FINAL REPORT

Buronga Peaking Power Plant Flora and Fauna Assessment

Prepared for

International Power

7 November 2007

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Contents

Contents

Tables, Figures, Plates, Appendices

Tables

Figures

Plates

Appendices

Executive Summary

URS Australia Pty Ltd (URS) was engaged by International Power (Australia) Pty Ltd (IPRA) to undertake an Environmental Assessment for the proposed Buronga Peaking Power Plant Project located near Buronga in the southwest of NSW. The proposed facility is subject to the development and assessment processes and requirements of Part 3A of the NSW *Environmental Planning & Assessment Act 1979* (EP&A Act). This flora and fauna assessment for the proposed development has been prepared as a technical document to support the Environmental Assessment.

The flora and fauna assessment consisted of a desktop literature review to identify the representative spectrum of flora and fauna, threatened species, populations and ecological communities listed under the NSW Threatened Species Conservation Act (TSC ACT) and the Commonwealth Environment Protection and Biodiversity Conservation Act (EPBC Act) that could be expected to occur within the study area, based on habitats present. The assessment also included ground based field flora and fauna surveys conducted during the months August and October 2007. These surveys were consistent with the Department of Environment and Climate Change (DECC) guidelines (DEC 2004).

The desktop literature review indicates five threatened plant species listed under the TSC/EPBC Acts which have been previously recorded or are predicted to occur in the locality. Two of these species were considered likely to occur in the study area based on suitable habitat. The desktop review also indicated the potential presence of a further 15 threatened fauna species listed under the TSC Act, which have previously been recorded in the local area, and/or EPBC Act which are predicted to occur in the local area.

A total of 36 plant species were recorded during the URS 2007 ground based field surveys, comprising 12 exotic species, and 24 native species. Of the exotic species 2 are listed as a noxious weed within Wentworth Local Government Area (LGA). None of the flora species recorded are listed as threatened under the TSC/EPBC Acts. The surveys also identified the presence of 15 mammals, 45 species of bird, 7 reptiles and 1 crustacean within the study area. Three of these fauna species, the Hooded Robin (*Melanodryas cucullata*), Little Pied Bat (*Chalinolobus picatus*) and Large-footed Myotis (*Myotis adversus/macropus*), are listed as Vulnerable under the TSC Act.

No threatened flora or fauna populations listed under the TSC/EPBC Acts are known from the locality (radius of 10km) and no evidence of endangered populations was detected during the field survey. Two endangered ecological communities (EEC's) have previously been recorded in the locality however the Site does not support habitat for these communities.

The proposed development will require the disturbance of approximately 4ha of native vegetation in total. Overall the impacts associated with the peaking power plant location with regard to flora are minor in the context of remaining vegetation in the locality and the surrounding region. Further, as the majority of fauna species recorded at the Site are mobile, widespread and common it is likely that the impact on local populations of fauna be low to moderate.

A 7-part test of significance was performed for the local population of the Hooded Robin that is known to occupy the Site and is included as **Appendix B**. The 7-part test concludes that the proposed development is not 'likely' to impose a 'significant effect' on the Hooded Robin should appropriate mitigation measures, outlined in **Section 7,** including, timing of construction outside the breeding period if practicable, a pre-clearing survey and avoidance of breeding individuals, be implemented. A 7-part test of significance performed for threatened microbats concluded that the proposed development is not 'likely' to impose a 'significant effect' on these species should appropriate mitigation measures (**Section 7**), including a pre-clearing survey, be implemented.

A 7-part test of significance was also performed on those threatened species predicted to occur in the study area on a transitory, seasonal or migratory basis, based on habitats present on Site and recent DECC (2007a) records in the vicinity. The 7-part test also concludes that the proposed development is not 'likely' to impose a 'significant effect' on these species.

Section 1 Introduction

1.1 Scope of Report

URS Australia Pty Ltd (URS) was engaged by International Power (Australia) Pty Ltd (IPRA) to undertake an Environmental Assessment for the proposed Buronga Peaking Power Plant Project located near Buronga in the southwest of NSW. IPRA proposes to construct and operate a distillate-fired peaking power plant to meet rising peak electricity demand and to potentially relieve TransGrid's identified network problems under certain load demand scenarios.

The proposal is a Major Project pursuant to Clause 24 'Electricity Generation' of Schedule 1 of *State Environmental Planning Policy (Major Projects)* as it is development for the purpose of electricity generation with a capital investment value of more than $30 million. Accordingly, the proposal is subject to the development and assessment processes and requirements of Part 3A of the NSW *Environmental Planning & Assessment Act 1979* (EP&A Act), with the Minister for Planning as the consent authority. A Project Application must be lodged with the NSW Department of Planning, accompanied by an Environmental Assessment (EA) prepared in accordance with the requirements of the Director-General (D-G) of the Department.

This Report has been prepared as a technical document to support the EA, and addresses the D-G's requirements, which state that the EA must include a 'flora and fauna impact assessment in accordance with the NSW Department of Environment and Climate Change (*DECC*) *Guidelines for Threatened Species Assessment (DEC [sic], 2005)*'. The Report assesses the flora and flora impacts of the proposed construction and operation of the facility, with due consideration of relevant Commonwealth and State legislation (see Section 3), as well as relevant guidelines, including:

- *Guidelines for Threatened Species Assessment (DEC* [sic]*, 2005)*, with regard to the nature and content of this report; and
- *DECC Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities Working Draft* (*DEC [sic]* 2004). The field surveys completed for this assessment, as described in Section 4, have been designed and implemented to comply with the minimum requirements recommended in these guidelines.

1.2 Proposed Development

The proposed Buronga Peaking Power Plant would be located on Crown land immediately adjacent to the TransGrid 220kV switching station, approximately 10km northeast of Buronga, as shown in **Figure 1**. The proposed facility would occupy an area of approximately 4 ha on a plot of 200 metres by 200 metres (**Figure 1)**. IPRA proposes to construct and operate a nominal 150MW distillate-fired peaking power plant (known as the Buronga Peaking Power Plant) at the Development Site.

The facility would generate up to 150MW of electricity and comprise three distillate-fired gas turbines, each of nominal capacity up to 50MW and, except for emergencies as allowed in its operating licence, would operate on an as-required, intermittent basis for a total maximum period of up to 10% of any year.

The Buronga Peaking Power Plant Project comprises a number of key features including the following:

- three gas turbines and ancillary plant;
- step up transformers and connection to the existing TransGrid high voltage switching station;
- control room, administration, amenities and workshop facility;
- fire water, process water and domestic/rainwater storage tanks;
- domestic wastewater treatment and disposal system;
- stormwater and wastewater ponds; and
- security fencing, internal roads, landscaping and tree planting to provide visual screening.

The Buronga Peaking Power Plant Project would be constructed in one stage with the completion of the construction programme estimated at approximately 6 months.

Section 2 Site Description

2.1 Site Location

The proposed Buronga Peaking Power Plant is to be constructed approximately 10km northeast of Mildura, in the Murray Darling Basin in south-western NSW. The proposed site is located on the northern side of Arumpo Road immediately adjacent the existing 220kV TransGrid owned switching station as shown in **Figure 1**. The site is situated approximately 2.5km northeast from the edge of Lake Gol Gol and lies approximately 9km north of the Murray River.

The existing TransGrid switching station is located on mostly flat, low-lying ground, cleared of most vegetation with remnant patches of woodland occurring in the immediate surrounds. The switching station site has been levelled and constructed on imported crushed rock base, providing a platform elevated above the surrounding ground.

The site assessed in this report comprises the development footprint for the proposed facility and associated works (the Site) (**Figure 1**). The study area refers to the development footprint and the surrounding area which encompasses shared features of the natural environment.

2.2 Geology, Soils and Topography

The broad floodplain of the Murray River forms part of the Murray Basin. This alluvial surface was formed as a result of a major period of deposition which occurred over the last 60 million years. The retreat of the ancient sea resulted in a series of north-south trending ridges representing the abandoned shorelines, sea bed, beaches and dunes (Hope 1999). The abandoned basin was filled by the freshwater Lake Bungunnia (Hope 1999). Approximately 25,000 BP the climate became more arid the lakes shrank and became shallow and saline. These lakebed deposits were reworked and divided into a series of rivers and channels which began forming lunettes associated with the lakes and sand dune ridges (Hope 1999).

Subsequently, a deposition of younger alluvium occurred and older alluvium surfaces were dissected by the ancestors of the present rivers. The channels of this phase are known as ancestral rivers. The continuing fluvial deposition built up the floodplain sediments and the drainage system that had previously emptied into the ancient sea developed into the Murray River and its tributaries (Hope 1999). The Murray River was subsequently diverted into two streams, the present Murray River and the Darling River. The only signs of the prior streams phase in the area today are aeolian sand ridges which rise up to 10 m above the floodplain, and the prior stream watercourses which have become aquifers.

Today the Murray Darling Basin is characterised by a relatively flat, low-lying landscape with shallow aeolian deposits overlying the clay sediments of the fluvial and marine periods (Hope 1999). The study area is located within the Darling Riverine Plains Bioregion and is predominantly alluvial fans and plains of grey clay soils covered by Eucalyptus dominated woodlands. The study area contains brown solonised soils (Resources of New South Wales, 1969).

The Site contains soils of aeolian origin including dune sands and calcareous clayey paleosols. East of the Site extending from Lake Gol Gol are fluvial deposits of clayey-sands, sandstone gravels and sands. West of the Site are fined grained gypsum deposits of the Yamba formation (DNR 1997)

Section 2 Site Description

2.3 Climate

The climate of the study area may be classified as warm and persistently dry.

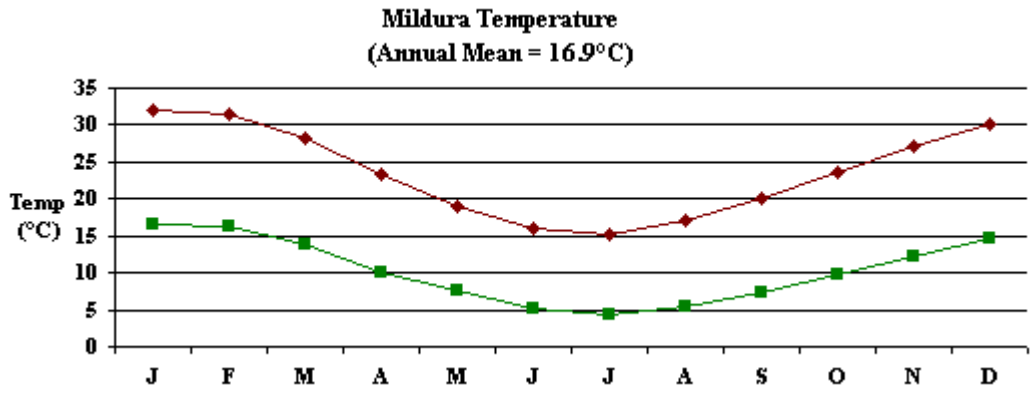
The annual rainfall total of 292 mm is fairly evenly distributed through the year, but is more concentrated in the winter and spring months. The month of October is, on average, the year's wettest, receiving 31 mm. By contrast, the year's driest months, March and April, receive only 19 mm.

The annual average minimum temperature is 10.3 deg C, monthly values varying from 4.3 deg C during July (the lowest on record is -4.4 deg C) to 16.5 deg C during January.

There are on average 4 nights per annum when the temperature falls below zero.

The annual average maximum temperature is 23.6 deg C - monthly values vary from 15.2 deg C in July to 31.9 deg C in January (the highest on record is 50.8 deg C).

There are, on average, 77 days per annum when the temperature exceeds 30 deg C, including 30 hot days when the temperature rises above 35 deg C.



Source (BOM, 2007).

The prevailing wind is southerly in summer, whilst in winter, the prevailing northerly wind in the morning tends westerly in the afternoon. Days with strong wind (21 per annum) are more likely to occur in the late winter and spring months than at other times of the year. During dry years, strong winds associated with cold fronts generate dust storms, particularly in spring and summer (BOM, 2007).

Section 3 Legislative Framework

3.1 Environmental Planning & Assessment Act 1979

The EP&A Act forms the legal and policy platform for development assessment and approval in NSW and aims to, *inter alia*, 'encourage the proper management, development and conservation of natural and artificial resources'. The proposal is a Major Project according to *State Environmental Planning Policy (Major Projects) 2005* and as such, is to be assessed under the provisions of Part 3A of the EP&A Act, with the Minster for Planning as the Consent Authority for the Project Application.

Section 5A of the EP&A Act lists seven factors that must be taken into account in the determination of the significance of potential impacts of a proposed development on 'threatened species, populations or ecological communities (or their habitats)' listed under the Threatened Species Conservation Act 1995 (TSC Act). The so-called '7-part test' is used to determine whether a proposed development is 'likely' to impose 'a significant effect' on threatened biota and thus whether a Species Impact Statement (SIS) is required to accompany the DA. For development applications under Part 4 and 5 of the EP&A Act, if the 7-part test concludes that there is 'likely' to be 'a significant effect' on a listed species, population or EEC, a Species Impact Statement (SIS) must be prepared. Under Part 3A of the EP&A Act, there is no requirement for Section 5A of the EP&A Act to be addressed, hence there is no requirement for an SIS. However, the approach herein has been to address s.5A and complete the 7-part test as a guide to assessing impacts on threatened biota that could be affected by the proposal.

A 7- part test was carried out for those TSC Act listed species and communities recorded and/or predicted to occur at times on the Site or within the adjoining area.

3.2 Threatened Species Conservation Act 1995

The TSC Act provides legal status for biota of conservation significance in NSW. The Act aims to, inter alia, 'conserve biological diversity and promote ecologically sustainable development'. It provides for:

- the listing of 'threatened species, populations and ecological communities', with endangered species, populations and communities listed under Schedule 1, 'critically endangered' species and communities listed under Schedule 1A, vulnerable species and communities listed under Schedule 2;
- the listing of 'Key Threatening Processes' (under Schedule 3);
- the preparation and implementation of Recovery Plans and Threat Abatement Plans; and
- requirements for the preparation of SISs.

The TSC Act has been addressed in the current assessment through:

- desktop review to determine the threatened species, populations or ecological communities that have been previously recorded within the locality of the site and hence could occur subject to the habitats present;
- targeted field surveys for threatened species listed under the Act;
- development of suitable impact mitigation and environmental management measures for threatened species, where required; and
- assessment of potential impacts on threatened species, including the general 7-part test described above.

Section 3 Legislative Framework

3.3 Native Vegetation Act 2003

The NSW Government released the regulations for the Native Vegetation Act 2003 (NV Act) on 14 November 2005, which came into effect on 1 December 2005. The NV Act regulates the clearing of native vegetation on all land in NSW except for land listed in Schedule 1 of the Act. Excluded land under Schedule 1 of the Act includes National Parks and other conservation areas, State forests and reserves, and urban areas. Specifically, urban areas, which are excluded, include areas zoned residential (but not rural residential), village, township, industrial or business.

According to s.75U(e) of the EP&A Act, an authorisation under Section 12 of the NV Act to clear native vegetation is not required for a project approved under Part 3A. Hence, the NV Act does not apply to the current proposal.

3.4 Noxious Weeds Act 1993

Under the Noxious Weeds Act 1993 (NW Act), Wentworth Shire Council is responsible for the control of noxious weeds in the local government area (LGA). The NW Act provides for the declaration of noxious weeds by the Minister of Agriculture. Noxious weeds may be considered noxious on a National, State, Regional or Local scale. All private landowners, occupiers, public authorities and Councils are required to control noxious weeds on their land under Part 3 Division 1 of the NW Act. As such, if present, Noxious Weeds on the Site have been recorded as part of this assessment.

3.5 State Environmental Planning Policy 44 – Koala Habitat Protection

State Environmental Planning Policy 44 (SEPP 44) aims 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 reverse the current trend of koala population decline'.

Schedule 1 of SEPP 44 lists the local government areas to which SEPP 44 applies. Wentworth Local Government Area is currently listed under Schedule 1.

SEPP 44 requires that before granting consent for development on land over 1 hectare in area, a consent authority must be satisfied as to whether or not the land is 'potential' and 'core' koala habitat. Potential koala habitat is defined as 'an area of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component'.

Core koala habitat, is defined as 'an area of land with a resident breeding population of koalas, evidenced by attributes such as breeding females and recent sightings and historical records of a population'. Where core koala habitat is found to occur, SEPP 44 requires that a site-specific Koala Plan of Management be prepared.

As discussed in Section 4, koala feed trees were targeted and recorded during field surveys and searches for signs of recent koala activity were conducted.

3.6 Environment Protection and Biodiversity Conservation Act

The purpose of the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) is to ensure that actions likely to cause a significant impact on 'matters of national environmental significance' undergo an assessment and approval process. Under the EPBC Act, an action includes a project, undertaking, development or activity. An action that 'has, will have or is likely to have a significant impact on a matter of national environmental significance' is deemed to be a 'controlled action' and may not be undertaken without prior approval from the Commonwealth Minister for the Environment and Water Resources.

In January 2007 the Commonwealth and NSW governments signed a Bilateral Agreement which accredits the assessment regimes under Part 3A, Part 4 and Part 5 of the EP&A Act for assessment purposes under the EPBC Act. The Bilateral Agreement applies only to proposals that the Commonwealth Environment Minister has determined are controlled actions under the EPBC Act, with the exception of nuclear actions (DoP 2007).

Section 3 Legislative Framework

The EPBC Act identifies matters of national environmental significance as:

- World heritage properties;
- National heritage places;
- Wetlands of international importance (Ramsar wetlands);
- Threatened species and ecological communities;
- Migratory species;
- Commonwealth marine areas; and
- Nuclear actions (including uranium mining).

The Administrative Guidelines for the EPBC Act (Department of the Environment & Heritage 2006) set out criteria intended to assist in determining whether an action is controlled and hence requires approval. In particular, the Guidelines contain criteria for determining whether a proposed action is likely to have a 'significant impact' on a matter of national environmental significance (NES). Should the proponent deem the proposal likely to have a significant impact on a matter of NES, a referral to the Commonwealth Minister for the Environment would be undertaken to obtain a determination as to whether the proposal is a 'controlled action' requiring Commonwealth approval.

The EPBC Act has been addressed in the current assessment through:

- desktop review to determine the threatened species or ecological communities that have been previously recorded within the locality of the site and hence could occur, subject to the habitats present;
- targeted field surveys for threatened species listed under the Act;
- development of suitable impact mitigation and environmental management measures for threatened species, where required; and
- assessment of potential impacts on threatened species

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Section 4 Methodology

4.1 Literature Review

A desktop literature review was undertaken by URS to identify the representative spectrum of flora and fauna, threatened species, populations and ecological communities listed under the NSW TSC Act and the Commonwealth EPBC Act that could be expected to occur within the study area, based on habitats present. To this end, the following documentation was reviewed prior to the conduct of the field investigations:

- a search of the NSW NPWS Wildlife Atlas database (August 2007 – 10km radius search for TSC Act listed flora and fauna, centred on the site. Selected NSW Robinvale Plains (Part B) sub-region for Endangered Ecological Communities); and
- EPBC online Protected Matters Database Search (May 2007 – a selected point, coordinates -34.0924,142.27138 buffered at 10km).

4.2 Field surveys

4.2.1 Flora Survey

The field flora survey was conducted at and within the vicinity of the Site (the study area) on 8 and 9 August 2007. The primary objective of the survey was to:

- map and describe the vegetation communities occurring within the study area;
- compile a flora list of those species occurring within the vegetation communities, identifying any threatened, nationally, regionally or locally significant species and communities; and
- assess the likely impacts of the proposed development and provide recommendations to assist in minimising impacts to flora in the study area.

The botanical surveys were generally consistent with the DECC guidelines (DEC 2004). All vascular taxa observed were recorded on appropriate proforma field data sheets.

Plant specimens not readily identifiable in the field were collected and subsequently identified using standard botanical texts and where required were compared with voucher specimens held in the National Herbarium of New South Wales Online Reference Collection. Structural vegetation communities were described according to classifications made by Specht (1970). Plant identifications were made according to nomenclature in Harden (1990, 1991, 1992, and 1993). Plant specimens which were difficult to identify (either insufficient sample collected or buds/fruiting bodies were not available at the time of the survey) were submitted to the NSW National Herbarium for identification.

On the basis of air photo interpretation, initial site walkover and habitat assessment, the Site was divided into stratification units i.e. functionally similar units for the purposes of environmental assessment according to the DECC guidelines (DEC 2004). Survey methodology included five 20m x 20m quadrats, with at least one quadrat positioned in each stratification unit. A Random Meander survey was also performed over the whole Site, as prescribed by Cropper (1993) for detecting threatened species.

Plant species were recorded on appropriate pro forma field data sheets. Each species list was accompanied by a detailed biophysical description including vegetation structure, soils, geology and geomorphology, habitat and fire and disturbance history.

The location of field survey quadrats and significant species, habitat and communities were captured with a handheld GPS unit. The location of the vegetation survey quadrats are shown in **Figure 3**.

Section 4 Methodology

4.2.2 Fauna Survey

Preliminary fauna surveys were carried out on 8 and 9 August 2007 and were generally consistent with the DECC guidelines (DEC 2004). Methods employed to survey fauna included diurnal bird counts, litter searches, opportunistic observations and track and scat analysis.

Weather during the August 2007 preliminary surveys comprised dry, clear, cool-mild days (7-19 deg C) and cool nights (6 deg C). Conditions during the dawn and dusk bird surveys were calm, with mild westerly and north-westerly breezes (BOM, 2007).

Targeted fauna surveys were carried out from 8 to 12 October 2007. The survey design was based on the likelihood of threatened species identified in the literature review occurring on Site and the initial habitat assessment. Methods included diurnal bird counts, Anabat recording, pitfall trapping, active searches, nocturnal call playback, stag watching and spotlighting. Survey effort and timing was consistent with the DECC guidelines (DEC 2004). The timing of the targeted surveys for the detection of targeted threatened fauna was also confirmed through consultation with Buronga National Parks and Wildlife Service (NPWS) staff (Ewan P. pers. comm.). All observations were recorded on appropriate pro forma field data sheets.

Weather during the October 2007 surveys comprised dry, clear, cool-mild days (7-19 deg C) and cool nights (4-7 deg C). Conditions during the dawn and dusk bird surveys were calm, with mild westerly and north-westerly breezes (BOM, 2007). There was a new moon (ie not visible at night) during the October surveys and there was no light spill from human sources. Traffic along Arumpo Road was very light with less than one vehicle movement per hour. Conditions through the October survey were suitable for the detection of small nocturnal fauna.

Fauna survey locations are shown on **Figure 3**. Survey techniques and effort are outlined below.

Diurnal Bird Counts

Diurnal bird counts were undertaken during the August and October 2007 surveys and consisted of area searches through habitat on Site. Searches were conducted at dawn and dusk, for at least 40 minutes over approximately 1ha consistent with the DECC guidelines (DEC 2004). Opportunistic observations of bird species were recorded throughout the duration of all surveys on the Site. Species were identified by visual observation and call and were documented along with numbers of individuals, behaviour, breeding activity and habitat type on proforma data sheets.

Weather during the surveys was suitable with little or no wind. The dawn survey on 10 October 2007 was cold with moderate wind.

Trees were also scanned for nests throughout the study area.

Pitfall Traps

Twelve pitfall traps with drift fences were placed from 8 to 11 October for a total of 48 trap nights (i.e. 12 traps over 4 nights). Pitfalls were placed singly with 10m drift fences and positioned adjacent to suitable shelter and foraging substrate for terrestrial fauna. Traps were checked each dawn and again in the late-afternoon or early evening.

Active Searches

Active searches for reptiles were performed within and adjacent to the site focussing on suitable substrate. Shelter sites were carefully lifted and replaced, trunks and decorticating bark were scanned, all crevices were searched, leaf litter was raked and visual scanning of vegetation for active and foraging specimens was undertaken. A diurnal and a nocturnal search was performed for at least 30 minutes each day, resulting in greater than four hours search time over the survey period.

Section 4 Methodology

Anabat Survey

The entire site was traversed with handheld Anabat devices on the first night of the October 2007 survey to assess microbat activity and identify flyways, roosts or other concentrations of activity. Fixed Anabat recordings were undertaken on the nights of 9 to 11 October 2007, recording from one hour before dusk and until the following morning.

The use of other survey methods such as harp trapping or mist netting was not performed during the October 2007 surveys as vegetation structure at the site was not suitable.

Stag Watching

Suitable stag watching sites were identified during daytime habitat assessments and included hollow-bearing trees and roosts with white wash. Selected sites were observed for 30 minutes before dark and for one hour after.

Call Playback

Call playback was performed over two nights targeting the Masked Owl and Barking Owl. Call playback was undertaken in accordance with DECC guidelines (DEC 2004) which included at least five minutes broadcasting and 10 minutes listening for each species per night.

Spotlighting

Spotlighting surveys were performed on the evenings of 9 and 10 October and involved walking 1km transects for one hour. Approximately two hours of additional, opportunistic spotlighting was performed each evening through the entire October 2007 survey period.

Fauna Habitat Assessment

An assessment of the quality of habitats present for native fauna was made across the entire Site. Habitat quality was based on the level of breeding, nesting, feeding and roosting resources available. Indicative habitat criteria for targeted threatened species (i.e. recorded in the TSC and EPBC Act searches) were identified prior to fieldwork. Criteria were based on information provided in TSC Act species profiles, field notebooks and the knowledge and experience of URS field ecologists. This technique is important in assisting in the compilation of a comprehensive list of fauna that are predicted within the vicinity of the Site, rather than relying solely on one off surveys that are subject to seasonal limitations and may only represent a snapshot of assemblages present.

The locations and quantitative descriptions of significant habitat features were captured with a handheld GPS unit and photographed where appropriate.

Ground debris searches

Ground debris searches were undertaken during the entire survey period while incidentally traversing the Site. These included active searches for scats, tracks, burrows or other traces.

Opportunistic Observations

Opportunistic and incidental observations of fauna species were recorded at all times during field surveys. Survey effort was concentrated on suitable areas of habitat throughout the course of the flora survey, for instance fallen timber was scanned for reptiles.

Reference Site Survey

A reference site within the Mallee Cliffs National Park was surveyed for habitat quality and diurnal reptile and bird activity in comparatively undisturbed native vegetation. The site was identified after consultation with Buronga NPWS staff (Foster E. pers. comm.). The reference site is located approximately 10km to the southeast of the site and was visited on the afternoon of 11 October. Particular attention was paid to Sand Dune Mallee communities with healthy stands of Spinifex. Many species of native fauna in the locality, including threatened species, are dependent upon this specific habitat type (DECC, 2007b; Cogger 1996). A two hour drive-through survey and two 30 minute diurnal active searches and habitat assessments were performed.

Section 4 Methodology

4.3 Conservation significance

Conservation status of species and communities recorded across the study area were determined with reference to the following:

- the TSC Act for State significance; and
- the EPBC Act for National significance.

4.4 Staff Qualifications

Field surveys were undertaken by qualified URS field ecologists with experience as laid out in **Table 3.1** below.

Table 4-1 URS Ecology Personnel and Qualifications

Name	Position	Qualifications	Relevant Experience
Jeremy Pepper	Associate Environmental Scientist	Bachelor of Science (Hons) UNSW	10+ years
Ben Harrington	Environmental Scientist	Master of Science, Bachelor of Science, Macquarie Uni	5+ years
Angela Standley	Environmental Scientist	Bachelor of Science (Applied Physical Geography) UNSW	6+ years

4.5 Survey limitations

It is possible that some species utilise the Site but were not detected during the survey period. These species are likely to include threatened flora species that flower after rainfall as well as annual, ephemeral or cryptic species. Some fauna species are also mobile and transient in their use of resources and it is likely that not all species (resident or transitory) were recorded during the survey period. The habitat assessment conducted for the Site allows for identification of habitat resources for such species. As such, the survey was not designed to detect all species, rather to provide an overall assessment of the ecological values on Site in order to predict potential impacts of the proposal.

Section 5 Results

5.1 Flora

5.1.1 Flora species

A total of 36 plant species were recorded during the field survey, comprising 12 exotic species, and 24 native species. Of the exotic species two are listed as a noxious weed within Wentworth LGA. None of the flora species recorded are listed as threatened under the TSC or EPBC Acts.

The total plant species list recorded during the field survey is presented in Appendix A.

Two species recorded on Site could not be identified because no fertile material was obtained. One of these was identified as an Echium sp. There are no native species within this genus. The second was identified as an Aizoaceae sp. This family has both native and exotic genera and includes two TSC Act listed species. Both species are listed as Presumed Extinct, and neither was known from the same Bioregion as the Site (PlantNET, 2007). Therefore neither of the unidentified species at the Site are likely to be of conservation significance.

5.1.2 Vegetation communities

Vegetation communities recorded in the study area are described below along with their conservation significance. Communities were defined according to modified nomenclature and definitions of Val (1998).

Community No. 1 Sandplain Mallee

Survey Effort:	P2, P3, Random Meander (see **Figure 3**)
Structure:	Low Woodland (Specht
Conservation status:	Not listed on TSC Act or EPBC Act
Areas on Site:	Approximately 0.8 ha. (see **Figure 4**)
Corresponding Map Units:	Sand plain mallee woodlands (DECC, 2007c); Swale Mallee – 3c Sandplain Mallee – 3d (Fox, 1991; Scott, 1992).

Sandplain Mallee recorded at the Site featured a canopy of mallee-form Eucalytus socialis (Red Mallee) to 7m (**Plate 9-1**). It is classified as a Low Woodland according to the system of Specht (1980).

This vegetation community has a patchy distribution over approximately 0.8 ha of the Site occurring on low dunes between flat areas supporting Community 2 and Community 3. Soils were red calcareous loamy sands and sandy loams with thick leaf litter immediately around mallee stems, low organic matter and moderate erosion.

Sandplain Mallee had a very sparse shrub layer of taller chenopods such as Maeriana pyrimidata (Black Bluebush) and the sub-shrub Zygophyllum apiculatum (Gallweed).

Ground cover was sparse to moderate and dominated by dwarf chenopods with patches of exotic grass species and native and exotic herbs. Dominant species included: the chenopods Sclerolaena diacantha (Grey Copperburr) and Dissocarpus paradoxus (Cannonball Burr); the exotic pasture grass Hordeum leporinum (Barley Grass); the exotic herb Brassica tournefortii (Mediterranean Turnip); and the native herbs Sysimbrium erysimoides (Smooth Mustard), Brachyscome lineariloba (Hard-headed Daisy) and Calotis hispidula (Bogan Flea).

Sandplain Mallee has close affinities with the Dune Mallee Woodlands (DECC, 2007c) which is differentiated by its dense ground cover of tussock grasses, especially Triodia spp. (Spinifex). In their natural condition the two communities are associated with different soil types and geomorphic positions as their names suggest. Sandplain Mallee in the study area occurs on plains but also small, linear dunes, typically associated with Dune Mallee. Accordingly it is likely that the some areas of sparse, chenopod-dominated understorey in the

Section 5 Results

study area area a product of past land use, especially grazing, rather than environmental factors (DECC, 2007c; Keith, 2004).

Community No. 2 Belah Woodland

Survey effort: P1, P5, Random Meander (see **Figure 3**)

Structure: Low Woodland (Specht, 1980).

Conservation significance: Not listed on TSC Act or EPBC Act.

Areas on Site: Approximately 1.3 ha. (see **Figure 4**)

Corresponding Map Units: Southern Semi-arid Sandplain Woodland (DECC, 2007c),

Belah woodland had a patchy occurrence on flat sandplains interspersed with Chenopod Shrubland (**Plate 9 -2**). It featured a mid-dense canopy of 50-80% cover, seven to 15m tall, dominated by Casuarina pauper (Belah). Soils were grey-brown, hard setting sandy clays, with very sparse leaf litter, low organic matter and moderate to serious erosion.

The midstorey consisted of suckering sub-adults of C. pauper.

Belah Woodland had a very sparse shrub layer of chenopods and sub-shrubs such as Rhagodia spinescens (Berry Saltbush), Maeriana pyrimidata and Zygophyllum apiculatum.

Ground cover density was very sparse in dense, mature stands of Belah Woodland but moderate in patches where C. pauper was more widely spaced. The groundcover was continuous with adjacent Sandplain Mallee and Chenopod Shrubland understorey. It featured a similar assemblage of species comprising dwarf chenopods with patches of exotic grass species and native and exotic herbs. Species included: the native chenopods Dissocarpus paradoxus, Einadia nutans subsp. nutans (Climbing Saltbush) and the exotic Psilocaulon tenue (Wiry Noon-flower); the exotic pasture grass Hordeum leporinum (Barley Grass); the exotic herb Brassica tournefortii; and the native herbs Sysimbrium erysimoides and Calotis hispidula.

Community No. 3 Chenopod Shrubland

Survey effort: P4, Random Meander (see **Figure 3**)

Structure: Dwarf Open Heathland (Specht, 1980).

Conservation significance: Not listed on TSC Act or EPBC Act.

Areas on Site: Approximately 1.3 ha. (see **Figure 4**)

Corresponding Map Units: Aeolian Chenopod Shrubland (DECC, 2007c).

Chenopod Shrubland occurred on flat sandplains throughout the study area interspersed with treed communities (**Plate 9-3**). The tallest vegetation stratum was a moderately dense sub-shrub layer 15 to 30cm tall. Treeless communities may be a product of historic clearing or other human influences, rather than natural environmental conditions. In these cases they are known as Secondary or Derived vegetation communities. Chenopod Shrubland is not recognised as a Derived vegetation community by DECC (2007c) however it is likely that some areas of this community in the study area represent historic clearing of woodland, particularly in the electricity easement through the centre of the Site.

Soils were red calcareous sandy loams, with very sparse leaf litter, low organic matter and moderate to serious erosion.

Ground cover density was moderate with approximately equal cover of native dwarf chenopods and the exotic pasture grass Hordeum leporinum. Chenopods included Dissocarpus paradoxus, Sclerolaena diacantha. There was also a moderate cover of exotic herbs such as Medicago minima (Wooly Burr Medic) and Salvia verbenaceae (Vervain) and native herbs including Calotis hispidula, Chamaesyce drummondii (Caustic Weed), Rhodanthe pygmaeum (Pygmy Sunray) and Daucus glochidiatus (Native Carrot).

Section 5 Results

Community No. 4 Black Box Woodland

Survey Effort: P3, Random Meander (see **Figure 3**)

Structure: Low Woodland (Specht

Conservation status: Not listed on TSC Act or EPBC Act

Areas on Site: Approximately 0.6 ha. (see **Figure 4**)

Corresponding Map Units: Inland floodplain woodland (DECC, 2007c).

This community consisted of small patches and isolated individuals of single-stemmed Eucalyptus largiflorens (Black Box) to 15m. It was a Woodland according to the system of Specht (1980).

This vegetation community has a patchy distribution over the Site occurring on flat areas. Soils were red calcareous sandy loams with very low gravel content, thin patchy leaf litter and moderate erosion.

Black box woodland featured the same lower vegetation layers as adjacent areas of Sandplain Mallee and Chenopod Shrubland. This comprised a very sparse shrub layer of taller chenopods and a sparse to moderate groundcover dominated by dwarf chenopods with patches of exotic grass species and native and exotic herbs.

5.1.3 Conservation significance

Species of conservation significance

The desktop literature review indicates five threatened plant species listed under the TSC/EPBC Acts which have been previously recorded or are predicted to occur in the locality. Three species were considered unlikely to occur at the Site as they are dependent upon heavy soils or periodically inundated sites. Suitable habitat for these species may occur in the study area at Lake Gol Gol however the site contains well-drained Aeolian sands. Two species were considered likely to occur in the study area:

- *Swainsona pyrophila* Yellow Swainson-pea; and
- *Santalum murrayanum* Bitter Quandong.

The full list of threatened plant species, including their habitat requirements and conservation status is presented in **Table 1 of Appendix B**.

No TSC and EPBC Acts listed flora species were recorded during the present study. However, as some species are cryptic and may not have been flowering during the survey, it is possible that individuals of threatened species may occur at the site.

Endangered populations

No threatened flora populations listed under the TSC/EPBC Acts are known from the locality.

Endangered ecological communities

Two endangered ecological communities (EEC's) have previously been recorded in the locality. The EEC 'Aquatic ecological community in the natural drainage system of the lower Murray River catchment' would not occur at the Site as it does not contain any drainage lines or depressions. The wetland at the site is an artificial feature and does not form part of the regions natural drainage system.

There is suitable habitat for the EEC 'Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions' at the Site and no Allocasuarina leuhmanii (Bulloke) was recorded. Casuarinacea-dominated communities on Site are Belah Woodland dominated by Casuarina pauper (Belah).

Section 5 Results

5.1.4 Noxious Weeds

The Noxious Weeds Act 1993 provides for the declaration of noxious weeds in local government areas. Landowners and occupiers must control noxious weeds according to the control category specified in the Act. Public authorities must control noxious weeds according to the control category to the extent necessary to prevent their spread to adjoining land.

The August 2007 survey revealed two declared noxious weeds for Wentworth LGA: Lycium ferocissimum (African boxthorn) and Asphodelus fistulosus (Onion Weed). Both species are listed as Class 4 Noxious Weeds for Wentworth Council. Under this classification the growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority.

5.2 Fauna

5.2.1 Fauna species

The URS 2007 field surveys recorded 15 mammals, 45 species of bird, 7 reptiles and 1 crustacean as listed in **Table 4 of Appendix A**. No frogs were recorded during the 2007 surveys. Three fauna species listed as Vulnerable under the TSC Act, namely the Hooded Robin (Melanodryas cucullata), Little Pied Bat (Chalinolobus picatus) and Large-footed Myotis (Myotis adversus/macropus), were recorded at the Site during the 2007 surveys.

There was an abundant and species-rich assemblage of native birds at the site. These included species from a range of guilds (ie species with different niches or lifestyles) which suggests the Site provides important habitat for native birds (Keats et al, 1985). These included: large, social species such as the Australian Magpie (Gymnorhina tibicen), Apostlebird (Struthidea cinereai) and White-winged Chough (Corcorax melanorhamphos); small woodland birds including the Chestnut-rumped Thornbill (Acanthiza uropygialis), Southern Whiteface (Aphelocephala leucopsis) and Weebill (Smicrornis brevirostris); honeyeaters including the White-eared Honeyeater (Lichenostomus leucotis), White-plumed Honeyeater (Lichenostomus penicillatus) and Yellow-plumed Honeyeater (Lichenostomus ornatus); raptors including the Wedge-tailed Eagle (Aquila audax) and Black Kite (Milvus migrans); and nocturnal species including the Southern Boobook (Ninox boobook), Tawny Frogmouth (Podargus strigoides) and Spotted Nightjar (Eurostopodus argus).

The mammals observed during the 2007 surveys included the exotic European Rabbit (Oryctolagus cuniculus) and Brown Hare (Lepus capensis). There were extensive Rabbit warrens throughout the Site. Other exotic species included the European Fox (Oryctolagus cuniculus) and the domestic dog (Canis familiaris).

No kangaroos were observed throughout the entire survey period which may suggest the Site has been degraded by livestock and Rabbit grazing and does not provide suitable foraging habitat.

Microchiropteran bat call analysis revealed the presence of 11 species of microbat and included species such as: White-striped Mastiff Bat (Tadarida australis), Southern Freetail Bat [Mormopterus planiceps (long penis form]), Inland Freetail Bat (Mormopterus sp.4), Gould's Wattled Bat (Chalinolobus gouldi), Chocolate Wattled Bat (Chalinolobus morio), Little Pied Bat (Chalinolobus picatus), Large-footed Myotis (Myotis adversus/macropus), Long-eared Bat (Nyctophilus sp.), Large Forest Bat (Vespadelus darlingtoni), Southern Forest Bat (Vespadelus regulus) and the Little Forest Bat (Vespadelus vulturnus).

Diurnal reptiles were relatively sparse during both August and October 2007 field surveys. Species observed included Cryptoblepharus carnabyi (Shiny-palmed Shinning-skink) sheltering or foraging amongst woody debris; Morethia boulengeri (South-eastern Morethia Skink), trapped in Belah Woodland; and Tiliqua rugosai (Shingleback Lizard) observed foraging in Belah Woodland and Chenopod Shrubland. Individuals of an unidentified Scinidae sp., probably a Ctenotus sp. were observed sheltering in rabbit warrens. Reptile burrows and tracks were moderately abundant in sand dunes supporting Sandplain Mallee. No fossorial lizard or snake tracks were observed.

Section 5 Results

Nocturnal reptiles were abundant but restricted to two species Heteronotia binoei (Prickly Gecko) and Underwoodisaurus milii (Thick-tailed Gecko). Individuals were detected in pitfall traps, whilst foraging in open ground in Belah Woodland and beneath woody debris in all vegetation communities.

The crustacean observed was a Yabby (Cherax sp.) which was identified from several shells in the dry dam.

During the reference site survey in Mallee Cliffs N.P. it was observed that native vegetation and fauna habitats were of better quality than at the Site. The reference site supported large patch sizes, which were less disturbed, and contained large, intact clumps of Spinifex. The reference site is therefore more likely to support a much greater abundance of fauna. Further, large numbers of Macropus fuliginosus (Western Grey Kangaroo) and Emu (Dromaius novaehollandiae) were observed at the reference site whereas no large terrestrial animals were recorded at the Site. Although few reptiles were directly observed at the reference site, tracks and burrows were abundant, particularly in Sand Dune Mallee with Spinifex. These tracks included those of fossorial reptiles and potentially of Aprasia inaurita. A similar abundance and diversity of birds were observed with the exception of raptors, with the Nankeen Kestrel (Falco cenchroides) and Little Eagle (Hieraaetus morphnoides) recorded at the reference site but not at the Site. Although no detailed survey effort (ie pitfalls, anabat surveys, nocturnal surveys) was conducted at the reference site, it is inferred that the reference site supports a much greater abundance and diversity of terrestrial fauna based on habitat quality and the abundance of tracks and other signs.

5.2.2 Fauna habitats

Habitat assessments were conducted across the entire study area in order to evaluate habitat quality and to assess the potential presence of threatened species not directly observed during the surveys. Biophysical features considered in assessing habitat on Site included:

- native diversity in ground flora;
- structural and floristic diversity of vegetation layers, particularly presence or absence of mid-storey (shrubs and juvenile canopy species) and/or presence of native tussock grasses;
- presence and quantity of litter layer and fallen dead timber;
- level of shelter, breeding, roosting and nesting resources available;
- presence of stem hollows and quantity of mature hollow bearing trees;
- exfoliated bark, feed trees and shrubs;
- fauna movement corridors;
- position in the landscape, connectivity or value as a habitat corridor;
- presence of rocky outcrops or partially buried rocks; and
- presence, size and ecological integrity of remnant communities.

The habitat assessment identified the following key habitat types across the study area:

Sandplain Mallee

The Sandplain Mallee was observed to be relatively intact and contained healthy, mature trees. However it was observed to support only moderate structural diversity as the canopy featured relatively uniform-aged stands of mallee-form trees with few emergents and limited recruitment of juveniles and seedlings. The shrub layer was very-sparse to absent. This lack of structural diversity may limit the habitat value of this community for some woodland and forest bird species (Keast et al, 1985). These include the threatened species Black-eared Miner (Manorina melanotis) and Malleefowl (Leipoa ocellata) which are known from the locality but prefer dense stands of mallee with a thick, variable shrub stratum. The matrix of treed vegetation communities and Chenopod Shrubland at the Site is likely to suit species which favour more open mallee-country. These include the Hooded Robin, which was recorded throughout the site, the Bush Stone-curlew (Burhinus grallarius) and the Chestnut Quail-thrush (Cinclosoma castanotus).

Section 5 Results

Eucalyptus socialis in this community feature good quantities of exfoliating bark which would provide shelter for native reptiles, invertebrates and micro bats and foraging substrate for native birds. Further, Eucalytus socialis is nectar-bearing and provides a food resource for native fauna, including birds such as the White-eared Honeyeater and Yellow-plumed Honeyeater observed on Site, other nectar feeding birds, and potentially arboreal mammals.

There was a sparse, patchy ground cover of exotic pasture species and herbaceous weeds mixed with a reasonable diversity of native chenopods and herbs. This would provide suitable foraging habitat for native herbivorous mammals.

The substrate was of moderate quality throughout the majority of this community with thin, patchy leaf litter, some woody debris and occasional fallen tree hollows. This is likely to provide adequate cover for native invertebrates, reptiles and possibly small terrestrial mammals. Substrate quality was greatest in the immediate vicinity of the mature habitat trees as indicated on **Figure 6** and **Plate 9-5**. There was excellent, thick cover of leaf litter surrounding the largest trees and good quantities of fallen timber (Plate 9-4). This provides shelter and foraging habitat for small terrestrial animals including native invertebrates, reptiles and mammals.

Many small terrestrial animals of semi-arid Australia rely on extensive clumps of spinifex to provide shelter and foraging habitat (DECC, 2007b; Cogger, 1996).These include the TSC Act listed Aprasia inaurita (Mallee Worm-lizard) and Ningaui yvonnae (Southern Ningaui). Accordingly the Sandplain Mallee may only provide marginal habitat for these species.

Soils in the Sandplain Mallee were friable loamy sands and would provide suitable habitat for fossorial (burrowing) reptiles as well as species that build burrows for shelter. There were no significant rock outcrops or large, platey rock fragments that would support habitat for other reptile species.

At the local scale the Sandplain Mallee has good connectivity with other treed communities on the Site. This diversity of vegetation species and structures within a relatively intact patch is likely to increase the habitat value of the Site as a whole.

Sandplain Mallee on Site does not form part of a continuous, treed habitat corridor at the regional scale as it occurs in a matrix with Chenopod Shrubland and cleared country. Larger patches of Sandplain Mallee may have significance as a refuge for fauna migrating across open country given the fragmented nature of vegetation throughout the region. There is important habitat in protected lands along the Murray River to the south and in Mallee Cliffs National Park to the east. Healthy populations of native fauna are likely to occur in these areas and more mobile species would utilise habitat present on the Site. These may include the TSC/EPBC Act listed species Regent Parrot (Polytelis anthopeplus monarchoides) Major Mitchell's Cockatoo (Cacatua leadbeateri) and Barking Owl (Ninnox connivens) which are likely to utilise roosting habitat in mature Eucalyptus camaldulensis (River Red Gums) along the Murray River and forage in the surrounding area. Sandplain Mallee on Site would provide suitable foraging habitat for these species.

Belah Woodland

This community has a dense canopy of mature trees including hollow-bearing habitat trees and stags. It provides important shelter and roosting habitat for native birds. Nests of the Apostlebird, which builds mud nests in mature trees and Chestnut-rumped Thornbill, which nests in stem-hollows were observed in the study area during the field surveys (Plate 9-6). Stem-hollows may also provide diurnal roosts for micro-bats, including the Eastern Long-eared Bat (Nyctophilus timoriensis).

The shrub and groundcover layers are sparse, as is typical for Casuarineacea-dominated communities, and provides limited foraging opportunities for shelter-dependent native birds and terrestrial mammals. The substrate was of moderate to good quality throughout this community. Leaf litter cover was patchy but there were excellent quantities of woody debris including potentially important piles of fallen timber and hollow-bearing logs (Figure 6, Plate 9-4). This community is likely to support a healthy assemblage of native invertebrates, reptiles and potentially small terrestrial mammals and micro bat species. As described for Sandplain Mallee the community would not support terrestrial fauna associated with unburnt Spinifex.

Soils in the Belah Woodland were hard-setting sandy clays and would not provide habitat for fossorial species.

Section 5 Results

The Belah Woodland may constitute a fauna movement corridor to other treed communities in the study area. Due to the discontinuous nature of the community as a whole and sparse, patchy shrub and groundcover layers it is likely to be of most significance to birds and microbats and only limited value as a movement corridor for terrestrial fauna. As described for Sandplain Mallee, local populations of the Regent Parrot, Major Mitchell's Cockatoo and Barking Owl are likely to forage at the Site. These species forage in open country however the Barking Owl relies on denser stands of vegetation for roosting and movement across the landscape. The Belah Woodland may therefore important foraging habitat for the Barking Owl and similar species given the fragmented nature of the surrounding vegetation and the relatively open structure of other treed communities in the study area.

Chenopod Shrubland

As stated in **Section 5.1.2** it is likely that some Chenopod Shrubland at the Site is a product of historic clearing. However all areas of the community at the Site are consistent with Chenopod Shrubland as defined by DECC (2007c) and provides habitat for native species associated with this community.

Chenopod Shrubland at the Site featured a very low, sparse shrub stratum and extensive areas of bare earth. The matrix of Chenopod Shrubland and treed communities at the Site provides habitat for open mallee-country specialists including the Hooded Robin, Bush Stone-curlew and the Chestnut Quail-thrush. It may also provide foraging habitat for larger native mammals and reptiles. Chenopod Shrubland contains small quantities of woody debris or other shelter but occurs in close proximity to treed communities with superior habitat resources. Accordingly this community would still provide important foraging habitat for small, shelter dependent terrestrial species. As discussed above this community is unlikely to support Spinifex-dependent species including Aprasia inaurita and Ningaui yvonnae.

Chenopod Shrubland would provide foraging habitat for micro bats given the proximity of other resources such as intact vegetation and tree hollows.

Black Box Woodland

The Black Box Woodland occurred as small patches and isolated individual trees which may limit its suitability for shelter-dependent species. Single-stemmed Eucalyptus largiflorens in this community were the tallest trees present at the Site and may provide important roost sites for raptors. Overall this community has similar structural attributes and connectivity to Belah Woodland at the Site and is likely to support an equivalent suite of native fauna and threatened species.

Eucalyptus largiflorens is a secondary food tree species for the Koala (Phascolarctos cinereus) in the Far West & South West Koala Management Area. However there are no records of the species in the locality or for Wentworth LGA (DECC, 2007a) and so the species is unlikely to occur at the Site.

Aquatic and wetland habitat

The site contained one ephemeral wetland – a man made dam of approximately 100 m2 (refer **Figure 6**). Crayfish shells were observed in the dam. The dam is likely to support other native aquatic fauna however there are no recent records or specific habitat attributes that suggest the presence of threatened aquatic species. The dam would have a dense cover of Typha orientalis (Bulrush) when inundated which would provide suitable habitat for many native birds, reptiles and frogs. Due to the isolation of this aquatic habitat within extensive areas of semi arid woodland and shrubland, these species would be dominated by more mobile bird, bat and reptile species and burrowing species of frogs. This may include the TSC/EPBC Act listed Australian Painted Snipe (Rostratula australis). Wetlands and associated fringing vegetation on Site are probably too disturbed and too small in area to support local populations of the species however they may be used intermittently as foraging habitat. The TSC/EPBC Act listed Litoria raniformis (Southern Bell Frog) has been recorded in the study area (DECC, 2007b) but requires permanent aquatic habitats as refuges during dry periods and so is unlikely to occur at the Site (Ehmann, 1997).

During inundated periods the dam is likely to provide foraging habitat for micro-bats, namely the TSC Act listed Large-footed Myotis (Myotis adversus/macropus), given the proximity of intact woodland and hollow-bearing trees. It may also be an important resource for terrestrial mammals and birds given the aridity of the surrounding landscape.

Section 5 Results

Other habitat resources

The DEC (2004) guidelines identify "special habitats" (eg water bodies, rocky outcrops and cliffs) that are likely to support specific fauna assemblages. These resources may be significant for threatened species (DECC, 2007b). Tree hollows are of particular significance for native fauna as diurnal or nocturnal shelter sites, for rearing young, for feeding, for thermoregulation, and to facilitate ranging behaviour and dispersal. An estimated 15% of all terrestrial vertebrate fauna in Australia are dependent upon tree hollows and for many of these species the relationship is obligate ie. no other habitat resource represents an adequate substitute (Gibbons and Lindenmayer, 2002). Accordingly the August 2007 field survey included a targeted survey of habitat resources in addition to the assessment of the communities described above.

Approximately ten important habitat trees are present on Site (refer **Figure 6**). Hollow-bearing trees may provide suitable diurnal roost sites for tree-roosting microbats including the TSC Act listed Little Pied Bat (Chalinolobus picatus) and Large-footed Myotis (Myotis adversus/macropus) which were recorded at the Site. They are also likely to support native parrots including the Mallee Ringneck and Galah, observed during the field survey. The Superb Parrot and Major Mitchells Cockatoo may also use these resources though local populations of these species are more likely to select hollows in taller trees and larger, less disturbed patches of vegetation.

It should be noted that ground-based field surveys may underestimate the quantity of important tree hollows present in a vegetation community. Conversely, many hollows visible from the ground may not have the required depth, orientation or other attributes required to constitute suitable shelter (Gibbons and Lindenmayer, 2002). Therefore the above assessment should be considered an estimate of the quality and quantity of tree hollows on Site.

Other habitat resources such as fallen logs and debris were present in good quantities through the Site. Fallen timber piles are probably a product of previous land clearing however in their current state they provide excellent shelter for native fauna.

There were no significant rock outcrops, boulder piles or caves in the study area. Rock fragments were sparse to absent.

No SEPP 44 Schedule 2 koala feed tree species are present on Site, however Eucalyptus largiflorens is a secondary food tree species as discussed above.

5.2.3 Conservation significance

Fauna Species

The Hooded Robin, which is listed as Vulnerable under the TSC Act, was recorded during field surveys. A breeding pair was observed during the August 2007 survey and again during the October 2007 survey. Birds were observed in Belah Woodland and Sandplain Mallee in the southeastern portion of the site on both occasions and are probably the same two individuals. In October 2007 the pair had a nest in Belah Woodland within the plant footprint as shown on **Figure 5** and **Plate 9-7**. The male was observed bringing food to the sitting female and the nest contained one or more nestlings. Breeding activity and the continuity of presence between the two survey rounds suggests that the site forms part of the species' core habitat in the local area. The species occupies home ranges of approximately 5ha during the breeding season and up to 30ha at other times (ACT Govt, 1999; Bell, 1983).

Two further threatened species, the Little Pied Bat and the Large-footed Myotis, which are listed as Vulnerable under the TSC Act, were observed by Anabat recordings during field surveys.

One unidentified reptile was recorded and identified as family Scinidae (the skinks). Three TSC Act listed skinks may occur within the region Cyclodomorphus melanops elongates (Mallee Slender Blue-tongue Lizard), Tiliqua occipitalis (Western Blue-tongued Lizard) and Lerista xanthura (Yellow-tailed Plain Slider). The two individuals observed did not resemble these species and were more likely a Ctenotus sp.

Section 5 Results

The desktop review indicates the potential presence of a further 15 threatened fauna species listed under the TSC Act, which have previously been recorded in the local area, and/or EPBC Act which are predicted to occur in the local area. This full list of threatened fauna species, including their conservation status, habitat requirements, previous records and likelihood of occurrence is presented in **Table 2 of Appendix A**. A review of the specific habitat requirements of these species, and the habitat present within the study area and its surrounds allowed a number of these species to be eliminated as having low likelihood of occurrence at the site. Ten species are likely to utilise habitats on Site and are presented below.

Five species were considered a high likelihood of occurrence at the Site based on the presence of suitable foraging and roosting habitat and recent records in the local area:

Burhinus grallarius Bush Stone-curlew;

Polytelis anthopeplus monarchoides Regent Parrot (eastern subsp.);

Cacatua leadbeateri Major Mitchell's Cockatoo;

Nyctophilus timoriensis Eastern Long-eared Bat (South-eastern form); and

Cinclosoma castanotus Chestnut Quail-thrush.

A further five species were considered a medium likelihood of occurrence at the site based on the presence of marginal foraging and roosting habitat and recent records in the local area:

Ninnox connivens Barking Owl;

Aprasia inaurita Mallee Worm-lizard;

Ningaui yvonneae Southern Ningaui;

Manorina melanotis Black-eared Miner; and

Leipoa ocellata Malleefowl.

These threatened species may use habitat resources in the site on a transient, seasonal or opportunistic basis.

Endangered populations

There are no threatened fauna populations listed under the EPBC Act and/or the TSC Act, which have been previously recorded in the locality (radius of 10km). No evidence of endangered populations was detected during the survey.

Impact Assessment

This Section assesses the potential impacts of the proposal during construction and operation on the flora and fauna of the study area.

5.3 Conservation significance

5.3.1 Threatened Flora Species

No threatened flora species or communities listed under the TSC or EPBC Acts were observed during field surveys and there are no previous records of threatened flora occurring on the Site (DECC, 2007a).

The study area provides potential habitat for two threatened flora species as listed in Appendix A. An assessment of the significance of the proposed development on threatened flora species (in general) has been undertaken (Appendix B). The outcome is that the proposed development is unlikely to result in a significant impact on any flora species located within the development footprint.

5.3.2 Threatened Fauna Species

The Hooded Robin is likely to utilise the Site on a semi-permanent basis (during breeding season) and will be directly impacted by construction of the peaking power plant. The Little Pied Bat and the Large-footed Myotis are also likely to intermittently use the Site as foraging habitat and may also use hollow bearing trees as diurnal roosts. Potential impacts upon these species due to the construction and operation of the proposed Peaking Power Plant Site are outlined below. Section 5A of the EP&A Act has been addressed as a guide to the consideration of impacts on threatened species, populations and ecological communities listed under the TSC Act.

A 7-part test of significance was performed for the local population of the Hooded Robin that is known to occupy the Site and is included as Appendix B. The 7-part test concludes that the proposed development is not 'likely' to impose a 'significant effect' on the Hooded Robin.

A 7-part test of significance was also performed for the Little Pied Bat and the Large-footed Myotis that are likely to intermittently use the Site and is included as Appendix B. The 7-part test concludes that the proposed development is not 'likely' to impose a 'significant effect' on these species.

The 15 threatened fauna species which are considered to have a medium to high likelihood of occurrence in the study area based on habitats present on Site and recent DECC (2007a) records in the vicinity as listed in Section 5.2.3. The full list of these species and a summary of their habitat requirements and likelihood of occurrence is presented in Table 2 of Appendix A.

A 7-part test of significance was also performed for species previously recorded, or considered to have a medium to high likelihood of occurrence in the study area for which suitable habitat is present and is included in Appendix B. The 7-part test concludes that the proposed development is not 'likely' to impose a 'significant effect' on these species.

5.3.3 Endangered Populations

No endangered populations occur within the study area, and thus there should be no impact on endangered populations arising from the proposed development.

5.3.4 Endangered Ecological Communities

There are no endangered ecological communities that could potentially occur within the study area.

5.3.5 Critical Habitat

There are no areas of listed critical habitat within the study area.

5.3.6 Koala Impact Assessment- SEPP 44

SEPP 44 define 'potential koala habitat' as an area of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component. There are no Schedule 2 feed tree species at the site.

The Site contains Eucalyptus largiflorens, which is a secondary food tree species for the Koala in the Far West & South West Koala Management Area. The Site constitutes Secondary Habitat (Class B) and thus is capable of supporting a viable, low density population of the species (Phillips, 2000b). However there are no records of the species in the locality or for Wentworth LGA (DECC, 2007a) and so the site does not constitute core koala habitat, defined as "an area of land with a resident breeding population of koalas, evidenced by attributes such as breeding females and recent sightings and historical records of a population".

Therefore there is no requirement for a site-specific Koala Plan of Management in accordance with SEPP 44.

5.3.7 Key Threatening Processes

A 'key threatening process' comprises 'a threatening process specified in Schedule 3' of the TSC Act. A 'threatening process' is defined under the Act as 'a process that threatens, or may have the capability to threaten the survival or evolutionary development of species, populations or ecological communities'.

The following Key Threatening Processes listed in Schedule 3 of the TSC Act, may be relevant to the current proposal: '

- Clearing of native vegetation;
- Removal of dead wood and dead trees; and
- Loss of hollow-bearing trees.

5.4 Vegetation Clearing and Construction Impacts

IPRA, prior to commencement on the Development Site, would prepare detailed construction programs and methods. These would be dependent on the detailed design and would demonstrate compliance with conditions of consent issued for the Buronga Peaking Power Plant Project and other statutory requirements. This assessment of construction impacts is based on indicative design drawings.

The peaking power plant would occupy an area of approximately 4.1 ha. Buildings would be constructed on Site to provide for office work area, amenities, control room, workshop and stores facilities. The plant footprint would be surrounded by a chain mesh fence. Construction activities are to be taken within the site footprint and should not impact on any additional areas of native vegetation.

5.4.1 Flora

The proposed development will require the disturbance of approximately 4 ha of native vegetation in total. The area to be impacted in each vegetation community is summarised in Table 6-1 below.

Table 5-1 Vegetation Communities to be affected by proposed development

No.	Vegetation Community	Area to be disturbed during construction (m^2)	Conservation significance
1	Sandplain Mallee	0.8 ha	Not listed (TSC Act/EPBC Act)
2	Belah Woodland	1.3 ha	Not listed (TSC Act/EPBC Act)
3	Chenopod Shrubland	1.3 ha	Not listed (TSC Act/EPBC Act)
4	Black Box Woodland	0.6 ha	Not listed (TSC Act/EPBC Act)
	Total	4 ha	

This footprint includes the portion of the peaking power plant site footprint and landscaped areas. Native vegetation that falls within the landscaped strip will be retained.

Overall the impacts associated with the peaking power plant location with regard to flora are minor in the context of remaining vegetation in the locality and the surrounding region.

Section 5 Results

5.4.2 Fauna

The proposed development will involve the construction and operation of a peaking power plant occupying a footprint of approximately 200m x 200m. This infrastructure will result in the removal of habitat and foraging resources for native fauna, including the threatened species outlined in **Section 5.2.3**. The development will involve the removal of important resources such as standing and fallen dead timber and hollow-bearing trees. Three Key Threatening Processes listed in Schedule 3 of the TSC Act will be directly contributed to by the proposal:

- Clearing of native vegetation;
- Removal of dead wood and dead trees; and
- Loss of hollow-bearing trees.

Native vegetation within the site footprint is shown on **Figure 4** and important habitat resources on **Figure 6**. The removal of these resources is 'likely' to 'threaten the survival or evolutionary development of species, populations or ecological communities' within the Site. The magnitude of these 'likely' impacts is assessed below.

A considerable abundance and diversity of native bird species occupy the Site and will be impacted by the removal of these resources. The majority of these species are mobile, widespread and common. It is unlikely that native birds will be killed or otherwise directly impacted by the construction or operation of the peaking power plant. However, there are large quantities of equivalent habitat and resources in the surrounding region and so it is likely that the impact on local populations of native birds will be low to moderate.

A breeding pair of Hooded Robins was nesting within the plant footprint during the October 2007 survey (**Figure 5**). The development footprint is likely to constitute the majority of their home range during the breeding season, however for the remainder of the year they are likely to occupy a much larger home range of up to 30 ha (ACT Govt, 1999; Bell, 1983). Some plasticity in the home ranges of the species is likely and there are large areas of equivalent habitat in the locality. Therefore the loss of up to 4 ha of habitat within the home range of these individuals is unlikely to prevent them from occupying the local area on an ongoing basis. Mitigation measures including, timing of construction outside the breeding period, a pre-clearing survey and avoidance of breeding individuals, will be required to avoid significant impacts on this species during construction. The existing switching station immediately adjacent to the Site is of similar size and activity levels as the proposed peaking power plant. This has not precluded the species from occupying and breeding within the Site. Therefore operation of the peaking power plant is also unlikely to prevent the species from occupying alternative habitats adjacent to the Site. Provided the mitigation measures outlined in Section 7 are followed it is not 'likely' that the proposed development and operation of the peaking power plant will have a significant impact upon local populations of the Hooded Robin (refer to **Appendix B**).

A total of 11 species of micro bat were recorded by Anabat calls at the Site during the 2007 surveys. As these species are mobile and generally widespread and considering that there is connecting habitat adjacent to the Site, the loss of 4 ha of foraging resources and potential roost habitat at the Site is likely to constitute a minor impact upon these species in the local area. Mitigation measures outlined in **Section 7** are likely to ameliorate impacts on these species.

A moderate diversity and abundance of native reptiles are likely to occupy the Site. Species recorded during field surveys were widespread and common (Cogger, 1996). It is likely that individuals will be killed or displaced during clearing, particularly species which burrow or shelter beneath woody debris. Mitigation measures outlined in **Section 7** are likely to ameliorate these impacts. These include: a pre-clearance survey and relocation of individuals where practicable; and careful removal of large woody debris and placement within landscaped areas of the Site or adjoining areas. The loss of up to 4ha of habitat is likely to have a minor impact on local populations of these species given the large areas of native vegetation and other resources in the vicinity of the site.

The existing farm dam will be entirely removed which will result in the death or displacement of native burrowing frogs and crustaceans currently occupying this habitat. The proposed stormwater and wastewater detention ponds may provide compensatory habitat for these species once constructed. Since the ponds would be lined and lack aquatic vegetation this habitat would provide far less habitat value than the existing dam. During wet periods the existing dam is considered to provide an important resource for terrestrial mammals, such as micro bats, and birds given the aridity of the surrounding landscape. The operating plant site will be fenced and hence this resource would be lost to terrestrial mammals though birds and bats are likely to use the stormwater and wastewater detention ponds.

There will be moderate, short term impacts on fauna utilising adjacent areas of habitat during the construction period associated with noise and other disturbances. Impacts during the operational phase are likely to be minor, especially given the relatively brief proposed periods of operation (up top a maximum of 10% of any year). Mitigation measures such as sound-proofing of the gas turbines and fencing of all operational areas should ensure these impacts are minimal.

5.4.3 Secondary and Operational Impacts

Sediments and runoff

The Construction Environmental Management Plan (CEMP) should include safeguards and mitigation measures to minimise potential impacts from additional runoff and associated erosion and transfer of sediments. The design of the peaking power plant will incorporate a sediment and evaporation pond.

The risk of additional impacts is considered low because the local area is relatively flat and there are no water bodies or other sensitive receptors in the vicinity of the Site. Standard construction controls, such as hay bales and silt fences if required in the event of heavy rainfall, should ensure no adverse impacts from erosion or transport of sediments should this occur during construction. The Site is relatively flat and there are no sensitive receptors on the downslope (south-eastern) side of the site.

Artificial lighting

Night-time security or operational lighting can potentially discourage habitat use where diffuse light penetrates into adjoining areas of vegetation. Nocturnal foraging regimes could be disrupted and may advantage predators such as cats, dogs and foxes as they are not strictly nocturnal foragers.

Nocturnal species' (such as owls, gliders and possums) eyesight is hindered by bright lights, and where they are affected by this, they become more susceptible to predation.

Construction would only occur during daylight hours and so it unlikely that large floodlights would be required during the construction. It is likely that some lighting may be required for emergencies, maintenance or security. Such lighting should be designed as 'down lights' and not spill outside the areas of disturbance proposed by the development.

Roads and access

Proposed access to the Site is from Arumpo Road via a short constructed entrance road. Predicted traffic volumes during the construction phase include: average peak hour traffic during the two months of high construction activity of 15 heavy vehicle movements per day and 100 light vehicle movements per day. This will represent an increase in the risk of vehicle collisions with fauna utilising habitats adjacent to Arumpo Road, which experiences very light traffic volumes.

The entrance road itself is less than 50m in length. Collisions within this area are unlikely as vehicle speeds over such a short distance will be very low and ongoing disturbance from construction activities are likely to discourage fauna from using this area. Construction would only occur during daylight hours and so vehicle collisions with macro- fauna are unlikely to correspond to travel periods for species present in the area.

During the operational phase staff levels are expected to average one (1) full time person with up to 2 (two) more on an intermittent basis generating two (2) vehicle trips over the morning and evening peak periods. This volume of operational traffic is likely to have a minor impact upon travelling macro-fauna. Additional traffic generated by the Buronga Peaking Power Plant is expected to be minor and so is unlikely to have significant impacts on native fauna utilising habitats through this area.

Section 6 Mitigation Measures

6.1 Planning

It is recommended that a CEMP and Operational Environment Management Plan (OEMP) be developed for the Site in consultation with an appropriately qualified ecologist and include the mitigation measures outlined below.

6.1.1 Soil Erosion / Runoff

The CEMP should contain detailed safeguard measures to reduce soil erosion and pollutant run-off during both construction and operation phases.

6.1.2 Dust

Appropriate construction and operational mitigation measures must be incorporated into the final detailed design to minimise the generation of dust and associated impacts on adjacent natural environments. These are likely to include:

- Setting maximum speed limits for construction and operational traffic on Site to limit dust generation;
- Use of a water tanker or similar to spray unpaved roads during construction where required; and
- Hard paving of the operational areas of the facility.

6.1.3 Pre-clearance Survey

A detailed pre-clearance survey by a qualified ecologist will be required prior to development of the Site. This should involve:

- diurnal searches for birds, nests and roosts;
- active searches for reptiles, including checking of woody debris within the development footprint,
- active searches for micro bats, including checking under exfoliating bark; and
- nocturnal surveys, including stag-watching of identified habitat trees, specifically focusing on observing use of trees by micro bats.

This survey would focus on locating individuals, and especially nests of the Hooded Robin as this species is very likely to occur within the local area. Construction should be planned to occur outside the species' breeding season of August to November if practicable. The species is likely to occupy a home range of up to 30 ha surrounding the site outside of this period and so direct impacts on the species should be avoidable (BIBY, 2007; Bell, 1983).

If nests or nestlings of the Hooded Robin are observed within, or close to, the development footprint then construction should be postponed until the nestlings have hatched and fully-fledged. The incubation period of the species is approximately 14 days and rearing period is a further 14 days (BIBY, 2007). If construction constraints mean that this delay is not practicable then Buronga DECC should be consulted to determine if relocating the birds is acceptable.

A similar approach of delaying or modifying construction should be adopted if any other TSC/EPBC Act listed species are recorded during the pre-clearance survey. Should micro bats be observed roosting within habitat trees within, or close to, the development footprint then a suitably qualified bat expert should be consulted and mitigation measures agreed prior to any on-site clearance works.

If non-threatened birds or other arboreal species are detected within the footprint then they should be managed according to the Tree Clearance Protocol outlined below.

If reptiles or other fauna are detected then they should be relocated by appropriately qualified personnel to equivalent habitat outside of the development footprint if practicable.

Section 6 Mitigation Measures

6.1.4 Tree Clearance Protocol

A Tree Clearance Protocol (TCP) is required for the site as it involves the removal of important habitat trees (>40cms diameter breast height or any trees with hollows). Further, nesting birds were observed in the development footprint during field surveys and would potentially occupy the Site during construction.

Due care during clearing is recommended to reduce direct impacts to any tree dwelling fauna species which may be utilising the area. Trees should be monitored for fauna during clearing operations and the following procedure applied:

- Trees with resident fauna should be felled with a heavy bulldozer that pushes from the same side as the roost in question so that the roost is uppermost when the tree is lying on the ground.
- The tree should be “tapped” several times with the bulldozer blade to alert any resident fauna and then pushed using the base of the blade at approximately 1 -2 metres from the ground until it starts to lean. The blade is then lowered to the base of the trunk where major roots protrude, and the tree is then held in position.
- The tree is then gently lowered to the ground by raising the blade so the machine operator can control the rate of fall to reduce damage.
- It is assumed that resident fauna will depart of its own accord.
- Trees with nesting birds should not be felled until they are fledged, but if this is not possible they should be taken to a WIRES wildlife carer. However no attempt should be made to fell trees housing the Hooded Robin. In this instance, the Buronga DECC should be consulted to discuss relocating the birds.

Cleared vegetation should not be ‘pushed’ into surrounding intact native vegetation.

6.1.5 Groundcover Clearance Protocol

Groundcover substrate and especially large woody debris provides important habitat for native fauna, including threatened species. It is recommended that a groundcover clearance protocol be incorporated into the CEMP. It is recommended that the protocol involve the following steps:

- identify areas of intact leaf litter or large woody debris and avoid if possible;
- remove large woody debris using excavator grabs or manual handling if practicable (racking);
- place intact large woody debris within landscaped areas (ie the visual-screening strip around the margin of the plant site) ;
- scrape and stockpile leaf litter and topsoil separately from deeper fill material; and
- reuse leaf litter and topsoil within landscaped areas.

6.2 Site Management

The following mitigation measures are recommended in order to minimise operational impacts of the proposed development:

- Setting maximum speed limits during construction and operation traffic on site to reduce fauna road fatalities;
- Limit vehicular and personnel entry into adjacent remnant vegetation during construction and operation through appropriate marking of operational areas; and
- Using down-lights and motion sensor lighting in order to reduce light spill and the associated secondary impact on nocturnal fauna species potentially utilising the adjoining vegetation.

Section 6 Mitigation Measures

6.2.1 Landscaping and Revegetation

The final design of the proposed peaking power plant will include landscaped areas around the perimeter of the Site. This should involve retention of existing vegetation where possible and supplementary plantings as required. Plant species selected should be representative of the vegetation communities previously located on the Site. A variety of native species, including trees, shrubs and groundcover species should be selected to increase species and structural diversity. Species selected and spacing between shrubs and trees will also need to meet the Asset Protection Zone (APZ) planting requirements as specified within Appendix F and Chapter 13 of the Environmental Assessment Report. The health of revegetated areas should be monitored closely and supplementary watering supplied as appropriate. Revegetated areas should be monitored for weed infestation and any infestations actively managed to minimise further weed spread.

It is recommended that security fencing surrounding the Site be located inside landscaped areas to maximise the connectivity between landscaped or retained areas and surrounding habitat. This may also serve to minimise the risk of negative operational impacts upon fauna utilising these areas by excluding them from built areas of the Site.

The Site contains fallen timber that is likely to constitute an important habitat resource for native fauna. It is recommended that timber within the development footprint be carefully replaced in areas of intact vegetation adjacent to the Site.

6.3 Weed and Pest Management

To limit the spread of weeds into adjoining remnant vegetation during construction of the peaking power plant site it is recommended that intact areas be temporarily fenced. This should be done prior to construction, restricting access by construction crew and machinery to remnant vegetation. Additionally, stockpiles of fill or vegetation should not be placed in areas of adjoining remnant vegetation but instead within existing cleared areas.

A Weed and Pest management plan should be prepared as part of the Construction Environmental Management Plan and Operation Environmental Management Plan for the Site.

It is recommended that the following measures be adopted to manage environmental weeds during construction and operation of the site:

- Perform a baseline weeds survey to assess the extent and severity of weed infestation in extant native vegetation within the study area pre and post construction;
- Incorporate control measures in the design of the proposed development to limit the spread of weed propagules downstream of the site;
- During construction: maintenance of silt fences and other mitigation measures to isolate runoff; and immediate rehabilitation of disturbed vegetation to limit the potential for colonisation by weeds;
- During construction areas of vegetation that will not be cleared should be fenced, restricting access by construction crew and machinery to remnant vegetation. Additionally, stockpiles of fill should not be placed in areas of remnant vegetation but instead in adjacent cleared areas;
- Post-construction landscape any open areas with indigenous native vegetation typical of the Dry Tallowwood community to limit the potential for colonisation by weeds;
- During operations monitor and control Noxious Weed species in line with legislative obligations;
- Perform ongoing monitoring of weed infestation on and on and adjoining the study area utilising the baseline weeds survey of the site and its surrounds.

Section 7 References

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Section 8 Limitations

URS Australia Pty Ltd (URS) has prepared this report in accordance with the usual care and thoroughness of the consulting profession for the use of Integra Coal and only those third parties who have been authorised in writing by URS to rely on the report. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report. It is prepared in accordance with the scope of work and for the purpose outlined in our Proposal.

The methodology adopted and sources of information used by URS are outlined in this report. URS has made no independent verification of this information beyond the agreed scope of works and URS assumes no responsibility for any inaccuracies or omissions. No indications were found during our investigations that information contained in this report as provided to URS was false.

This report was prepared during the period August to October 2007 and is based on the conditions encountered and information reviewed at the time of preparation. URS disclaims responsibility for any changes that may have occurred after this time.

This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties. This report does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.

Figures

Legend:

Proposed Site Boundary

TransGrid Property Boundary

0 100 200

metres

Source: Google Earth Pro

Drawn: AJW	Approved: DRAFT	Date: 13/11/2007
Job No: **43177455**	File: 43177455-008.wor	

Client

INTERNATIONAL POWER
(AUSTRALIA) PTY LTD

Project

BURONGA PEAKING POWER PLANT

Title

PROPOSED SITE BOUNDARY

Figure: **1**

URS

Legend:

- Site Boundary
- 20 x 20m Vegetation Survey Quadrats
- Echolocation (Anabat) Survey Location
- Pitfall Trap with 10m Drift Fence
- Stag Watch Survey Location

Source:
Datum: GDA94, Projection: UTM, Grid: MGA Zone 54

Drawn: AJW	Approved: DRAFT	Date: 02/11/2007
Job No: **43177455**	File: 43177455-003.wor	

Client

INTERNATIONAL POWER (AUSTRALIA) PTY LTD

Project

ENVIRONMENTAL ASSESSMENT - BURONGA PEAKING POWER PLANT

Title

SURVEY EFFORT

Figure: **3**

URS