August & October 2001
Casual Technician (Flora and fauna surveys)

Charles Sturt University, Wagga Wagga NSW, Science and Technology (April 1999 – March 2001) Casual Technical Officer.

NSW Department of Agriculture, Wagga Wagga - Casual Regulatory Officer/Casual Farm Assistant (1998).

Greening Australia, Wagga Wagga, NSW (November/December 1998) Casual Technical Officer (Roadside Flora Surveys).

Charles Sturt University, Wagga Wagga NSW, Science and Technology (November/December 1997) - Casual Technical Officer

Australian Army (1992 – 1997) - Infantry Soldier, Ready Reserve Scheme

Certificates/Short Courses

- Threatened Invertebrate Workshop (Snails, Dragonflies, Beetle, Moths & Butterflies. Dr Chris Reid & Dr Frank Koehler - Australian Museum, Sydney. Ecological Consultants Association of NSW. 22 June 2017.
- Shorebird Identification and Assessment Workshop. Ecological Consultants Association of NSW. Course Leader - Phil Straw. 20 April 2015.
- BioBanking & Biodiversity Certification Assessor Accreditation Training Course 4 - 8 August 2014.
- Snail Workshop - Australian Botanic Garden, Mount Annan. Presented by Dr Stephanie Clark, Director of Invertebrate Identification Australia. 24 January 2013.
- Statement of Attainment - Apply First Aid (HLTFA311A - Allens Training 28 September 2012.
- Eucalypts of the Sydney Region. Eucalypt identification workshop with Van Klaphake. CECAL Hall, Earlwood. (10 & 11 July 2010).
- HLTFA301B Apply First Aid (17 September 2009).
- Safe Working at Heights Statement of Attainment (August 2008) Combined Safety Services, Adamstown NSW. BCPRF2001A.
- Sedges and Rushes of Sydney and the Blue Mountains –Van Klaphake. Marrickville, Sydney. (21 & 22 May 2005).
- Workshop on the Translocation of Threatened Plants. June 2004 - Royal Botanic Gardens Sydney.
- Community Greening Volunteer. – Newcastle City Council. 30 August 2003 - Induction Training Module.
- 25 March 2002 – Occupational Health and Safety, Induction Training for Construction Work. General course under the Occupational Health and Safety Regulation 2001. Work Cover NSW. Course completed to work on worksites.
- Identification of Coleoptera from the Australo-Pacific Region - CSIRO Canberra. (10 - 16 December 2001).
- 13th Taxonomic Workshop: Hirudinea, Lepidoptera, Mollusca, Nematoda, Odonata and Plecoptera. Lake Hume Resort. 12 – 13 February 2001.
- Certificate II in Bushland Weed Control, North Wagga TAFE, 1998.
- Chainsaw Operations - North Wagga TAFE - 1998.
- Wildlife Management – A subject through Charles Sturt University, Thurgoona Campus, Albury NSW. Summer Break 1997.
- Shearing Shed Hand - College Statement Wagga Wagga TAFE 1989.

Memberships

- Australian Association of Bush Regenerators. - Accredited Member
- Ecological Consultants Association of NSW - Full Practicing Member

Name: Mungo Worth

Position: Manager/Ecologist

Qualifications: BioBanking & Biodiversity Certification Assessor
Accreditation Training Course 4 - 8 August 2014.

Fields of Competence:

- Flora and Fauna Impact Assessments
- Field Surveys involving Flora, Fauna and Habitat identification
- Ecological Constraints Assessments
- Environmental Management Plans
- Bushfire Protection and Attack Assessments
- Habitat Tree Identification and Clearance Supervision
- Nest Box Management Plans, Installation and Monitoring
- Plant identification
- Fauna identification

Licences and other:

- Scientific Investigation Licence, NSW National Parks and Wildlife Service
- NSW Drivers Licence, Class C
- Current with Lyssa virus injections
- Current Whitecard to work on construction sites

Professional Employment and Experience:

Wildthing Environmental Consultants:

- Salt Ash, NSW (1995 – 2001, 2003 – 2004)
- Burleigh Heads, QLD (2002 – 2003)
- Wallsend, NSW (2005 – Present)

(1995 – Present) – Bat call analyst

(1995 – 1997) – Technical Assistant / Junior Ecologist

(1997 – 2004) - Ecologist

(1999 – 2001) – Training Officer

(2002 – 2003) – Queensland Projects Manager

(2004) –IT officer

(2005 – Present) – Manager / Ecologist

Details of work carried out:

- Assessments on Threatened Flora and Fauna
- Species Impact Statements – Fieldwork, Report Writing
- Seven Part Test Assessments for Flora and Fauna
- Environmental Management Plans
- Environmental monitoring
- Bushfire Protection and Attack Assessments
- Habitat tree clearance supervision and fauna rescue
- Nest Box installation, monitoring & maintenance
- Plant identification
- Fauna identification

Certificates/Short Courses:

- HLTFA301B Apply First Aid (17 September 2009).
- Safe Working at Heights Statement of Attainment (August 2008) Combined Safety Services, Adamstown NSW. BCPRF2001A.
- 25 March 2002 – Occupational Health and Safety, Induction Training for Construction Work. General course under the Occupational Health and Safety Regulation 2001. Work Cover NSW. Course completed to work on worksites.

Memberships:

- Australasian Bat Society.

RESUME – KYLIE BRIDGES

Personal details

FULL NAME: Dr. Kylie Louise Bridges (nee Dixon) B Env Sc, PhD
HOME ADDRESS: 57 Duns Creek Road, Duns Creek, NSW, 2321
PHONE NUMBER: 0439385307
EMAIL ADDRESS: kylie.bridges@hotmail.com
DATE OF BIRTH: 03/02/1985

Employment History Summary

Employer: **Wildthing Environmental Consultants**
2014-Present
Ecologist
Preparing Ecological Impact Assessments
Preparing Species Impact Assessments
Preparing Ecological Assessments for electricity infrastructure projects

Employer: **University of Technology, Sydney**
2010-2014
PhD scholarship student in Marine Biology.
See Education Highlights for further information

Employer: **Umwelt Environmental Consultants**
2010
Contractor – *Polychaete taxonomist*

Employer: **University of Newcastle**
2009-2010
Laboratory demonstrator – *Teaching 2nd Year course 'Ecology'*

Employer: **University of Newcastle**
2009
Laboratory demonstrator – *Teaching 3rd Year course 'Environmental Biology'*

Employer: **University of Newcastle - Ecotoxicology and Ecology Laboratory**
2008-2009
Research Officer and Benthic Ecologist - *specialising in polychaete and other benthic fauna identification and ecology*

Employer: **Australian Museum – Marine Invertebrates Department**
2008
Technical Officer – *Assisted in the review of the polychaete family Ampharetidae for scientific publication*

Employer: **Hunter- Central Rivers Catchment Management Authority (HRCMA)**
2005 – 2006
Assistant WaterWatch Coordinator – *Teaching water quality testing protocol and freshwater ecology*

Employer: **University of Newcastle - Microbiology Laboratory**
2005
Laboratory technician – *Bluescope Steel Water Tank Project*

Education Highlights

- 2014 Publication: Dixon-Bridges, K.; Gladstone, W. & Hutchings, P. (2014). One new species of *Micronephthys* Friedrich, 1939 and one new species of *Nephtys* Cuvier, 1817 (Polychaeta: Phyllodocida: Nephtyidae) from eastern Australia with notes on *Aglaophamus australiensis* (Fauchald, 1965) and a key to all Australian species. *Zootaxa*, **3872**(5): 513-540.
- 2014 Publication: Dixon-Bridges, K., Hutchings, P. & Gladstone, W. (2014) Effectiveness of habitat classes as surrogates for biodiversity in marine reserve planning. *Aquatic Conservation: Marine and Freshwater Ecosystems*, **24**(4): 463-477.
- 2010-2014 PhD in Marine Biology at the University of Technology, Sydney in association with the Marine Parks Authority, Fisheries and the Australian Museum. My thesis examined the effectiveness of the current conservation zoning system of the Port Stephens-Great Lakes Marine Park (PSGLMP) and devised a more efficient and cost effective protocol for future use, examined polychaete biodiversity associated with a rare soft-coral habitat within the PSGLMP in order to employ a no-anchor zone for conservational purposes, discovered and described three new species of polychaete, and examined conservation value on a temporal scale within the estuarine environment
- 2010 Presented at the International Polychaete Conference, Lecce, Italy
- 2009 Various public seminars at the Australian Museum detailing my PhD project
- 2007 Honours work featured in the FRDC (Fisheries Research and Development) Magazine and AMSA (Australian Marine Science) Bulletin
- 2007 Won Fisheries Research Development Corporation Best Poster Presentation Prize at the Australian Marine Science Association Conference
- 2006-2007 1st Class Honours in Biology assessing polychaete assemblage condition below pearl farms on the Kimberley coast in Western Australia in association with Paspaley Pearls, Cygnet Bay Pearls, Fisheries Research Development Corporation and Pearl Producers Association

Referees

Professor William Gladstone
 (PhD supervisor)
 Head of School - School of the Environment
 University of Technology, Sydney
 PH: (02) 9514 8272

Dr. Pat Hutchings
 (PhD supervisor and Employer)
 Principle Scientist at the Australian Museum
 Marine Invertebrates
 PH: (02) 93206243

Professor Geoff MacFarlane
 (Honours Supervisor and Employer)
 School of Environment and Life Sciences
 PH: (02) 49217858

Ingrid Berthold
 (Previous WaterWatch Coordinator at HCRCMA)
 Local Land Services
 PH: (02) 49301030

Mike Lawrie

188 Merewether Street
Merewether, NSW, 2291
Phone: 02 4963 3849
Mobile: 0412 525 864
Email: mikealawrie@gmail.com

Education

Macquarie University

Master of Environment
Specialisation in Environmental Science
Commenced 2014

University of Newcastle

Bachelor of Environmental Science and Management
Major in Physical Systems
2009 – 2011

Professional Development

December 2014 - Present Ecologist - Wildthing Environmental Consultants

- Environmental consulting and flora/fauna surveys.
- Preparation of reports including Flora and Fauna Assessment on a variety of projects electricity, infrastructure and residential projects.
- Preparation of Koala Plan of Management reports.
- Using a number of animal traps including Elliott traps, harp traps, pitfalls, hair tubes, Anabats, camera traps and glider tubes.
- Performing hollow-bearing tree assessments.
- Vegetation and habitat mapping.
- Supervision of tree clearings.

April 2013 – January 2015 Ecologist - SLR Consulting

- Environmental consulting and flora/fauna surveys.
- Using a number of animal traps including Elliott traps, harp traps, pitfalls, hair tubes, Anabats, camera traps and glider tubes.
- Vegetation and habitat mapping
- Preparing reports including Flora and Fauna Assessment and Koala Plan of Management reports.

September 2014 – December 2014 Environmental Scientist - Hazchem Pty Ltd

- Investigation of contaminated sites including Phase 1 and Phase 2 assessments
- Field work investigating contaminated sites including soil and water sampling.
- Data analysis and preparation of reports for contaminated sites.

October 2013 – October 2014 Environmental Scientist - Tom Farrell Institute for the Environment

- Assisting with research, compiling environmental information and reporting on a variety of projects.
- Use of GIS programs for analysis of data.
- Involved in water quality monitoring projects for Port Stephens Council, Newcastle City Council and Caring for Our Country.
- Taking measurements for surface water and groundwater flow and testing water quality.

October 2010 – June 2014 Surveyor's Assistant - Richard Hutchison Surveying

- Assisting the surveyor set up technical equipment and taking measurements using a theodolite and manual measuring devices.
- Assessing land features, marking boundaries using pegs, stakes and strings and clearing vegetation and obstructing features.

Additional Qualifications

- NSW Construction Induction card
- Apply First Aid certificate
- NSW Driver's Licence

Referees

Silas O'Hara

Owner and Director of Hazchem Pty Ltd

Mobile: 0438365994

Email: silas@haz-chem.com.au

Richard Hutchison

Owner and Surveyor of Richard Hutchison Surveying

Mobile: 0417 404 455

Email: rhsurv@bigpond.net.au

Matt Consterdine

Ecologist at SLR Consulting

Mobile: 0412 494 989

Email: mconsterdine@slrconsulting.com