



**SITE CONSTRAINTS REVIEW**

**POSSIBLE CARAVAN PARK  
CENTRAL COAST HIGHWAY  
BUDGEWOI**

DRAFT FOR  
COMMENT

**JANUARY 2010  
(REF: 9128B)**

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**1. INTRODUCTION****1.1 BACKGROUND**

As part of its review of various landholdings identified for possible development, Wyong Shire Council has engaged Conacher Environmental Group to undertake some comprehensive investigations relating to planning and ecological matters for a parcel of land at Lakes Beach.

At this stage no commitment has been made to a proposed development concept. However for the purposes of undertaking some preliminary assessments, a preliminary caravan park concept plan has been prepared for consideration.

The following sections of this report provide details on various matters relevant to the subject site and possible future development. A detailed assessment of planning, bushfire and threatened species (biodiversity) is provided in the various appendices of this report.

**1.2 SITE CHARACTERISTICS**

The subject site is an area of undeveloped bushland located to the east of Budgewoi Road and west of Lakes Beach. It is located north of the urban areas of Werepi Road and south of Lakes Beach Surf Club.

The planning and cadastral details of the subject site are provided in Table 1.1 while Table 1.2 summarises the geographical characteristics of the site.

<b>TABLE 1.1 SITE DETAILS</b>	
<b>Location</b>	Lot 7084 DP 1030670 Werepi Street Noraville, Lot 523 DP 704440, Part Lot 7023 DP 1030667 Central Coast Highway, Budgewoi.
<b>Area</b>	Approximately 10.7 hectares
<b>Topographic Map</b>	Toukley 1:25 000
<b>Grid Reference</b>	366055E 6319260N
<b>Local Government Area</b>	Wyong Shire Council
<b>Existing Land Use</b>	Vacant land
<b>Current Zoning</b>	6(a) Open Space and Recreation
<b>Proposed Development</b>	Coastal foreshore walkway and caravan park

<b>TABLE 1.2 SITE CHARACTERISTICS</b>	
<b>Elevation</b>	Approximately 1-5m AHD
<b>Topography</b>	Sand dune and coastal sand flats
<b>Slope</b>	Up to 10% on dunes and <2% on flats
<b>Aspect</b>	Westerly to north westerly
<b>Soil Type</b>	Loose medium yellowish brown quartz sand of the Narrabeen Soil Landscape and dark brown loose loamy sand of the Woy Woy Soil Landscape
<b>Catchment</b>	Tuggerah Lakes
<b>Drainage</b>	Seepage into the watertable
<b>Vegetation</b>	- Littoral Rainforest; - Swamp Sclerophyll Forest; - Dune Vegetation; and - Tall heath Vegetation.

## 2. PLANNING AND LEGISLATION REVIEW

A detailed review of planning, environmental legislation and policies relevant to the subject site and considerations of a possible caravan park on the subject site is provided in Appendix 1.

Following an assessment of the site characteristics, proposed development and planning/environmental regulations the principal relevant Acts and Policies applying to the site and consideration of a caravan park as a land use option are:

- Environment Protection and Biodiversity Conservation Act;
- Environmental Planning and Assessment Act;
- Threatened Species Conservation Act;
- Rural Fires Act;
- National Parks and Wildlife Act;
- Native Vegetation Act;
- Coastal Protection Act;
- State Environmental Planning Policy 71 – Coastal Protection;
- State Environmental Planning Policy (Major Developments) 2005;
- Wyong Shire Council Local Environment Plan (1991);
- Wyong Shire Council Development Control Plan (2005);
- Wyong Shire Council Draft Climate Change Policy (2009).

Details on each of the above matters and their requirements in relation to the subject site and proposed caravan park are provided below.

### • Environment Protection and Biodiversity Conservation Act

The *Environment Protection and Biodiversity Conservation Act 1999* (EP&BC Act) is the Australian Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places which are defined in the Act as matters of national environmental significance (DEWHA 2010).

Where a proposed activity is located in an area identified to be of national environmental significance, or such that it is likely to significantly affect nationally listed threatened species, ecological communities, migratory species or their habitats, the matter needs to be referred to the Department of the Environment, Water, Heritage and Arts (DEWHA). Where the Commonwealth decides that an action will have a significant effect on a NES matter, it becomes known as a controlled action and will require approval under the EPBC Act. An assessment of these matters is provided in the Flora and Fauna Assessment Report (Conacher Environmental Group 2010), as provided in Appendix 2.

A report on the EP&BC Act Protected Matters has been undertaken and is included in the Appendices. This EP&BC Protected Matters Report identifies the likely presence of the critically endangered Littoral Rainforest and Coastal Vine Thickets of Eastern Australia in the area. The patch of Littoral Rainforest in the southern parts of the site meet the criteria for classification as the Littoral Rainforest and Coastal Vine Thickets critically endangered ecological community.

### • Environmental Planning and Assessment Act

The EP&A Act is the lead legislation in NSW governing planning, land development and environmental assessment. The Act and its supporting Regulations identify the process and procedures required for considering and assessing a specific project on land within each local government area. The EP&A Act and Regulations identify a range of planning policies (State

Environmental Planning Policies) which may need to be addressed when preparing and reviewing applications for various types of projects.

Initially the application for a caravan park on the subject site could be subject to the reporting and assessment requirements of Part 4 of the EP& A Act. Under Part 4 of the EP& A Act a development application is required to be submitted to Council with relevant supporting documentation including a Statement of Environmental Effects. The Statement of Environmental Effects determines if a significant environmental impact is likely to result from the proposed development and whether an Environmental Impact Statement should be prepared.

However, in this particular case the proposed development as currently proposed would be categorised as a Coastal Development covered under Section 13(c) (a) of State Environmental Planning Policy (Major Developments) 2005. Under this SEPP caravan parks located in sensitive coastal locations (ie land within 100 metres of high tide level) which provide accommodation for more than 100 persons is classified as a major development.

Developments included in SEPP (Major Developments) 2005 require approval from the Minister for Planning following a detailed assessment by the Department of Planning. Initial consultation is required with the Department of Planning to obtain the Director Generals Requirements for undertaking the planning and environmental assessments for the proposed development. Generally a preliminary planning report and assessment is provided to the Department of Planning as background material for consideration by the Department when preparing the specifications for reporting and assessment for the specified project.

Section 5(A) of the EP&A Act requires an assessment as to whether the proposal is likely to result in a significant effect on a threatened species, endangered ecological community or their habitats. An assessment of these matters is provided in the Flora and Fauna Assessment Report (Conacher Environmental Group 2010), as provided in Appendix 2.

- **Threatened Species Conservation Act**

The scope of the TSC Act is to address a range of matters relating to biological diversity, sustainable development, threatened species, populations, ecological communities and their habitats. One of the aims of the TSC Act is to.... "*prevent the extinction and promote the recovery of threatened species, populations and ecological communities*" (Part 1, Section 3 (b)). The TSC Act makes provision for the listing of threatened species, populations, ecological communities, critical habitats and threatening processes to be considered for assessment under Section 5(A) of the EP& A Act and provides a framework to assist the assessment of actions which have been deemed likely to have a significant impact on a threatened species, population, ecological community or their habitats.

Details of the threatened species, populations and/or ecological communities observed within the subject site are provided in the Flora and Fauna Assessment Report (Conacher Environmental Group 2010), as provided in Appendix 2.

- **National Parks and Wildlife Act (1974)**

The NP&W Act addresses a range of matters relating to biodiversity, threatened species, aboriginal cultural heritage and conservation reserves. The NP&W Act is the primary legislation for the protection of Aboriginal cultural heritage in New South Wales. One of the objectives of the NP&W Act is:...."*the conservation of objects or features (including biological diversity) of cultural value within the landscape, including but not limited to...(i) places, objects and features of significance to Aboriginal people*" (Section 2A(1)(b)).

The site is in a relatively undisturbed condition with a dense groundcover of grasses and herbs, although some patches of bare sand are present. The presence of aboriginal artefacts or sites of aboriginal significance are not known at this stage. It is accepted procedure that any detailed site investigations for future developments would include an Aboriginal / archaeological cultural heritage assessment. This would include:

- A review of the Aboriginal Heritage Information Management System (AHIMS Database of the National Parks and Wildlife Service);
- Site investigations by a qualified and experienced archaeologist;
- Consultation with members of the local aboriginal community;
- Consultation with aboriginal cultural heritage officers of the Department of Environment, Climate Change and Water.

Part 6 of the NP&W Act (Sections 83-91) relate to the conservation and protection requirements for aboriginal objects and aboriginal places.

If any artefacts or sites of cultural heritage value to the local aboriginal community are present onsite they cannot be removed or disturbed without the relevant approvals provided by the Director General of the National Parks and Wildlife in accordance with the provisions of the NP&W Act.

- **Native Vegetation Act**

The vegetation on the site is covered under the provisions of the Nature Vegetation Act and supporting regulations. Consultation with the Hunter/Central Region Catchment Authority is required for any proposals to clear native vegetation. Compensating offsets of vegetation conservation would need to be assessed for any vegetation clearing option.

- **State Environmental Planning Policy 71 – Coastal Protection**

The site and proposed development is subject to review and consideration of the provisions of SEPP N° 71. Clause 2(1) lists the aims of the SEPP as follows:

- (a) to protect and manage the natural, cultural, recreation and economic attributes of the New South Wales coast, and
- (b) to protect and improve existing public access to and along coastal foreshores to the extent that this is compatible with the natural attributes of the coastal foreshore, and
- (c) to ensure that new opportunities for public access to and along coastal foreshores are identified and realised to the extent that this is compatible with the natural attributes of the coastal foreshore, and
- (d) to protect and preserve Aboriginal cultural heritage, and Aboriginal places, values, customs, beliefs and traditional knowledge, and
- (e) to ensure that the visual amenity of the coast is protected, and
- (f) to protect and preserve beach environments and beach amenity, and
- (g) to protect and preserve native coastal vegetation, and
- (h) to protect and preserve the marine environment of New South Wales, and
- (i) to protect and preserve rock platforms, and
- (j) to manage the coastal zone in accordance with the principles of ecologically sustainable development (within the meaning of section 6 (2) of the Protection of the Environment Administration Act 1991),

The principles of ecological sustainable development are:

- i) precautionary principle;
- ii) intergenerational equity;
- iii) conservation of biological diversity and ecological integrity; and

- iv) improved valuation, pricing and incentive mechanisms.
- (k) to ensure that the type, bulk, scale and size of development is appropriate for the location and protects and improves the natural scenic quality of the surrounding area, and
- l) to encourage a strategic approach to coastal management.

Clause 8 of SEPP 71 lists the following matters for consideration of any future development within the coastal zone, which would include the subject site.

- a) existing public access to and along the coastal foreshore for pedestrians or persons with a disability should be retained and, where possible, public access to and along the coastal foreshore for pedestrians or persons with disability should be improved,
- b) opportunities to provide new public access to and along the coastal foreshore for pedestrians or persons with a disability,
- c) the suitability of development given its type, location and design and its relationship with the surrounding area,
- d) any detrimental impact that development may have on the amenity of the coastal foreshore, including any significant overshadowing of the coastal foreshore and any significant loss of views from a public place to the coastal foreshore,
- e) the scenic qualities of the New South Wales coast, and means to protect and improve these qualities,
- f) measures to conserve animals (within the meaning of the Threatened Species Conservation Act 1995) and plants (within the meaning of that Act), and their habitats,
- g) measures to conserve fish (within the meaning of Part 7A of the Fisheries Management Act 1994) and marine vegetation (within the meaning of that Part), and their habitats,
- h) existing wildlife corridors and the impact of development on these corridors,
- i) the likely impact of coastal processes and coastal hazards on development and any likely impacts of development on coastal processes and coastal hazards,
- j) measures to reduce the potential for conflict between land-based and water-based coastal activities,
- k) measures to protect the cultural places, values, customs, beliefs and traditional knowledge of Aboriginals,
- l) likely impacts of development on the water quality of coastal waterbodies,
- m) the conservation and preservation of items of heritage, archaeological or historic significance,
- n) only in cases in which a council prepares a draft local environmental plan that applies to land to which this Policy applies, the means to encourage compact towns and cities,
- o) only in cases in which a development application in relation to proposed development is determined:
  - (i) the cumulative impacts of the proposed development on the environment, and
  - (ii) measures to ensure that water and energy usage by the proposed development is efficient.

• **State Environmental Planning Policy (Major Developments) 2005**

The site and proposed development may be subject to the provisions of SEPP (Major Developments) for the following reasons:

- i) The type of development (Caravan park);
- ii) The site of the proposed development (within 100metres of mean high water mark).

These matters are addressed in the SEPP as follows:

13(c) Coastal Development to which this part applies.

This part applies to development within the Coastal Zone for any of the following purposes:

- (a) Caravan parks and tourist visitor accommodation.
- (ii) in the case of development wholly or partially in a sensitive coastal location in the metropolitan coastal zone that provides accommodation for 100 persons or more.

For the purposes of this SEPP the following definitions apply:

- Sensitive coastal location is land within 100m of mean high water mark of the sea, bay or an estuary;
- Metropolitan coastal zone is the coastal zone between Newcastle and Shellharbour.

Although no detailed surveys of the mean high water mark have been reviewed for this report preliminary measurements of aerial photographs and site inspections indicate that the site is likely to be located partially within 100 metres of the mean high water mark. Therefore at this stage the provisions of SEPP (Major Development) appear to be relevant to the site.

Further consultation with the Department of Planning is required to obtain the specific requirements for any future planning and environmental assessments from the Director General of the Department of Planning; in accordance with the requirements of the SEPP (Major Development).

- **Wyong Shire Council Local Environment Plan (1991)**

Future development options need to be planned and assessed with consideration of the relevant sections of Councils LEP.

- **Wyong Shire Council Development Control Plan (2005)**

Relevant chapters of Councils DCP will require

- **Wyong Shire Council Draft Climate Change Policy (2009)**



### 3. THREATENED SPECIES AND ENDANGERED ECOLOGICAL COMMUNITIES

#### 3.1 FLORA AND FAUNA DETAILS

A detailed ecological survey of the site has been undertaken in accordance with Wyong Councils Flora and Fauna Survey Guidelines (Appendix 2). No threatened flora or fauna species were detected during the ecological surveys. However, habitat for a range of threatened fauna species known to occur in the local area was assessed as being present on the site. This habitat could occasionally be utilized by threatened fauna species at various times of the year as part of foraging roosting or movement habitat.

Four vegetation communities were identified and described within the site as outlined below.

##### ***Littoral Rainforest***

Located in south-east part of the site between the frontal dune and swamp forest covering approximately 2.1 hectares.

##### ***Swamp Sclerophyll Forest***

Located in the south-west corner of the site adjacent to Budgewoi Road and the Littoral Rainforest and covers approximately 1.4 hectares in area.

##### ***Dune Vegetation***

A linear patch of grass and low heath located along the frontal dune system covering approximately 1.1 hectares.

##### ***Tall Heath***

Tall heath comprising *Banksia* and *Leptospermum* (Tea Tree) species is located within the northern and central parts of the site covering approximately 6.1 hectares.

#### 3.2 ENDANGERED ECOLOGICAL COMMUNITIES

The Littoral Rainforest area is categorised as an area of the endangered ecological community Littoral Rainforest in the NSW North Coast and Sydney Basin Bioregion (TSA Act). The Swamp Sclerophyll Forest is categorised as Swamp Sclerophyll Forest on Coastal Floodplains, (TSA Act).

The presence of the two areas of endangered ecological communities within the site has significant implications in relation to application of the Native Vegetation Act and any subsequent approvals which may be required from the Hunter/Central Rivers Catchment Management Authority. Areas of endangered ecological communities cannot be cleared under the provisions of the Native Vegetation Act.

The area of Littoral Rainforest is also categorised as an area of Littoral Rainforest and Coastal Vine Thickets of Eastern Australia, which is listed as a critically endangered ecological community under the provisions of the EP&BC Act.

### 3.3 LITTORAL RAINFOREST

This area of Littoral Rainforest is an important local ecological matter as it is an isolated patch of Littoral Rainforest within the local area. The closest mapped area of Littoral Rainforest is located approximately 5 kilometres to the south-west.

Littoral Rainforests are restricted to coastal environments growing in sheltered areas buffered from windy conditions by adjoining vegetation and coastal dunes. Disturbances to the protective supporting vegetation can expose the littoral rainforest vegetation to strong, salt laden winds which can then dry out and damage the sheltered rainforest area. This results in damage to large trees and gradual changes in the vegetation structure to a drier more open forest structure with resultant changes to species composition, and weed invasions.

Littoral Rainforests identified within SEPP N<sup>o</sup>. 26 are protected by a 100 metre buffer zone in order to retain protective vegetation surrounding the areas of littoral rainforest.

While the patch of Littoral Rainforest within the site is not included within the areas mapped in SEPP N<sup>o</sup> 26 as a littoral rainforest the provision of a 100 metre buffer zone is considered relevant in this situation. In reviewing any future development application the consent authority could adopt the precautionary approach and utilize the best practice principals of including a 100 metre buffer area around littoral rainforest areas in order to mitigate against increased wind impacts on residual littoral rainforest areas.

### 3.4 VEGETATION PROTECTION AND THE NATIVE VEGETATION ACT

The subject site is subject to the provisions of the Native Vegetation Act if the development is assessed under Part 4 of the EP&A Act. The application of the NV Act within the provisions of SEPP (Major Developments) 2005 is not as well defined as under Part 4. However the project would need to demonstrate that future development could accommodate the requirements and objectives of the NV Act.

The vegetation within the site does not appear to be regrowth vegetation and therefore would not fit into the classification of vegetation exempted from the NV Act.

Under the provisions of the NV Act areas of endangered ecological communities are identified as 'red flag areas' where clearing of vegetation within these areas cannot be approved by the Catchment Management Authority. Additionally areas of native vegetation to be cleared would need to be offset by conserving areas of similar vegetation type within the local area. The amount of land to be offset for conservation is determined by the CMA during consideration of an application for approval to clear native vegetation.

#### 4. BUSHFIRE PROTECTION REQUIREMENTS

The subject site is located within an area mapped as Bushfire Prone Land and therefore requires a Bushfire Hazard Assessment to be prepared to address the requirements of Planning for Bushfire Protection (Rural Fire Service 2006). A detailed assessment for the subject site is provided in the appendices of this Report.

Caravan parks are categorised as Special Fire Protection Purpose developments and require asset protection zones to be incorporated within the proposed developed to meet the requirements of Table A2.6 of Planning for Bushfire Protection (RFS 2006).

The required widths for the asset protection zones between any future caravan/camping sites and the adjoining bushfire hazard, as detailed in Appendix 3 is provided in Table 6.1. From this table it is identified that an asset protection zone of a least 70 metres will be required to retained vegetation in the south and 70 metres to the forested vegetation in the west. A 35 metre APZ is also required to any dune vegetation retained along the eastern side of the site.

These APZ distances can contain the adjoining road ways and non-habitable areas (swimming pool, car park, open space areas etc) within the caravan park area. However no caravan or camping sites should be located within the required asset protection zones.

The extent of asset protection zones affecting the subject site are shown in Table 4.1.

Direction	Predominant Vegetation Type	Slope	APZ (m)
North	Cleared Land	0-5° up	NR
South	Forest	1° down	70
East	Short Heath	5° up	35
West	Forest	1° down	70

If asset protection zones are implemented in accordance with the requirements of Planning for Bushfire Protection (RFS 2006) and are excluded from areas retained to buffer areas of endangered ecological communities then the areas of the site unconstrained by the requirement for an asset protection zone total approximately 1.5 hectares in the central northern part of the site, as depicted in Figure 4.1.

## 5. CLIMATE CHANGE AND SEA LEVEL RISE

The site is located between the coastal waters of the Pacific Ocean and Lakes Beach immediately to the east and Budgewoi Lake, approximately 1,500 metres to the west, and has low elevations. Therefore the subject site is likely to be vulnerable from future impacts of climate change induced sea-level rise.

Consideration of future development within the subject site would require assessment of benchmark levels of sea level rises of 90cm by 2100 in accordance with the NSW Draft Sea Level Rise Policy (Department of Planning 2009). Sea level rise would also impact on flooding and inundation levels and coast line recession for sandy beaches and frontal dune systems.

Wyong Shire Council Draft Climate Change Policy (2009) identifies that coastal localities will be exposed to increasing coastal erosion, shoreline recession, salt water intrusion to groundwater, tidal inundation and coastal floodplain biodiversity threats.

This Draft Policy also identifies that a 100 year period should be adopted as a minimum strategic land use planning period.

At present the site is protected from coastal erosion and salt water intrusion by the intact frontal dune system. However this dune is a relatively narrow single dune, not a series of barrier dunes and therefore would be more susceptible to recession from eroding waves during storm events. This risk would be accentuated by increasing sea levels resulting from climate change.

The subject site has been mapped within the Wyong Coastal Hazard Management Study (SMEC undated) as being within the zone of wave impact and slope adjustment for the 2050 scenario. This would indicate that the site would be exposed to a significant risk of coastal erosion and shoreline recession for a sea level rise scenario prediction for 2050.

Wyong Councils Development Control Plan (2005, Chapter 77 Coastal Hazards) delineates an immediate or very high hazard erosion zone for dunes where no development can occur.

Development to the west of this line can occur in the high hazard zone (0-50 years) requires development controls to address the hazard. However, with the implementation of the sea level rise hazard line the current hazard line will move inland and the risk to development from coastal erosion will increase significantly.

To address the potential changes to the coastline and coastal recession Councils Draft policy for Coastline Management, as outlined in the Draft Climate Change Policy, identifies that any new developments should be located landwards of the hazard line equivalent to the asset period for the development.

If the asset period for the Caravan Park is given as 40 years then the hazard line assessed would be the 2050 year hazard line, adjusted to accommodate sea level rise. The asset period for the proposal would need to be determined in accordance with the Draft Climate Change Policy.

The existing site is located on the seaward side of the 2050 zone of wave impact (as calculated by SMEC).

## 6. CONCLUDING COMMENTS

Following consideration of the planning legislation and ecological characteristics of the site it is concluded that the subject site has some significant constraints to future development for a caravan park.

The principal environmental constraints identified include:

- 1) Sensitive coastal location in a hind dune area likely to be impacted on by coastline recession resulting from sea level rise.
- 2) Presence of two endangered ecological communities (Littoral Rainforest and Swamp Sclerophyll Forest)
- 3) Requirement for a 100 metre wide buffer zone to the areas of Littoral Rainforest.
- 4) Requirements for bushfire asset protection zones of between 70 metres and 35 metres from adjacent areas of bushfire hazards.
- 5) Location of the site within biodiversity corridor under consideration by Council under the provisions of Chapter 13 of Councils DCP.
- 6) Requirement to develop a vegetation conservation offset for any future clearing of native vegetation.

If any future development is proposed for this site a detailed assessment and consideration of the relevant legislative requirements identified in Section 2, including, but not restricted to the following:

- Environment Protection and Biodiversity Conservation Act;
- Environmental Planning and Assessment Act;
- Threatened Species Conservation Act;
- Rural Fires Act;
- National Parks and Wildlife Act;
- Native Vegetation Act;
- Coastal Protection Act;
- State Environmental Planning Policy 71 – Coastal Protection;
- State Environmental Planning Policy (Major Developments) 2005;
- Wyong Shire Council Local Environment Plan (1991);
- Wyong Shire Council Development Control Plan (2005);
- Wyong Shire Council Draft Climate Change Policy (2009).

Any future development options should be discussed with Councils Strategic Planning section as this site has been identified for inclusion in various Management Plans as a biodiversity corridor and conservation area for threatened species habitat and endangered ecological communities.

## 7. REFERENCES

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Department of the Environment, Water, Heritage and the Arts, (2010), Environmental Protection and Biodiversity Conservation Act: EPBC Act Home website: <http://www.environment.gov.au/epbc/index.html>

Conacher Environmental Group (2010) Flora and Fauna Assessment Report. Central Coast Highway, Budgewoi.

Department of Planning (2009) NSW Draft Sea Level Rise Policy.

Department of Environment, Water, Heritage and the Arts (2009) *EPBC Act Policy Statement 1.1 Significant Impact Guidelines, Matters of National Environmental Significance*, Commonwealth of Australia.

Environment Australia (2000) Response to disturbance of forest species – southern region. A project undertaken as part of the NSW Comprehensive Regional Assessments for Commonwealth - NSW Regional Forest Agreement Steering Committee.

Environmental Planning and Assessment Act (1979). New South Wales Government.

Environmental Protection and Biodiversity Conservation Act (1999). Environment Australia.

NSW Rural Fires Services (2006) Planning for Bushfire Protection.

SMEC (undated) Wyong Coastal Hazard Management Study.

Wyong Shire Council (2009), Draft Climate Change Policy.

Wyong Shire Council (2005), Development Control Plan, Chapter 77 Coastal Hazards.

Wyong Shire Council (1999), *Flora and Fauna Guidelines for Development*.

**APPENDIX 1  
LEGISLATION REVIEW**

**Relevant Planning Legislation**

The subject land is zoned 6(a) (Open space and Recreation) under the Wyong Local Environmental Plan 1991.

The objectives of this zone are:

- (a) to provide for the open space and recreation needs of the local community and visitors, and
- (b) to allow for other leisure and recreation-orientated development, or any other use that is authorised by a plan of management adopted under section 40 of the Local Government Act 1993, which:
  - (i) promotes worthwhile community benefits, and
  - (ii) would not reduce the amount and distribution of public open space areas below acceptable levels and standards which meet the needs of the community, and
  - (iii) would not have an unacceptable impact on the amenity of adjacent areas, and
  - (iv) would not have an adverse effect on water catchments, water quality, land surface conditions and important ecosystems such as Tuggerah Lakes, Lake Macquarie, streams, estuaries and wetlands.

This zone provides for a variety of uses so long as they are consistent with the zone objectives.

The following is a summary of relevant planning legislation which must be considered in the preparation and assessment of any proposal upon the site.

Legislation/Policy	Comment
<p><b>Environment Protection and Biodiversity Conservation Act (1999)</b></p> <p>This Act provides a legal framework to protect and manage matters of national environmental significance.</p>	<p>This Act is relevant to the subject site in the context of nationally listed threatened and migratory species and ecological communities and must be taken into account. Assessment is included in the Flora and Fauna Assessment Report.</p> <p>Where a proposed activity is located in an area identified to be of National Environmental Significance, or such that it is likely to significantly affect threatened species, ecological communities, migratory species or their habitats, the matter needs to be referred to the Department of the Environment, Water, Heritage and Arts (DEWHA).</p>



Legislation/Policy	Comment
<p><b>National Parks and Wildlife Act 1974</b></p> <p>This Act addresses matters relating to biodiversity, threatened species, Aboriginal cultural heritage and conservation reserves.</p>	<p>The matters within this Act pertaining to the protection of Aboriginal cultural heritage are of particular relevance for the site. It is accepted procedure that any detailed site investigations for future developments would include an Aboriginal / archaeological cultural heritage assessment.</p> <p>Relevant approvals will be required to remove or disturb any artefacts or sites of Aboriginal cultural heritage value.</p>
<p><b>Threatened Species Conservation Act 1995</b></p> <p>The TSC Act makes provision for the listing of threatened species, populations, ecological communities, critical habitats and threatening processes to be considered for assessment under Section 5(A) of the EP&amp;A Act and provides a framework to assist the assessment of actions which have been deemed likely to have a significant impact on a threatened species, population, ecological community or their habitats.</p>	<p>Assessment of state listed threatened species, populations and ecological communities must be taken into account. Assessment is included in the Flora and Fauna Assessment Report. Further assessments in the form of a Species Impact Statement may be required.</p>
<p><b>Native Vegetation Act 2003</b></p> <p>This Act regulates the clearing of native vegetation on all land in NSW, except for excluded land listed in Schedule 1 of the Act. The Act outlines what landowners can and cannot do in clearing native vegetation.</p>	<p>The vegetation on the site is covered under this Act and its supporting regulations. Consultation with the Hunter/Central Rivers CMA is required for any proposals within the site to clear native vegetation. Compensating offsets of vegetation conservation would also need to be assessed for any vegetation clearing option.</p>
<p><b>Environmental Planning and Assessment Act 1979</b></p> <p>All Planning and development in NSW is carried out under the Environmental Planning and Assessment Act 1979 and Environmental Planning and Assessment Regulation 2000. Relevant Sections include</p>	<p>This Act is relevant as the principle Act for development proposals in NSW.</p> <p>Amongst other sections, the Act provides matters for consideration (at Sec 79C) which must be taken into account when considering a Development Application.</p> <p>Section 5A requires assessment of significance of impact on the threatened species, endangered ecological communities and their</p>

Legislation/Policy	Comment
	<p>habitats. A full assessment of the impacts of this Act is beyond the scope of this report, but should be undertaken early in the design process.</p>
<p><b>SEPP No. 14 - Coastal Wetlands</b> This Policy seeks to ensure coastal wetlands are preserved and protected for environmental and economic reasons. Land clearing, levee construction, drainage work or filling may only be carried out within these wetlands with the consent of the local council and the agreement of the Director General of the Department and Planning. Such development also requires an environmental impact statement to be lodged with a development application.</p>	<p>This Policy does not apply since no part of the site is mapped as wetlands under the Policy.</p>
<p><b>SEPP No. 19 - Bushland in Urban Areas</b> Protects and preserves bushland within certain urban areas, as part of the natural heritage or for recreational, educational and scientific purposes. The policy is designed to protect bushland in public open space zones and reservations, and to ensure that bush preservation is given a high priority when local environmental plans for urban development are prepared.</p>	<p>Wyong Shire Council is not included under Schedule 1 of SEPP No. 19. Therefore the proposal is not required to be assessed in relation to the provisions of SEPP 19.</p>
<p><b>SEPP No. 26 - Littoral Rainforests</b> This Policy seeks to protect littoral rainforests, a distinct type of rainforest well suited to harsh salt-laden and drying coastal winds. The policy requires that the likely effects of proposed development be thoroughly considered in an environmental impact statement. The policy applies to 'core' areas of littoral rainforest as well as a 100 metre wide 'buffer' area surrounding these core areas, except for residential land and areas to which SEPP No. 14 - Coastal Wetlands applies.</p>	<p>Littoral Rainforest occurs onsite but is not mapped as an SEEP26 area. The subject land is not included in any areas mapped as Littoral Rainforest in accordance with SEPP No. 26. Therefore the subject land is not affected by SEPP No. 26. Littoral Rainforest is also an EEC and a 100m buffer zone relevant to SEPP26 could also be reasonably applied.</p>

Legislation/Policy	Comment
<p><b>SEPP No. 44 - Koala Habitat Protection</b></p> <p>Encourages the conservation and management of natural vegetation areas that provide habitat for koalas to ensure permanent free-living populations will be maintained over their present range.</p>	<p>The provisions of SEPP No. 44 Koala Habitat Protection apply to all lands within the Wyong Shire Council Local Government Area. Therefore an assessment of the vegetation is required in accordance with the provisions of SEPP No. 44 to determine if the vegetation comprises Koala Habitat. Assessment included in Flora and Fauna Report.</p>
<p><b>SEPP No. 71 - Coastal Protection</b></p> <p>This policy seeks to ensure that development in the NSW coastal zone is appropriate and suitably located, to ensure that there is a consistent and strategic approach to coastal planning and management and to ensure there is a clear development assessment framework for the coastal zone.</p>	<p>The site is located within the coastal zone as defined by this Policy. Therefore the proposal is required to be assessed in relation to the provisions of SEPP 71. The Policy provides matters for consideration (at Cl. 8) which must be taken into account when considering a Draft LEP or Development Application. A full assessment of the impacts of this Policy is beyond the scope of this report, but should be undertaken early in the design process.</p>
<p><b>SEPP (Infrastructure) 2007</b></p> <p>Provides a consistent planning regime for infrastructure and the provision of services across NSW, along with providing for consultation with relevant public authorities during the assessment process. The SEPP supports greater flexibility in the location of infrastructure and service facilities along with improved regulatory certainty and efficiency.</p>	
<p><b>SEPP (Major Development) 2005</b></p> <p>Defines certain developments that are major projects to be assessed under Part 3A of the Environmental Planning and Assessment Act 1979 and determined by the Minister for Planning.</p>	<p>This Policy is relevant as the development falls under Cl. 13C (a) (ii) of the Policy, since:</p>

Legislation/Policy	Comment
	<ul style="list-style-type: none"> <li>part of the site is located within a sensitive coastal location and</li> <li>the proposal will provide accommodation for 100 persons or more.</li> </ul> <p>Accordingly, an application may be made to the Minister under Part 3A of the Act for approval of a concept plan, or for project approval.</p> <p>A full assessment of the impacts of this Policy is beyond the scope of this report, but should be undertaken early in the design process</p>
<p><b>Wyong Local Environmental Plan (1991 – as amended)</b></p> <p>The purpose of this Plan is to guide planning decisions through zoning and development controls.</p> <p>Relevant Clauses include;</p> <p>Cl. 10 Zone objectives and development control table</p> <p>Cl. 15 Development on land containing acid sulphate soils</p> <p>Cl. 24 Development by Council</p> <p>Cl. 31 Foreshore building lines</p>	<p>The provisions of the WLEP 1991 are relevant to the site and must be taken into account</p> <p>A full assessment of the impacts of this Policy is beyond the scope of this report, but should be undertaken early in the design process.</p> <p>The site is included within the area covered by Wyong Local Environmental Plan (1991, as amended).</p>
<p><b>Wyong Shire Development Control Plan 2005</b></p> <p>The purpose of this Plan is to provide Council's requirements for quality development and environmental outcomes within Wyong Shire.</p> <p>Relevant Chapters include;</p> <p>Chapter 13 - Interim Conservation Areas for Wyong Shire</p> <p>Chapter 14 - Tree Management</p> <p>Chapter 23 - Caravan Parks</p> <p>Chapter 77 – Coastal Hazards</p> <p>Chapter 99 – Building lines</p>	<p>The provisions of the DCP 2005 are relevant to the site and must be taken into account.</p> <p>A full assessment of the impacts of this Policy is beyond the scope of this report, but should be undertaken early in the design process.</p>
<p><b>Draft Coastal Management Plan, Wyong Shire Council</b></p> <p>Wyong Shire Council has commenced the Coastline Management Study and Hazard Assessment, which will lead to the implementation of the Coastline Management Plan.</p>	<p>Council is currently preparing this draft Plan which is expected to be ready for Council consideration in the first quarter of 2010.</p>

Legislation/Policy	Comment
<p><b>Coastal Protection Act 1979</b></p> <p>The objects of this Act are to provide for the protection of the coastal environment of the State for the benefit of both present and future generations.</p>	<p>The Coastal Protection Act applies to the site as it is located within the defined coastal area, being within one kilometre landward of coastal waters; however there are no notices under Sections 38 or 39 of the Act which prescribes the development restrictions within the coastal zone.</p>
<p><b>New South Wales Coastal Policy 1997</b></p> <p>The 1997 NSW Coastal Policy sets the context in providing for population growth and economic development at the same time protecting the natural, cultural, spiritual and heritage values of the coastal environment.</p> <p>The objective of the Coastal Policy is to reduce the impact of coastline hazards on individual owners and occupiers of land and to reduce private and public losses resulting from such hazards.</p> <p>The NSW Coastal Policy 1997 discourages the development of land with high conservation value or other constraints where development would not be consistent with the aims of the policy. The aims of the Policy are similar to those of SEPP 71.</p>	<p>The provisions of this Policy are relevant to the site and must be taken into account.</p> <p>A full assessment of the impacts of this Policy is beyond the scope of this report, but should be undertaken early in the design process.</p>
<p><b>NSW Coastline Management Manual (1990)</b></p> <p>This Manual was released with the NSW Coastal Policy to assist local Councils to develop integrated coastal zone management plans that are consistent with the aims of the NSW State Plan, the NSW Coastal Policy, the National Framework for Integrated Coastal Zone Management and amendments to the Coastal Protection Act 1979.</p> <p>The Manual promotes wider adoption of risk management approaches to address issues such as natural hazards and climate change and provides guidance on coastal emergency management and the integration of coastal zone management outcomes with other land use planning and natural resource management outcomes.</p> <p>The NSW Coastline Management Manual identifies the following</p>	<p>The provisions of this Policy are relevant to the site and should be taken into account.</p> <p>A full assessment of the impacts of this Policy is beyond the scope of this report, but should be undertaken early in the design process.</p>

Legislation/Policy	Comment
<p>potential coastal hazards for consideration in a Coastal Hazard Assessment - Beach erosion; Shoreline recession; Coastal entrance instability; Sand drift; Coastal inundation; Stormwater erosion hazard; Slope and cliff instability; and Climate change.                      A range of potential management options are considered in the Manual that would be considered in the context of the specific issues affecting each site in the coastal zone.</p>	

<b>The following Policies are currently being developed in relation to Climate Change</b>	
<p><b>NSW Draft Sea Level Rise Policy</b></p> <p>The NSW Government has issued a draft policy on sea level rise in 2009. The policy addresses the hazards arising from sea level rise and provides principles for assessment of development in the coastal zones to minimise impacts and risks. Benchmark levels for sea level rise are provided as well as policy principles aimed at minimising the social, economic costs and environmental impacts resulting from long term sea level rise. Benchmark levels identified in the policy are relative to 1990 mean sea levels and indicate a sea level rise of up to 40 cm by 2050 and 90 cm by 2100. (See also NSW Climate Change Action Plan, DECC)</p>	<p>The provisions of this Policy are relevant to the site and should be taken into account. A full assessment of the impacts of this Policy is beyond the scope of this report, but should be undertaken early in the design process.</p>
<p><b>Draft NSW Coastal Planning Guideline: Adapting to Sea Level Rise</b> <b>(Department of Planning, Dec 2009)</b></p> <p>The draft Guideline adopts the NSW sea level rise planning benchmarks in the NSW Sea Level Rise Policy Statement. The draft Guideline outlines a proposed approach to assist councils, State agencies, planners and development proponents when addressing sea level rise in land-use planning and development assessment.</p>	<p>The provisions of this Policy are relevant to the site and should be taken into account. A full assessment of the impacts of this Policy is beyond the scope of this report, but should be undertaken early in the design process.</p>
<p><b>Draft Coastal Risk Management Guide: Incorporating sea level rise benchmarks in coastal risk assessments</b></p> <p>The Department of Environment, Climate Change and Water has released draft guidelines on incorporating sea level rise into flood risk and coastal hazard assessment for consultation.</p>	<p>The provisions of this Policy are relevant to the site and should be taken into account. A full assessment of the impacts of this Policy is beyond the scope of this report, but should be undertaken early in the design process.</p>

Optional Extended (brief) SEPP 71 assessment		Comment
Policy		
<b>SEPP 71 – matters for consideration (Cl. 8)</b>		
<i>(a) to protect and manage the natural, cultural, recreational and economic attributes of the New South Wales coast, and</i>		The proposal has the potential to adversely impact on the natural and cultural attributes of the NSW Coast. These adverse impacts are likely to outweigh any positive contributions to recreational and economic attributes.
<i>(b) to protect and improve existing public access to and along coastal foreshores to the extent that this is compatible with the natural attributes of the coastal foreshore, and</i>		The subject land has limited public access, which has contributed to the preservation of quality Coastal vegetation within the site. Enhancement of access through this site has the potential to adversely impact on this Coastal vegetation.
<i>(c) to ensure that new opportunities for public access to and along coastal foreshores are identified and realised to the extent that this is compatible with the natural attributes of the coastal foreshore, and</i>		Given the high quality of Coastal vegetation within the site, increased public access is not preferred. Access to the coastal foreshore from Werepi St and The Lake Surf Club would remain unaltered.
<i>(d) to protect and preserve Aboriginal cultural heritage, and Aboriginal places, values, customs, beliefs and traditional knowledge, and</i>		No listed areas of Aboriginal heritage or cultural significance have been identified within the location of the proposed activity, however a detailed assessment of the site has yet to be undertaken.
<i>(e) to ensure that the visual amenity of the coast is protected, and</i>		Visual impacts associated with a higher use of the site can be managed through effective landscaping.
<i>(f) to protect and preserve beach environments and beach amenity, and</i>		Future development would be limited to the western side of a large dune. As such, there would be little impact to beach amenity. However, any development within the coastal dune zone has the potential to adversely impact on the integrity of the dune system and may result in longer term damage.
<i>(g) to protect and preserve native coastal vegetation, and</i>		The proposal will result in the removal of prime Coastal vegetation.
<i>(h) to protect and preserve the marine environment of NSW; and</i>		Appropriate stormwater management measure can be implemented to ensure minimal impact on the marine environment.



Policy	Comment
<p>(i) to protect and preserve rock platforms, and</p>	<p>The closest rock platform is located approximately 100m seaward of the site and is only exposed at low tide. Development is unlikely to impact on this platform.</p>
<p>(j) to manage the coastal zone in accordance with the principles of ecologically sustainable development (within the meaning of section 6 (2) of the Protection of the Environment Administration Act 1991),</p> <p>The principles of ecological sustainable development are:</p> <ul style="list-style-type: none"> <li>i) precautionary principle;</li> <li>ii) intergenerational equity;</li> <li>iii) conservation of biological diversity and ecological integrity; and</li> <li>iv) improved valuation, pricing and incentive mechanisms</li> </ul> <p>and</p>	<p>Whilst future development can be designed to promote ecologically sustainable development principles, any proposal upon the site will result in the removal or modification to a significant portion of coastal vegetation, the results of which are unknown on the immediate Coastal dune formation. This is contrary to the principles of ESD.</p>
<p>(k) to ensure that the type, bulk, scale and size of development is appropriate for the location and protects and improves the natural scenic quality of the surrounding area, and</p>	<p>The type, bulk, scale and size of the development has yet to be finalised, however, appropriate landscaping (including the retention of existing vegetation where possible) can help to minimise the impact on the surrounding area.</p>
<p>(l) to encourage a strategic approach to coastal management.</p>	<p>Detailed investigation will help to define opportunities and limitations for the site, which can then be incorporated into Council's new comprehensive LEP and Plans of Management.</p>
<p>And</p>	
<p>(b) existing public access to and along the coastal foreshore for pedestrians or persons with a disability should be retained and, where possible, public access to and along the coastal foreshore for pedestrians or persons with a disability should be improved,</p>	<p>The subject land has limited public access, which has contributed to the preservation of quality Coastal vegetation within the site. Enhancement of access through this site has the potential to adversely impact on this Coastal vegetation.</p>

<i>(c) opportunities to provide new public access to and along the coastal foreshore for pedestrians or persons with a disability,</i>	Beach foreshore access from Weropi Street has recently been upgraded
<i>(d) the suitability of development given its type, location and design and its relationship with the surrounding area,</i>	A number of environmental assessments have been carried out over the site that have identified the site's opportunities and constraints, both within and external to the site (eg, bushfire risk resulting from vegetation located to the west of the Central Coast Highway).
<i>(e) any detrimental impact that development may have on the amenity of the coastal foreshore, including any significant overshadowing of the coastal foreshore and any significant loss of views from a public place to the coastal foreshore,</i>	a low scale such that it would not affect the amenity of the coastal foreshore.
<i>(f) the scenic qualities of the New South Wales coast, and means to protect and improve these qualities,</i>	The expected visual impacts associated with the use of the site have been assessed and are considered to be minor.
<i>(g) measures to conserve animals (within the meaning of the Threatened Species Conservation Act 1995) and plants (within the meaning of that Act), and their habitats,</i>	The proposal will result in the removal or modification to a significant portion of coastal vegetation.
<i>(h) measures to conserve fish (within the meaning of Part 7A of the Fisheries Management Act 1994) and marine vegetation (within the meaning of that Part), and their habitats</i>	The proposed development will not impact on fish and marine vegetation. Refer to the ecological assessment and stormwater management assessment
<i>(i) existing wildlife corridors and the impact of development on these corridors,</i>	The proposal has the potential to impact on an important linkage from the beach foreshore to classified wetlands located to the west.
<i>(j) the likely impact of coastal processes and coastal hazards on development and any likely impacts of development on coastal processes and coastal hazards,</i>	The site may be subject to coastal processes or hazards and requires separate assessment.
<i>(k) measures to reduce the potential for conflict between land-based and water-based coastal activities,</i>	The proposal would not result in any conflict between land-based and water-based coastal activities as the proposed development is separated by a large vegetated dune to the beach foreshore.

<i>(l) measures to protect the cultural places, values, customs, beliefs and traditional knowledge of Aboriginals,</i>	No listed areas of Aboriginal heritage or cultural significance have been identified within the location of the proposed activity, however a detailed assessment of the site has yet to be undertaken.
<i>(m) likely impacts of development on the water quality of coastal waterbodies,</i>	Appropriate stormwater management measures can be implemented to ensure minimal impact on coastal waterbodies.
<i>(n) the conservation and preservation of items of heritage, archaeological or historic significance,</i>	No listed areas of Aboriginal heritage or cultural significance have been identified within the location of the proposed activity, however a detailed assessment of the site has yet to be undertaken.
<i>(o) only in cases in which a council prepares a draft local environmental plan that applies to land to which this Policy applies, the means to encourage compact towns and cities,</i>	Not applicable to this site.
<i>(p) only in cases in which a development application in relation to proposed development is determined:</i>	
<i>(i) the cumulative impacts of the proposed development on the environment, and</i>	The proposal will result in the removal or modification to a significant portion of coastal vegetation
<i>(ii) measures to ensure that water and energy usage by the proposed development is efficient.</i>	Development on the site will comply with BASIX requirements, or equivalent standards.

**APPENDIX 2**

**FLORA AND FAUNA ASSESSMENT REPORT**



**FLORA AND FAUNA ASSESSMENT REPORT**

**POSSIBLE CARAVAN PARK  
CENTRAL COAST HIGHWAY  
BUDGEWOI**

**JANUARY 2010  
(REF: 9128F)**

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**FLORA AND FAUNA ASSESSMENT REPORT**

**POSSIBLE CARAVAN PARK  
CENTRAL COAST HIGHWAY  
BUDGEWOI**

**JANUARY 2010**

**Conacher Environmental Group**

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## PREFACE

This Flora and Fauna Assessment Report has been prepared by *Conacher Environmental Group* to identify the flora and fauna characteristics of land within Lot 7084 DP 1030670, Werepi Street, Norville and Lot 523 DP 704440 and Part Lot 7023 DP 1030667, Central Coast Highway, Budgewoi.

This report provides an assessment of existing habitats and the potential for the proposed activity to significantly impact on threatened species according to the provisions of Section 5(A) of *the Environmental Planning and Assessment (EP&A) Act 1979* and the *Threatened Species Conservation Act 1995*.

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## SECTION 1

## INTRODUCTION AND BACKGROUND

## 1.1 INTRODUCTION

Conacher Environmental Group has been engaged to prepare a Flora and Fauna Assessment Report for a proposed development within Lot 7084 DP 1030670, Werepi Street, Noraville and Lot 523 DP 704440 and Part Lot 7023 DP 1030667, Central Coast Highway, Budgewoi.

This Flora and Fauna Assessment Report has been prepared to identify the flora and fauna characteristics of the site and to determine whether or not a Species Impact Statement should be prepared for development according to the provisions of Section 5(A) of the *Environmental Planning & Assessment Act 1979* (EP&A Act) and the *Threatened Species Conservation Act 1995* (TSC Act).

## 1.2 SITE CHARACTERISTICS

The planning and cadastral details of the subject site are provided in Table 1.1 while Table 1.2 summarises the geographical characteristics of the site.

TABLE 1.1 SITE DETAILS	
<b>Location</b>	Lot 7084 DP 1030670, Werepi Street, Noraville and Lot 523 DP 704440 and Part Lot 7023 DP 1030667, Central Coast Highway, Budgewoi.
<b>Area</b>	Approximately 10.7 hectares
<b>Topographic Map</b>	Toukley 1:25 000
<b>Grid Reference</b>	366055E 6319260N
<b>Local Government Area</b>	Wyong Shire Council
<b>Existing Land Use</b>	Vacant land
<b>Current Zoning</b>	6(a) Open Space and Recreation
<b>Proposed Development</b>	Coastal foreshore walkway and caravan park

TABLE 1.2 SITE CHARACTERISTICS	
<b>Elevation</b>	Approximately 1-5m AHD
<b>Topography</b>	Sand dune and coastal sand flats
<b>Slope</b>	Up to 10% on dunes and <2% on flats
<b>Aspect</b>	Westerly to north-westerly
<b>Soil Type</b>	Loose medium yellowish brown quartz sand of the Narrabeen Soil Landscape and dark brown loose loamy sand of the Woy Woy soil landscape
<b>Catchment</b>	Tuggerah Lakes
<b>Drainage</b>	Seepage into the watertable
<b>Vegetation</b>	-Littoral Rainforest; -Swamp Sclerophyll Forest; -Dune Vegetation; and -Tall Heath Vegetation.

### 1.3 PROPOSED DEVELOPMENT

The proposed development is for a coastal foreshore walkway and a caravan park encompassing 101 short term sites and associated infrastructure such as recreation facilities, amenities, a site office, access, bushfire Asset Protection Zones (APZ's) and provision of services. The proposed development is considered for location within the northern section of the subject site while the retained areas of the subject site will be managed as an environmental conservation area.

At this stage the proposed development is for consideration purposes only so that an assessment of the site constraints can be determined. Although some preliminary layout plans have been prepared, no final plans have been determined for the site.

For Ecological assessment purposes the proposed development would include the provision for a 100 metre buffer (development exclusion area) to the north of the areas identified as the Littoral Rainforest within the site. Bushfire asset protection zones would not be provided within the 100 metre buffer zone area.

## SECTION 2

## FLORA CHARACTERISTICS

## 2.1 THREATENED FLORA SPECIES

A search of the Atlas of NSW Wildlife (NPWS 2010) was undertaken to identify records of threatened flora species located within 10km of the site. This allowed for a specific search for threatened flora to be undertaken determining if any threatened flora species were present within the subject site. Details on threatened flora species as listed in Schedules 1 and 2 of the *TSC Act* (1995), with a known or possible occurrence within the local area, are provided in Table 2.1.

TABLE 2.1 THREATENED FLORA SPECIES OF THE AREA				
SPECIES	TSC ACT	EPBC ACT	GROWTH FORM AND HABITAT REQUIREMENTS	COMMENTS
<i>Acacia bynoeana</i>	E1	V	Erect or spreading shrub to 0.3 m high growing in heath and dry sclerophyll open forest on sandy soils. Often associated with disturbed areas such as roadsides.	Suitable habitat present.
<i>Angophora inopina</i>	V	V	Small tree in open sclerophyll forest growing on deep sandy soils with associated lateritic outcrops.	No suitable habitat present.
<i>Caladenia porphyrea</i>	E1	-	Terrestrial orchid. Grows in coastal sclerophyll forest on sandy soils. Found in only two locations approximately 2km apart near Norah Head	Suitable habitat present.
<i>Caladenia tessellata</i>	E1	V	Terrestrial orchid. Found in grassy sclerophyll woodland on clay loam or sandy soils.	No suitable habitat present.
<i>Callistemon linearifolius</i>	V	-	Shrub to 4m high. Grows in Sclerophyll Forest in moist gullies on coast and adjacent ranges, Nelson Bay to Georges River.	Suitable habitat present.
<i>Chamaesyce psammogeton</i>	E1	-	Prostrate herb. Grows on fore-dunes and exposed headlands, often with Spinifex. Distribution limits N- Tweed Heads S- Jervis Bay	Suitable habitat present.
<i>Cryptostylis hunteriana</i>	V	V	Saprophytic orchid. Favours swamp fringes or steep hillsides in tall eucalypt forests.	No suitable habitat present.
<i>Diuris praecox</i>	V	V	Terrestrial orchid. Grows in sclerophyll forest near the coast, most often found on clay graminoid heath on coastal headlands. Distribution limits N - Nelson Bay S - Ourimbah.	No suitable habitat present.
<i>Eucalyptus camfieldii</i>	V	V	Stringybark to 10 m high. Grows in coastal shrub heath and woodlands on sandy soils derived from alluviums and Hawkesbury sandstone.	Suitable habitat present.

TABLE 2.1 THREATENED FLORA SPECIES OF THE AREA				
SPECIES	TSC ACT	EPBC ACT	GROWTH FORM AND HABITAT REQUIREMENTS	COMMENTS
<i>Genoplesium insignis</i>	E	-	Occurs in heathland and forest amongst shrubs and sedges. Associated with <i>Themeda australis</i> . Known only between Charmhaven and Wyong.	No suitable habitat present.
<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	V	V	Open to erect shrub to 1 metre. Grows in sandy or light clay soils usually over thin shales. Occurs in heath, shrubby woodland and open forest.	No suitable habitat present.
<i>Melaleuca biconvexa</i>	V	V	Tall shrub. Grows in wetlands adjoining perennial streams and on the banks of those streams, generally within the geological series known as the Terrigal Formation.	No suitable habitat present.
<i>Rutidosia heterogama</i>	V	V	Small perennial herb to 30cm tall. Grows in heaths in clay soils and has been recorded along disturbed roadsides.	No suitable habitat present.
<i>Syzygium paniculatum</i>	V	V	Small tree. Subtropical and littoral rainforest on sandy soil.	Suitable habitat present.
<i>Tetradlea juncea</i>	V	V	Prostrate shrub to 1 m high. Dry sclerophyll forest and heath.	No suitable habitat present.
<i>Thelymitra</i> sp. <i>adorata</i>	Crit E	-	Large blue orchid, flowers September to October. Prefers woodland vegetation with grassy understorey in well-drained clay loam or shale derived soils. The extent of occurrence is about 5 km <sup>2</sup> confined within the Wyong LGA.	No suitable habitat present.

E = Endangered Species      Crit E = Critically Endangered      V = Vulnerable Species

The threatened flora species which are considered to have suitable habitat within the subject will be assessed under the 7 part test of significance in Section 4 of this report.

No threatened flora species as listed in the *TSC Act* (1995) or the *EPBC Act* (1999) were observed on the subject site.

## 2.2 ENDANGERED FLORA POPULATIONS & ECOLOGICAL COMMUNITIES

### 2.2.1 Endangered Flora Populations

The endangered flora populations known to occur within the local government area are *Eucalyptus oblonga* population at Bateau Bay in the Wyong local government area and *Eucalyptus parramattensis* subsp. *parramattensis* population in the Wyong and Lake Macquarie local government areas.

These species were not observed on the subject site. It is therefore considered that no endangered flora population is present on the subject site.

### 2.2.2 Endangered Ecological Communities

Details regarding the habitat attributes and indicative species for the Endangered Ecological Communities (EECs) known to occur in the local government area are provided in Table 2.2.

TABLE 2.2 ENDANGERED ECOLOGICAL COMMUNITIES OF THE AREA		
Name	Habitat Requirements	Comments
<b>Coastal Saltmarsh</b> in the NSW North Coast, Sydney Basin and South East Corner Bioregions (CS)	<b>Geology / Soils:</b> Estuarine mud flats. <b>Topography:</b> Intertidal zone on the shores of estuaries and lagoons often inland of Mangrove stands. <b>Characteristic Species:</b> Variable with elevation; Lowest- <i>Sarcocornia quinqueflora</i> ; Mid- <i>Sporobolus virginicus</i> ; Upper- <i>Juncus kraussii</i> & <i>Baumea juncea</i>	Not observed during surveys.
Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregion (FWCF)	<b>Geology / Soils:</b> Silts, muds or humic loams. <b>Topography:</b> in depressions, flats, drainage lines, backswamps, lagoons and lakes associated with coastal floodplains. <b>Characteristic Species:</b> <i>Carex appressa</i> , <i>Paspalum distichum</i> , <i>Baumea caniculata</i> , <i>Phylidrum lanuginosum</i> , <i>Ludwigia peploides ssp. montevidensis</i> and <i>Myriophyllum spp.</i>	Not observed during surveys.
Littoral Rainforest in the NSW North Coast, Sydney Basin and South East Corner Bioregions (LR)	<b>Geology / Soils:</b> Coastal dune soils, shallow soils over bedrock, deep clay soils. <b>Topography:</b> Located near coastline in sheltered positions. Often found on coastal dunes, headlands or riparian locations. <b>Characteristic Species:</b> Rainforest type species; <i>Cupaniopsis anacardioides</i> , <i>Syzygium leuhmannii</i> , <i>Acacia hemilampra</i> , <i>Lophostemon confertus</i> , <i>Ficus sp.</i> , <i>Liivistona australis</i> .	Observed during surveys.  Also listed on EP&BC Act as critically endangered ecological community.
Low Woodland with Heathland on Indurated Sand at Norah Head (LWHIS)	<b>Geology / Soils:</b> Indurated (hardsetting) sands with a range of local variation in drainage conditions. <b>Topography:</b> low rolling sandy hills – restricted to Norah Head east off Wilfred Barrett Drive. <b>Characteristic Species:</b> <i>Eucalyptus camfieldii</i> , <i>Melaleuca quinquenervia</i> , <i>Melaleuca thymifolia</i> , <i>Lambertia formosa</i> , <i>Corymbia gummifera</i> , <i>Acacia longifolia</i> , <i>Banksia oblongifolia</i> , <i>Allocasuarina distyla</i> and <i>Melaleuca sieberi</i> .	Not observed during surveys.
Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions (LLR)	<b>Geology / Soils:</b> Typically of high nutrient geological substrates, notably basalts and fine-grained sedimentary rocks. <b>Topography:</b> Lower slopes and ranges below 600m above sea level in its northern range and below 350m sea level within the Sydney basin. <b>Characteristic Species:</b> Lowland Rainforest encompasses stands which fall principally within the following subtropical alliances and suballiances of: <b>Argyrodendron trifoliatum alliance</b> <ul style="list-style-type: none"> <li>• 1. <i>Argyrodendron trifoliatum</i> suballiance</li> <li>• 5. <i>Castanospermum australe</i> – <i>Dysoxylum muelleri</i> suballiance</li> <li>• 6. <i>Archontophoenix</i> – <i>Livistonia</i> suballiance</li> </ul> <b>Dendrocnide excelsa – Ficus spp. alliance</b> <ul style="list-style-type: none"> <li>• 14. <i>Doryphora sassafras</i> – <i>Daphnandra micranthus</i> – <i>Dendrocnide excelsa</i> – <i>Ficus</i> spp. – <i>Toona</i> suballiance</li> <li>• 15. <i>Ficus</i> spp. – <i>Dysoxylum fraserianum</i> – <i>Toona</i></li> </ul>	Not observed during surveys.

TABLE 2.2 ENDANGERED ECOLOGICAL COMMUNITIES OF THE AREA		
Name	Habitat Requirements	Comments
	<p>– <i>Dendroica</i> suballiance</p> <p><b><i>Drypetes australasica</i> – <i>Araucaria cunninghamii</i> alliance</b></p> <ul style="list-style-type: none"> <li>• 21. <i>Araucaria cunninghamii</i> suballiance</li> <li>• 22. <i>Flindersia</i> spp. – <i>Araucaria</i> suballiance</li> </ul>	
River-Flat Eucalypt Forest on Coastal Floodplains of the North Coast, Sydney basin and South East Corner bioregions (REFCF)	<p><b>Geology / Soils:</b> Silts, clay-loams and sandy loams.</p> <p><b>Topography:</b> Periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains with a recurring flood interval of less than 1 in 100 years.</p> <p><b>Characteristic Species:</b> <i>Eucalyptus tereticornis</i>, <i>E. amplifolia</i>, <i>E. botryoides</i>, <i>E. grandis</i>, <i>E. benthamii</i>, <i>Angophora floribunda</i>, <i>A. subvelutina</i>, <i>Melaleuca decora</i>, <i>M. stypheloides</i>, <i>Backhousia myrtifolia</i>, <i>Casuarina cunninghamiana</i> and <i>Casuarina glauca</i>.</p>	Not observed during surveys.
Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregions (SOFF)	<p><b>Geology / Soils:</b> Alluvial soils of fluvial or estuarine origin, with significant salinity.</p> <p><b>Topography:</b> Flood plains in areas with saline soils and flats adjoining estuaries.</p> <p><b>Characteristic Species:</b> <i>Casuarina glauca</i>.</p>	Not observed during surveys.
Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions (SSFCF)	<p><b>Geology / Soils:</b> Waterlogged or periodically inundated humic clay loams and sandy loams.</p> <p><b>Topography:</b> Alluvial flats and drainage lines of coastal floodplains with a recurring flood interval of less than 1 in 100 years.</p> <p><b>Characteristic Species:</b> includes species such as <i>Eucalyptus robusta</i>, <i>Melaleuca quinquenervia</i> and <i>Eucalyptus botryoides</i>.</p>	Observed during surveys.
Sydney Freshwater Wetlands in the Sydney Basin Bioregion (SFW)	<p><b>Geology / Soils:</b> Generally on the Warriewood and Tuggerah Soil Landscapes (Chapman and Murphy 1989).</p> <p><b>Topography:</b> Swales and depressions on sand dunes and sandplain sites.</p> <p><b>Characteristic Species:</b> <i>Eleocharis sphacelata</i>, <i>Baumea juncea</i>, <i>B. rubiginosa</i>, <i>B. articulata</i>, <i>Gahnia sieberiana</i>, <i>Ludwigia peploides</i> and <i>Persicaria sp</i></p>	Not observed during surveys.

The endangered ecological communities, Littoral Rainforest in the NSW North Coast, Sydney Basin and South East Corner Bioregions and Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions were observed within the subject site during surveys. The endangered ecological communities observed within the subject site will be assessed under the 7 part test of significance in Section 4 of this report.

### 2.3 VEGETATION SURVEY METHODOLOGY

To determine the likely and actual occurrence of flora species and plant communities on the subject site, field survey work was undertaken to supplement literature reviews and previous flora surveys of the area. The methods utilised for the flora survey are outlined below.

**Literature Review**

- A review of available literature for the area was undertaken to obtain reference material and background information for this study. These documents are listed in the References section of this Report.
- A search of the Atlas of NSW Wildlife (NPWS 2010) was undertaken to identify records of threatened flora species located within 10km of the site. This enabled the preparation of a predictive list of threatened flora species that could possibly occur within the habitats found on the site.

**Aerial Photograph Interpretation**

- Aerial imagery was utilised to identify the extent of vegetation with respect to the site and surrounding areas.

**Field Survey**

- Field surveys which consisted of foot traverses within vegetated areas were conducted according to Cropper (1993) to identify the occurrence of flora species and the extent and location of vegetation communities present across the subject site and to determine the positioning of more intensive survey locations.
- Flora surveys were undertaken on 17 December 2009 and 12 January, 2010 generally incorporating the methodologies outlined in the Flora and Fauna Survey Guidelines for Development prepared by Wyong Shire Council (1999).
- Specimens of plants not readily identified in the field were collected for identification.
- Specimens of plants tentatively identified as threatened species are sent to the Sydney Royal Botanic Gardens for confirmation of the identification.
- Determination of species composition as well as structural descriptions of the vegetation on the site according to Specht *et. al.* (1995) was also carried out. All vascular plants were identified using keys and nomenclature in Harden (1994), Harden and Murray (2000) and Harden (2002). Wherever they were known, changes to nomenclature and classification have been incorporated into the results.

**Vegetation Community Nomenclature**

- The vegetation communities identified within the site by *Conacher Environmental Group* were classified according to a modified Walker and Hopkins (1990) methodology. Within the descriptions, the dominant species are listed after the structural description.
- Corresponding Endangered Ecological Communities listed on both the *TSC Act* (1995) and *Environmental Protection and Biodiversity Conservation Act* (1999) (EPBC) are also provided if relevant.

**Seasonality**

As many threatened flora species are best observed during their flowering period, this survey was unable to detect species which flower at various other times of the year. In order to detect species that flower at other times of the year, additional targeted searches may be required. The flowering times of cryptic threatened flora and the dates of seasonally targeted searches are provided in Table 2.3.

TABLE 2.3 FLOWERING TIMES OF CRYPTIC FLORA		
SPECIES	FLOWERING PERIOD*	SURVEYED
<i>Caladenia porphyrea</i>	August – October	-
* The flowering period may differ (earlier or later) due to annual differences in seasonal intensity		

## 2.4 VEGETATION COMMUNITY DESCRIPTIONS AND FLORA SPECIES

The vegetation communities present within the subject site consist of:

- Littoral Rainforest;
- Swamp Sclerophyll Forest;
- Dune Vegetation; and
- Tall Heath.

Vegetation community locations are shown in Figure 1, vegetation community descriptions are provided below while a detailed species list is provided in Table 2.4.

### LITTORAL RAINFOREST

#### Structure:

**Trees:** To 15 metres in height with a variable 10-70% Projected Foliage Cover (PFC).

**Shrub Layer:** To 1 metre in height with a 20% PFC.

**Ground Layer:** To 0.5 metres in height with a 90% PFC.

#### Floristics:

(Main Species Present)

**Trees:** *Cupaniopsis anacardioides* (Tuckeroo), *Glochidion ferdinandii* (Cheese Tree) and *Acmena smithii* (Lillypilly).

**Shrub Layer:** *Acacia longifolia* var. *longifolia* (Sydney Golden Wattle) and *Banksia integrifolia* subsp. *integrifolia* (Coast Banksia).

**Ground Layer:** *Ehrharta erecta*\* (Panic Veldtgrass), *Dianella caerulea* (Blue Flax Lilly) and *Oplismenus imbecillis*.

**Exotics:** *Ehrharta erecta*\* (Panic Veldtgrass) and *Tradescantia albiflora*\* (Wandering Jew).

#### Classification:

This vegetation community is considered to correspond to Map Unit 12 Coastal Sand Littoral Rainforest as described by Bell (2002), however it has been mapped as Map Unit 6 Coastal Sand Holocene Banksia Scrub. This community is classified as the endangered ecological community Littoral Rainforest in the NSW North Coast, Sydney Basin and South East Corner Bioregions and also corresponds to the critically endangered ecological community (as listed on the EP&BC Act) called Littoral Rainforest and Coastal Vine Thickets of Eastern Australia.



**Disturbance:**

This community has been disturbed by weed invasion which has been recently targeted by bush regeneration works. Areas of this community south of Gomul Street contain moderate levels of weed invasion in all structural layers with a cleared and landscaped understorey.

**Variation:**

The section of this community south of Gomul Street has higher levels of weed invasion and clearing of understorey species compared to other areas. Variation is also present in regard to species composition where this community intergrades with adjoining vegetation communities.

**Weed Invasion:**

The ground layer within large areas of this community is dominated by *Ehrharta erecta*\* (Panic Veldtgrass). Weed invasion is otherwise low within this community with the exception of the section south of Gomul Street, which supports moderate levels of weed invasion. Weed growth in this vegetation community has been maintained by the Budgewoi Dune Care Group in association with Wyong Shire Council and the Central/Hunter Rivers Catchment Management Authority.

**Location and Distribution:**

This community is located in the southern sheltered sections of the site as shown in Figure 1 and occupies approximately 2.1 hectares. This area of Littoral Rainforest occurs in an area protected from strong winds, by the Dune System to the east and south-east, Swamp Forest to the west and Tall Heath to the north.

**SWAMP SCLEROPHYLL FOREST****Structure:**

**Canopy Trees:** To 15 metres in height with 40% Projected Foliage Cover (PFC).

**Sub Canopy Trees:** To 10 metres in height with 70% Projected Foliage Cover (PFC).

**Shrub Layer:** To 2 metres in height with a variable 45% PFC.

**Ground Layer:** To 1 metres in height with a 60% PFC.

**Floristics:**

(Main Species Present)

**Trees:** *Eucalyptus botryoides* (Bangalay) and *Melaleuca quinquenervia* (Broad-leaved Paperbark).

**Shrub Layer:** *Gahnia clarkei* (Tall Saw-sedge), *Livistona australis* (Cabbage Tree Palm) and *Breynia oblongifolia* (Coffee Bush)

**Ground Layer:** *Dianella caerulea* (Blue Flax Lilly) and *Lomandra longifolia* (Spiky-headed Mat-rush).

**Exotics:** *Asparagus aethiopicus* (Asparagus Fern) and *Conyza sumatrensis*\* (Fleebane).

**Classification:**

The vegetation within the subject site is mapped by Bell (2002) as Map Unit 9 – Coastal Sand-Bangalay Paperbark Forest and is classified as the endangered ecological community Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions.

**Disturbance:**

This community is disturbed by edge effects such as clearing, weed invasion and rubbish accumulation associated with Budgewoi Road and Werepi Street.

**Variation:**

Variation is present in regard to species composition where this community intergrades with adjoining vegetation communities.

**Weed Invasion:**

Weed invasion is generally low throughout this community.

**Location and Distribution:**

This community is located within the south-western area of the site as shown in Figure 1 and occupies approximately 1.4 hectares.

**DUNE VEGETATION****Structure:**

**Shrub Layer:** To 1 metre in height with 30% PFC.

**Ground Layer:** To 0.3 metres in height with a variable 5-60% PFC.

**Floristics:**

(Main Species Present)

**Shrub Layer:** *Acacia longifolia* var. *longifolia* (Sydney Golden Wattle) and *Leptospermum laevigatum* (Coast Tea-tree).

**Ground Layer:** *Spinifex sericeus* (Beach Spinifex), *Carpobrotus glaucescens* (Pigface) and *Hydrocotyle bonariensis*\* (Pennywort).

**Exotics:** *Hydrocotyle bonariensis*\* (Pennywort) and *Chrysanthemoides monilifera* subsp. *rotundata*\* (Boneseed).

**Classification:**

The vegetation within the subject site is mapped by Bell (2002) as Map Unit 4 – Coastal Sand Beach Spinifex.

**Disturbance:**

This community has been disturbed by weed invasion and wind erosion

**Variation:**

There is a structural predominance of shrub species where this community intergrades with the Heath Vegetation community compared to a greater structural predominance of groundlayer species, closer to the front of the dune. Weed invasion is also higher in the southern section of this community.

**Weed Invasion:**

Weed invasion is moderate throughout this community.

**Location and Distribution:**

This community is located along the frontal dune within the site as shown in Figure 1 and occupies approximately 1.4 hectares.

**TALL HEATH****Structure:**

**Trees:** To 8-12 metres in height with a variable 0-40% Projected Foliage Cover (PFC).

**Shrub Layer:** To 1.5-3 metres in height with a variable 20% PFC.

**Ground Layer:** To 0.5 metres in height with a 60% PFC.

**Floristics:**

(Main Species Present)

**Trees:** *Banksia serrata* (Old Man Banksia), *Banksia integrifolia* subsp. *integrifolia* (Coast Banksia) and *Leptospermum laevigatum* (Coast Tea-tree).

**Shrub Layer:** *Acacia longifolia* var. *longifolia* (Sydney Golden Wattle), *Leptospermum laevigatum* (Coast Tea-tree) and *Persoonia lanceolata* (Lance-leaved Geebung).

**Ground Layer:** *Dianella caerulea* (Blue Flax Lilly), *Lomandra longifolia* (Spiky-headed Mat-rush) and *Pteridium esculentum* (Bracken).

**Exotics:** *Chrysanthemoides monilifera* subsp. *rotundata*\* (Boneseed), *Lantana camara* (Lantana) and *Conyza sumatrensis*\* (Fleebane).

**Classification:**

This vegetation community is considered to correspond to a combination of Map Unit 5 Coastal Sand Fore-dune Acacia Scrub and Map Unit 6 Coastal Sand Holocene Banksia Scrub as mapped by Bell (2002) within the immediate locality.

**Disturbance:**

This community has been disturbed by weed invasion and natural disturbance associated with wind damage. Bush regeneration works have been undertaken within this community, as a consequence several areas which have been weeded now support only a sparse cover of vegetation.

**Variation:**

Weed invasion is higher within this community along the fore-dune area. Projected foliage cover is also sparser in areas which have been subjected to extensive weed removal.

**Weed Invasion:**

Weed invasion is moderate throughout this community.

**Location and Distribution:**

This community is located within the northern section of the site below the surf club and at the rear of the foredune area adjoining the Dune Vegetation community as shown in Figure 1 and occupies approximately 5.8 hectares.

TABLE 2.4 FLORA SPECIES OBSERVED ON THE SUBJECT SITE		
Family	Scientific Name	Common Name
<b>TREES</b>		
Anacardiaceae	<i>Euroschinus falcata</i> var. <i>falcata</i>	Ribbonwood
Araliaceae	<i>Polyscias elegans</i>	Celerywood
Arecaceae	<i>Livistona australis</i>	Cabbage Tree Palm
Casuarinaceae	<i>Allocasuarina littoralis</i>	Black She-oak
Casuarinaceae	<i>Casuarina glauca</i>	Swamp Oak
Eleocarpaceae	<i>Elaeocarpus obovatus</i>	Hard Quandong
Euphorbiaceae	<i>Glochidion ferdinandii</i>	Cheese Tree
Faboideae	<i>Erythrina X sykesii</i>	Coral Tree
Myrsinaceae	<i>Myrsine variabilis</i>	Muttonwood
Myrtaceae	<i>Acmena smithii</i>	Lillypilly
Myrtaceae	<i>Angophora costata</i>	Smooth-barked Apple
Myrtaceae	<i>Eucalyptus botryoides</i>	Bangalay
Myrtaceae	<i>Eucalyptus robusta</i>	Swamp Mahogany
Myrtaceae	<i>Eucalyptus tereticornis</i>	Forest Red Gum
Myrtaceae	<i>Melaleuca quinquenervia</i>	Broad-leaved Paperbark
Oleaceae	<i>Notelaea longifolia</i>	Mock Olive
Pittosporaceae	<i>Pittosporum undulatum</i>	Sweet Pittosporum
Proteaceae	<i>Banksia serrata</i>	Old Man Banksia
Santalaceae	<i>Exocarpos cupressiformis</i>	Native Cherry
Sapindaceae	<i>Cupaniopsis anacardioides</i>	Tuckeroo
<b>SHRUBS</b>		
Asteraceae	<i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i> *	Boneseed
Asteraceae	<i>Ozothamnus diosmifolius</i>	Ball Everlasting
Cesalpinioidae	<i>Senna pendula</i> var. <i>glabrata</i> *	-
Epacridaceae	<i>Leucopogon margarodes</i>	-
Epacridaceae	<i>Leucopogon parviflorus</i>	-
Epacridaceae	<i>Monotoca elliptica</i>	Tree Broom-heat
Epacridaceae	<i>Styphelia viridis</i> subsp. <i>viridis</i>	Green Five-corners
Euphorbiaceae	<i>Amperea xiphioclada</i>	Broom Spurge
Euphorbiaceae	<i>Breynia oblongifolia</i>	Coffee Bush
Euphorbiaceae	<i>Homalanthus populifolius</i>	Bleeding Heart
Euphorbiaceae	<i>Omalanthus populifolius</i>	Bleeding Heart
Euphorbiaceae	<i>Ricinocarpos pinifolius</i>	Wedding Bush
Faboideae	<i>Aotus ericoides</i>	-
Mimosaceae	<i>Acacia ulicifolia</i>	Prickly Moses
Mimosoideae	<i>Acacia longifolia</i> var. <i>longifolia</i>	Sydney Golden Wattle
Mimosoideae	<i>Acacia longifolia</i> var. <i>sophorae</i>	-
Mimosoideae	<i>Acacia saligna</i> *	Orange Wattle
Mimosoideae	<i>Acacia suaveolens</i>	Sweet Scented Wattle
Myrtaceae	<i>Leptospermum laevigatum</i>	Coast Tea-tree
Pittosporaceae	<i>Pittosporum revolutum</i>	Yellow Pittosporum

**TABLE 2.4**  
**FLORA SPECIES OBSERVED ON THE SUBJECT SITE**

Family	Scientific Name	Common Name
Proteaceae	<i>Banksia integrifolia</i> subsp. <i>integrifolia</i>	Coast Banksia
Proteaceae	<i>Persoonia lanceolata</i>	Lance-leaved Geebung
Rutaceae	<i>Correa alba</i>	
Rutaceae	<i>Correa reflexa</i>	Native Fuschia
Sapindaceae	<i>Dodonaea triquetra</i>	Hop Bush
Sterculiaceae	<i>Commersonia fraseri</i>	Brush Kurrajong
Verbenaceae	<i>Lantana camara</i> *	Lantana
<b>GROUNDCOVERS</b>		
Aizoaceae	<i>Carpobrotus glaucescens</i>	Pigface
Aizoaceae	<i>Tetragonia tetragonioides</i>	New Zealand Spinach
Apiaceae	<i>Actinotus helianthi</i>	Flannel Flower
Apiaceae	<i>Hydrocotyle bonariensis</i> *	Kurnell Curse / Pennywort
Apiaceae	<i>Hydrocotyle peduncularis</i>	
Asparagaceae	<i>Asparagus aethiopicus</i> *	Asparagus Fern
Aspleniaceae	<i>Asplenium australasicum</i>	Birds Nest Fern
Asteraceae	<i>Conyza sumatrensis</i> *	Fleabane
Asteraceae	<i>Gazania rigens</i> *	Gazania
Asteraceae	<i>Senecio pterophorus</i> *	
Chenopodiaceae	<i>Einadia hastate</i>	Berry Saltbush
Commelinaceae	<i>Commelina cyanea</i>	Scurvy Weed
Commelinaceae	<i>Tradescantia albiflora</i> *	Wandering Jew
Cyperaceae	<i>Baumea teretifolia</i>	
Cyperaceae	<i>Cyperus imbecilis</i>	-
Cyperaceae	<i>Gahnia clarkei</i>	Tall Saw-sedge
Cyperaceae	<i>Isolepis nodosa</i>	-
Cyperaceae	<i>Lepidosperma concavum</i>	
Cyperaceae	<i>Lepidosperma laterale</i>	Variable Sword-sedge
Dennstaedtiaceae	<i>Pteridium esculentum</i>	Bracken
Euphorbiaceae	<i>Euphorbia peplus</i> *	Spurge
Geraniaceae	<i>Pelargonium australe</i>	Coastal Geranium
Goodeniaceae	<i>Scaveola calendulacea</i>	Scented Fan Flower
Haloragaceae	<i>Gonocarpus teucroides</i>	Raspwort
Iridaceae	<i>Patersonia sericea</i>	Wild Iris
Lamiaceae	<i>Plectranthus parviflorus</i>	Cockspur Flower
Lomandraceae	<i>Lomandra longifolia</i>	Spiky-headed Mat-rush
Oxalidaceae	<i>Oxalis latifolia</i> *	Pink Fishtail
Phormiaceae	<i>Dianella caerulea</i>	Blue Flax Lily
Poaceae	<i>Cynodon dactylon</i>	Common Couch
Poaceae	<i>Echinopogon ovatus</i>	Forest Hedgehog Grass
Poaceae	<i>Ehrharta erecta</i> *	Panic Veldtgrass
Poaceae	<i>Entolasia marginata</i>	Bordered Panic
Poaceae	<i>Imperata cylindrica</i> var. <i>major</i>	Blady Grass
Poaceae	<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Rice Grass
Poaceae	<i>Oplismenus aemulus</i>	Basket Grass
Poaceae	<i>Oplismenus imbecillis</i>	-
Poaceae	<i>Spinifex sericeus</i>	-
Polygonaceae	<i>Acetosa saggitata</i> *	Turkey Rhubarb
Rubiaceae	<i>Pomax umbellate</i>	Pomax
Solanaceae	<i>Solanum aviculare</i>	Kangaroo Apple

TABLE 2.4 FLORA SPECIES OBSERVED ON THE SUBJECT SITE		
Family	Scientific Name	Common Name
Solanaceae	<i>Solanum nigrum</i> *	Black Nightshade
Thymelaeaceae	<i>Pimelea linifolia</i> subsp. <i>linifolia</i>	Slender Rice Flower
Violaceae	<i>Viola banksii</i>	
CLIMBERS		
Apocynaceae	<i>Marsdenia rostrata</i>	Common Milk Vine
Apocynaceae	<i>Parsonia straminea</i>	Common Silkpod
Asteraceae	<i>Senecio tamoides</i> *	
Convolvulaceae	<i>Calystegia solandella</i>	
Convolvulaceae	<i>Calystegia sepium</i>	
Dilleniaceae	<i>Hibbertia scandens</i>	Climbing Guinea-flower
Lauraceae	<i>Cassytha pubescens</i>	Common Devil's Twine
Luzuriagaceae	<i>Eustrephus latifolius</i>	Wombat Berry
Menispermaceae	<i>Stephania japonica</i> var. <i>discolor</i>	Snake Vine
Passifloraceae	<i>Passiflora edulis</i> *	Common Passionfruit
Smilacaceae	<i>Smilax australis</i>	Lawyer Vine
Smilacaceae	<i>Smilax glycyphylla</i>	Sarsaparilla
Vitaceae	<i>Cayratia clematidea</i>	Slender Grape
EPIPHYTES		
Loranthaceae	<i>Muellerina celastroides</i>	Mistletoe
<b>Species name</b> <sup>TS</sup> = Threatened Species * = Introduced Species		

## 2.5 LOCAL AND REGIONAL DISTRIBUTION AND CONNECTIVITY OF VEGETATION

An inspection of the available aerial imagery for the local area indicates that the vegetation within the subject site is directly connected to other areas of vegetation to the north. Large areas of native vegetation also exist to the west of the subject site beyond Budgewoi Road.

The subject site is considered to correspond to the following vegetation communities as described within the Wyong local government area by Bell (2002):

- Map Unit 4 - Coastal Sand Beach Spinifex;
- Map Unit 5 - Coastal Sand Foredune Acacia Scrub;
- Map Unit 6 - Coastal Sand Holocene Banksia Scrub;
- Map Unit 9 - Coastal Sand Bangalay Paperbark Forest;
- Map Unit 10 - Coastal Sand Swamp Mahogany-Paperbark Swamp Forest; and
- Map Unit 12 Coastal Sand Littoral Rainforest.

Within the Wyong Local government these vegetation types are represented within Munmorah State Conservation Area and Wyrabalong National Park (Bell 2002).

## SECTION 3

## FAUNA AND FAUNA HABITATS

## 3.1 THREATENED FAUNA SPECIES

A search of the Atlas of NSW Wildlife (NPWS 2010) was conducted for threatened fauna recorded within 10km of the subject site. This revealed a number of threatened species that may be present in the area. Details on threatened fauna species (Schedule 1 or 2 of the TSC Act (1995)) which are known to occur within the area are provided in Table 3.1.

TABLE 3.1 THREATENED FAUNA SPECIES OF THE AREA				
Common Name Scientific Name	TSC Act	EPBC Act	Preferred Habitat	Comments
Wallum Froglet <i>Crinia tinnula</i>	V	-	Found in acidic paperbark swamps and wallum country with dense groundcover. Breeds in temporary and permanent pools and ponds of high acidity. Distribution Limit- N-Tweed Heads S-Kurnell.	Suitable habitat present.
Green and Golden Bell Frog <i>Litoria aurea</i>	E	V	Prefers the edges of permanent water, streams, swamps, creeks, lagoons, farm dams and ornamental ponds. Often found under debris. Distribution Limit – N-Byron Bay. S-South of Eden	No suitable habitat present.
Osprey <i>Pandion haliaetus</i>	V	-	Utilises waterbodies including coastal waters, inlets, lakes, estuaries and offshore islands with a dead tree for perching and feeding.	Suitable habitat present.
Comb-crested Jacana <i>Irediparra gallinacea</i>	V	-	Deep and permanent vegetation-choked tropical and warm temperate wetlands.	No suitable habitat present.
Australasian Bittern <i>Botaurus poiciloptilus</i>	V	-	Inhabits shallow freshwater or brackish wetlands with tall dense beds of reeds, sedges or rush species and swamp edges.	No suitable habitat present.
Black Bittern <i>Ixobrychus flavicollis</i>	V	-	Freshwater & brackish streams & ponds.	No suitable habitat present.
Pied Oystercatcher <i>Haematopus longirostris</i>	V	-	Inhabits coastal beaches and estuarine flats.	No suitable habitat present.
Sooty Oystercatcher <i>Haematopus fuliginosus</i>	V	-	Exclusively coastal in distribution foraging along rocky coastlines and estuaries.	No suitable habitat present.
Lesser Sand-plover <i>Charadrius mongolus</i>	V	-	A migratory coastal species found along coastal beaches, mangroves and mudflats.	Suitable habitat present.
White Tern <i>Gygis alba</i>	V	-	Inhabits oceanic Is within tropical and sub tropical seas.	No suitable habitat present.

TABLE 3.1 THREATENED FAUNA SPECIES OF THE AREA				
Common Name Scientific Name	TSC Act	EPBC Act	Preferred Habitat	Comments
Little Tern <i>Sterna albitrons</i>	E	-	An almost exclusively coastal species inhabiting open beaches, sheltered inlets, estuaries and occasionally lakes.	Suitable habitat present.
Sanderling <i>Calidris alba</i>	V	-	Inhabits tidal mudflats, beaches with seaweed and the edges of shallow saline and fresh wetlands.	Suitable habitat present.
Great Knot <i>Calidris tenuirostris</i>	V		Summer migrant to Australian coastal regions. Forages on tidal mudflats, and sandy ocean shores. Distribution N - Tweed Heads S - South of Eden.	Suitable habitat present.
Broad-billed Sandpiper <i>Limicola falcinellus</i>	V		Almost exclusively coastal feeding along estuaries, mudflats, salt marshes and occasionally shallow freshwater lagoons. This species roosts on banks on sheltered sand, shell or shingle beaches	Suitable habitat present.
Terek Sandpiper <i>Xenus cinereus</i>	V		Almost exclusively coastal species feeding along estuarine mudflats, coral reefs, mangrove swamps and beaches.	Suitable habitat present.
Black-tailed Godwit <i>Limosa limosa</i>	V		A mainly coastal species feeding along estuarine mudflats, beaches, mangroves and lagoons.	Suitable habitat present.
Gang-gang Cockatoo <i>Callocephalon fimbriatum</i>	V	-	Prefers wetter forests and woodlands from sea level to > 2000m on Divide, timbered foothills and valleys, timbered watercourses, coastal scrubs, farmlands and suburban gardens.	Suitable habitat present.
Glossy Black-cockatoo <i>Calyptorhynchus lathamii</i>	V	-	Open forests with <i>Allocasuarina</i> species and hollows for nesting.	No suitable habitat present.
Black-necked Stork <i>Ephippiorhynchus asiaticus</i>	E	-	Occurs in tropical to warm temperate terrestrial wetlands, estuarine and littoral habitats.	No suitable habitat present.
Superb Fruit-dove <i>Ptilinopus superbus</i>	V	-	Rainforests, adjacent mangroves, eucalypt forests, scrubland with native fruits.	Suitable habitat present.
Little Lorikeet <i>Glossopsitta pusilla</i>	V	-	Inhabits forests and woodlands feeding mostly on nectar and pollen particularly in profusely-flowering eucalypts.	Suitable habitat present.
Swift Parrot <i>Lathamus discolor</i>	E	E	Inhabits eucalypt forests and woodlands with winter flowering eucalypts.	Suitable habitat present.
Turquoise Parrot <i>Neophema pulchella</i>	V	-	Inhabits coastal scrubland, open forest and timbered grassland, especially ecotones between dry hardwood forests and grasslands.	Suitable habitat present.
Barking Owl <i>Ninox connivens</i>	V	-	Inhabits principally woodlands but also open forests and partially cleared land and utilises hollows for nesting.	Suitable habitat present.
Sooty Owl <i>Tyto tenebricosa</i>	V	-	Tall, dense, wet forests containing trees with very large hollows.	No suitable habitat present.



TABLE 3.1 THREATENED FAUNA SPECIES OF THE AREA				
Common Name Scientific Name	TSC Act	EPBC Act	Preferred Habitat	Comments
Powerful Owl <i>Ninox strenua</i>	V	-	Forests containing mature trees for shelter or breeding & densely vegetated gullies for roosting.	Suitable habitat present.
Masked Owl <i>Tyto novaehollandiae</i>	V	-	Open forest & woodlands with cleared areas for hunting and hollow trees or dense vegetation for roosting.	Suitable habitat present.
Grey-crowned Babbler <i>Pomatostomus temporalis temporalis</i>	V	-	Found in dry open forests, woodland scrubland, and farmland with isolated trees.	No suitable habitat present.
Diamond Firetail <i>Stagonopleura guttata</i>	V	-	Found in Eucalypt woodlands, forests and mallee where there is grassy understorey west of the Great Div. also drier coastal woodlands of the Cumberland Plain and Hunter Richmond and Clarence River Valleys.	No suitable habitat present.
Regent Honeyeater <i>Xanthomyza phrygia</i>	E	E	Temperate eucalypt woodland and open forest including forest edges wooded farmland and urban areas with mature eucalypts.	Suitable habitat present.
Southern Brown Bandicoot <i>Isoodon obesulus</i>	E		Utilises a range of habitats containing thick ground cover - open forest, woodland, heath, cleared land, urbanised areas and regenerating bushland.	Suitable habitat present.
Eastern Pygmy-possum <i>Cercartetus nanus</i>	V	-	Found in a variety of habitats from rainforest through open forest to heath. Feeds on insects but also gathers pollen from banksias, eucalypts and bottlebrushes. Nests in banksias and myrtaceous shrubs.	Suitable habitat present.
Spotted-tailed Quoll <i>Dasyurus maculatus</i>	V	V	Dry and moist open forests containing rock caves, hollow logs or hollow trees for shelter.	Suitable habitat present.
Koala <i>Phascolarctos cinereus</i>	V	-	Inhabits both wet & dry eucalypt forests on high nutrient soils containing preferred feed trees.	Suitable habitat present.
Squirrel Glider <i>Petaurus norfolkensis</i>	V	-	Mixed aged stands of eucalypt forest & woodlands including gum barked & high nectar producing species & hollow bearing trees.	Suitable habitat present.
Grey-headed Flying-fox <i>Pteropus poliocephalus</i>	V	V	Found in a variety of habitats including rainforest, mangroves, paperbark swamp, wet and dry open forest and cultivated areas. Forms camps commonly found in gullies and in vegetation with a dense canopy.	Suitable habitat present.
Yellow-bellied Sheath-tail-bat <i>Saccolaimus flaviventris</i>	V	-	Inhabits wet and dry sclerophyll forest, open woodland, shrubland, mallee, grassland and desert. Roosts in tree hollows.	Suitable habitat present.
Eastern Freetail-bat <i>Mormopterus norfolkensis</i>	V	-	Inhabits eucalypt forest and woodland on the coastal side of the Great Dividing Range. Roosts in tree hollows, under bark and in various man made structures.	Suitable habitat present.

TABLE 3.1 THREATENED FAUNA SPECIES OF THE AREA				
Common Name Scientific Name	TSC Act	EPBC Act	Preferred Habitat	Comments
Greater Broad-nosed Bat <i>Scoteanax rueppellii</i>	V	-	Inhabits moist gullies in mature coastal forest, rainforest, open woodland, Melaleuca swamp woodland, wet and dry sclerophyll forest, cleared areas with remnant trees and tree-lined creeks in open areas. Roosts in tree hollows, cracks and fissures in trunks and dead branches, under exfoliating bark, and in man made structures.	Suitable habitat present.
Eastern Bentwing-bat <i>Miniopterus schreibersii</i>	V	-	Inhabits rainforest, wet and dry sclerophyll forest, open woodland, Melaleuca forests and open grassland. Roosts in caves and man made structures.	Suitable habitat present.
Little Bentwing-bat <i>Miniopterus australis</i>	V	-	Inhabits rainforest, vine thicket, wet and dry melaleuca swamps and coastal forests. Roosts in caves, man made structures such as abandoned mines and buildings and occasionally banana trees and tree hollows.	Suitable habitat present.
Southern Myotis <i>Myotis macropus</i>	V	-	Roosts in caves, mines, tunnels, buildings, tree hollows and under bridges. Forages over open water.	No suitable habitat present.
Eastern False Pipistrelle <i>Falsistrellus tasmaniensis</i>	V	-	Inhabits wet sclerophyll forest, open forest, rainforest and coastal mallee. Roosts mostly in hollow trunks of eucalypts but also in caves and man made structures.	Suitable habitat present.
Giant Dragonfly <i>Petalura gigantea</i>	E		Inhabits permanent swamps and bogs with some free water and open vegetation.	No suitable habitat present.
V = Vulnerable species      E = Endangered species				

Threatened fauna species identified in Table 3.1 as having suitable habitat within the subject site will be assessed under the 7 part test of significance in Section 4 of this report.

### 3.2 ENDANGERED FAUNA POPULATIONS

There are no Endangered Fauna Populations currently listed as occurring in the local government area, therefore this matter does not require any further consideration.

### 3.3 FAUNA HABITATS

A range of fauna habitats are present throughout the site and include:

- Flower and nectar producing tree and shrub species;
- Leaf litter layer;
- Fallen timber and hollow logs; and
- Hollow bearing trees.

The vegetation within the subject site consists of dune, littoral rainforest, swamp forest and tall heath communities. The flower and nectar producing tree and shrub species of these communities provides a foraging resource for arboreal mammal, bat, bird and reptile species. The understorey, groundcover and leaf litter layer within the site provides a foraging resource and shelter for amphibian, reptile, bird and terrestrial mammal species. Fallen timber and hollow logs present across the site may also provide refuge sites for amphibian, reptile and mammal species.

No hollow bearing trees were observed within the proposed development area. Approximately four hollow bearing trees were observed within the Swamp Sclerophyll Forest vegetation community with hollows ranging from 15-20cm sized splits to 15-20cm branch hollows. The hollow bearing trees within the site provide potential shelter habitat for reptile, small bird, small arboreal mammal and microchiropteran bat species.

### 3.4 FAUNA SURVEY METHODOLOGY

In order to detect the possible occurrence of threatened fauna species the following specific methods targeting these species were employed.

#### *Literature Review*

- Review of local resource documents;
- A search of the Atlas of NSW Wildlife (NPWS 2010) was undertaken to identify records of threatened fauna species located within 10km of the site. This enabled the preparation of a predictive list of threatened fauna species that could possibly occur within the habitats found on the site.

#### *Fauna Survey*

A fauna survey of the subject site was undertaken generally incorporating the methodologies outlined in the Flora and Fauna Survey Guidelines For Development prepared by Wyong Shire Council (1999).

- Terrestrial and arboreal mammal trapping;
- Diurnal bird surveys;
- Nocturnal spotlighting;
- Bat echolocation call detection (Overnight and continuous recording);
- Nocturnal and diurnal amphibian searches;
- Nocturnal and diurnal reptile searches;
- Nocturnal and diurnal habitat searches;
- Playback of recorded owl calls;

Details of the fauna survey are shown in Table 3.2 and Figure 1.

This survey was a limited duration summer survey and more detailed seasonal surveys would be required to meet Councils Flora and Fauna Survey Guidelines.

TABLE 3.2 FAUNA SURVEY DETAILS				
Fauna Group	Date	Weather Conditions	Survey Method	Survey Effort/Time
Reptiles	03/12/09	20°C, 0/8 cloud, no wind, no rain	Diurnal habitat search / Opportunistic observation	3hrs 15min 0745-1100
	11/12/09	25°C, 8/8 cloud, NW wind, no rain	Diurnal habitat search / Opportunistic observation	1hr 0800-0900
	15/12/09	22°C, 7/8 cloud, Moderate NE wind, no rain	Diurnal habitat search / Opportunistic observation	2hrs 1800-2000
	15/12/09	22°C, 7/8 cloud, Moderate NE wind, no rain	Diurnal habitat search / Opportunistic observation	2hrs 1800-2000
	12/01/09	25°C, 0/8 cloud, Moderate NE wind, no rain	Diurnal habitat search / Opportunistic observation	1.5hrs 0800-0930
	24/11/09	18°C, 8/8 cloud, Light SE wind, light rain, no moon	Spotlighting	1hr 2030-2130
	15/12/09	22°C, 7/8 cloud, NE wind, no moon	Spotlighting	1hr 15min 2015-2130
Amphibians	03/12/09	20°C, 0/8 cloud, no wind, no rain	Diurnal habitat search / Call detection/ Opportunistic observation	3hrs 15min 0745-1100
	11/12/09	25°C, 8/8 cloud, NW wind, no rain	Diurnal habitat search / Call detection/ Opportunistic observation	1hr 0800-0900
	15/12/09	22°C, 7/8 cloud, Moderate NE wind, no rain	Diurnal habitat search / Call detection/ Opportunistic observation	2hrs 1800-2000
	15/12/09	22°C, 7/8 cloud, Moderate NE wind, no rain	Diurnal habitat search / Call detection/ Opportunistic observation	2hrs 1800-2000
	12/01/09	25°C, 0/8 cloud, Moderate NE wind, no rain	Diurnal habitat search / Call detection/ Opportunistic observation	1.5hrs 0800-0930
	24/11/09	18°C, 8/8 cloud, Light SE wind, light rain, no moon	Spotlighting	1hr 2030-2130
	15/12/09	22°C, 7/8 cloud, NE wind, no moon	Spotlighting	1hr 15min 2015-2130
Diurnal Birds	03/12/09	20°C, 0/8 cloud, no wind, no rain	Census & Opportunistic Survey	3hrs 15min 0745-1100
	11/12/09	25°C, 8/8 cloud, NW wind, no rain	Census & Opportunistic Survey	1hr 0800-0900
	15/12/09	22°C, 7/8 cloud, Moderate NE wind, no rain	Census & Opportunistic Survey	2hrs 1800-2000
	12/01/09	25°C, 0/8 cloud, Moderate NE wind, no rain	Census & Opportunistic Survey	1.5hrs 0800-0930
	24/11/09	18°C, 8/8 cloud, Light SE wind, light rain, no moon	Spotlighting; Recorded Call Playback	1hr 2030-2130
Nocturnal Birds	15/12/09	22°C, 7/8 cloud, NE wind, no moon	Spotlighting; Recorded Call Playback	1hr 15min 2015-2130
	24/11/09	18°C, 8/8 cloud, Light SE wind, light rain, no moon	Spotlighting	1hr 2030-2130
Arboreal Mammals	15/12/09	22°C, 7/8 cloud, NE wind, no moon	Spotlighting	1hr 15min 2015-2130
	28/12/09	20°C, 8/8 cloud, S wind, overnight showers	Type A & Type B Elicited Traps	200 Trap Nights
	29/12/09	20°C, 8/8 cloud, S wind, overnight showers	x 10 Traps per Transect	
	30/12/09	20°C, 0/8 cloud, SE wind, no rain	x 5 Transects	
	31/12/09	20°C, 3/8 cloud, NE wind, no rain		

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TABLE 3.2 FAUNA SURVEY DETAILS				
Fauna Group	Date	Weather Conditions	Survey Method	Survey Effort/Time
Terrestrial Mammals	24/11/09	18°C, 8/8 cloud, Light SE wind, light rain, no moon	Spotlighting	1hr 2030-2130
	15/12/09	22°C, 7/8 cloud, NE wind, no rain, no moon	Spotlighting	1hr 15min 2015-2130
	28/12/09	20°C, 8/8 cloud, S wind, overnight showers	Type A & Type B Elliott Traps x 10 Traps per Transect x 5 Transects	200 Trap Nights
	30/12/09	20°C, 0/8 cloud, SE wind, no rain		
31/12/09	20°C, 3/8 cloud, NE wind, no rain			
Bats	15/12/09	22°C, 7/8 cloud, NE wind, no rain, no moon	Spotlighting	1hr 15min 2015-2130
	24/11/09	18°C, 8/8 cloud, Light SE wind, light rain, no moon	Spotlighting	1hr 2030-2130
	24/11/09	18°C, 8/8 cloud, Light SE wind, light rain, no moon	Anabat II detection	0.5hrs 2030-2100
	15/12/09	22°C, 7/8 cloud, NE wind, no rain, no moon	Anabat II detection x 2	1hr 15min 2015-2130
	03/12/09	20°C, 0/8 cloud, no wind, no rain	Diurnal Habitat Search	3hrs 15min 0745-1100
	11/12/09	25°C, 8/8 cloud, NW wind, no rain	Diurnal Habitat Search	1hr 0800-0900
	15/12/09	22°C, 7/8 cloud, Moderate NE wind, no rain	Diurnal Habitat Search	2hrs 1800-2000

## 3.5 FAUNA OBSERVED

The fauna species observed within the subject site are included within Table 3.2. No threatened fauna species were observed within the subject site during surveys.

TABLE 3.3 FAUNA OBSERVED AND RECORDED		
Common Name	Scientific Name	Observation Method
<b>REPTILES</b>		
Land Mullet	<i>Egernia major</i>	O
Pale-flecked Garden Sunskink	<i>Lampropholis guichenoti</i>	O
Red-bellied Black Snake	<i>Pseudechis porphyriacus</i>	O
<b>BIRDS</b>		
Crested Pigeon	<i>Ocyphaps lophotes</i>	OC
Spotted Turtledove	<i>Streptopelia chinensis</i>	OC
Pied Cormorant	<i>Phalacrocorax varius</i>	O
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	O
Crested Tern	<i>Thalasseus bergii</i>	O
Silver Gull	<i>Chroicocephalus novaehollandiae</i>	OC
Galah	<i>Eolophus roseicapillus</i>	O
Laughing Kookaburra	<i>Dacelo novaeguineae</i>	O
Dollarbird	<i>Eurystomus orientalis</i>	OC
White-throated Treecreeper	<i>Cormobates leucophaea</i>	OC
Superb Fairy-wren	<i>Malurus cyaneus</i>	OC
White-browed Scrubwren	<i>Sericornis frontalis</i>	OC
Brown Thornbill	<i>Acanthiza pusilla</i>	OC
Eastern Spinebill	<i>Acanthorhynchus tenuirostris</i>	OC
Lewin's Honeyeater	<i>Meliphaga lewinii</i>	OC
Little Wattlebird	<i>Anthochaera chrysoptera</i>	OC
Red Wattlebird	<i>Anthochaera carunculata</i>	OC
New Holland Honeyeater	<i>Phylidonyris novaehollandiae</i>	OC
Eastern Whipbird	<i>Psophodes olivaceus</i>	O
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	OC
Australasian Figbird	<i>Sphecotheres vieilloti</i>	O
Olive-backed Oriole	<i>Oriolus sagittatus</i>	OC
White-breasted Woodswallow	<i>Artamus leucorhynchus</i>	O
Australian Magpie	<i>Cracticus tibicen</i>	OC
Pied Currawong	<i>Strepera graculina</i>	OC
Willie Wagtail	<i>Rhipidura leucophrys</i>	OC
Australian Raven	<i>Corvus coronoides</i>	OC
Magpie-lark	<i>Grallina cyanoleuca</i>	OC
Eastern Yellow Robin	<i>Eopsaltria australis</i>	OC
Silvereye	<i>Zosterops lateralis</i>	OC
Welcome Swallow	<i>Hirundo neoxena</i>	O
<b>MAMMALS</b>		
Brown Antechinus	<i>Antechinus stuartii</i>	E
Common Ringtail Possum	<i>Pseudocheirus peregrinus</i>	E Sp
Swamp Wallaby	<i>Wallabia bicolor</i>	Sp
Bush Rat	<i>Rattus fuscipes</i>	E
Swamp Rat	<i>Rattus lutreolus</i>	E
House Mouse *	<i>Mus musculus</i>	E
Gould's Wattle Bat	<i>Chalinolobus gouldii</i>	A

TABLE 3.3 FAUNA OBSERVED AND RECORDED		
Common Name	Scientific Name	Observation Method
<b>Key to Observation Type</b>		
O	- Observation	S - Search
C	- Call identification	A - Anabat II
Sp	- Spotlight	Sc - Scat, Track or Sign
E	- Elliott Trap	K - Kill
Note: * indicates introduced species. <b>Species Name</b> <sup>TS</sup> indicates threatened species TSC Act NSW. <b>Species Name</b> <sup>TSP</sup> indicates preliminary threatened species listing exists for inclusion within the TSC Act (1995).		

## SECTION 4

### ASSESSMENTS AND CONCLUSIONS

#### 4.1 ENVIRONMENT PROTECTION & BIODIVERSITY CONSERVATION ACT (1999) ASSESSMENT

The *Environment Protection and Biodiversity Conservation Act*, (1999) requires that Commonwealth approval be obtained for certain actions. The Act provides an assessment and approvals systems for actions that have a significant impact on matters of National Environment Significance (NES). These may include:-

- Wetlands protected by international treaty (the Ramsar Convention);
- Nationally listed threatened species and ecological communities;
- Nationally listed migratory species.

Actions are projects, developments, undertakings, activities, series of activities or alteration of any of these. An action that needs Commonwealth approval is known as a controlled action. A controlled action needs approval where the Commonwealth decides the action would have a significant effect on a matter of National Environmental Significance.

Where a proposed activity is located in an area identified to be of National Environmental Significance, or such that it is likely to significantly affect threatened species, ecological communities, migratory species or their habitats, the matter needs to be referred to the Department of the Environment, Water, Heritage and Arts (DEWHA).

No threatened flora or fauna species listed within the EP&BC Act (1999) were observed within the subject site.

One migratory fauna species the White-bellied Sea-eagle (*Haliaeetus leucogaster*) listed within the EP&BC Act (1999) was observed flying over the subject site.

One Critically Endangered Ecological Community listed within the EP&BC Act (1999) was observed within the subject site. The area of Littoral Rainforest is included in the Littoral Rainforest and Coastal Vine Thickets critically endangered ecological community. A detailed assessment of any future development proposal is required to be undertaken in accordance with the Significant Impact Guidelines published by DEWHA (2009). A referral of the project to DEWHA may be required depending on the outcome of the assessments undertaken for any future development.

##### 4.1.1 Assessment of Significant Impact on a Listed Migratory Species

With regard to the migratory species listed in the *EPBC Act* (1999), observed within the subject site, several criteria must be assessed to satisfy the requirements of the *EPBC Act* (1999). These criteria are identified within the EPBC Act Policy Statement 1.1 *Significant Impact Guidelines* (DEWHA 2009).

##### White-bellied Sea-eagle (*Haliaeetus leucogaster*)

##### Determining Important Habitat for a Migratory Species

For the purposes of assessment of a migratory species under the *EP&BC Act* (1999) an assessment as to whether the subject site provides an area of "important habitat" is required.



Questions (in bold) to determine whether the subject site provides "*important habitat*" are as follows:

- **Habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species; and/or**

Due to the low numbers of this species observed (one individual) and the presence of larger areas of suitable habitat within adjoining lands it is considered that the subject site does not support an ecologically significant proportion of the population of the species.

- **Habitat that is of critical importance to the species at particular life-cycle stages; and/or**

The subject site is considered to provide foraging and roosting habitat for this species. The subject site has not been registered as critical habitat for this species within the provisions of the *EPBC Act* (1999). Larger areas of suitable habitat this species are present within the adjoining areas and therefore the subject site is considered to not be habitat that is of critical importance to the species at particular life-cycle stages.

- **Habitat utilised by a migratory species which is at the limit of the species range;**

This species is widespread along most of the coastline of Australia and inland along rivers (Marchant and Higgins 1993). Therefore the subject site is considered to not contain habitat utilised by a migratory species which is at the limit of the species range.

- **Habitat within an area where the species is declining.**

The subject site has not been registered as critical habitat for this species within the provisions of the *EPBC Act* (1999). The population demographics for this species within the local area are not known. Further studies are required in order to ascertain whether the species is declining within the local area. These studies are beyond the scope of this assessment.

From the above information and details it is considered that the habitats for this species within the subject site are not:

- Habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species; and/or
- Habitat that is of critical importance to the species at particular life-cycle stages; and/or
- Habitat utilised by a migratory species which is at the limit of the species range; or
- Habitat within an area where the species is declining.

Therefore it is considered that the habitat within the subject site for this migratory species does not satisfy the criteria of "*important habitat*" as identified by the DEWHA (2009).

Notwithstanding the above conclusions if the precautionary approach is adopted, further consideration as to whether the proposed action is likely to have a significant impact on this

species needs to assess the significant impact criteria (DEWHA 2009) for a migratory species.

#### **Significant Impact Criteria**

The consideration as to whether the proposed action is likely to have a significant impact on a migratory species needs to assess the significant impact criteria (DEWHA 2009) for a migratory species.

An action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- ***Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate and area of important habitat for a migratory species;***

The proposed development area has already been modified by weed invasion. The proposed development will result in the retention of approximately 6.5 hectares of the better quality habitat within the subject site for this species. Therefore it is considered that the proposed action is unlikely to substantially modify, destroy or isolate an area of important habitat for this species.

- ***Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species; or***

The proposed action is not of a type of development that is likely to result in the establishment of an invasive species that is harmful to this species becoming established in an area of important habitat for this species.

- ***Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.***

Due to the availability of a larger areas of suitable habitat for this species within the locality it is considered that the removal of a relatively small amount of potential foraging and roosting habitat is not likely to seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

It is considered that the proposed action does not constitute a matter of National Environmental Significance and a referral of this project to the Department of the Environment, Water, Heritage and Arts is not required as the proposed action is not likely to impact on a significant population of nationally listed threatened or migratory species or on any nationally listed endangered ecological community.

#### **4.2. ASSESSMENT OF IMPACT ON THREATENED SPECIES**

As identified in Section 5(A) of the *EP&A Act 1979* the following matters need to be addressed to determine whether or not a significant effect on threatened species, populations or ecological communities or their habitats is likely to result from the proposed development.

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

**FLORA*****Acacia bynoeana***

This species occurs mainly in heath and dry open forests or woodlands on sandy soils and loamy clay soils (Harden 1994). This species is easily identifiable when not in flower.

It is considered that suitable habitat for this species is present on the subject site, however this species was not observed during surveys. It is considered that the action proposed is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

***Caladenia porphyrea***

This species grows in coastal sclerophyll forest on sandy soils and flowers between August and October.

It is considered that suitable habitat for this species is present on the subject site, however this species was not observed during surveys. It is considered that the action proposed is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

***Callistemon linearifolius***

This species grows in woodland or dry sclerophyll forest on the coast and adjacent ranges. This species is easily identifiable when not in flower.

It is considered that suitable habitat for this species is present on the subject site, however this species was not observed during surveys. It is considered that the action proposed is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

***Chamaesyce psammogeton***

This species grows on foredunes and exposed sites on headlands.

It is considered that suitable habitat for this species is present on the subject site, however this species was not observed during surveys. It is considered that the action proposed is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

***Eucalyptus camfieldii***

*Eucalyptus camfieldii* has been described as being associated with number of habitats. One is shallow sandstone soils bordering coastal heath in association with other stunted or mallee eucalypts (Harden 1991), often in areas with restricted drainage. Another habitat preference is for laterite influenced soils (Carolin & Tindale 1994). The presence of such laterite influenced soils, containing *E. camfieldii*, is thought to be associated with proximity to shale (Benson & Howell 1995).

It is considered that suitable habitat for this species is present on the subject site, however this species was not observed during surveys. It is considered that the action proposed is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

***Syzygium paniculatum***

This species is found predominantly along the coast on headlands and ranges. It is usually found growing in or near subtropical and littoral rainforests on sandy soils, stabilised dunes near the sea or sheltered gullies, especially near watercourses (Fairly and Moore 1989; Harden 1991).

It is considered that suitable habitat for this species is present on the subject site, however this species was not observed during surveys. It is considered that the action proposed is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

## FAUNA

### Wallum Froglet (*Crinia tinnula*)

The Wallum Froglet is mainly confined to acid paperbark swamps and wallum areas with poor drainage (Barker *et al.* 1995). This species breeds in late winter and is restricted to coastal areas of southern Qld and NSW (Cogger 2000).

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

### Osprey (*Pandion haliaetus*)

The Osprey is generally found in association with waterbodies including coastal waters, inlets, lakes, estuaries, beaches, offshore islands and sometimes along inland rivers (Schodde and Tidemann 1986; Clancy 1991; Olsen 1995). These habitat locations usually have a sufficient supply of fish for food and possible nesting sites (Clancy 1991). Osprey may nest on the ground on sea cliffs or in trees. Osprey generally prefer emergent trees, often dead or partly dead with a broken off crown (Olsen 1995).

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

### Lesser Sand Plover (*Charadrius mongolus*)

The Lesser Sand Plover inhabits beaches of sheltered bays, harbours and estuaries with large intertidal sandflats or mudflats (Marchant & Higgins 1993). This species forages on the intertidal mudflats taking molluscs, crustaceans and worms. They breed in Central and Northern Asia during the northern summer migrating south in the non breeding season throughout South East Asia and as far south as Australia arriving around September. In NSW this species is most common on the north coast.

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

### Little Tern (*Sterna albifrons*)

This species inhabits shelter coastal lagoons, estuaries, river mouths, bays harbours of coastal eastern and northern Australia and New Zealand, especially those with exposed sandbanks or spits. They forage above shallow waters plunging into the water to take fish and crustaceans (Higgins & Davies 1996). Little Terns nest in colonies on sand spits and the banks of lakes, estuaries and ocean beaches. This species suffers severe nest loss through human activities and predation from foxes and cats.

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

**Sanderling (*Calidris alba*)**

During the non-breeding season, this species occurs in coastal areas on low beaches of firm sand, near reefs and inlets, along tidal mudflats and bare open coastal lagoons. This species prefers open sandy beaches exposed to open sea-swell, exposed sandbars and spits (Higgins & Davies 1996).

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

**Great Knot (*Calidris tenuirostris*)**

The Great Knot breeds in far north-eastern Siberia and winters from southern China west to Pakistan and south to Australia, where it occurs mainly from October to March. Preferred habitats for this species include tidal mudflats; sandy ocean and bay shores; estuaries; shallow saline and freshwater wetlands. A small portion of individuals have been recorded in inland fresh and salt water lakes (NPWS 1999).

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

**Broad-billed Sandpiper (*Limicola falcinellus*)**

The Broad-billed Sandpiper is a migratory species that breeds in the Northern Hemisphere, visiting Australia during the summer. This species inhabits tidal mudflats, estuaries, saltmarshes and reefs as roosting and feeding habitats. Occasionally, individuals may be recorded in shallow river margins and sewage ponds. The species tends to favour intertidal sand and mudflats in estuaries. This species roosts on banks on sheltered sand, shell or shingle beaches.

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

**Terek Sandpiper (*Xenus cinereus*)**

This species inhabits saline intertidal flats in sheltered estuaries, bays harbours and lagoons. They forage on the intertidal mudflats taking molluscs, crustaceans and arachnids (Higgins & Davies 1996). Terek Sandpipers are a summer migrant to the south-eastern coastline of Australia and undertake winter breeding migrations to Northern Eurasia from Finland in the west to Northern China in the east.

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

**Black-tailed Godwit (*Limosa limosa*)**

The Black-tailed Godwit is a migratory species that breeds in Mongolia and Siberia, visiting Australia during the summer (Kingsford 1991). The Black-tailed Godwit inhabits tidal mudflats, beaches, estuaries, sandpits, shallow river margins, sewage ponds; inland on large shallow fresh or brackish waters.

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

**Gang-gang Cockatoo (*Callocephalon fimbriatum*)**

The Gang-gang Cockatoo is associated with a variety of woodland and forest habitats, and occasionally more open areas in south-eastern New South Wales and Victoria (NSW Scientific Committee, 2005). This species utilises eucalypt forests and exotic trees, and is known to feed on the seeds of native shrubs and trees, in addition to some exotic species such as the Hawthorn and Cupressus species (Schodde & Tideman 1986).

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

**Superb Fruit-dove (*Ptilinopus superbis*)**

This species inhabits mostly closed forests, occasionally near streams or lakes within rainforest. Breeding most commonly occurs within dense forests. They are a regular autumn and winter migrant to the Hunter, Sydney, Illawarra and South Coast regions. This species is frugivorous, taking fruits of many species of rainforest trees, vines and palms (Higgins & Davies 1996).

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

**Little Lorikeet (*Glossopsitta pusilla*)**

Little Lorikeets are distributed in forests and woodlands from the coast to the western slopes of the Great Dividing Range, extending westwards to the vicinity of Albury, Parkes, Dubbo and Narrabri. Lorikeets are gregarious, usually foraging in small flocks, often with other species of lorikeet. They feed primarily on nectar and pollen in the tree canopy, particularly on profusely-flowering eucalypts, but also on a variety of other species including, melaleucas and mistletoes (Courtney & Debus 2006).

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

**Swift Parrot (*Lathamus discolor*)**

The Swift Parrot inhabits Eucalypt forests. It breeds in hollows in mature and senescent trees (Lindsey 1992). This species favours the nectar and pollen of eucalypts particularly Blue Gum (*E. globulus*) in Tasmania (Brown 1989). On the mainland this species congregates on winter-flowering Eucalypts including Red Ironbark (*E. sideroxylon*), Yellow Gum (*E. leucoxyton*), White Box (*E. albens*), Swamp Gum (*E. ovata*) and Manna Gum (*E. viminalis*) (Brown 1989; Garnett 1993). The Swift Parrot is a migratory species that breeds in Tasmania and its offshore islands in summer. In late March almost the entire population migrates to mainland Australia spreading from Victoria through to central and coastal NSW and south east Queensland (Schodde & Tidemann 1986).

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

**Turquoise Parrot (*Neophema pulchella*)**

The Turquoise Parrot is a sedentary species inhabiting the foothills of the Great Divide, including steep rocky ridges and gullies, rolling hills, valleys and river-flats, sometimes nearby plains (Higgins 1999). This species feeds on the ground among seeding grasses or weeds usually beneath trees. This species is endemic to eastern Australia, and is known from south-east Queensland through eastern New South Wales to north-east Victoria (Higgins 1999).

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

**Barking Owl (*Ninox connivens*)**

The Barking Owl utilises Dry sclerophyll forests and woodlands of tropical, temperate and semi-arid zones, often dominated by *Eucalyptus*, and containing many large trees suitable for roosting or breeding. This species is both carnivorous and insectivorous, taking mainly insects outside breeding season and more birds and mammals when breeding (Higgins 1999).

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

**Powerful Owl (*Ninox strenua*)**

The Powerful Owl breeds in open or closed sclerophyll forests and woodlands, including wet sclerophyll forest and dry sclerophyll forest and woodlands. They nest in hollows in large old trees; usually living *Eucalyptus*, within or below canopy – rarely in dead stags, stumps or broken-off trunks (Higgins 1999). Powerful Owls are sedentary within home ranges of about 1,000 hectares within open eucalypt, *Casuarina* or *Callitris* pine forest and woodlands, though they often roost in denser vegetation, including rainforest or exotic pine plantations (Garnett & Crowley, 2000). Powerful Owls feed mainly on those medium-sized species of arboreal marsupials that are most readily available at any given locality (Lavazanian *et al.* 1994).

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

**Masked Owl (*Tyto novaehollandiae*)**

The Masked Owl is widespread through forests and woodlands, utilising caves for shelter in treeless country. The Masked Owl is known to utilise forest margins and isolated stands of trees within agricultural land (Hollands 1991; and Hyem 1979). This species is often found in heavily disturbed forest where its prey of small and medium sized mammals can be readily obtained (Kavanagh & Peake 1993). The Masked Owl requires old mature trees with large hollows for breeding and as diurnal roosting sites, being dependent upon hollow bearing trees all year round rather than only during the breeding season (Hyem 1979).

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

**Regent Honeyeater (*Xanthomyza phrygia*)**

The Regent Honeyeater inhabits mostly dry eucalypt woodlands and forests dominated by box ironbark eucalypts; on inland slopes of Great Divide, especially associations in moister more fertile sites, along creeks, broad river valleys and on lower slopes of foothills (Higgins *et al.* 2001). Nectar is the principle food but sugary exudates from insects are also used, and insects are essential for breeding (Oliver 1998 and Oliver 2000). The Regent Honeyeater is known to breed along the western slopes of the Great Dividing Range in New South Wales (Bundarra-Barraba district, Capertee Valley). Occasionally breeding elsewhere (Franklin *et al.* 1989).

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

**Southern Brown Bandicoot (*Isodon obesulus obesulus*)**

The Southern Brown Bandicoot has also been detected in forests and woodlands with a heathy or shrubby understorey characterised by *Acacia*, *Banksia*, *Daviesia*, *Epacris*, *Hakea*, *Leptospermum*, *Melaleuca* and *Platylobium* species as well as in agricultural land and urban areas. The Southern Brown Bandicoot prefers areas with thick ground cover which provide protection from predators (Braithwaite, 1988). Environment Australia (2000) found that although this species was found over a range of habitat types it was more typically associated with heathland environments on sandy friable soils.

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

**Eastern Pygmy Possum (*Cercartetus nanus*)**

The Eastern Pygmy-possum is found from rainforest through sclerophyll forest to tree heath. *Banksia* and myrtaceous shrubs and trees are favoured (Turner & Ward 1995). Eastern Pygmy-possums usually shelter alone in tree cavities, rotten stumps, holes in the ground, disused bird nests and possum dreys and in vegetation thickets such as *Xanthorrhoea* species (Menkhorst 2001). The home ranges of males, about 0.65 hectares are larger than those of females, about 0.35 hectares and not exclusive with home ranges broadly overlapping. Apart from females with young in the nest, individuals may utilise a number of nest sites within the home range (Turner & Ward 1995; Menkhorst 2001).

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

**Spotted-tailed Quoll (*Dasyurus maculatus*)**

The Spotted-tailed Quoll inhabits a number of habitats including dry to moist open forests or closed forests containing rock caves, hollow logs or trees for shelter / breeding.

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have



an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

**Koala (*Phascolarctos cinereus*)**

Koalas inhabit forested areas with acceptable Eucalypt food trees, also utilising some other non-Eucalypt species as a food source. Koalas inhabit both wet and dry Eucalypt forest that contain a canopy cover of between 10 and 70% as well as suitable feed trees (Reed *et al.* 1990).

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

**Squirrel Glider (*Petaurus norfolcensis*)**

The Squirrel Glider inhabits dry hardwood forest and woodland over most of its range. Mixed-aged stands that support the Squirrel Glider invariably include gum-barked and high nectar-producing species including some that flower in winter (Menkhorst *et al.* 1988). Riparian open forests inhabited by the Squirrel Glider typically contain mature *Acacia dealbata* which may act as an important winter carbohydrate source when other food sources are scarce (Menkhorst *et al.* 1988). The presence of mature, hollow-bearing eucalypts is a critical characteristic of habitat occupied by Squirrel Gliders and are utilised for nesting and breeding (Suckling 1995).

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

**Grey-headed Flying-fox (*Pteropus poliocephalus*)**

The Grey-headed Flying-fox inhabits a wide range of habitats including rainforest, mangroves, paperbark forests, wet and dry sclerophyll forests and cultivated areas. This species roosts in camps, which may contain tens of thousands of individuals. Camps are commonly formed in gullies, typically not far from water and usually in vegetation with a dense canopy (Tidemann 1998).

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

**Yellow-bellied Sheath-tail-bat (*Saccolaimus flaviventris*)**

The Yellow-bellied Sheath-tail-bat inhabits a wide variety of habitats from wet and dry sclerophyll forest, to open woodland, shrubland, mallee, grassland and desert. They fly fast and straight usually over the canopy, and lower over open spaces and at forest edges. This species roosts in large tree hollows (Churchill 2009).

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

**Eastern Freetail-bat (*Mormopterus norfolkensis*)**

The Eastern Freetail-bat utilises dry eucalypt forest and woodland on the coastal side of the Great Dividing Range. They show a preference for open spaces in woodland or forest, and are more active in the upper slopes of forest areas rather than in riparian zones. They also forage over large waterways. This species roosts in hollow trees (usually in hollow spouts), under exfoliating bark and in various man made structures (Churchill 2009).

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

**Greater Broad-nosed Bat (*Scoteanax rueppellii*)**

A wide variety of habitats are utilised by this species including moist gullies in mature coastal forest, rainforest, open woodland, Melaleuca swamp woodland, wet and dry sclerophyll forest, cleared areas with remnant trees and tree-lined creeks in open areas. The Greater Broad-nosed Bat forages about 5m from the edge of isolated trees, forest remnants or along forest crowns with a slow direct flight pattern. This species is known to roost in tree hollows, cracks and fissures in trunks and dead branches, under exfoliating bark, as well as in man made structures including roofs of old buildings (Churchill 2009).

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

**Eastern Bentwing-bat (*Miniopterus schreibersii*)**

Preferred habitats for this species include rainforest, wet and dry sclerophyll forest, open woodland, Melaleuca forests and open grassland. The Eastern Bentwing-bat forages high in forested areas from just above canopy height to many times canopy height. In more open areas such as grasslands, flight may be within a few metres of the ground. Eastern Bentwing-bats are cave dwellers, but will also roost in man made structures such as road culverts and mines (Churchill 2009).

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

**Little Bentwing-bat (*Miniopterus australis*)**

The Little Bentwing-bat forages below the canopy within well timbered areas including rainforest, vine thicket, wet and dry Melaleuca swamps and coastal forests. This species is a cave dweller with individuals congregating during the summer months in maternity colonies and disperse during the winter. Other roost sites used by this species include abandoned mines, tunnels, stormwater drains and occasionally in buildings, banana trees and tree hollows (Churchill 2009).

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

**Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)**

The Eastern False Pipistrelle inhabits wet sclerophyll forest, open forest, rainforest and coastal mallee. They generally prefer tall and wet forests where the trees are more than 20 metres high and the understorey is dense. This species predominantly roosts in hollow trunks of eucalypts, however have also been reported to roost in caves and old buildings (Churchill 2009).

The subject site is considered to contain suitable habitat for this species however it was not observed during surveys. It is considered that the proposed development is not likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.

**b) species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,**

No flora or fauna specimens belonging to any endangered population were observed within the subject site. Therefore the proposed action will not have an adverse effect on the life cycle of any species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.

**c) In the case of a critically endangered or endangered ecological community, whether the action proposed,**

The endangered ecological communities observed within the subject site are:

- Littoral Rainforest in the NSW North Coast, Sydney Basin and South East Corner Bioregions (LR) which corresponds to the Littoral Rainforest vegetation community and;
- Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions (SSFCF) which corresponds to the Swamp Sclerophyll Forest vegetation community.

A 100 metre buffer zone to the area of Littoral Rainforest is included within the proposed development, exclusive of areas required for bushfire asset protection zones.

Assessments for these endangered ecological communities are provided below.

**i. Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**

The proposed development area is not within an endangered ecological community.

It is therefore considered that the proposed development is not likely to have an adverse effect on the extent of any ecological community such that its local occurrence is likely to be placed at risk of extinction.

**ii. Is likely to substantially and adversely modify the composition such that its local occurrence is likely to be placed at risk of extinction,**

The proposed development area is not within an endangered ecological community.

With adequate buffers surrounding endangered ecological communities and vegetation management the proposed development is not likely to substantially and

adversely modify the composition such that the local occurrence of any ecological communities are likely to be placed at risk of extinction.

**d) In relation to the habitat of threatened species, populations or ecological community:**

**i. The extent to which habitat is likely to be removed or modified as a result of the action proposed, and**

The proposed development is likely to result in the removal or modification of approximately 4.2 hectares of vegetation and habitats within the northern portion of the subject site. Approximately 6.5 hectares of vegetation within the remainder of the site will be retained.

**ii. Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action,**

The subject site is located at the southern extremity of an already isolated remnant of native vegetation. It is therefore unlikely that the proposed development will further fragment or isolate other areas of habitat as a result of the proposed action.

**iii. The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality**

The subject site provides suitable habitat for locally occurring threatened species.

Areas of habitat within the proposed development area however have been disturbed by weed invasion.

Due to the presence of large areas of similar habitats within the local conservation reserves such as Wyrabalong and Wallarah National Parks, Munmorah State Conservation Area and Wamberal lagoon nature Reserve, the habitat to be removed, modified, fragmented or isolated by the proposal is considered not important to the long-term survival of threatened species, populations or ecological communities in the locality.

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

The subject site has not been classed as critical habitat within the provisions of the *Threatened Species Conservation Act* (1995). Therefore it is considered that the proposed development will not have an adverse effect on critical habitat (either directly or indirectly).

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

There are Recovery Plans for the following threatened species which are considered to have suitable habitat contained within the subject site: Barking Owl, The Large Forest Owls, Southern Brown Bandicoot, Koala and Grey-headed Flying-fox.

The proposed development is considered not inconsistent with the broader objectives or actions of these Recovery Plans.

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

The proposal is likely to result in "Clearing of native vegetation", "Loss of hollow bearing trees", "Invasion of native plant communities by exotic perennial grasses" and "Removal of Dead Wood and Dead Trees" and is therefore a class of development recognised as several key threatening processes. The proposed development is likely to provide an opportunity to manage the site with regard to "Invasion, establishment and spread of Lantana" and the "Invasion of native plant communities by Bitou Bush and Boneseed".

#### 4.3 STATE ENVIRONMENTAL PLANNING POLICIES

##### **SEPP 14 - Coastal Wetlands**

The subject site is not included within an area mapped as a wetland in SEPP 14.

##### **SEPP 26 - Littoral Rainforest**

The subject site is not included within any area mapped as a Littoral Rainforest in SEPP 26. However areas of vegetation on-site correspond to Littoral Rainforest with respect to species composition and substrate. This area is identified as an endangered ecological community and is assessed in Section 4.2.

##### **SEPP 44 - Koala Habitat Assessment**

The subject site was assessed for activity by Koalas using the following methods:

- i. A search of the Atlas of NSW Wildlife (NPWS 2010) was undertaken to identify records of Koalas in the area.
- ii. The site was surveyed on foot with any species of Koala food trees being inspected for signs of Koala usage. Trees were inspected and identified for presence of Koalas, scratch and claw marks on the trunk and scats around the base of each tree. The proportion of any trees showing signs of Koala use was calculated for the whole of the site. Additionally the location and density of droppings if found were documented.
- iii. Koalas were also targeted during spotlight surveys.
- iv. Identification and assessment of the density of tree species listed as Koala food trees in State Environmental Planning Policy No. 44 - Koala Habitat Protection was undertaken across the site.

<b>TABLE 4.1</b>			
<b>SEPP-44 KOALA FEED TREE SPECIES</b>			
<small>(From SEPP 44 Schedule 2)</small>			
<b>Scientific Name</b>	<b>Common Name</b>	<b>Observed On Site</b>	<b>Percentage within survey plots</b>
<i>Eucalyptus tereticornis</i>	Forest Red Gum	Yes	<15%
<i>Eucalyptus microcorys</i>	Tallowwood	No	0%
<i>Eucalyptus punctata</i>	Grey Gum	No	0%
<i>Eucalyptus viminalis</i>	Ribbon or Manna Gum	No	0%
<i>Eucalyptus camaldulensis</i>	River Red Gum	No	0%
<i>Eucalyptus haemasioma</i>	Broad-leaved Scribbly Gum	No	0%
<i>Eucalyptus signata</i>	Scribbly Gum	No	0%
<i>Eucalyptus albens</i>	White Box	No	0%
<i>Eucalyptus populnea</i>	Bimble Box or Poplar Box	No	0%
<i>Eucalyptus robusta</i>	Swamp Mahogany	Yes	<15%

Two Koala food tree species *Eucalyptus tereticornis* (Forest Red Gum) and *Eucalyptus robusta* (Swamp Mahogany) as listed on Schedule 2 of State Environmental Planning Policy No. 44 - Koala Habitat Protection (SEPP 44) is present within the subject site. These species not constitute more than 15% of the total number of trees in the upper or lower strata of the tree component. Therefore the subject site is considered to not form potential koala habitat as defined by SEPP 44.

No Koalas were observed during the fauna survey and no evidence of Koala habitation, such as scats, claw and scratch marks, were located on the site. Therefore the subject site is considered to not form core koala habitat as defined by SEPP 44.

#### 4.4 WYONG SHIRE COUNCIL INTERIM CONSERVATION AREAS

The site is included within the areas identified as an Interim Conservation Area within Chapter 13 of Councils Development Control Plan. A detailed assessment of any future development scenarios would need to be undertaken in relation to the requirements of chapter 13 of the DCP and Councils Squirrel Glider Conservation Management Plan.

As the site contains habitat for Squirrel Gliders and is included in the Interim Conservation Area then the proposal is likely to require the preparation of a species Impact Statement as identified on Page 31 of Councils Squirrel Glider Conservation Management Plan.

#### 4.5 CONCLUSIONS

Based on the detailed field survey and information provided in this report it is concluded that:

- i. No threatened flora or fauna species or threatened populations were observed on the subject site;
- ii. One migratory fauna species, the White-bellied Sea-eagle, as listed within the *EPBC Act* (1999) was observed flying over the subject site;
- iii. No endangered populations were observed within the subject site;
- iv. Two endangered ecological communities, Littoral Rainforest in the NSW North Coast, Sydney Basin and South East Corner Bioregions and Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions were observed within the subject site;
- v. One critically endangered ecological community listed on the EP&BC Act, Littoral Rainforest and Coastal Vine Thickets of Eastern Australia is present on the site;
- vi. A Species Impact Statement is likely to be required for the proposed development in relation to Squirrel Glider habitat clearing and DCP Chapter 13.
- vii. A referral to the Department of the Environment, Water, Heritage and Arts (DEWHA) may be required if the area of Littoral Rainforest is likely to be impacted by future development.

If future development is to occur within the site it is recommended that suitable management strategies be implemented to ensure the protection of habitats and species within and adjoining the site. Preparation of an Environmental Management Plan (EMP) for the construction activities is recommended. This EMP should include but not be limited to:

- a) Sediment and erosion control measures;
- b) Weed management strategies;
- c) Habitat protection and amelioration strategies;
- d) Protection of retained areas;
- e) Appropriate planning and tree management strategies to minimise tree removal; and
- f) Adequate revegetation of disturbed areas.

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**APPENDIX 3**

**BUSHFIRE HAZARD ASSESSMENT**



**BUSHFIRE ASSESSMENT REPORT**

**POSSIBLE CARAVAN PARK  
CENTRAL COAST HIGHWAY  
BUDGEWOI**

**JANUARY 2010  
(REF: 9128B)**

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**BUSHFIRE ASSESSMENT REPORT**

**POSSIBLE CARAVAN PARK  
CENTRAL COAST HIGHWAY  
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**JANUARY 2010**

**Conacher Environmental Group**

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## **PREFACE**

This document provides an assessment of the bushfire attack potential and the necessary bushfire protection strategies for the proposed construction of a caravan/tourist park at Budgewoi. Aspects in relation to the Bushfire Assessment Report include; vegetation type, slopes, water supplies, entry and egress access, provision and maintenance of defendable space and construction standards for the proposed buildings.

Report & Assessment Completed by:

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## SECTION 1

## BACKGROUND DETAILS

## 1.1 INTRODUCTION

This Bushfire Assessment Report has been prepared by *Conacher Environmental Consultants* for the proposed development within land to the east of the Scenic Highway and south of Lakes Beach Surf Club, Budgewoi.

The objectives of this Report are to:

- i) Address the relevant requirements of Planning for Bushfire Protection (Rural Fire Service, 2006);
- ii) Identify if the development complies with the aims and objectives of Planning for Bushfire Protection (RFS, 2006);
- iii) Prepare a Report that supplies the relevant information for the Rural Fire Service and Council prior to granting a development approval.

## 1.2 SITE CHARACTERISTICS

The planning and cadastral details of the subject site are provided in Table 1.1 while Table 1.2 summarises the geographical characteristics of the site.

TABLE 1.1 SITE DETAILS	
Location	Lot 7084 DP 1030670, Wepipi Street, Noraville and Lot 523 DP 704440 and Part Lot 7023 DP 1030667, Central Coast Highway, Budgewoi.
Area	Approximately 10.7 hectares
Topographic Map	Toukley 1:25 000
Grid Reference	366055E 6319260N
Local Government Area	Wyong Shire Council
Existing Land Use	Vacant land
Current Zoning	6(a) Open Space and Recreation
Proposed Development	Coastal foreshore walkway and caravan park

TABLE 1.2 SITE CHARACTERISTICS	
Elevation	Approximately 1-5m AHD
Topography	Sand dune and coastal sand flats
Slope	Up to 10% on dunes and <2% on flats
Aspect	Westerly to north-westerly
Soil Type	Loose medium yellowish brown quartz sand of the Narrabeen Soil Landscape and dark brown loose loamy sand of the Woy Woy soil landscape
Catchment	Tuggerah Lakes
Drainage	Seepage into the watertable
Vegetation	-Littoral Rainforest; -Swamp Sclerophyll Forest; -Dune Vegetation; and -Tall Heath Vegetation.

### 1.3 PROPOSED DEVELOPMENT

At this stage the site is being assessed for its potential suitability for a caravan park. A preliminary concept plan has been prepared which identifies a total of 101 sites for short term tourist use. A range of amenities and facilities including camp kitchen, pool, recreation facilities and park amenities buildings are also proposed. Onsite guest and visitor parking and an internal roadway is also included in the design plans.

The Flora and Fauna Assessment Report (Conacher Environment Group 2010) identified the presence of two endangered ecological communities in the southern part of the site. A 100 metre conservation buffer area has been recommended to the north of the Littoral Rainforest area to protect this EEC from wind impacts from adjoining developed areas.

The Bushfire Assessment has incorporated the 100 metre buffer area within the assessment parameters for the proposal. Any future asset protection zones have been assessed as being located outside of this 100 metre buffer zone.

## SECTION 2

### BUSHFIRE ATTACK ASSESSMENT

---

#### 2.1 BUSHFIRE ASSESSMENT CRITERIA

##### ***Bushfire Prone Land Map***

The Bushfire Prone Land Map for the subject site shows the site contains and is adjoined by Category 1 vegetation.

Land to the east of the site is mapped as Category 1 vegetation while the residential land to the west is mapped as a buffer area to Category 2 vegetation.

##### ***Forest Fire Danger Index***

The subject site is located within the Wyong Shire Council Local Government Area in the Greater Sydney Region. The Forest Fire Danger Index for the Greater Sydney Region is rated at 100 for use in determining asset protection zone requirements and categories for bushfire attack.

##### ***Vegetation Classification***

The vegetation formations surrounding the subject site, to a distance of 140 metres from the proposed development are as follows:

North	Cleared land within carpark and surf club areas. Remnant vegetation.
South	Forest vegetation and tall heath.
East	Low heath on frontal dune.
West	Tall forest extending to the west of Central Coast Highway.

The forest vegetation to the south and west contains area of Swamp Forest. However they have not been assessed as forested wetlands because of the high infiltration rates for the sandy soil substrate which is unlikely to retain flooding inundation for any lengthy periods.

##### ***Development Category***

The caravan park (tourist accommodation) is classified as special fire protection purpose development for the purposes of undertaking a bushfire hazard assessment.

##### ***Planning for Bushfire Protection (RFS, 2006)***

Due to the subject site being mapped within a bushfire prone land map a Bushfire Assessment Report prepared in accordance with the requirements of *Planning for Bushfire Protection* (RFS 2006) is required. Section 4.2 of *Planning for Bushfire Protection* (RFS 2006) details the planning and bushfire requirements for Special Fire Protection Purposes.

##### ***State Legislation***

The proposed development is considered an integrated development to be assessed under Section 91 of the EP&A Act and Section 100B of the Rural Fires Act. A Bushfire Safety Authority is required from the Rural Fire Service for the proposed development.

**Adjoining and Surrounding Development**

Land to the north contains the carpark areas for the Lakes Beach Surf Club and Lakes Beach area. Bushland is located to the south and west with the coastal dunes of Lakes Beach located to the east.

**2.2 BUSHFIRE ATTACK ASSESSMENT**

An assessment of the bushfire attack in relation to the adjoining lands, vegetation and slope gradients is provided in Tables 2.1 and Table 2.2.

<b>TABLE 2.1</b>			
<b>BUSHFIRE ATTACK ASSESSMENT – PROPOSED CARAVAN PARK</b>			
<i>(from Table A2.6 PBP, 2006)</i>			
<b>Direction</b>	<b>Vegetation Classification (within 140m)</b>	<b>Effective Slope (within 100m)</b>	<b>Recommended Width of APZ (metres)</b>
North	Cleared land	-	NR
South	Forest	1° downslope	70
*East	Short Heath	5° upslope	35
West	Forest	1° downslope	70

NR – No requirement

\* An APZ of 50 metres might be required to the east if the areas of vegetation retained contain tall heath vegetation.

## SECTION 3

### BUSHFIRE PROTECTION MATTERS

#### 3.1 ASSET PROTECTION ZONE AND BUSHFIRE HAZARD MANAGEMENT

The proposed development will require asset protection zones to be implemented between adjoining vegetation in the south, west and east of between 35-70metres as identified in Table 2.1.

The APZ to the south is required to be located outside of the recommended 100 metre buffer zone to the Littoral Rainforest endangered ecological community. If the vegetation retained along the hind dune area of the frontal dune contains tall heath vegetation (Tea tree/Banksia) then the required APZ would be increased from 35 metres (for low heath) to 50 metres (for tall heath vegetation).

The 70 metre APZ to the west can incorporate the roadway easement for the Central Coast Highway as this area is required to be managed by Council to control the spread of bushfires.

The areas of asset protection zones affecting the subject site are shown in Figure 1. Infrastructure such as roads, swimming pools and outdoor recreation areas can be located within the APZ however caravan sites and buildings are not permitted within the APZ.

#### 3.2 SPECIFIC BUSHFIRE PROTECTION REQUIREMENTS

##### 3.2.1 Building Construction Level

The caravan park development is a special fire protection purpose development and building construction levels applicable to Class 1, 2 or 3 buildings as identified in AS 3959-1999 are not applicable to special fire protection purpose developments. Amenities and ancillary buildings are not subject to the requirements of AS3959-1999. However, as a precautionary measure the Rural Fire Service has required permanent buildings associated with special fire protection developments to be constructed to at least a Level 1 Construction Standard. It is considered that this approach is reasonable for this site and the proposed development.

##### 3.2.2 Additional Bushfire Protection Measures

Due to the presence of the Forest vegetation to the west and south of the proposed development, it is considered that additional safeguards to future buildings against ember and flame attack are warranted. Some specific measures to reduce the potential for damage from ember or flame attack during a bushfire event include:

- i) Incorporation of aluminium, bronze or non-corrosive metal mesh screens with a maximum aperture size of 1.8mm on all open-able windows and door screens such that the entire open portion of the window remains screened when the window is open.
- ii) All gutters and roof valleys to be fitted with leaf exclusion barriers which have a flammability index of not more than 5 when tested to AS-1530.2
- iii) Installation of ember proof skylights and vents.
- iv) Maintenance of the retained areas of Managed Lands or curtilage areas within the development as an Inner Protection Area (Asset Protection Zone) in accordance with PBP (RFS 2006).

- v) The installation of adequate water supply infrastructure including strategically placed fire hydrants around the proposed development.

### 3.3 ACCESS

Section 4.2.7 – Access / Internal Roads in Planning for Bushfire Protection (RFS, 2006) states that :-

*"The public road system in a bush fire prone area should provide alternative access or egress for firefighters and residents during a bush fire emergency if part of the road system is cut by fire."*

Planning for Bushfire Protection (REF 2006 pg 35) requires the following criteria for access and internal roadways for special fire protection purpose developments.

- Internal roads are two wheel drive, sealed all weather roads;
- Roads are through roads;
- Internal perimeter roads are provided with two traffic lane widths (carriageway 8 metre wide minimum kerb to kerb);
- Road curves have a minimum inner radius of six metres.

The current internal road system will require some modification to meet these access requirements for special fire protection purpose developments.

This access will be required to comply with the requirements as outlined in Section 4.1.3 - Property Access within PBP (RFS 2006) and in accordance with AS2890.2 – 2002.

### 3.4 WATER SERVICES

The proposed development is expected to have reticulated water mains designed and installed in accordance with the requirements of AS2419.1 – 2005. It is expected that the proposed development will use the existing water reticulation from the surrounding infrastructure therefore a supplementary form of water supply will not be necessary for fire fighting purposes. The reticulated water supply, fire hydrant spacing, sizing and pressure is to comply with the requirements of AS2419.1 – 2005. A certification or test report from the Water Supply Authority is to be provided to demonstrate that the requirements of AS2419.1-2005 can be achieved during a bushfire event.

### 3.5 ENVIRONMENT AND HERITAGE ISSUES

There are no known heritage matters affecting the subject site.

Areas of Swamp Sclerophyll Forest and Littoral Rainforest (endangered ecological communities) are present in the southern part of the site.

A detailed Flora and Fauna Assessment Report (*Conacher Environmental Group* 2010) has determined that the proposed development is not likely to result in a significant effect on any endangered ecological communities, threatened species or their habitats provided a 100 metre buffer zone is retained to the area of Littoral Rainforest.

The subject site has no known geological features of note.

There are no drainage features of note within the site.

## SECTION 4

### CONCLUSIONS AND RECOMMENDATIONS

---

#### 4.1 AIM AND OBJECTIVES OF PLANNING FOR BUSHFIRE PROTECTION

*"The aim of Planning for Bushfire Protection is to use the NSW development assessment system to provide for the protection of human life and to minimise impacts on property from the threat of bushfire, while having due regard to development potential, on site amenity and protection of the environment" (PBP pg 1).*

The following objectives need to be assessed when, and if, any redesign of the current concept proposal is being developed.

*Objective 1*

*(i) afford occupants of any building adequate protection from exposure to a bush fire;*

*Objective 2*

*(ii) provide for a defensible space to be located around buildings;*

*Objective 3*

*(iii) provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition;*

*Objective 4*

*(iv) ensure that safe operational access and egress for emergency service personnel and residents is available;*

*Objective 5*

*(v) provide for ongoing management and maintenance of bush fire protection measures, including fuel loads in the asset protection zone (APZ);*

*Objective 6*

*(vi) ensure that utility services are adequate to meet the needs of fire fighters (and others assisting in bush fire fighting)*

#### 4.2 CONCLUDING COMMENTS

The principal bushfire hazard affecting the proposed development is the Forested land to the south and west along with areas of heath to the east. The proposal can be designed in a manner that enables the required asset protection zones to be implemented within the subject site.

With the implementation of the measures recommended, and outlined in Section 3 of this Report, the overall aims and objectives of Planning for Bushfire Protection (RFS, 2006) can be achieved for the proposed development. It is concluded that the proposed development can implement acceptable solutions to address the potential bushfire hazard affecting the subject site in any future redesign to accommodate ecological or other site constraints.

A revised bushfire assessment report will be required for any future development plan for the subject site.

**6. REFERENCES**

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*Conacher Environmental Group* (2010). Flora and Fauna Assessment Report prepared for Wyong Shire Council.

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**APPENDIX 4**

**EPBC PROTECTED MATTERS  
SEARCH RESULTS**