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Flora & Fauna Assessment Report

Salamander Shores Hotel Redevelopment
(Project No.161-002)

Report prepared for:
Salamander Shores Hotel Pty Ltd

August 2010

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Executive Summary

Salamander Shores Hotel Pty Ltd has engaged Eco Logical Australia Pty Ltd to prepare a Flora and Fauna Assessment report for the proposed redevelopment of the Salamander Shores Hotel. This was undertaken to address the Director General's Environmental Assessment Requirements (DGR's) issued under the NSW *Environmental Planning and Assessment Act 1979*.

This report presents the findings of the ecological investigations and impact assessment that has been undertaken.

This report presents the findings of a review of the relevant literature, database interrogation, as well as a site visit. It also addresses relevant statutory considerations associated with the proposal.

The site consists primarily of the current hotel development, and the remnant vegetation within the site comprises scattered trees around the existing development. More intact remnant vegetation occurs outside of the subject site to the east and south and comprises Nerong Smooth Barked Apple Forest. No threatened species, populations or ecological communities were located within the site, however the site does provide marginal potential habitat resources for several locally occurring threatened species.

Based on the results of data reviews and the site investigation, a number of flora and fauna species were highlighted as species requiring consideration under the NSW Threatened Species Conservation Act 1995 and the Commonwealth Environment Protection and Biodiversity Conservation Act 1999. Species include those considered as threatened that are likely to occur within the study area based on their known occurrence within the local area.

Assessments of significance, according to Part 3A of the EP&A Act, for threatened species and EEC's considered to potentially occur within the study area, are provided in Appendix B. The DGR's relevant to flora and fauna issues have been specifically addressed in section 4.2 and the proposal is considered to be consistent with these requirements and is considered to have achieved and maintain or improve outcome. Significant impact assessments of matters of national environmental significance under the EPBC Act are provided in Appendix C.

For all threatened species that are considered likely to or potentially occurring within the site, the assessments determined that the proposed redevelopment is unlikely to have significant impact on any threatened species, populations, ecological communities on migratory species. Refer to Appendix B and C for more detailed assessments per species.

In terms of SEPP44 Koala Habitat Protection, the study area falls within the Port Stephens Comprehensive Koala Plan of Management (CKPOM) area and the proposed redevelopment has been assessed against the CKPOM performance criteria (section 4.1). Based on this, the proposed redevelopment will not involve impacts on important koala habitat (ie Preferred Habitat), as the proposal is mostly

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infill and involves retention of trees wherever possible. As such, the proposal is considered to be consistent with the CKPOM performance criteria.

Potential impacts associated with the proposed development include:

- The removal of several trees representing potential foraging resource for fauna.
- Impacts of sediment runoff into Port Stephens during demolition, earth works and building activities.

Several recommendations have been made (refer to Section 5) in order to reduce the level of impact from the proposed development on threatened species and increase the current ecological values of the site.

1. Introduction

Salamander Shores Hotel Pty Ltd engaged Ecological Australia Pty Ltd (ELA) to prepare a Flora and Fauna Assessment report for the proposed redevelopment of the Salamander Shores Hotel Lot 31 DP 529002, located at 143 Soldiers Point Road, Soldiers Point, hereafter referred to as the study area (Figure 1). This report represents the findings of the ecological investigations and impact assessment that has been undertaken.

A Flora and Fauna Assessment is required to gain Department of Planning Concept Approval under Part 3A and, in particular, address the Director Generals Requirements (DGR's) for the redevelopment of the hotel and part Project Approval for demolition of the existing hotel.

1.1 Objectives

The objectives of this report are to provide the information necessary to fulfil the requirements of assessing the proposed works according to requirements of the EP&A Act, TSC Act and EPBC Act, and associated Draft Guidelines for Threatened Species Assessment (DPI&DECC 2005).

Objectives of this ecological assessment are to:

1. Provide an introduction and background to the proposed development works and study area characteristics. This is addressed in section 1.3.
2. Provide a summary of the legislative requirements associated with the proposed redevelopment. This is dealt with in section 1.4 to 1.6.
3. Undertake data audits to gather information on the ecological condition, value and conservation significance of the study area. This is addressed in section 3 and Appendix A.
4. Conduct field investigations to validate the findings from Objective 3, which will incorporate habitat assessments and vegetation community validation, This is addressed in section 3.
5. Identify and illustrate known and potential occurrences of ecological values, including species and Endangered Ecological Communities (EEC) listed under *Threatened Species Conservation Act 1995* (TSC Act) and *Environmental*

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Protection and Biodiversity Conservation Act 1999 (EPBC Act) and koala habitat mapped according to Port Stephens Comprehensive Koala Plan of Management (CKPOM). This objective is covered in section 4.

1.2 Description of Project

The study area is located at Lot 31 DP 529002, 143 Soldiers Point Road, Soldiers Point. The proposal is for the complete redevelopment of the existing hotel. This will comprise a new hotel, service apartments, , residential flat building and associated facilities such as parking and landscaping.

1.3 Study Area

The study area covers approximately 1.23 ha and is located on the eastern side of Soldiers Point Road, Soldiers Point within the Port Stephens LGA. The study area is currently zoned 3 (a) Commercial under Port Stephens Shire Council Local Environmental Plan (LEP). The study area is currently used for tourist purposes with the Salamander Shores Hotel.

The general area around the study area can be described as an established residential setting, and land uses in the immediate surrounds include urban housing, remnant bushland to the east and south, Salamander Bay to the east, a sports facility and other recreational accommodation.

The topography is relatively hilly with the existing hotel development sitting approximately 15 metres above sea level, and sloping relatively steeply down to the east towards the shore of Port Stephens.

The local soils are described as well drained yellow podsolic soil on sandy clay loam of volcanic origin. Local reserves include Stoney Ridge Reserve approximately 400 metres to the southwest, Tingerry nature Reserve lying to the south, and Tomaree National Park approximately 6 km to the southeast of the study area.

The study area is almost entirely covered by the footprint of the existing hotel development, and remnant native vegetation is very limited to few sparse eucalyptus trees including smooth-barked apple (*Angophora costata*), Sydney peppermint (*Eucalyptus piperita*) and broad-leaved white mahogany (*Eucalyptus umbra*). The adjacent bushland vegetation has elements of two Lower Hunter Central Coast Regional Environmental Strategy (LCCREMS) vegetation map units including Nerong Smooth barked Apple Forest, and Coastal Plains Smooth Barked Apple Woodland.

The study area is illustrated in Figure 1.

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Figure 1: Study area and proposed redevelopment.

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1.4 Commonwealth Legislation

1.4.1 Environmental Protection and Biodiversity Conservation Act 1999

Approval from the Commonwealth Environment Minister is required under the EPBC Act if the action (can include a project, development, undertaking or activity) will, or is likely to, have a significant impact on matters considered to be of national environmental significance (NES matters). The EPBC Act does not define significant impact but identifies matters that are necessary to take into consideration.

In this study area threatened species, ecological communities and migratory species listed under international agreements, including Japanese-Australia Migratory Bird Agreement (JAMBA) and China-Australia Migratory Bird Agreement (CAMBA) that are listed under the Act may be relevant.

1.5 State Government Legislation and Planning Instruments

1.5.1 Environmental Planning and Assessment Act 1979

The proposal is to be assessed under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Under Part 3A, the proponent and consent authority must consider all aspects of the environment, including biological, physical, social and economic factors and the principles of ecologically sustainable development, when assessing the impacts of the project. Assessment under Part 3A of the EP&A Act includes consideration of threatened species, endangered populations and communities listed under the TSC Act, Matters of National Environmental Significance listed under the EPBC Act.

Part 3A of the EP&A Act removes the requirement to assess the significance of impacts on threatened species, populations and ecological communities or their habitat pursuant to Section 5A of the EP&A Act (the 7-part test). However, an assessment of the magnitude and extent of impacts and the significance of the impacts as related to the conservation importance of the habitat, individuals and populations likely to be affected is required (DECC & DPI, 2005).

1.5.2 Part 3A Threatened Species Assessment Guidelines

The Department of Environment and Climate Change (DECC) and the Department of Primary Industries (DPI) have prepared Draft Guidelines for the assessment of impacts on threatened species, populations or ecological communities or their habitats arising from project applications assessed under Part 3A of the EPA Act (DECC DPI, 2005).

The Assessment Guidelines outline guiding principles for the provision of information to "enable decision makers to ensure that developments deliver the following environmental outcomes:

1. Maintain or improve biodiversity values (i.e. there is no net impact on threatened species or native vegetation);
2. Conserve biological diversity and promote ESD;

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3. Protect areas of High Conservation value (including areas of Critical habitat);
4. Prevent the extinction of threatened species;
5. Protect the long-term viability of local populations of a species, population or ecological community; and
6. Protect aspects of the environment that are matters of National Environmental Significance" (pursuant to the EPBC Act).

In order to assess the magnitude of the proposed development and determine whether the above outcomes are achievable, Appendix 3 of the Assessment Guidelines provides guiding assessment questions to identify potential effects of the proposal on threatened species, population or ecological communities or their habitats.

These questions have been addressed in Appendix B of this document for each threatened species, population or ecological community that are known or likely to occur within the study area. Where a proposal cannot avoid or mitigate impacts on threatened species, populations and ecological communities, according to key thresholds, other measures, including undertaking a suitable and approved offset action, may need to be taken.

Director General Requirements have been issued in relation to the proposed redevelopment. Within these requirements the concept plan must consider the following:

- Consideration of the consistency of the project with the EP&A Act
- Consideration of any matters of national environmental significance under the EPBC Act.
- Address the potential impacts of the project on any threatened species, populations or ecological communities listed under the TCS Act, Fisheries management Act and draft Guidelines for Threatened Species Assessment (DECC 2005).
- Outline measures for the conservation of existing wildlife corridor values or connective importance of any vegetation within the site.
- Address measures to protect and manage any riparian corridors or adjacent aquatic habitats.

Consultation with the Newcastle office of DECCW was undertaken in May 2010, whereby the current plan was presented in the context of the ecological characteristics of the site. Comment was also requested on the adequacy of survey design and intensity. Documentation of the subsequent consultation with DECCW is provided in Appendix F. Key points raised by the DECCW officer consulted, included consideration of secondary offsite impacts, such as noise and dust generation; management of habitat features such as hollows; and the importance of survey period for seasonal species, such as locally occurring orchids. These key points have been addressed in this report.

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1.5.3 SEPP 14 – Coastal Wetlands

State Environmental Planning Policy 14 - Coastal Wetlands (SEPP 14) was introduced to protect coastal wetlands in New South Wales (outside of the Sydney Metropolitan area). Any activity involving filling, draining, levee bank construction or clearing in a gazetted SEPP 14 wetland is designated development under the EP&A Act. An EIS is required to be prepared for all designated development.

No SEPP 14 wetlands occur within the study area and the proposal is unlikely to result in secondary impacts on SEPP 14 wetland.

1.5.4 SEPP 71– Coastal Protection

State Environmental Planning Policy 71 - Coastal Protection (SEPP 71) was introduced to protect coastal environment in New South Wales. Any activity involved in the proposed redevelopment will need to consider SEPP 71 at a planning level, and will not be considered within this flora and fauna assessment.

1.5.5 SEPP 44 – Koala Habitat Protection

State Environmental Planning Policy 44 – Koala Habitat Protection (SEPP 44) was introduced to protect potential and core koala habitat in NSW. Under SEPP 44, developers of land with koala habitat (as defined in the SEPP) have to consider the impact of their proposals on koalas, and in certain circumstances, prepare individual koala plans of management for their land.

Councils are encouraged to prepare shire wide koala plans of management and, once agreed to by the NSW Department of Planning, they could be used by developers to address koala issues – individual plans would no longer be required.

Port Stephens Shire Council has prepared a Comprehensive Koala Plan of Management (CKPOM) (see below), and therefore the provisions of the CKPOM must now be considered in place of SEPP44.

1.5.6 Threatened Species Act 1995

The TSC Act aims to protect and encourage the recovery of threatened species, populations and communities listed under the Act. The Act is integrated with the NSW Environmental Planning and Assessment Act and requires consideration of whether a development or an activity will affect threatened species, populations and ecological communities or their habitat.

1.5.7 Water Management Act 2000

The Rivers and Foreshores Improvement Act 1948 was repealed and the controlled activity provisions in the Water Management Act 2000 (WM Act) have now commenced. A controlled activity approval under the WM Act is required for certain types of developments and activities that are carried out in or within 40 m of a river, lake or estuary.

The WM Act provides a number of mechanisms for protection of water sources via the water management planning process. If a 'controlled activity' is proposed on 'waterfront land', an approval is required under Section 91 (2) of the WM Act.

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'Controlled activities' include; the construction of buildings or carrying out of works; the removal of material or vegetation from land by excavation or any other means; the deposition of material on land by landfill or otherwise. 'Waterfront land' is defined as 'the bed of any river or lake, and any land lying between the river or lake and a line drawn parallel to and 40 metres inland from either the highest bank or shore'.

Approvals for controlled activities are administered by the NSW Department of Environment, Climate Change and Water (DECCW) and a set of guidelines have been developed to assist applicants who are considering carrying out a controlled activity on waterfront land. The guidelines provide information on the design and construction of a controlled activity, and other mechanisms for the protection of waterfront land and include:

- In-stream works
- Laying pipes & cables in watercourses
- Outlet structures
- Riparian corridors
- Vegetation Management Plans
- Watercourse crossings

These guidelines are available from: http://www.dnr.nsw.gov.au/water/controlled_activity.shtml

The permit typically requires the preparation of a Vegetation Management Plan. The proponents' responsibility under the WM Act is to assess impact and adjacency to 'waterfront land' i.e. within 40 m and to apply guidelines for permits required under s91 of the WM Act. There are no drainage lines within the study area on the 1:25000 topographic map for Port Stephens (93324S). The eastern edge of the subject site, that is the eastern perimeter of the proposed building, is approximately 55m from the Salamander Bay Shoreline; however, this distance is based on aerial photo interpretation and has not been surveyed. Therefore, the proposal is not within, nor does it involve modification of, land within 40 m of "waterfront land". The land within 40m of the waterfront acts as a buffer as it contains native vegetation and is owned and managed by Port Stephens Council. The proposal is therefore not not a controlled activity under the WM Act. Despite this, adequate mitigation measures, such as erosion and sediment control, have been put forward to prevent secondary impacts from the proposal on "waterfront land".

1.6 Local Government Planning Instruments

1.6.1 Port Stephens Council Comprehensive Koala Plan of Management (CKPoM)

The Port Stephens Council CKPoM provides performance criteria by which any development application is assessed to determine how a proponent will protect and manage koala habitat appropriately. In order to show compliance the proponent must indicate how the development will comply or ameliorate impacts as outlined by the performance criteria.

2. Methods

The primary methods that were undertaken as part of this study involved information gathering and biodiversity data audits as well as field investigations to validate the

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findings of available literature by recording habitat characteristics and mapping of the extents of vegetation communities.

2.1 Data Audit

The results of the data audit, particularly with respect to records and locations of threatened species, have been compiled and summarised in Section 3 and Appendix A. Databases and other information sources used to generate a list of species recorded within 10km of the study area (locality) include:

- the NSW National Parks and Wildlife Service Wildlife Atlas database for threatened species and ecological communities;
- the National Herbarium of NSW Plant Net database for threatened and other significant species;
- the Australian Museum, NSW Department of Environment, Climate Change and Water and the NSW Department of Primary Industries BioNet map and database collections for threatened and other significant species;
- The Commonwealth Department of Environment, Water, Arts and Heritage database for nationally listed threatened species and 'Important Wetlands'.

In general, database searches involved obtaining point information on threatened species recorded in the local area from relevant authorities (see above) and online sources (i.e. BioNet). Threatened and migratory species and EEC's that have been recorded within the locality have been assessed for their likelihood to occur within the study area, as provided within Appendix A.

All listed species and EEC's considered likely to occur within the study area require consideration in line with Part 3A Guidelines for Threatened Species Assessment and DEWHA guidelines for assessment of impacts on threatened and migratory species, provided in Appendix B.

2.2 Field Investigation

The field investigations incorporating vegetation community validation and mapping, informal habitat assessments, opportunistic fauna observations for evidence of threatened species activity were undertaken across the study area for this current report.

2.2.1 Habitat Assessment

Informal habitat assessments were undertaken within the study area and included:

- vegetation community and type;
- Habitat connectivity;
- forage resources (ie Koala primary browse trees, sap feed trees, flowering trees and shrubs);
- topography, slope and aspect;
- presence of hollow bearing trees;
- disturbance history.

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2.2.2 Vegetation Community Validation

All the vegetation within the study area was traversed to gain an understanding and species identified and recorded. The vegetation survey was undertaken using a random meander technique. No quadrat sampling was carried out, due to the very limited extent of vegetation being inadequate for this method. Where appropriate, significant ecological features were logged for position using GIS data logger, and this data was mapped on the ground using aerial photo interpretation and later mapped using ArcMap. A brief inspection of the native vegetation surrounding the study area was carried out, to further understand the ecological within the study area.

2.2.3 Opportunistic Observations

All fauna species encountered during the field investigations were recorded and later compiled within a fauna species list (refer to Appendix D).

3. Results

3.1 Data Audit

Based on the results of data reviews, a number of flora and fauna species were highlighted as species requiring consideration within the impact assessment under the TSC Act and EPBC Act. Species included those that are threatened that are considered likely to occur within the study area based on their known occurrence within the local area.

3.2 Field Investigations

The field investigation was conducted on 25th August 2008. This involved traversing the study area to understand the context of the proposal. Weather conditions during the site inspection were mild and sunny (19-23ºC).

3.2.1 Vegetation Community Validation

The vegetation on the site is dominated by managed lawns and gardens. A number of remnant or native local species are represented in these gardens. The bushland surrounding the site to the east and south represents remnant vegetation and fits most closely within the Nerong Smooth Barked Apple Forest community from LHCCREMS (NPWS 2000). A full flora species list is provided in Appendix D.

The lawns surrounding the site are dominated by couch (*Cynodon dactylon**), *Veronica*. sp and buffalo grass (*Stenotaphrum secundatum**). The adjoining gardens to these lawn areas include a mixture of natives and exotics. The gardens throughout the western side of the building are dominated by smooth-barked apple (*Angophora costata*), cabbage palm (*Livistona australis*) and bangalow palm (*Archontophoenix cunninghamiana*) in the canopy with willow bottlebrush (*Callistemon salignus*), jacaranda (*Jacaranda mimosifolia**), bird of paradise (*Strelitzia sp.**) and *Murraya paniculata** amongst other cultivated species in the lower strata. Areas of garden directly adjacent but not on the site also included species such as blue flax lily (*Dianella caerulea*), coastal rosemary (*Westringia fruticosa*) and *Cyathea* sp.

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The bushland which is present in the south-west corner of the site and which also surrounds the site on the east and southern sides is most closely aligned to the Nerong Smooth Barked Apple Forest community (NPWS 2000). This vegetation community is dominated by broad-leaved white mahogany (*Eucalyptus umbra*) and smooth-barked apple (*Angophora costata*) in the canopy. A number of other species such as Sydney peppermint (*Eucalyptus piperita*), forest red gum (*Eucalyptus tereticornis*) and red bloodwood (*Corymbia gummifera*) were also intermittently present. The understorey was dominated by sweet pittosporum (*Pittosporum undulatum*), blueberry ash (*Elaeocarpus reticulatus*), large mock olive (*Notelaea longifolia*), cheese tree (*Glochidion ferdinandi*) and coffee bush (*Breynia oblongifolia*). The lower strata was dominated by mat-rush (*Lomandra longifolia*), lantana (*Lantana camara**), asparagus fern (*Protasparagus aethiopicus**), blady grass (*Imperata cylindrica*), bracken (*Pteridium esculentum*), lawyer vine (*Smilax australis*) and false sarsaparilla (*Hardenbergia violacea*).

3.2.2 Habitat Assessment

There are very few habitat resources on the site. Some isolated winter flowering tree species are present such as swamp mahogany (*Eucalyptus robusta*) and broad-leaved melaleuca (*Melaleuca quinquenervia*), although only one or two individuals occur on site in the extreme south west. Two forest red gums (*Eucalyptus tereticornis*) which are also winter flowering and primary koala feed trees are found directly adjacent to the site in the north east. The other habitat features represented on-site were four small tree hollows (<5cm opening) and one large tree hollow (>5cm opening). These are all located in the north of the site within large smooth barked apple (*Angophora costata*) and broad-leaved white mahogany (*Eucalyptus umbra*) trees. The site does not provide any wildlife corridors, although the surrounding bushland provides significant connectivity for many species such as the koala (*Phascolarctos cinereus*), which have been recorded moving through the site.

3.2.3 Opportunistic Observations

Species recorded during the site inspection included locally abundant native avifauna including superb fairy-wren (*Malurus cyaneus*), eastern rosella (*Platycercus adscitus eximius*), masked lapwing (*Vanellus miles*), and galah (*Eolophus roseicapillus*). A complete list of fauna recorded within the study area is presented in Appendix D. No threatened fauna species were recorded during the site inspection although several threatened species either previously recorded, or known to occur locally have been considered within Appendix B and C of this report.

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Figure 2: Results

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4. Policy and Statutory Assessment

4.1 SEPP 44 Koala Habitat Assessment – Port Stephens Comprehensive Koala Plan of Management

The Port Stephen Shire Council CKPOM maps Koala habitat (Figure 3) and prescribes subsequent management requirements and replaces the typical process of identifying Potential and Core Koala habitat under SEPP44. Several different koala habitat classifications occur within the study area and surrounds, with Cleared Link occupying the central and western portion, Cleared Buffer in the eastern portion and Clear in the northeast of the study area. It is noted that Preferred habitat occurs to the east of the study area. Whilst the CKPOM mapping is coarse and only indicative, these habitat classes in the context of the findings of this study have been considered in this section.

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Figure 3: Port Stephens Council CKPOM map.

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Development applications and subdivision applications must demonstrate that they comply with the objectives of the CKPOM performance criteria for Development Applications (excluding applications proposing agricultural activities). These performance criteria and a summary of how the proposal compares to these objectives are provided in Table 1 below.

Table 1: Performance Criteria and proposal justification for Development Applications (excluding applications proposing agricultural activities).

CKPOM Performance Criteria	Justification of Proposal
a) Minimise the removal or degradation of native vegetation within Preferred Koala Habitat or Habitat Buffers;	No Preferred Habitat occurs within the subject area to be affected. 0.29ha of Cleared Buffer will be affected, though this area already comprises the existing hotel and the proposal is an infill construction. Therefore there will be no net change to the extent of Cleared Buffer.
b) Maximise retention and minimise degradation of native vegetation within Supplementary Koala Habitat and Habitat Linking Areas;	No areas of Supplementary Habitat occur within the study area. The majority of the study area comprised Cleared Link and will be subject to the proposed re-development.
c) Minimise the removal of any individuals of preferred koala food trees, where ever they occur on a development site. In the Port Stephens LGA these tree species are Swamp Mahogany (*Eucalyptus robusta*), Parramatta Red Gum (*Eucalyptus parramattensis*), and Forest Red Gum (*Eucalyptus tereticornis*), and hybrids of any of these species. An additional list of tree species that may be important to koalas based on anecdotal evidence is included in Appendix 8	No preferred trees species would be removed as a result of the development of the subdivision area or the APZ. Some species listed in Appendix 8 of the CKPOM will require removal within the subdivision area, including Red Mahogany (*E. resinifera*), Sydney Peppermint (*E. piperita*) and Smooth Barked Apple (*Angophora costata*).
d) Make provision, where appropriate, for restoration or rehabilitation of areas identified as Koala Habitat including Habitat Buffers and Habitat Linking Areas over Mainly Cleared Land. In instances where Council approves the removal of koala habitat (in accordance with dot points 1-4 of the above waive clause), and where circumstances permit, this is to include measures which result in a "net gain" of koala habitat on the site and/or adjacent land;	Trees within the subject area have been retained where ever possible.
e) Make provision for long term management and protection of koala habitat including both existing and restored habitat;	Trees within the subject area have been retained where ever possible. The proposed development is infill, subsequently the area offers limited potential for koala habitat or opportunity to retain or restore habitat.
f) Not compromise the potential for safe movement of koalas across the site. This should include maximising tree retention generally and minimising the likelihood that the proposal would result in the creation of barriers to koala movement, such as would be imposed by certain types of fencing. The	The proposed infill development results in limited net changes in regards to affects on koala habitat and likely movement routes. Traffic and parking is to remain on the western edge of the subject site, adjacent to Soldiers Point Road. Traffic speeds will be limited due to

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CKPOM Performance Criteria	Justification of Proposal
preferred option for minimising restrictions to safe koala movement is that there be no fencing (of a sort that would preclude koalas) associated with dog free developments within or adjacent to Preferred or Supplementary Koala Habitat, Habitat Buffers or Habitat Linking Areas. Suitable fencing for such areas could include: i) fences where the bottom of the fence is a minimum of 200 mm above ground level that would allow koalas to move underneath; Port Stephens Council CKPoM - June 2002 69 ii) fences that facilitate easy climbing by koalas; for example, sturdy chain mesh fences, or solid style fences with timber posts on both sides at regular intervals of approximately 20m; or iii) open post and rail or post and wire (definitely not barbed wire on the bottom strand). However, where the keeping of domestic dogs has been permitted within or adjacent to Preferred or Supplementary Koala Habitat, Habitat Buffers or Habitat Linking Areas, fencing of a type that would be required to contain dogs (and which may also preclude koalas) should be restricted to the designated building envelope. Fences which are intended to preclude koalas should be located away from any trees which now or in the future could allow koalas to cross the fence.	the design and nature of the car parking space. Fence designs for the proposal have not been finalised though it has been recommended that fences be designed to allow for koala movement.
g) Be restricted to identified envelopes which contain all buildings and infrastructure and fire fuel reduction zone. Generally there will be no clearing on the site outside these envelopes. In the case of applications for subdivision, such envelopes should be registered as a restriction on the title, pursuant to the Conveyancing Act 1919.	The proposed redevelopment will be restricted to the identified envelope.
h) Include measures to effectively minimise the threat posed to koalas by dogs, motor vehicles and swimming pools by adopting the following minimum standards. i) The development must include measures that effectively abate the threat posed to koalas by dogs through prohibitions or restrictions on dog ownership. Restrictions on title may be appropriate.	Dogs will not be permitted on the premises. Pools will be adequately fenced according to Australian Standards. The proposal does not involve establishment of any roads as access is to be provided Soldiers Point Road, an existing carriage way.

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CKPOM Performance Criteria	Justification of Proposal
ii) The development must include measures that effectively minimise the threat posed to koalas from traffic by restricting motor vehicle speeds, where appropriate, to 40 kph or less. iii) The development must reduce the risk of koala mortality by drowning in backyard swimming pools. Appropriate measures could include: trailing a length of stout rope (minimum diameter of 50mm), which is secured to a stable poolside fixture, in the swimming pool at all times; designing the pool in such a way that koalas can readily escape; or enclosing the pool with a fence that precludes koalas. This last option should include locating the fence away from any trees which koalas could use to cross the fence.	

4.2 EP&A Act - Part 3 A guidelines assessment per species and EEC.

The likelihood of occurrence table identifies the following species as likely to occur within the study area, based on previous records, local records and suitable habitat.

Threatened Species

- Koala (*Phascolarctos cinereus*)
- Grey-headed flying-fox (*Pteropus poliocephalus*)
- Large-eared pied bat (*Chalinolobus dwyeri*)
- Eastern false pipistrelle (*Falsistrellus tasmaniensis*)
- Little bent-wing bat (*Miniopterus australis*)
- Eastern bent-wing bat (*Miniopterus schreibersii oceanensis*)
- East coast free-tail bat (*Mormopterus norfolkensis*)
- Large-footed myotis (*Myotis adversus*)
- Yellow-bellied sheath-tail bat(*Saccolaimus flaviventris*)
- Eastern cave bat (*Vespadelus troughtoni*)

Assessment under Part 3A of the EP&A Act (Appendix B) showed that the proposed redevelopment of the study will have a maintain or improve outcome for threatened species either occurring or likely to occur within the study area. This is based on the following:

- No significant impacts on threatened species, populations or ecological communities listed under the TSC Act, Fisheries management Act in accordance with the Draft Guidelines for the assessment of impacts on threatened species, populations or ecological communities assessed under Part 3A of the EPA Act (DECC DPI, 2005).
- The proposal will not result in a reduction of existing wildlife corridor values or connectivity within and adjacent to the site.

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Part 3A Director Generals Requirements

Table 2: Part 3A DGR's and project evaluation.

DGR's	Response
Consideration of the consistency of the project with the EP&A Act	The project is considered to be consistent with the EP&A Act, with guidelines relevant to Part 3A having been addressed along with relevant SEPPS.
Consideration of any matters of national environmental significance under the EPBC Act.	Matters of NES under the EPBC Act have been addressed in Appendix C via the Commonwealth guidelines for assessment of impacts on EPBC Act listed Matters. The proposal will not have a significant impact on Matters of NES.
Address the potential impacts of the project on any threatened species, populations or ecological communities listed under the TCS Act, Fisheries management Act and draft Guidelines for Threatened Species Assessment (DECC 2005).	Appendix B provides an assessment of the impacts of the proposal according relevant guidelines (DECC & DPI 2005). Based on these assessments it was considered unlikely that the proposal would have substantial impacts on threatened biodiversity, due to the nature of the infill development that avoids unnecessary clearing of habitat and the mitigation measures provided.
Outline measures for the conservation of existing wildlife corridor values or connective importance of any vegetation within the site.	The proposal is an infill development of an existing hotel. Requirement for tree clearing has been limited to up to 14 individual trees mostly constituting trees within the confines of the existing hotel. The subject site is situated on the western edge of what is considered an existing north south corridor. The proposed footprint does not encroach into this corridor.
Address measures to protect and manage any riparian corridors or adjacent aquatic habitats.	No riparian corridors occur in the subject site. The subject site is however situated approximately 55m from the Salamander Bay shoreline. As such, whilst the proposal is not considered to be a "controlled activity" pursuant to the *Water Management Act 2000*, it is particularly important to control and manage any potential for erosion and stormwater contamination both during construction and operation in accordance with recommendations below.

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4.3 The EPBC Act assessment of impacts on threatened and migratory species

The EPBC Act Administrative Guidelines on Significance set out **'Significant Impact Criteria'** that are to be used to assist in determining whether a proposed action is likely to have a significant impact on matters of national environmental significance. Matters listed under the EPBC Act as being of national environmental significance include:

- Listed threatened species and ecological communities
- Listed Migratory species
- Wetlands of International Importance
- The Commonwealth marine environment
- World Heritage properties
- National Heritage places
- Nuclear actions

The following species were assessed for impacts under EPBC Act guidelines in Appendix C:

- Grey-headed flying-fox (*Pteropus poliocephalus*)
- Large-eared Pied bat (*Chalinolobus dwyeri*)
- Satin Flycatcher (*Myiagra alecto*)

This assessment showed that the proposed redevelopment of the study area is unlikely to have significant impacts on these species based of the criteria of assessment.

5. Recommendations

In order to mitigate the overall environmental effects of the proposal the following recommendations and mitigation measures are proposed:

- Any pool fencing is to be designed to exclude koala from the pool enclosure.
- Fencing around the proposed infill development is not recommended, though if fences are necessary a gap at the base of the fence that allows for koala passage (ie 30-40cm) should be provided.
- Vehicular traffic speed is to be managed by speed control measures;
- Emergent trees are to be retained where ever possible.
- Appropriate sediment, erosion control and stormwater contamination management measures need to be in place through an appropriate management plan. The Construction Environmental Management Plan (CEMP) should focus on all demolition, earth works and building activities. This is particularly critical on the eastern and southern edge of the subject site to prevent impacts on stormwater and secondary impacts to the adjacent Salamander Bay water body.
- Appropriate stormwater management and treatment should be incorporated into the plans to avoid secondary impacts on Salamander Bay.
- Several native eucalyptus trees including any hollow bearing trees (refer to Figure 2) should be retained within the development plan. Where this is not

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possible, a suitably trained ecologist should inspect hollows prior to tree felling and be available during tree felling.
- The CEMP should specify that work should only be conducted during daylight hours to ameliorate noise impacts, should include dust suppression especially during windy days, include erosion and sedimentation control, and should place restrictions on construction during wet periods.
- Planting of additional koala feed trees and winter flowering eucalyptus trees such as Swamp Mahogany and Forest Red Gum.

6. Conclusion

Salamander Shores Hotel Pty Ltd has engaged Eco Logical Australia Pty Ltd to prepare a Flora and Fauna Assessment report for the proposed redevelopment of the Salamander Shores Hotel. This was undertaken to address the Director General's Environmental Assessment Requirements (DGR's) issued under the *Environmental Planning and Assessment Act 1979*.

This report presents the findings of the ecological investigations and impact assessment that has been undertaken.

This report presents the findings of a review of the relevant literature, database interrogation, as well as a field surveys. It also addresses relevant statutory considerations associated with the proposal.

The site consists primarily of the current hotel development, and the remnant vegetation within the site comprises scattered trees around the existing development. More intact remnant vegetation occurs outside of the subject site to the east and south and comprises Nerong Smooth Barked Apple Forest. No threatened species, populations or ecological communities were located within the site, however the site does provide marginal potential habitat resources for several locally occurring threatened species.

Based on the results of data reviews and the site investigation, a number of flora and fauna species were highlighted as species requiring consideration within the impact assessment under the TSC Act and EPBC Act. Species include those considered as threatened that are likely to occur within the study area based on their known occurrence within the local area.

Assessments of significance, according to Part 3A of the EP&A Act, for threatened species and EEC's considered to potentially occur within the study area, are provided in Appendix B. The DGR's relevant to flora and fauna issues have been specifically addressed in section 4.2 and the proposal is considered to be consistent with these requirements and is considered to have achieved and maintain or improve outcome. Significant impact assessments of matters of national environmental significance under the EPBC Act are provided in Appendix C.

For all threatened species that are considered likely to or potentially occurring within the site, the assessments determined that the proposed redevelopment is unlikely to have significant impact on any threatened species, populations, ecological

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communities on migratory species. Refer to Appendix B and C for more detailed assessments per species.

In terms of SEPP44 Koala Habitat Protection, the study area falls within the Port Stephens Comprehensive Koala Plan of Management (CKPOM) area and the proposed redevelopment has been assessed against the CKPOM performance criteria (section 4.1). Based on this, the proposed redevelopment will not involve impacts on important koala habitat (ie Preferred Habitat), as the proposal is mostly infill and involves retention of trees wherever possible. As such, the proposal is considered to be consistent with the CKPOM performance criteria.

Potential impacts associated with the proposed development include:

- The removal of several trees representing potential foraging resource for fauna.
- Impacts of sediment runoff into Port Stephens during demolition, earth works and building activities.

Several recommendations have been made (refer to Section 5) in order to reduce the level of impact from the proposed development on threatened species and increase the current ecological values of the site.

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Appendix A Likelihood of Occurrence Table

Summary of initial assessment to determine the likelihood of occurrence of threatened species, populations and ecological communities in the proposal site.

An assessment of likelihood of occurrence was made for threatened and migratory species identified from the database search. Five terms for the likelihood of occurrence of species are used in this report. This assessment was based on database or other records, presence or absence of suitable habitat, features of the proposal site, results of the field survey and professional judgement. The terms for likelihood of occurrence are defined below:

- "yes" = the species was or has been observed on the site
- "likely" = a medium to high probability that a species uses the site
- "potential" = suitable habitat for a species occurs on the site, but there is insufficient information to categorise the species as likely to occur, or unlikely to occur
- "unlikely" = a very low to low probability that a species uses the site
- "no" = habitat on site and in the vicinity is unsuitable for the species.

Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
Asperula asthenes		V		Damp sites often along river banks (Harden 1994).	Unlikely. Not recorded on site. Site lacks suitable habitat
Callistemon linearifolius	Netted Bottlebrush	V	—	Grows in dry sclerophyll forest on the coast and adjacent ranges (DECC 2007). *C. linearifolius* has been recorded from the Georges River to Hawkesbury River in the Sydney area, and north to the Nelson Bay area of NSW. For the Sydney area, recent records are limited to the Hornsby Plateau area near the Hawkesbury River (DECC 2007).	Unlikely. Not recorded on site. Site lacks suitable habitat
Chamaesyce psammogeton	Sand Spurge	E	—	*C. psammogeton* is a prostrate perennial herb, which grows on foredunes and exposed sites on headlands often with Spinifex (DECC 2007). Flowers in Summer.	Unlikely. Not recorded on site. Site lacks suitable habitat

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Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
Corybas dowlingii	Red Helmet Orchid	E	—	*Corybas dowlingii* or Red Helmet Orchid is a tuberous orchid species which grows in clonal colonies and flowers from June to August. This orchid is restricted to New South Wales where it is currently known from 4 localities including Port Stephens (2 localities), Bulahdelah and Freemans Waterhole south of Newcastle. Corybas dowlingii typically grows in gullies in tall open forest on well-drained gravelly soil at elevations of 10-200m (Jones 2004).	Unlikely. Although the species has been recorded in the nearby Colonial Ridge Reserve, the habitat of the study area is considered unsuitable and the study area has been and continues to be affected by built gardens and maintenance.
Cryptostylis hunteriana	*Leafless Tongue Orchid*	V	V	It is known from a range of vegetation communities including swamp-heath and woodland (DECC 2007). The larger populations typically occur in woodland dominated by Scribbly Gum (*Eucalyptus sclerophylla*), Silvertop Ash (*E. sieberi*), Red Bloodwood (*Corymbia gummifera*) and Black Sheoak (*Allocasuarina littoralis*); where it appears to prefer open areas in the understorey of this community and is often found in association with the Large Tongue Orchid (*C. subulata*) and the Tartan Tongue Orchid (*C. erecta*) (DECC 2007). Bell (2001) has identified Coastal Plains Scribbly Gum Woodland and Coastal Plains Smoothed-barked Apple Woodland as potential habitat on the Central Coast. Flowers between November and February, although may not flower regularly (DECC 2007; Bell 2001).	Unlikely. Not recorded on site. Site lacks suitable habitat
Diuris arenaria	Sand Doubletail	E		Sand Doubletail is a small ground orchid. The light purple to mauve flowers appear between August and September and are 20-30 mm wide. There are usually two 15-50 cm long by 2-6 mm wide leaves that grow from the base of the plant. (DECC 2005). Sand Doubletail is known from the Tomaree Peninsula near Newcastle. It is currently known from three locations, two of which are in reserves. This species occurs in coastal heath and dry grassy eucalypt forest on sandy flats. Grows in gently undulating country in eucalypt forest with a grassy understorey on clay soil (DECC 2005).	Unlikely. The site inspection was conducted in an appropriate survey period and the species was not encountered on site. Site lacks suitable habitat

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Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
Diuris praecox	Rough Doubletail	V	V	Hills and slopes of coastal and near coastal open dry sclerophyll forests which have a grassy to fairly dense understorey (DECC 2007). Flowers July to early September (DECC 2007).	Unlikely. The site inspection was conducted in an appropriate survey period and the species was not encountered on site. Site lacks suitable habitat
Eucalyptus parramattensis spp. decadens	Drooping Red Gum	V	V	There are two separate meta-populations of Drooping Red Gum. The Kurri Kurri meta-population is bordered by Cessnock—Kurri Kurri in the north and Mulbring—Abedare in the south (DECC 2007). Large aggregations of the sub-species are located in the Tomalpin area. The Tomago Sandbeds meta-population is bounded by Salt Ash and Tanilba Bay in the north and Williamtown and Tomago in the south (DECC 2007). Drooping Red Gum generally occupies deep, low-nutrient sands, often those subject to periodic inundation or where water tables are relatively high (DECC 2007). It occurs in dry sclerophyll woodland with dry heath understorey. It also occurs as an emergent in dry or wet heathland (DECC 2007). Often where this species occurs, it is a community dominant. Flowers from November to January.(DECC 2007).	Unlikely. Not recorded on site. Site lacks suitable habitat
Melaleuca groveana	Grove's Paperbark	V	–	Grove's Paperbark grows in heath and shrubland, often in exposed sites, at high elevations, on rocky outcrops and cliffs (DECC 2007). It also occurs in dry woodlands (DECC 2007). Occurs north from Port Stephens (Harden 1994).	No. Not recorded on site. Site lacks suitable habitat
Prostanthera densa		V	V	Associated with sclerophyll forests and shrubland on coastal headlands and near coastal ranges, chiefly on sandstone (Harden 1994).	Unlikely. Not recorded on site. Site lacks suitable habitat
Senecio spathulatus	Coast Groundsel	E		A low-growing smooth-stemmed daisy, often forming hummocks to 30 cm tall with yellow flowers. Coast Groundsel occurs in Nadgee Nature Reserve (Cape Howe) and between Kurnell in Sydney and Myall Lakes National Park (with a possible occurrence at Cudmirrah). In Victoria there are scattered populations from Wilsons Promontory to the NSW border. It grows on primary dunes.	Unlikely. Not recorded on site. Site lacks suitable habitat

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Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
Tetratheca juncea	Black-eyed Susan	V	V	Occurs on predominantly low nutrient soils with a dense grassy understorey of grasses although it has been recorded in heathland and moist forest (DECC 2007). It is associated with dry open forest or woodland habitats dominated by *Corymbia gummifera, E. capitellata, E. haemastoma* and *Angophora costata* (Payne 1993). *Themeda australis* is generally the dominant ground cover (Payne 1993). T. juncea also displays a preference for southern aspect slopes, although is slopes with different aspects (DECC 2007). Flowers July to December.	Unlikely. Not recorded on site. Site lacks suitable habitat
		TSC Act	**EPBC Act**		
FROGS					
Crinia tinnula	Wallum Froglet	V	—	Wallum swamps and associated low land meandering watercourses on coastal plains (Ehmann 1997). Occurs in elevations up to around 50m and is closely related to freshwater habitats in the coastal zone (DECC 2007). Found most commonly in wallum wetlands characterised by low nutrients, highly acidic, tanin-stained waters that are typically dominated by paperbarks and tea-trees. Also found in sedgeland and wet heathland (DECC 2007)	No. Habitat within study area is considered unsuitable
Litoria aurea	Green and Golden Bell Frog	E	V	This species has been observed utilising a variety of natural and man-made waterbodies (Pyke & White 1996) such as coastal swamps, marshes, dune swales, lagoons, lakes, other estuary wetlands, riverine floodplain wetlands and billabongs, stormwater detention basins, farm dams, bunded areas, drains, ditches and any other structure capable of storing water (DECC 2007). Fast flowing streams are not utilised for breeding purposes by this species (Mahony 1999). Preferable habitat for this species includes attributes such as shallow, still or slow flowing, permanent and/or widely fluctuating water bodies that are unpolluted and without heavy shading (DECC 2007). Large permanent swamps and ponds exhibiting well-established fringing vegetation (especially bulrushes–Typha sp. and spikerushes–Eleocharis sp.) adjacent to open grassland areas for foraging are preferable (Ehmann 1997; Robinson 1993). Ponds that are typically inhabited tend to be free from predatory fish such as Mosquito Fish (Gambusia holbrooki) (DECC 2007).	No. Habitat within study area is considered unsuitable
Mixophyes balbus	Stuttering Frog	E	V	A variety of forest habitats from rainforest through wet and moist sclerophyll forest to riparian habitat in dry sclerophyll forest (DECC 2007) that are generally characterised by deep leaf litter or thick cover from understorey vegetation (Ehmann 1997). Breeding habitats are streams and occasionally springs. Not known from streams disturbed by humans (Ehmann 1997) or still water environments (NSW Scientific Committee 2002).	No. Habitat within study area is considered unsuitable

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Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
REPTILES					
Hoplocephalus stephensii	Stephen's Banded Snake	V	—	Found in a variety of habitats from rainforest through wet and moist sclerophyll forests to dry sclerophyll forests (DECC 2007). However it is most commonly found in wet to moist forests with rocky outcrops, cliffs or ridges and tends to favour ecotones between wet and dry forests (DECC 2007). It most frequestly uses gaps in the peeling bark of large senecsent or dead trees for daytime shelter (DECC 2007). However it can use hollow trunks, limbs, epiphytes, vine thickets, rock crevices or rock slabs (DECC 2007).	No. Habitat within study area is considered unsuitable
DIURNAL BIRDS					
Burhinus grallarius	Bush Stone-curlew	E	—	Associated with dry open woodland with grassy areas, dune scrubs, in savanna areas, the fringes of mangroves, golf courses and open forest / farmland (Pittwater Council 2000; Marchant & Higgins 1993). Forages in areas with fallen timber, leaf litter, little undergrowth and where the grass is short and patchy (Environment Australia 2000; Marchant & Higgins 1993). Is thought to require large tracts of habitat to support breeding, in which there is a preference for relatively undisturbed in lightly disturbed.	Unlikely. Habitat within study area is considered unsuitable
Callocephalon fimbriatum	Gang-gang Cockatoo	V	—	During summer in dense, tall, wet forests of mountains and gullies, alpine woodlands (Morcombe 2004). In winter they occur at lower altitudes in drier more open forests and woodlands, particularly box-ironbark assemblages (Shields & Chrome 1992). They sometimes inhabit woodland, farms and suburbs in autumn/winter (Simpson & Day 2004).	Unlikely. Habitat within study area is considered unsuitable
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	—	Associated with a variety of forest types containing Allocasuarina species, usually reflecting the poor nutrient status of underlying soils (Environment Australia 2000; NPWS 1997; DECC 2007). Intact drier forest types with less rugged landscapes are preferred (DECC 2007). Nests in large trees with large hollows (Environment Australia 2000).	Unlikely. Habitat within study area is considered unsuitable
Charadrius mongolus	Lesser Sand Plover	V	M	Favours coastal areas including beaches, mudflats and mangroves where they forage (DECC 2007). They may be seen roosting during high tide on sandy beaches or rocky shores (DECC 2007).	Unlikely. Habitat within study area is considered unsuitable
Dromaius novaehollandiae NSW North Coast Bioregion and Port Stephens LGA Population	Emu	E2	—	Occupies a range of mainly open habitats including plains, grasslands, woodlands, shrubs and occasionally forest (NSW Scientific Committee 2002). Not found in rainforest (Simpson & Day 1999).	Unlikely. Habitat within study area is considered unsuitable

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Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
Ephippiorhynchus asiaticus	Black-necked Stork	E	—	Associated with tropical and warm temperate terrestrial wetlands, estuarine and littoral habitats, and occasionally woodlands and grasslands floodplains (Marchant & Higgins 1993). Forages in fresh or saline waters up to 0.5m deep, mainly in open fresh waters, extensive sheets of shallow water over grasslands or sedgeland, mangroves, mudflats, shallow swamps with short emergent vegetation and permanent billabongs and pools on floodplains (Marchant & Higgins 1993; DECC 2007).	Unlikely. Habitat within study area is considered unsuitable
Haematopus fuliginosus	Sooty Oystercatcher	V	—	A coastal species that inhabits rock coastlines, coral cays, reefs and occasionally sandy beaches and Marchant & Higgins 1993; Simpson & Day 1999).	Unlikely. Habitat within study area is considered unsuitable
Haematopus longirostris	Pied Oystercatcher	V	—	Roosts and forages on sandy beaches, sand banks, mudflats and estuaries (Marchant & Higgins 1993, Simpson & Day 1999).	Unlikely. Habitat within study area is considered unsuitable
Lathamus discolor	Swift Parrot	E	E	Breeds in Tasmania between September and January. Migrates to mainland in autumn, where it forages on profuse flowering Eucalypts (Blakers et al. 1984; Schodde and Tidemann 1986; Forshaw and Cooper 1981). Hence, in this region, autumn and winter flowering eucalypts are important for this species. Favoured feed trees include winter flowering species such as Swamp Mahogany (Eucalyptus robusta), Spotted Gum (Corymbia maculata), Red Bloodwood (C. gummifera), Mugga Ironbark (E. sideroxylon), and White Box (E. albens) (DECC 2007).	Unlikely. Habitat within study area is considered unsuitable
Pandion haliaetus	Osprey	V	—	Associated with waterbodies including coastal waters, inlets, lakes, estuaries, beaches, offshore islands and sometimes along inland rivers (Schodde and Tidemann 1986; Clancy 1991; Olsen 1995). Osprey may nest on the ground, on sea cliffs or in trees (Olsen 1995). Osprey generally prefer emergent trees, often dead or partly dead with a broken off crown (Olsen 1995).	Unlikely Trees within study area not considered mity of study suitable for nesting or feeding
Ptilinopus magnificus	Wompoo Fruit-Dove	V	—	Associated with large, undisturbed patches of tall tropical or subtropical rainforest, at all altitudes, preferrably with a diversity of fruit (Marchant and Higgins 1999; DECC 2007). Occasionally located in patches of monsoon rainforest, closed gallery forest, wet sclerophyll forest, tall open forest, open woodland or vine thickets near rainforest (Marchant and Higgins 1999; DECC 2007).	No. Habitat within study area is considered unsuitable

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Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
Ptilinopus superbus	Superb Fruit-Dove	V	—	Inhabits rainforest and similar closed forests where it forages high in the canopy, eating the fruits of many tree species such as figs and palms (DECC 2007). It may also forage in eucalypt or acacia woodland where there are fruit-bearing trees (*ibid.*). Part of the population is migratory or nomadic (*ibid.*). At least some of the population, particularly young birds, moves south through Sydney, especially in autumn (*ibid.*). Breeding takes place from September to January (*ibid.*). Will feed in adjacent mangroves or eucalypt forests (Blakers et al. 1984).	No. Habitat within study area is considered unsuitable
Sterna albifrons	Little Tern	E	—	Almost exclusively coastal, preferring sheltered areas (DECC 2007), however may occur several kilometres inland in harbours, inlets and rivers (Smith 1990). Australian birds breed on sandy beaches and sand spits (Simpson & Day 1999).	Unlikely. Habitat within study area is considered unsuitable
NOCTURNAL BIRDS					
Ninox connivens	Barking Owl	V	—	Associated with a variety of habitats such as savanna woodland, open eucalypt forests, wetland and riverine forest. The habitat is typically dominated by Eucalypts (often Redgum species), however often dominated by Melaleuca species in the tropics (DECC 2007). It usually roosts in dense foliage in large trees such as River She-oak (Allocasuarina cunninghamiana), other Casuarina and Allocasuarina, eucalypts, Angophora, Acacia and rainforest species from streamside gallery forests (NPWS 2003). It usually nests near watercourses or wetlands (NPWS 2003) in large tree hollows with entrances averaging 2-29 metres above ground, depending on the forest or woodland structure and the canopy height (Debus 1997).	Unlikely. The study area lacks suitable nesting habitat, and has very limited marginal foraging habitat
Ninox strenua	Powerful Owl	V	—	Powerful Owls are associated with a wide range of wet and dry forest types with a high density of prey, such as arboreal mammals, large birds and flying foxes (Environment Australia 2000, Debus & Chafer 1994). Large trees with hollows at least 0.5m deep are required for shelter and breeding (Environment Australia 2000).	Unlikely. The study area lacks suitable nesting habitat, and has very limited marginal foraging habitat
Tyto capensis	Grass Owl	V	—	Reported habitats include tall grass, swampy, sometimes tidal areas, mangrove fringes, grassy plains, coastal heaths, grassy woodland, cane grass, lignum, sedges, cumbungi, cane fields and grain stubble (Pizzey and Knight, 1997). The Grass Owl nests on the ground within dense tall grass, sedges, reeds and even sugarcane plantations (Pizzey and Knight, 1997). The Grass Owl primarily feeds on rodents, hunting on the wing over heathland, grassland and sedgeland, as well as along the edge of sugar cane, crops and pastureland (Pizzey and Knight, 1997).	No. Habitat within study area is considered unsuitable

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Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
Tyto novaehollandiae	Masked Owl	V	—	Associated with forest with sparse, open, understorey, typically dry sclerophyll forest and woodland (DECC 2007) and especially the ecotone between wet and dry forest, and non forest habitat (Environment Australia 2000). Known to utilise forest margins and isolated stands of trees within agricultural land (Hyem 1979) and heavily disturbed forest where its prey of small and medium sized mammals can be readily obtained (Kavanagh & Peake 1993).	Unlikely. The study area lacks suitable nesting habitat, and has very limited marginal foraging habitat
MAMMALS (EXCLUDING BATS)					
Dasyurus maculatus *Dasyurus maculatus maculatus*	Spotted-tailed Quoll Spotted-tailed Quoll (SE Mainland Population)	V —	— E	The Spotted-tailed Quoll inhabits a range of forest communities including wet and dry sclerophyll forests, coastal heathlands and rainforests (Mansergh 1984; DECC 2007j), more frequently recorded near the ecotones of closed and open forest. This species requires habitat features such as maternal den sites, an abundance of food (birds and small mammals) and large areas of relatively intact vegetation to forage in (DECC 2007). Maternal den sites are logs with cryptic entrances; rock outcrops; windrows; burrows (Environment Australia 2000).	No. The study area lacks suitable habitat
Petaurus australis	Yellow-bellied Glider	V	—	This species is restricted to tall mature forests, preferring productive tall open sclerophyll forests with a mosaic of tree species including some that flower in winter (Environment Australia 2000, Braithwaite 1984, Davey 1984, Kavanagh 1984; DECC 2007). Large hollows within mature trees are required for shelter, nesting and breeding (Henry and Craig 1984; DECC 2007).	No. The study area lacks suitable habitat
Petaurus norfolcensis	Squirrel Glider	V	—	Associated with dry hardwood forest and woodlands (Menkhorst et al. 1988; Quin 1995). Habitats typically include gum barked and high nectar producing species, including winter flower species (Menkhorst et al. 1988). The presence of hollow bearing eucalypts is a critical habitat value (Quin 1995).	Unlikely. May occur off-site in adjacent bushland, but site lacks suitable foraging habitat.
Phascogale tapoatafa	Brush-tailed Phascogale	V	—	Preferred habitat is Dry Open forest with a sparse open understorey, however, has been located in heath, swamps and rainforest and wet sclerophyll forest (DECC 2007).	Unlikely. May occur off-site in adjacent bushland, but site lacks suitable foraging habitat

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Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
Phascolarctos cinereus	Koala	V	—	Associated with both wet and dry Eucalypt forest and woodland that contains a canopy cover of approximately 10 to 70% (Reed et al. 1990), with acceptable Eucalypt food trees. Some preferred Eucalyptus species are: Eucalyptus tereticornis, E. punctata, E. cypellocarpa, E. viminalis	Likely Known sighting adjacent to site, and feed trees occur within study area
Potorous tridactylus *Potorous tridactylus tridactylus*	Long-nosed Potoroo Long-nosed Potoroo (SE Mainland Population)	V —	— V	Associated with dry coastal heath and dry and wet sclerophyll forests (Strahan 1998) with dense cover for shelter and adjacent more open areas for foraging (Menkhorst & Knight 2004).	No. The study area lacks suitable habitat
MAMMALS (BATS)					
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	The Large-eared Pied Bat has been recorded in a variety of habitats, including dry sclerophyll forests, woodland, sub-alpine woodland, edges of rainforests and wet sclerophyll forests (Churchill 1998; DECC 2007). This species roosts in caves, rock overhangs and disused mine shafts and as such is usually associated with rock outcrops and cliff faces (Churchill 1998; DECC 2007).	Potential. Site lacks suitable roosting habitat, but has limited foraging opportunities.
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	—	Prefers moist habitats with trees taller than 20m (DECC 2007). Roosts in tree hollows but has also been found roosting in buildings or under loose bark (DECC 2007).	Potential. Limited roosting hollows available on site and marginal foraging habitat.
Miniopterus australis	Little Bent-wing Bat	V	—	Prefers well-timbered areas including rainforest, wet and dry sclerophyll forests, Melaleuca swamps and coastal forests (Churchill 1998). This species shelter in a range of structures including culverts, drains, mines and caves (Environment Australia 2000). Relatively large areas of dense vegetation of either wet sclerophyll forest, rainforest or dense coastal banksia scrub are usually found adjacent to caves in which this species is found (DECC 2007). Breeding occurs in caves, usually in association with M. schreibersii (Environment Australia 2000, DECC 2007).	Potential. Site lacks suitable roosting habitat, but has limited foraging opportunities.

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Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
Miniopterus schreibersii oceanensis	Eastern Bent-wing Bat	V	—	Associated with a range of habitats such as rainforest, wet and dry sclerophyll forest, monsoon forest, open woodland, paperbark forests and open grassland (Churchill 1998). It forages above and below the tree canopy on small insects (AMBS 1995, Dwyer 1995, Dwyer 1981). Will utilise caves, old mines, and stormwater channels, under bridges and occasionally buildings for shelter (Environment Australia 2000, Dwyer 1995).	Potential. Site lacks suitable roosting habitat, but has limited foraging opportunities.
Mormopterus norfolkensis	East Coast Free-tail Bat	V	—	Most records of this species are from dry eucalypt forest and woodland east of the Great Dividing Range (Churchill 1998). Individuals have, however, been recorded flying low over a rocky river in rainforest and wet sclerophyll forest and foraging in clearings at forest edges (Environment Australia 2000; Allison & Hoye 1998). Primarily roosts in hollows or behind loose bark in mature eucalypts, but have been observed roosting in the roof of a hut (Environment Australia 2000; Allison & Hoye 1998).	Potential. Limited roosting hollows available on site and marginal foraging habitat.
Myotis adversus	Large-footed Myotis	V	—	Will occupy most habitat types such as mangroves, paperbark swamps, riverine monsoon forest, rainforest, wet and dry sclerophyll forest, open woodland and River Red Gum woodland, as long as they are close to water (Churchill 1998). While roosting is most commonly associated with caves, this species has been observed to roost in tree hollows, amongst vegetation, in clumps of Pandanus, under bridges, in mines, tunnels and stormwater drains (Churchill 1998). However the species apparently has specific roost requirements, and only a small percentage of available caves, mines, tunnels and culverts are used (Richards 1998).	Potential. Limited roosting hollows available on site and marginal foraging habitat.
Pteropus poliocephalus	Grey-headed Flying-Fox	V	V	Inhabits a wide range of habitats including rainforest, mangroves, paperbark forests, wet and dry sclerophyll forests and cultivated areas (Churchill 1998, Eby 1998). Camps are often located in gullies, typically close to water, in vegetation with a dense canopy (Churchill 1998).	Potential. Limited foraging habitat available on site.
Saccolaimus flaviventris	Yellow-bellied Sheath tail-bat	V	—	Found in almost all habitats, from wet and dry sclerophyll forest, open woodland (Churchill 1998), open country, mallee, rainforests, heathland and waterbodies (SFNSW 1995). Roosts in tree hollows; may also use caves; has also been recorded in a tree hollow in a paddock (Environment Australia 2000) and in abandoned sugar glider nests (Churchill 1998). The Yellow-bellied Sheathtail-bat is dependent on suitable hollow-bearing trees to provide roost sites, which may be a limiting factor on populations in cleared or fragmented habitats (Environment Australia 2000).	Potential. Limited roosting hollows available on site and marginal foraging habitat.

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Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
Scoteanax rueppellii	Greater Broad-nosed Bat	V	—	Associated with moist gullies in mature coastal forest, or rainforest, east of the Great Dividing Range (Churchill, 1998), tending to be more frequently located in more productive forests (Hoye & Richards 1998). Within denser vegetation types use is made of natural and man made openings such as roads, creeks and small rivers, where it hawks backwards and forwards for prey (Hoye & Richards 1998).	Unlikely. Limited roosting hollows available on site and foraging habitat marginal foraging habitat.
Vespadelus troughtoni	Eastern Cave Bat	V	—	Inhabit tropical mixed woodland and wet sclerophyll forest on the coast and the dividing range but extend into the drier forest of the western slopes and inland areas (Churchill 1998). Has been found roosting in sandstone overhand caves, boulder piles, mine tunnels and occasionally in buildings(Churchill 1998).	Potential. Site lacks suitable roosting habitat, but has limited foraging opportunities.
INVERTEBRATES					
Petalura gigantea	Giant Dragonfly	E	—	Swamps, streamlines and seepages in mainly natural condition with short to moderate vegetation and a relatively deep soil base (Trueman 2005). Larvae permanently burrow into soil and so do not survive in permanent ponds or other open water (Trueman 2005).	Unlikely. Site lacks suitable foraging and breeding habitat
MIGRATORY TERRESTRIAL SPECIES LISTED UNDER EPBC ACT					
Haliaeetus leucogaster	White-bellied Sea-Eagle	—	M	Forages over large open fresh or saline waterbodies, coastal seas and open terrestrial areas (Marchant & Higgins 1993, Simpson & Day 1999). Breeding habitat consists of tall trees, mangroves, cliffs, rocky outcrops, silts, caves and crevices and is located along the coast or major rivers. Breeding habitat is usually in or close to water, but may occur up to a kilometre away (Marchant & Higgins 1993).	Unlikely Trees within study area not considered tor nesting or feeding
Hirundapus caudacutus	White-throated Needletail	—	M	Forages aerially over a variety of habitats usually over coastal and mountain areas, most likely with a preference for wooded areas (Marchant & Higgins 1993; Simpson & Day 1999). Has been observed roosting in dense foliage of canopy trees, and may seek refuge in tree hollows in inclement weather (Marchant & Higgins 1993).	Unlikely May fly over or forage aerially above site, but unlikely to utilize site.

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Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
Merops ornatus	Rainbow Bee-eater	—	M	Resident in coastal and subcoastal northern Australia; regular breeding migrant in southern Australia, arriving September to October, departing February to March, some occasionally present April to May (Pizzey and Doyle 1988). Occurs in open country, chiefly at suitable breeding places in areas of sandy or loamy soil: sand-ridges, riverbanks, road-cuttings, sand-pits, occasionally coastal cliffs (*ibid*). Nest is a chamber a the end of a burrow, up to 1.6 m long, tunnelled in flat or sloping ground, sandy back or cutting (*ibid*).	Unlikely Site lacks suitable sandy soil for nesting.
Monarcha melanopsis	Black-faced Monarch	—	M	Rainforest and eucalypt forests, feeding in tangled understorey (Blakers et al. 1984).	Unlikely. Site lacks suitable foraging and breeding habitat
Monarcha trivirgatus	Spectacled Monarch	—	M	Wet forests, mangroves (Simpson and Day 1999).	Unlikely. Site lacks suitable foraging and breeding habitat
Myiagra cyanoleuca	Satin Flycatcher	—	M	Associated with drier eucalypt forests, absent from rainforests (Blakers et al. 1984), open forests, often at height (Simpson & Day 1999).	Potential Site has marginal foraging habitat.
Rhipidura rufifrons	Rufous Fantail	—	M	The Rufous Fantail is a summer breeding migrant to south-eastern Australia (Morcombe, 2004). The Rufous Fantail is found in rainforest, dense wet eucalypt and monsoon forests, paperbark and mangrove swamps and riverside vegetation (Morcombe, 2004). Open country may be used by the Rufous Fantail during migration (Morcombe, 2004).	Unlikely. Site lacks suitable foraging and breeding habitat
Xanthomyza phrygia	Regent Honeyeater	E	E, M	SEE DIURNAL BIRDS ABOVE	SEE DIURNAL BIRDS ABOVE
MIGRATORY WETLAND SPECIES LISTED UNDER EPBC ACT					
Ardea alba	Great Egret	—	M	The Great Egret is common and widespread in Australia (McKilligan, 2005). It forages in a wide range of wet and dry habitats including permanent and ephemeral freshwaters, wet pasture and estuarine mangroves and mudflats (McKilligan, 2005).	Unlikely. Site lacks suitable foraging and breeding habitat

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Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
Ardea ibis	Cattle Egret	—	M	Cattle Egrets forage on pasture, marsh, grassy road verges, rain puddles and croplands, but not usually in the open water of streams or lakes and they avoid marine environments (McKilligan, 2005). Some individuals stay close to the natal heronry from one nesting season to the next, but the majority leave the district in autumn and return the next spring. Cattle Egrets are likely to spend the winter dispersed along the coastal plain and only a small number have been recovered west of the Great Dividing Range (McKilligan, 2005).	Unlikely. Site lacks suitable foraging and breeding habitat
Gallinago hardwickii	Latham's Snipe	—	M	A variety of permanent and ephemeral wetlands, preferring open fresh water wetlands with nearby cover (Marchant and Higgins 1999). Occupies a variety of vegetation around wetlands (Marchant and Higgins 1999) including wetland grasses and open wooded swamps (Simpson and Day 1999).	Unlikely. Site lacks suitable foraging and breeding habitat
Numenius madagascariensis	Eastern Curlew	—	M	Intertidal coastal mudflats, coastal lagoons, sandy spits (DEH 2005a). Breeds in Russia, NE China (*ibid*).	Unlikely. Site lacks suitable foraging and breeding habitat
Numenius phaeopus	Whimbrel	—	M	Intertidal coastal mudflats, river deltas and mangroves, occasionally sandy beaches (DEH 2005a). Breeds Siberia and Alaska (*ibid.*).	Unlikely. Site lacks suitable foraging and breeding habitat
Rostratula benghalensis s. lat.	Painted Snipe	—	M	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber (DECC 2007). Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds (*ibid.*). Breeding is often in response to local conditions; generally occurs from September to December (DECC 2007). Roosts during the day in dense vegetation (NSW Scientific Committee 2004). Forages nocturnally on mud-flats and in shallow water (DECC 2007). Feeds on worms, molluscs, insects and some plant-matter (*ibid.*).	Unlikely. Site lacks suitable foraging and breeding habitat
Disclaimer: Data extracted from the Atlas of NSW Wildlife and DEW Protected Matters Report are only indicative and cannot be considered a comprehensive inventory. 'Migratory marine species' and 'listed marine species' listed on the EPBC Act (and listed on the DEW protected matters report) have not been included in this table, since they are considered unlikely to occur within the study area due to the absence of marine habitat.					

E = Endangered; E2 = Endangered Population; V = Vulnerable; M = Migratory.

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Appendix B Assessments of Significance

EP&A Act - Part 3 A guidelines assessment per species and EEC.

The likelihood of occurrence table identifies the following species as likely to occur within the study area, based on previous records, local records and suitable habitat.

Threatened Species

- Koala (*Phascolarctos cinereus*)
- Grey-headed Flying-Fox (*Pteropus poliocephalus*)
- Large-eared Pied bat (*Chalinolobus dwyeri*)
- Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)
- Little Bent-wing Bat (*Miniopterus australis*)
- Eastern Bent-wing Bat (*Miniopterus schreibersii oceanensis*)
- East Coast Free-tail Bat (*Mormopterus norfolkensis*)
- Large-footed Myotis (*Myotis adversus*)
- Yellow-bellied Sheath-tail Bat(*Saccolaimus flaviventris*)
- Eastern Cave Bat (*Vespadelus troughtoni*)

Koala

Koalas are solitary and territorial (particularly males) yet they live in established sedentary polygynous breeding aggregates arranged in a matrix of overlapping home ranges whose size varies according to sex (males tend to be larger so that they overlap the ranges of several females) and carrying capacity of the habitat (usually measured in terms of density of primary browse species) (Phillips and Callaghan 1995).

Nationally, koalas have been observed feeding or resting in about 120 eucalypt species (66 in NSW) and 30 non-eucalypt (seven in NSW) species. Usage may also be determined by site-dependant edaphic factors eg soil type (Sharp and Phillips 1999), which affects the nutrient quality of forage. Forest consisting of primary browse species associations located on deep, fertile soils on floodplains, in gullies and along watercourses are generally considered preferred koala habitat. This may possibly be a reflection of the nutritional value of the foliage.

The home range of a single koala is usually occupied for at least several years or more commonly throughout its life (Phillips 1997, Sharp and Phillip 1999). Size of a Koala home range may vary from a hectare to hundreds of hectares (eg Jurskis and Potter 1997 report home ranges of 38 ha to 520 ha with an average size of 169 ha, near Eden); varying with habitat quality (eg if primary browse species dominate the tree component, home range size is expected to be small and carrying capacity high), sex (males have larger territories and may make forays into other areas), age of the animals (eg sub-adults versus adults), and location (Jurskis and Potter 1997, Phillips 1997, Sharp and Phillip 1999).

Within a Koala home range, a few specific trees (home range trees) are used to mark territories and identify individual koalas. Such trees are recognisable by heavy scratching and collections of scats close to the tree base and may also have significant forage value (Phillips and Callaghan 1995, Hume 1989). Male Koalas may leave their scent by rubbing the gland on their chest against the bark. Koalas frequently return to these trees

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or deliberately seek them out during travel (koalas have been recognised to have the ability to know where they are and return to a discrete location (Phillips 1997)). Such trees are very important as they maintain social cohesion through identification of population members and assist geographical location (Phillips 1997, Sharp and Phillips 1999).

1. How is the proposal likely to affect the lifecycle of a threatened species and/or population?

The koala has been recorded within the study area, and several trees occurring on the site are listed as koala feed tree species according the Port Stephens CKPoM. These species include smooth-barked apple (*Angophora costata*) and broad-leaved white mahogany (*Eucalyptus umbra*). The study area is currently developed with the existing hotel complex, and the proposed redevelopment footprint is likely to remove up to 14 trees within the study area. Given the proposal is infill development, whilst some trees with potential to provide refuge/forage for the koala will be removed, koala are likely to continue to use the site at current levels and this impact is unlikely to significantly affect the lifecycle of the local koala population.

2. How is the proposal likely to affect the habitat of a threatened species, population or ecological community?

Up to 14 individual trees may be removed as a result of the proposal, some of which may offer some potential for refuge or forage. Based on the Port Stephens CKPoM, the study area including existing development footprint is mapped primarily as habitat Linking Area and Habitat Buffer. Preferred Koala habitat is located along the coastal strip to the adjacent east on the study area. The proposal will not result in the removal of Preferred Koala Habitat as mapped within the CKPoM.

3. Does the proposal affect any threatened species or populations that are at the limit of its known distribution?

The koala has a patchy distribution throughout the coast, sub-coast and tablelands of NSW, with localised concentrated populations occurring on more productive soil types and where threats are low. Occurrence of koala within the study area would not be at the limit of this species known distribution.

4. How is the proposal likely to affect current disturbance regimes?

The proposed redevelopment of an existing hotel complex will not be an enlargement of the existing development footprint. The proposal is unlikely to result in increased edge effects, increased weed invasion, or increase fire frequency of koala habitat. Recommendations within this assessment report include the planting of koala feed trees within the landscape design to increase the ecological value of the study area. Therefore the proposal is unlikely to affect current disturbance regimes.

5. How is the proposal likely to affect habitat connectivity?

The proposed redevelopment of an existing hotel complex will not be an enlargement of the existing development footprint. The proposal will not remove koala habitat or cause koala habitat to become fragment.

6. How is the proposal likely to affect critical habitat?

The study area does not contain any areas of critical habitat.

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Grey-headed Flying-fox

The grey-headed flying fox is a nectarivore and frugivore, reliant on a seasonably reliable and continuous nectar flow from Eucalyptus, Melaleuca and related genera, and primarily rainforest fruits (Eby, 2000a, 2000b). The Grey-Headed Flying Fox, particularly lactating females, has been recorded feeding on introduced flowers and fruits (eg orchards), which has been attributed to poor production of native forage resources (Eby, 2000a; Tideman et al. 1997).

During nocturnal activities, the grey-headed flying-fox travels long distances (ie generally within 20km but sometimes 50km) between roosts and foraging areas. Social grey-headed flying-fox roosts/camps are used diurnally, and locations are generally stable over many years. Grey-headed flying-fox roosts vary with function, with many forming an interrelated network. Roost selection in grey-headed flying-fox is poorly understood, though they mostly occur proximate to a watercourse with the dominant vegetation usually being rainforest, wet sclerophyll, Melaleucas, Casuarinas or mangroves (Eby 2000a).

Grey-headed flying-fox roosts are classified as follows: occupied continuously (key colonial roosts); occupied annually in certain seasons; or irregularly. Spring-Summer roosts are considered maternity sites (Eby 2001a). During poor seasons, individual grey-headed flying-fox or small groups may occupy temporary roosts often within or close to the food source plants.

The grey-headed flying-fox is a nomadic species, following fruiting seasons, with only a small portion being sedentary. The grey-headed flying-fox has been reported migrating hundreds of kilometres (Eby 2000a, 2000b). Slow breeding, extended longevity, and physiological inability to withstand food shortages are all factors limiting the success of the grey-headed flying-fox. This can result in high mortality, especially of young grey-headed flying-fox if shortages occur during spring, and also reduced reproductive success (Eby 2000b).

1. ***How is the proposal likely to affect the lifecycle of a threatened species and/or population?***

The grey-headed flying-fox has not been recorded within the study area although previous records exist for the Soldiers Point area in the vicinity of the site, and given the high mobility and wide foraging range it is likely to occur within the study area on at least an occasional basis. Eucalyptus trees occur within the study including smooth-barked apple (*Angophora costata*), Sydney peppermint (*Eucalyptus piperita*) and broad-leaved white mahogany (*Eucalyptus umbra*), and these offer limited seasonal foraging habitat in the form of myrtaceous flowers. The study area is currently developed with the existing hotel complex, and the proposed redevelopment footprint is unlikely to affect the potential foraging habitat for this species. No known roosting habitat occurs within the study area and as such critical lifecycle phases of the local population will not be disrupted by the proposal.

2. ***How is the proposal likely to affect the habitat of a threatened species, population or ecological community?***

The proposed redevelopment of the study area will not result in a loss of habitat, therefore it will not affect the habitat of this species. Recommendations within this assessment report include the planting of eucalyptus trees within the landscape design to increase the ecological value of the study area.

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3. Does the proposal affect any threatened species or populations that are at the limit of its known distribution?

The grey-headed flying-fox generally has a coastal distribution extending from Victoria to central-northern Queensland. Occurrence within the study area is not at the limit of this species distribution.

4. How is the proposal likely to affect current disturbance regimes?

The proposal will not result in the clearing or disturbance of suitable habitat for these species. There is unlikely to be any increase edge effects, weed invasion, or an increase in fire frequency. Therefore the proposed redevelopment is unlikely to affect current disturbance regimes.

5. How is the proposal likely to affect habitat connectivity?

The proposal will result will not result in the clearing or fragmentation of suitable habitat for these species, therefore it is unlikely to affect habitat connectivity.

6. How is the proposal likely to affect critical habitat?

The study area does not contain any areas of critical habitat.

Cave Dwelling Micro-chiropteran Bats

For the purposes of consolidating those species that occupy similar ecological niches, the following micro-chiropteran bat species have been assessed under the one assessment:

- Eastern bent-wing bat (*Miniopterus schreibersii oceanensis*)
- Little bent-wing bat (*Miniopterus australis*)
- Large-eared Pied bat (*Chalinolobus dwyeri*)
- Eastern cave bat (*Vespadelus troughtoni*)

Eastern bent-wing bat and little bent-wing bat

The eastern bent-wing bat is associated with a range of habitats, typically well-timbered areas (AMBS 1995; Dwyer 1995, 1981). Generally, eastern bent-wing bat utilises caves, old mines, and stormwater channels, under bridges and occasionally buildings for shelter (Environment Australia 2000, Dwyer 1988). The eastern bent-wing bat is also known to roost in tree hollows (Schultz, referred to in AMBS 1996). The eastern bent-wing bat has been reported utilising bushland remnants in urban areas and is estimated to forage within a 20 km radius in a single night. Predators include owls, green tree frog (*Litoria caerulea*), pythons, feral cats and foxes (Dwyer 1995).

Breeding in eastern bent-wing bat and little-bent wing bat is confined to caves with suitable temperature, humidity and physical dimensions to permit breeding (Reardon and Flavel 1987). The dependence of the eastern bent-wing bat upon relatively few nursery caves suggests that threats to the existence or structural integrity of these may place widespread populations in jeopardy (Dwyer 1995). The Macleay valley has the southernmost and only known NSW population of little-bent wing bats, which appear to be dependant on environmental conditions provided by a larger nursery colony of eastern bent-wing bats (Dwyer 1991, 1968; Smith *et al* 1995). Another maternity cave of the eastern bent-wing bat occurs near Riverton (western tablelands) (Dwyer 1966). Long

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migrations of eastern bent-wing bat and little-bent wing bat between roost sites, according to seasonal needs or reproductive status, have been recorded (ie up to 60-70km in one night)(Dwyer 1995a).

Both the eastern bent-wing bat and little-bent wing bat move and utilise different type of roosts according to various vital lifecycle stages, including (Strahan 1995, Dwyer 1996, 1968):

- *Mating roosts (April to mid-June)* - Consist of a constant male colony visited by transient females
- *Over-wintering roosts* – Usually formed from February to July (region dependant). Caves are likely to offer relatively low temperatures triggering deep torpor, relying on body reserves of fat. Bats in this state are particularly vulnerable to disturbance. At roosts in more temperate climates near the coast, only short bouts of torpor are used rather than hibernation and the bats are active for most of the winter.
- *Acclimatisation roosts* - Several of these roosts are formed en route to maternity colonies, gradually larger with proximity to maternity caves. These roosts are used to acclimatise to high humidity levels to be experienced in maternity caves.
- *Maternity/nursery caves (September – November peak and extending to March)* - Where young are born and left when old enough while female forages. A single young is born in December and juveniles are independent between February and March when nursery colonies disband and individuals disperse over long distances. Females disperse to mating roosts following this season (usually by March). They are sexually mature in their second year and may live to over 17 years of age.

The eastern bent-wing bat occurs in discrete territorial populations based on maternity colonies whose ranges are often determined by catchment boundaries (Smith *et al* 1995). Movement of eastern bent-wing bat between territories is unusual, though distances of 1300km have been recorded (Churchill 1998).

Both the little bent-wing bat and eastern bent-wing bat generally forage above and beneath the canopy of tropical rainforest, warm temperate rainforest, tall open forest, riparian forest and dry sclerophyll forest, and in/on the edge of clearings adjacent to forest (Dwyer 1991, Smith et al 1995, Berrigan 2001d). The little bent-wing bat and eastern bent-wing bat are often recorded flying along tracks under canopy or forest edge.

The main cause of mortality of little bent-wing bat and eastern bent-wing bat is young falling from the roof of nursery caves. Predators include the Green Tree Frog, pythons, feral cat, fox and owls (Dwyer 2000a, 2000b).

Large-eared Pied Bat

This species was only identified in the late 1960's and as such, very little is known about its distribution or habitat tolerances. The Large Pied Bat ranges from Rockhampton in central Queensland to Bungonia in southern NSW. This species has been recorded to occupy dry sclerophyll forest and woodland, both to the east and west of the Great Divide. Recordings of this species have also been made in subalpine woodland and at the ecotone of rainforest and wet Eucalypt forest.

The Large-eared Pied Bat roosts in caves, abandoned mud-nests of Fairy Martins and mine tunnels. Colonies recorded have ranged in size from 3 to 37 individuals, and are usually located in the twilight area not far from the cave entrance. The

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physiology of the bat suggests that it feeds primarily on small insects below the canopy. They fly relatively slowly with rapid but shallow wing beats. During autumn and early winter the males have enlarged testes. At this time, the facial glands on either side of the muzzle become swollen and show a cream colour beneath the skin. They exude a milky secretion when compressed. It is probable that these glands have a secondary sexual function. It is not known whether mating occurs in the autumn or spring; hence the duration of pregnancy is also unknown. The females give birth in November, commonly to twins, and the young are independent by late February. They leave the cave soon after and the females remain another month before abandoning the roost in late March for the winter. It is thought that during the cooler winter months the colony disperses for individual hibernation.

Eastern cave bat

The eastern cave bat roosts in caves, sandstone overhangs, and mine tunnels, usually in well-lit areas. The eastern cave bat roosts in colonies of up to 500, but 6 to 60 have also been recorded. The species is vulnerable to disturbance from human visitors to cave roosts, destruction of caves by mining, and loss of feeding habitat by clearing and land degradation from agriculture. They have a wide distribution but are poorly known. The eastern cave bat occurs in tropical mixed woodland and wet sclerophyll forests on coast and dividing range but extend into drier forest of western slopes and inland areas.

1. ***How is the proposal likely to affect the lifecycle of a threatened species and/or population?***

The little bent-wing bat, eastern bent-wing bat, eastern cave bat, and large-eared pied bat are all predominantly cave, overhang or in some cases building structure roosting bats, although the eastern bent-wing bat has been reported roosting in tree hollows (most probably a temporary shelter roost). The study area lacks caves or similar structures, and as such, the study area does not support critical lifecycle phases for these species, due to the absence of suitable roost structures.

2. ***How is the proposal likely to affect the habitat of a threatened species, population or ecological community?***

Several native eucalyptus trees occur within the study these trees together with the surrounding open area of the study area provides suitable forage habitat for all these bat species and given the high mobility of these species, and their extensive foraging ranges, the are likely to forage within the study area on at least an occasional basis. Given the proposal is infill development and the majority of existing habitat will be retained, though up to 14 trees may require removal. In this context, habitat for this species is unlikely to be significantly affected by the proposed redevelopment.

3. ***Does the proposal affect any threatened species or populations that are at the limit of its known distribution?***

All of these bat species have a patchy distribution that extends through coastal NSW and none are at the limit of their known distribution.

4. ***How is the proposal likely to affect current disturbance regimes?***

The proposal will not result in the clearing or disturbance of suitable habitat for these species. No increase edge effects are likely to occur that might facilitate weed

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invasion or increased fire frequency. Therefore the proposed redevelopment is unlikely to affect current disturbance regimes.

5. How is the proposal likely to affect habitat connectivity?

The proposal will not result in the clearing and fragmentation of suitable habitat for these species. There is not likely to be and increased edge effects, weed invasion or increased fire frequency. Therefore the proposed redevelopment is unlikely to affect habitat connectivity.

6. How is the proposal likely to affect critical habitat?

The study area does not contain any areas of critical habitat.

Hollow Dwelling Microchiropteran Bats

For the purposes of consolidating those species that occupy similar ecological niches, the following micro-chiropteran bat species have been assessed under the one assessment:

- Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)
- East Coast Free-tail Bat (*Mormopterus norfolkensis*)
- Large-footed Myotis (*Myotis adversus*)
- Yellow-bellied Sheath-tail Bat(*Saccolaimus flaviventris*)

Eastern False Pipistrelle

The Eastern Falsistrelle occurs along the coastal ranges from southern Queensland to western Victoria, and is endemic to Australia. These bats inhabit sclerophyll forests from the Great Divide to the east coast. In Tasmania they are found in wet sclerophyll and coastal mallee. A preference has been noted for wet habitats where trees are more than 20m high. Based upon the size and shape of it's wings the bat is thought to be highly mobile with a relatively large hunting range. A specimen of this species has been radio-tracked and found to move 12km from where it was hunting to where it was roosting in a very large tree.

On the mainland they eat moths, rove beetles, chafers, weevils, plant bugs, flies and ants. Their flight is swift and direct, within or just below the tree canopy. They tend to fly fast in a fixed horizontal plane with sudden darting changes in course. It has been observed roosting in holes and hollow trunks of Eucalypts, with recorded colony sizes ranging from 3 to 36 individuals. Colonies are usually almost entirely male or female groups, although evenly mixed colonies sometimes occur. They have been recorded roosting in a cave at Jenolan, NSW, and they are occasionally found in old wooden buildings.

Males produce sperm in late summer and store it in the epididymis over the winter. Females produce a large 'hibernation follicle' in autumn. Ovulation, fertilisation and pregnancy occur in late spring and early summer. Single young are born in December. Lactation continues through January and February. The Eastern Falsistrelle hibernates generally during winter, particularly in the southern extent of its range.

East coast freetail bat

Little is known of the biology of the east coast freetail bat and no information is available on its reproductive strategies. There is little information on east coast freetail bat local

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and seasonal movements, foraging habitat, roost requirements, population structure and potential barriers to movements (AMBS 1995). However, the east coast freetail bat does appear to occur in dry sclerophyll forest and woodland. When foraging, the east coast freetail bat flies above the forest canopy or in clearings at the edge of the forest (Allison 1983). Small colonies of east coast freetail bat have been found in tree hollows and under loose bark, rock crevices, river banks and buildings (Allison 1983; Mount King Ecological Surveys 1992). In a survey in the Wingham Management Area, the east coast freetail bat typically occupied unlogged rainforest and moist forest but was also found to occur in logged forest (Mount King Ecological Surveys 1992).

In the case of the east coast freetail bat, tree hollows within the study area offer suitable roost habitat, particularly where they occur in high densities in the Coastal Sand Smooth Barked Apple – Blackbutt Forest. Consequently, the proposal has the potential to affect critical lifecycle (ie breeding and denning) phases for the east coast freetail bat. Although recommendations to map and class hollow bearing trees will allow for identification of suitable hollows, based on the current information, the level of impact on the east coast freetail bat cannot be quantified.

Large-footed Myotis

The Large-footed Myotis has been recorded along much of the coastal strip of Australia occurring from the east of SA, around the Victorian, NSW, Queensland and NT coasts and into WA as far as the Kimberley.

In NSW, the Large-footed Myotis is found in various habitats of the coast and adjacent ranges. Recently, it has also been found along the Murray River valley well into South Australia. A variety of foraging habitats are used by this species although it is usually found near large bodies of water, including estuaries, lakes, reservoirs, rivers and large streams, often in close proximity to their roost site. Although the Large-footed Myotis is usually recorded foraging over wet areas, it also utilises a variety of wooded habitats adjacent to such areas including rainforest, wet and dry sclerophyll forest and woodland, and swamp forest. The Large-footed Myotis has been reported feeding on flying insects (including beetles, flies, moths and grasshoppers), aquatic insects (such as boatmen) and small fish. Observations of the feeding behaviour found that it foraged predominantly just above the water (average height of 9 cm from the water surface), but also raked the surface of the water with the recurved claws of its large feet and sometimes also used its tail membrane as a scoop. Flying insects are caught as the bat spirals downward through the air. This species feeds alone, in pairs, or infrequently in small groups. The species has a slow and manoeuvrable flight pattern.

It roosts in small colonies of between 15 and several hundred individuals with recorded roosts including caves, mines and disused railway tunnels as well as dense rainforest foliage in the tropical parts of its range. Some occurrences of roosting in tree hollows are also noted. Males establish territories within the colony and monopolise a cluster of females during the breeding season. Outside the breeding season, males roost separately. The number of pregnancies per year varies with latitude. In NSW and Victoria there is one pregnancy per year, the single young being born in November to December. In southern Queensland they produce two litters of single young in October and January. Males show two peaks of testicular development: in April to June and in September to November. Lactation lasts for

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about eight weeks and young born in late September suckle until late December. The bond between mother and young extends a further 3 to 4 weeks after weaning; they hunt together and roost together during this period. In northern Queensland they are reported to have three births per year.

Yellow-bellied Sheath-tail Bat

This species is widespread across Australia and its apparent rarity is probably due to its flying so high and fast that it is seldom collected. It has been reported from a wide variety of habitats. Hunting height appears to vary depending upon the height of the dominant vegetation in Eucalypt forests it feeds above the canopy, but in mallee or open country it comes lower to the ground. Prey species include beetles, long-horned grasshoppers, shield bugs and flying ants.

Usually solitary, but occasionally occurring in colonies of less than ten individuals, the Yellow-bellied Sheathtail-bat roosts in tree hollows, animal burrows, dry clay cracks, under rock slabs, abandoned Sugar Glider nests, and has been found resting on the walls of buildings in broad daylight, and one such individual, caught at Queanbeyan, NSW, appeared to be so exhausted that it made no effort to escape. Similar reports suggest that it is migratory in southern Australia and that individuals found resting in the open are in the course of a winter migration from the cooler to warmer areas. They have been reported from southern Australia only between January and June.

Males have a prominent throat-pouch which is devoid of glandular tissue but a subcutaneous gland lies behind it. The throat-pouch is represented by a rudimentary fold of skin in the female. There is no seasonal difference in testicular size in males and there is no relationship between reproductive condition in males and the size of the throat pouch. Pregnancy is always restricted to the right uterine horn. Single young are born between December and mid-March. Sub-adults have only been collected in January and February.

1. ***How is the proposal likely to affect the lifecycle of a threatened species and/or population?***

The eastern false pipistrelle, east coast free-tail bat, large-footed myotis and yellow-bellied sheath-tail bat are all predominantly hollow roosting species. The study area contains limited suitable roosting habitat including three native eucalyptus trees having a total of four small hollows. These trees are to be retained within the current redevelopment proposal, and interims of roosting habitat, these hollows represent a relatively small available resource relative to the roosting habitat available off-site in adjacent bushland and in the wider local Port Stephens area. Therefore the proposal is unlikely to affect the lifecycle of these species.

2. ***How is the proposal likely to affect the habitat of a threatened species, population or ecological community?***

Several native eucalyptus trees occur within the study these trees together with the surrounding open area of the study area provides suitable forage habitat for all these bat species and given the high mobility of these species, and their extensive foraging ranges, the are likely to forage within the study area on at least an occasional basis. The current proposal includes the retention of most native trees

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comprising potential foraging habitat and four potential roosting hollows, therefore habitat is unlikely to be affected by the proposed redevelopment.

3. Does the proposal affect any threatened species or populations that are at the limit of its known distribution?

All of these bat species have a patchy distribution that extends through coastal NSW and none are at the limit of their known distribution.

4. How is the proposal likely to affect current disturbance regimes?

The proposal will not result in the clearing or disturbance of suitable habitat for these species. No increase edge effects are likely to occur that might facilitate weed invasion or increased fire frequency. Therefore the proposed redevelopment is unlikely to affect current disturbance regimes.

5. How is the proposal likely to affect habitat connectivity?

The proposal will not result in the clearing and fragmentation of suitable habitat for these species. There is not likely to be and increased edge effects, weed invasion or increased fire frequency. Therefore the proposed redevelopment is unlikely to affect habitat connectivity.

6. How is the proposal likely to affect critical habitat?

The study area does not contain any areas of critical habitat.

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Appendix C Assessments of Significance

The EPBC Act - DEWAH guidelines for assessment of impacts on threatened and migratory species

The EPBC Act Administrative Guidelines on Significance set out **'Significant Impact Criteria'** that are to be used to assist in determining whether a proposed action is likely to have a significant impact on matters of national environmental significance. Matters listed under the EPBC Act as being of national environmental significance include:

- Listed threatened species and ecological communities
- Listed Migratory species
- Wetlands of International Importance
- The Commonwealth marine environment
- World Heritage properties
- National Heritage places
- Nuclear actions

Specific **'Significant Impact Criteria'** are provided for each matter of national environmental significance except for threatened species and ecological communities in which case separate criteria are provided for species listed as endangered and vulnerable under the EPBC Act.

Threatened and migratory species listed under the EPBC Act that are considered likely or potentially to occur within the study area are given in Appendix A of this Report. The relevant Significant Impact Criteria have been applied to these threatened and migratory species to determine the significance of impact of the proposed redevelopment (Table 1).

Table 3: Significant Impact Criteria for matters of National Environmental Significance (*EPBC Act*)

Matters to be addressed	Impact (Commonwealth Legislation)
(a) any environmental impact on a World Heritage Property;	No
(b) any environmental impact on Wetlands of International Importance;	The proposal will not affect any part of RAMSAR wetland.
(c) any environmental impact on listed threatened species and ecological communities	Two Commonwealth listed vulnerable species, the grey-headed flying fox, and large-eared pied bat are considered likely to occur in the study area on at least am intermittent basis. The guidelines in terms of these two vulnerable species are discussed below: **Grey-headed flying fox (*Pteropus poliocephalus*)** *a. lead to a long-term decrease in the size of an important population of a species, or* Habitat within the study area offers seasonal forage habitat for the grey-headed flying-fox, in the form of several seasonally flowering myrtaceous trees

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Matters to be addressed	Impact (Commonwealth Legislation)
	within the grounds of the existing hotel development. The site lacks known camp habitat. Individuals that potentially utilise seasonal resources within the study area are most likely those that occupy local populations roosting in the Hunter region and Port Stephens LGA (Eby 2000) The proposed hotel redevelopment is not likely to result in the removal of potential foraging habitat for the local population. The grey-headed flying-fox has a large foraging home range potentially up to a 50km radius around the site which includes large areas of native vegetation. Mitigation measures are not required due to the lack of habitat disturbance expected from the proposal, however, recommendations include the planting of native trees within the landscape design which are aimed at enhancing the ecological value of the site. In this context, the proposal is not likely to result in a long term decrease in the size of an important population of the species. *b. reduce the area of occupancy of an important population, or* The proposal will not result in the removal of forage habitat, therefore there will net be a reduction in the area of occupancy for an important population of grey-headed flying-fox. *c. fragment an existing important population into two or more populations, or* The grey-headed flying-fox is a highly mobile species capable of flying up to 50km in one night, including over cleared areas. The species is commonly encountered foraging and, in some cases, roosting in and adjacent to urban landscapes. Hence, the species exhibits reasonable tolerance to disturbance and the redevelopment of the existing hotel site is unlikely to cause habitat fragmentation for the grey-headed flying-fox. *d. adversely affect habitat critical to the survival of a species, or* No roost camp habitat will be affected by the proposal and thus habitat that is critical to the survival of the species will not be affected. *e. disrupt the breeding cycle of an important population, or* No roost habitat will be affected by the proposal and thus breeding habitat and the breeding cycle of the grey-headed flying-fox will not be affected by the proposal. *f. modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or* The proposal will not result in the removal of available forage resources for this species, therefore in the long term, within the context of available forage resources in the locality and region will not result in a decline in the local population. *g. result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*, or* The proposal will not result in the introduction or facilitation of an invasive species that would be harmful to the grey-headed flying-fox. *h. interferes substantially with the recovery of the species.* The proposal will not substantially interfere with the recovery of the grey-headed flying-fox. **Large-eared Pied bat (*Chalinolobus dwyeri*)** *a. lead to a long-term decrease in the size of a population of a species, or* The site lacks cave habitat suitable for roosting of this species. Potential foraging habitat includes approximately 1.2 ha of land which is almost entirely occupied by the existing hotel development. This habitat if used would form a

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Matters to be addressed	Impact (Commonwealth Legislation)
	fraction of a much larger foraging home range extending into the surrounding locality. Therefore the proposed redevelopment is not likely to lead to the long-term decrease in the size of the population. *b. reduce the area of occupancy of a population, or* The proposed redevelopment does not involve the removal of available habitat for this species, and is unlikely to reduce the area of occupancy of the species local population. *c. fragment an existing population into two or more populations, or* The proposal will not increase the current degree of habitat fragmentation within or adjacent to the site. The subject site is not considered to form an integral portion of a corridor. Given the high mobility of this bat, habitat connectivity would be retained through the study area, as well as around the study area on adjoining lands (refer to Figure 1). As such the proposal will not result in the fragmentation of local populations of the species. *d. adversely affect habitat critical to the survival of a species, or* The site lacks caves suitable for roosting but has 1.2 ha of marginal foraging habitat. No critical habitat for this species if known to occur onsite, therefore habitat within the study area is not considered to be critical to the survival of the large-eared pied bat. *e. disrupt the breeding cycle of a population, or* The site lacks caves suitable for breeding sites, and as such breeding will not be disrupted by the proposal. *f. modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or* The proposed hotel redevelopment is not likely to result in the removal or destruction of available habitat for this species. Mitigation measures are not required due to the lack of habitat disturbance expected from the proposal, however recommendations within this report include the planting of native trees within the landscape design which are aimed at enhancing the ecological value of the site including foraging habitat for this species. *g. result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat*, or* Invasive species, such as fox and cat, are already likely to occur within the study area and locality. The proposal is not expected to advantage ingress of exotic predators, nor substantially increase there occurrence in the area. *h. interfere with the recovery of the species.* The proposal will not substantially interfere with the recovery of the large-eared pied bat.
(d) any environmental impact on Commonwealth Listed Migratory Species;	One Commonwealth listed migratory species is considered likely to occur within the study area: • Satin Flycatcher The guidelines in terms of the migratory species are discussed below: *a. substantially modify (including fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat of the migratory species, or* The proposal will not substantially modify, destroy or isolate an area of important habitat for the satin flycatcher as : • The proposal involves the redevelopment of an existing hotel several trees within the site represents a small proportion of potential habitat for

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Matters to be addressed	Impact (Commonwealth Legislation)
	this species. • This species is capable of flying large distances and thus any temporary disturbance during redevelopment will not isolate habitat for this species. • The site is 1.23 ha and this area is almost entirely developed by the existing hotel. Potential foraging habitat includes a relatively small proportion of the site consisting of several eucalyptus trees. This habitat if used by this species represents a fraction of a much larger foraging home range extending into the surrounding locality. *b. result in invasive species that is harmful to the migratory species becoming established in an area of important habitat of the migratory species, or* The proposal will not introduce or facilitate an invasive species that is harmful to the satin flycatcher in an area of important habitat or otherwise. *c. seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of the species.* The proposal is unlikely to disrupt the lifecycle of an ecologically significant proportion of the population of a migratory species for the following reasons: The proposal involves the modification/removal of a very small area of potential habitat consisting of several trees, that offers at best, marginal habitat suitability.
(e) does any part of the Proposal involve a Nuclear Action;	No. The project does not include a Nuclear Action.
(f) any environmental impact on a Commonwealth Marine Area;	No. There are no Commonwealth Marine Areas within the study area.
In addition, any direct or indirect effect on Commonwealth land.	No. The project does not directly or indirectly affect Commonwealth land.

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Appendix D Flora and Fauna Species Recorded in the Study Area

Fauna Species

Scientific Name	Common Name
ON-SITE	
Angophora costata	Sydney Red/Rusty Gum
Archontophoenix cunninghamiana	Bangalow Palm
Blechnum sp.	Gristle Fern
Callistemon salignus	Willow Bottlebrush
Cyathea sp.	Tree Fern
*Cynodon dactylon**	Common Couch
Dianella caerulea	Blue Flax-lily
Eucalyptus globoidea	White Stringybark
Eucalyptus robusta	Swamp Mahogany
Eucalyptus umbra	Broad-leaved White Mahogany
*Jacaranda mimosifolia**	Jacaranda
*Lantana camara**	Lantana
Livistona australis	Cabbage Palm
Lophostemon confertus	Brush Box
Melaleuca quinquenervia	Broad-leaved Paperbark
*Murraya paniculata**	
Platycerium bifurcatum	Elkhorn
*Protasparagus aethiopicus**	Sprengeri Fern
Schefflera actinophylla	Umbrella Tree
*Stenotaphrum secundatum**	Buffalo Grass
*Strelitzia sp.**	Bird of Paradise
*Veronica sp.**	
Westringia fruticosa	Coastal Rosemary
SURROUNDING BUSH	
Acacia longifolia	Coastal Wattle
Allocasuarina littoralis	Black Sheoak
Angophora costata	Smooth Barked Apple
Breynia oblongifolia	Coffee Bush
Dodonaea triquetra	Large-leaf Hop-bush
Elaeocarpus reticulatus	Blueberry Ash
Corymbia gummifera	Red Bloodwood
Eucalyptus piperita	Sydney Peppermint
Eucalyptus robusta	Swamp Mahogany
Eucalyptus tereticornis	Forest Red Gum
Eucalyptus umbra	Broad-leaved White Mahogany
Exocarpos cupressiformis	Native Cherry
Glochidion ferdinandi	Cheese Tree
Hardenbergia violacea	False Sarsaparilla
Imperata cylindrica	Blady grass
Kennedia rubicunda	Red Kennedy Pea
*Lantana camara**	Lantana
Leptospermum laevigatum	Coast Teatree
Lomandra longifolia	Spiny-headed Mat-rush
Notelaea longifolia	Large Mock-olive
Patersonia sericea	Silky Purple-Flag
Pittosporum undulatum	Sweet Pittosporum
*Protasparagus aethiopicus**	Sprengeri Fern
Pteridium esculentum	Bracken
Pultenaea ferruginea	
Smilax australis	Lawyer Vine, Wait-a-while, Barbwire Vine
Xanthorrhoea media	Grass Tree

Note: Species marked with * are exotic

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Fauna Recorded

Scientific Name	Common Name
Dacelo novaeguineae	Laughing Kookaburra
Eolophus roseicapillus	Galah
Gymnorhina tibicen	Australian Magpie
Hirundo neoxena	Welcome Swallow
Malurus cyaneus	Superb Fairy-wren
Manorina melanocephala	Noisy Miner
Platycercus adscitus eximius	Eastern Rosella
Trichoglossus haematodus	Rainbow Lorikeet
Vanellus miles	Masked Lapwing

Appendix E Qualifications and Licences

Eco Logical Australia Pty Ltd holds the following licences which cover all their employees engaged in works related to this project:

- NPWS Scientific Licence S10805, expires April 2010

The formal qualifications of all staff involved in this Flora and Fauna Assessment are included below:

Dr David Bain
PhD in ecology and conservation.
Translocation of the endangered, Eastern Bristlebird.
Bachelor of Science (Honours).
Biology, Geography Double Major.
University of Wollongong, NSW.

Antony von Chrismar
Bachelor of Applied Science, Environmental Resource Management.
Southern Cross University, NSW

Robert Browne-Cooper
Bachelor of Science, Biology. Minor in Environmental Management.
Edith Cowan University WA

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Appendix F Consultation with DECCW

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Subject	Phone discussion on the layout, ecological survey design and impacts of Salamander Shores Hotel redevelopment
Attendees	Steve Lewer (DECCW) Antony von Chrismar (ELA)
Date	31 May 2010

This memo has been provided to document a phone discussion between Steve Lewer of the Department of Environment, Climate Change and Water (DECCW) and Antony von Chrismar of Eco Logical Australia.
The phone discussion followed a request for DECCW to comment on the ecological issues associated with the proposed plan for Salamander Shores Hotel redevelopment and the key findings and survey design of the ecological investigations. Key discussion points and conclusions are presented as follows:

Proposed Salamander Shores Hotel redevelopment plan:

- The level of encroachment of the plan on adjacent lands, both directly and indirectly, was raised. Direct impacts were agreed to be likely minimal, as the construction works would be confined to the site. Secondary impacts such as noise, dust and erosion and sediment issues would need to be addressed, and where required supplemented by appropriate surveys / assessments. Although DECCW acknowledged that on-site impacts to existing vegetation / habitat is likely negligible, appropriate surveying would still be required at a level that would detect potential species and in accordance with current DECCW guidelines. DECCW accepts that not all techniques / methodologies would be warranted.

- Impacts on hollow-bearing trees would need to be addressed in terms of accessibility to hollows following development and any direct removal of hollows. No hollow-bearing trees are proposed to be removed and, whilst some trees would be removed, connection to the hollow-bearing trees would be retained via remnant vegetation to the east.

Key findings of the ecological investigation and survey design:

- The findings of the ecological investigation did not raise any comments or real concern. Note: DECCW has not reviewed any survey documents associated with the EA and as such can not make a definitive comment on whether the

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proposal has any real concerns, though based on Eco Logical verbal advice it appears unlikely.

- In terms of survey design, Steve made comment on the survey and timing of targeted surveys for some locally occurring threatened flora species, particularly orchids such as *Corybas dowlingii*, *Diuris arenaria* and *D. praecox* and *Cryptostylis hunteriana*. Whilst the study area has been subject to ongoing disturbance, some of these orchid species are known to occur in disturbed environments. The potential for these species needs to be considered and, where potential habitat exists, seasonal surveys would be suggested.

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