



global environmental solutions

## Culburra West Urban Development Project

### Ecological & Riparian Issues & Assessment Report

#### Appendix M Relevance of the Subject Site for MNES

22 March 2013



**Table 1 MNES that are of No Relevance**

Common Name	Scientific Name	Habitat Preferences	Relevant Habitat	Impact
<b>Birds</b>				
Amsterdam Albatross	<i>Diomedea exulans amsterdamensis</i>	Rests on ocean waters. Nests on open vegetated, exposed ridges and hillocks.	None present	None
Antipodean Albatross	<i>Diomedea exulans antipodensis</i>	Open vegetated, exposed ridges and hillocks	None present	None
Tristan Albatross	<i>Diomedea exulans exulans</i>	Ocean waters, small islands	None present	None
Gibson's Albatross	<i>Diomedea exulans gibsoni</i>	Ocean waters, small islands	None present	None
Wandering Albatross	<i>Diomedea exulans (sensu lato)</i>	Ocean waters, small islands	None present	None
Southern Giant-Petrel	<i>Macronectes giganteus</i>	Ocean waters, small islands	None present	None
Northern Giant-Petrel	<i>Macronectes halli</i>	Ocean waters, small islands	None present	None
Great Skua	<i>Catharacta skua</i>	Coasts and islands	None present	None
Gould's Petrel	<i>Pterodroma leucoptera leucoptera</i>	Ocean waters, small islands	None present	None
Kermadec Petrel (western)	<i>Pterodroma neglecta neglecta</i>	Ocean waters, small islands	None present	None
Fairy Tern (Australian)	<i>Sternula nereis nereis</i>	Sandy shoals and beaches	None present	None
Buller's Albatross	<i>Thalassarche bulleri</i>	Ocean waters, small islands	None present	None
Shy Albatross	<i>Thalassarche cauta cauta</i>	Ocean waters, small islands	None present	None
Salvin's Albatross	<i>Thalassarche cauta salvini</i>	Ocean waters, small islands	None present	None
White-capped Albatross	<i>Thalassarche cauta steadi</i>	Ocean waters, small islands	None present	None
Black-browed Albatross	<i>Thalassarche melanophris</i>	Ocean waters, small islands	None present	None
Campbell Albatross	<i>Thalassarche melanophris impavida</i>	Ocean waters, small islands	None present	None
White-bellied Storm-Petrel	<i>Fregetta grallaria grallaria</i>	Ocean waters, small islands	None present	None
Australian Grayling	<i>Prototroctes maraena</i>	Various water courses, mostly clear gravel bottomed with riffles and pools	None present	None
Fork-tailed Swift	<i>Apus pacificus</i>	Marine environments	None present	None
Streaked Shearwater	<i>Calonectris leucomelas</i>	Inshore ocean waters	None present	None
White-throated Needletail	<i>Hirundapus caudacutus</i>	Mostly aerial, recorded most often above wooded areas	None present	None

Common Name	Scientific Name	Habitat Preferences	Relevant Habitat	Impact
<b>Mammals</b>				
Brush-tailed Rock-wallaby	<i>Petrogale penicillata</i>	Rocky areas, with boulders, cliffs and escarpments	None present	None
Bryde's Whale	<i>Balaenoptera edeni</i>	Marine environments	None present	None
Pygmy Right Whale	<i>Caperea marginata</i>	Marine environments	None present	None
Common Dolphin,	<i>Delphinus delphis</i>	Marine environments	None present	None
Risso's Dolphin	<i>Grampus griseus</i>	Marine environments	None present	None
Dusky Dolphin	<i>Lagenorhynchus obscurus</i>	Marine environments	None present	None
Orca, Killer Whale	<i>Orcinus orca</i>	Marine environments	None present	None
Southern Right Whale	<i>Eubalaena australis</i>	Marine environments	None present	None
Blue Whale	<i>Balaenoptera musculus</i>	Marine environments	None present	None
Humpback Whale	<i>Megaptera novaeangliae</i>	Marine environments	None present	None
Bottlenose Dolphin	<i>Tursiops truncatus</i>	Marine environments	None present	None
Dugong	<i>Dugong dugon</i>	Marine environments	None present	None
New Zealand Fur-seal	<i>Arctocephalus forsteri</i>	Marine environments	None present	None
Australian Fur-seal	<i>Arctocephalus pusillus</i>	Marine environments	None present	None
<b>Reptiles</b>				
Loggerhead Turtle	<i>Caretta caretta</i>	Oceans and beaches	None present	None
Green Turtle	<i>Chelonia mydas</i>	Oceans and beaches	None present	None
Leatherback Turtle	<i>Dermochelys coriacea</i>	Oceans and beaches	None present	None
Hawksbill Turtle	<i>Eretmochelys imbricata</i>	Oceans and beaches	None present	None
Broad-headed Snake	<i>Hoplocephalus bungaroides</i>	Sandstone ridges and rocky outcrops	None present	None
Flatback Turtle	<i>Natator depressus</i>	Oceans and beaches	None present	None
<b>Fish</b>				
Black Rock Cod	<i>Epinephelus daemeli</i>	Marine environments	None present	None
Short-pouch Pygmy Pipehorse	<i>Acentronura tentaculata</i>	Marine environments	None present	None
Lord Howe Pipefish	<i>Cosmocampus howensis</i>	Marine environments	None present	None
Upside-down Pipefish	<i>Heraldia nocturna</i>	Marine environments	None present	None
Eastern Potbelly Seahorse	<i>Hippocampus abdominalis</i>	Marine environments	None present	None

Common Name	Scientific Name	Habitat Preferences	Relevant Habitat	Impact
<b>Fish</b>				
Short-head Seahorse	<i>Hippocampus breviceps</i>	Marine environments	None present	None
White's Seahorse	<i>Hippocampus whitei</i>	Marine environments	None present	None
Crested Pipefish	<i>Histiogamphelus briggsii</i>	Marine environments	None present	None
Grey Nurse Shark	<i>Carcharias taurus</i>	Marine environments	None present	None
Great White Shark	<i>Carcharodon carcharias</i>	Marine environments	None present	None
Whale Shark	<i>Rhincodon typus</i>	Marine environments	None present	None
Porbeagle, Mackerel Shark	<i>Lamna nasus</i>	Marine environments	None present	None
Bass Strait Pipefish	<i>Kimblaeus bassensis</i>	Marine environments	None present	None
Javelin Pipefish	<i>Lissocampus runa</i>	Marine environments	None present	None
Sawtooth Pipefish	<i>Maroubra perserrata</i>	Marine environments	None present	None
Macquarie Perch	<i>Macquaria australasica</i>	Deep clear freshwater pools	None present	None
Red Pipefish	<i>Notiocampus ruber</i>	Marine environments	None present	None
Common Seadragon	<i>Phyllopteryx taeniolatus</i>	Marine environments	None present	None
Australian Spiny Pipehorse	<i>Solegnathus spinosissimus</i>	Marine environments	None present	None
Robust Ghost Pipefish	<i>Solenostomus cyanopterus</i>	Marine environments	None present	None
Rough-snout Ghost Pipefish	<i>Solenostomus paegnius</i>	Marine environments	None present	None
Spotted Pipefish	<i>Stigmatopora argus</i>	Marine environments	None present	None
Widebody Pipefish	<i>Stigmatopora nigra</i>	Marine environments	None present	None
Double-end Pipehorse	<i>Syngnathoides biaculeatus</i>	Marine environments	None present	None
Hairy Pipefish	<i>Urocampus carinirostris</i>	Marine environments	None present	None
Mother-of-pearl Pipefish	<i>Vanacampus margaritifer</i>	Marine environments	None present	None
Port Phillip Pipefish	<i>Vanacampus phillipi</i>	Marine environments	None present	None
<b>Plants</b>				
Spring Tiny Greenhood	<i>Specularantha vernalis</i>	Dense, wet vegetation, swampy areas	None present	None
Nowra Heath-myrtle	<i>Triplarina nowraensis</i>	Poorly drained, sandy soils on sandstone, treeless or very open tree canopy due to impeded drainage.	None present	None

**Table 2     Peripheral MNES**

Common Name	Scientific Name	Habitat Preferences	Relevant Habitat	Impact
<b>Birds</b>				
Eastern Bristlebird	<i>Dasyornis brachypterus</i>	Low dense vegetation, sedgeland, heathland, swampland, shrubland, sclerophyll forest and woodland and rainforest	No records on or near site; marginal habitat	None
Great Egret, White Egret	<i>Ardea alba</i>	Very wide range of wetland habitats; freshwater and saline.	Crookhaven River foreshore only	Not likely; not significant
Ruddy Turnstone	<i>Arenaria interpres</i>	Exposed rocks or reefs, often with shallow pools, and on beaches	No habitat	None
Sharp-tailed Sandpiper	<i>Calidris acuminata</i>	Grassy edges of shallow inland freshwater wetlands	No habitat	None
Sanderling	<i>Calidris alba</i>	Open sandy beaches	No habitat	None
Red Knot, Knot	<i>Calidris canutus</i>	Sandy estuaries and tidal mudflats	Crookhaven River foreshore only	Not likely; not significant
Curlew Sandpiper	<i>Calidris ferruginea</i>	Intertidal mudflats of estuaries, lagoons, mangroves, as well as beaches, rocky shores and around lakes	Crookhaven River foreshore only	Not likely; not significant
Red-necked Stint	<i>Calidris ruficollis</i>	Sheltered inlets, bays, lagoons, estuaries, intertidal mudflats and protected sandy or coralline shores	Crookhaven River foreshore only	Not likely; not significant
Great Knot	<i>Calidris tenuirostris</i>	Large areas of bare or sparsely vegetated intertidal mudflats or sandflats	Crookhaven River foreshore only	Not likely; not significant
Double-banded Plover	<i>Charadrius bicinctus</i>	Coastal beaches, mudflats, sewage farms, river banks, fields, dunes	Crookhaven River foreshore only	Not likely; not significant
Greater Sand Plover, Large Sand Plover	<i>Charadrius leschenaultii</i>	Open sandy beaches and coastal wetlands	Crookhaven River foreshore only	Not likely; not significant

Birds				
Common Name	Scientific Name	Habitat Preferences	Relevant Habitat	Impact
Lesser Sand Plover, Mongolian Plover	<i>Charadrius mongolus</i>	Large intertidal sandflats or mudflats in sheltered bays, harbours and estuaries	Crookhaven River foreshore only	Not likely; not significant
Latham's Snipe, Japanese Snipe	<i>Gallinago hardwickii</i>	Often in wetlands surrounded by dense vegetation cover.	Crookhaven River foreshore only	Not likely; not significant
Grey-tailed Tattler	<i>Heteroscelus brevipes</i>	Estuaries and coastal lagoons with rock platforms or with intertidal mudflats	Crookhaven River foreshore only	Not likely; not significant
Broad-billed Sandpiper	<i>Limicola falcinellus</i>	Estuarine mudflats, beaches and mangroves	Crookhaven River foreshore only	Not likely; not significant
Bar-tailed Godwit	<i>Limosa lapponica</i>	Estuarine mudflats, beaches and mangroves	Crookhaven River foreshore only	Not likely; not significant
Black-tailed Godwit	<i>Limosa limosa</i>	Swampy lake shores, pools, flooded grassland	Crookhaven River foreshore only	Not likely; not significant
Eastern Curlew	<i>Numenius madagascariensis</i>	Intertidal mudflats and sandflats, often with beds of seagrass	Crookhaven River foreshore only	Not likely; not significant
Little Curlew, Little Whimbrel	<i>Numenius minutus</i>	Saltmarshes, coastal swamps, mudflats with short grass and sedges	Crookhaven River foreshore only	Not likely; not significant
Whimbrel	<i>Numenius phaeopus</i>	Tidal and estuarine mudflats, especially near mangroves	Crookhaven River foreshore only	Not likely; not significant
Pacific Golden Plover	<i>Pluvialis fulva</i>	Muddy, rocky and sandy wetlands, shores, paddocks, saltmarsh, coastal golf courses, estuaries and lagoons.	Crookhaven River foreshore only	Not likely; not significant
Painted Snipe	<i>Rostratula benghalensis</i> s. lat.	Shallow terrestrial freshwater (occasionally brackish) wetlands	No habitat	None
Wood Sandpiper	<i>Tringa glareola</i>	Inland shallow freshwater wetlands	No habitat	None
Marsh Sandpiper, Little Greenshank	<i>Tringa stagnatilis</i>	Inland shallow freshwater wetlands	No habitat	None
Pectoral Sandpiper	<i>Calidris melanotos</i>	Freshwater pools, marshes or lakesides	No habitat	None

Common Name	Scientific Name	Habitat Preferences	Relevant Habitat	Impact
<b>Birds</b>				
Red-capped Plover	<i>Charadrius ruficapillus</i>	Wetlands and swamps with saline and brackish waters	Crookhaven River foreshore only	Not likely; not significant
Swinhoe's Snipe	<i>Gallinago megala</i>	Edges of wetlands, swamps and freshwater streams	No habitat	None
Pin-tailed Snipe	<i>Gallinago stenura</i>	Shallow freshwater swamps, ponds and lakes with emergent, sparse to dense cover of grass/sedge	No habitat	None
Grey-tailed Tattler	<i>Heteroscelus brevipes</i>	Sheltered coasts with reefs and rock platforms or with intertidal mudflats estuaries and coastal lagoons.	Crookhaven River foreshore only	Not likely; not significant
Black-winged Stilt	<i>Himantopus himantopus</i>	Freshwater and saltwater marshes, mudflats, and the shallow edges of lakes and rivers	Crookhaven River foreshore only	Not likely; not significant
Hooded Plover	<i>Thinornis rubricollis</i>	Open sandy beaches, around river mouths	No habitat	None
<b>Amphibians</b>				
Littlejohn's Tree Frog, Heath Frog	<i>Litoria littlejohni</i>	Semi-permanent or permanent dams, ponds and creeks, to inhabit forest, coastal woodland and heath	No habitat	None



**Table 3 Potentially Relevant MNES**

Common Name	Scientific Name	Habitat Preferences	Relevant Habitat	Impact
<b>Birds</b>				
Australasian Bittern	<i>Botaurus poiciloptilus</i>	Densely vegetated freshwater wetlands and, <b>rarely</b> , in estuaries or tidal wetlands	Some possible habitat along the Crookhaven River foreshore	Not likely; not significant
Little Tern	<i>Sterna albifrons</i>	Coastal shorelines and beaches, as well as inland rivers.	Possible foraging along Crookhaven River to the north	Not likely; not significant
<b>Amphibians</b>				
Green & Golden Bell Frog	<i>Litoria aurea</i>	Wide range of water bodies except fast flowing; often occurs in disturbed sites	Recorded in Culburra Beach and around northern parts of Lake Wollumboola; no habitat on Part 3A land but could use ephemeral ponds in STP	Not likely; not significant

**Table 4 Theoretical MNES**

Common Name	Scientific Name	Habitat Preferences	Relevant Habitat	Impact
<b>Birds</b>				
Cattle Egret	<i>Ardea ibis</i>	Grasslands, wetlands as well as pastures and croplands	Minimal habitat in pasture at western end of site	Not likely; not significant
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	Coastal areas and major river systems	Peripheral habitat only along Crookhaven River	Not likely; not significant
Rainbow Bee-eater	<i>Merops ornatus</i>	Open forests, woodlands and shrublands, and cleared areas, usually near water	Some potential habitat; never recorded	Not likely; not significant
Black-faced Monarch	<i>Monarcha melanopsis</i>	Rainforests, eucalypt woodlands, coastal scrub and damp gullies	Very limited habitat; never recorded	Not likely; not significant
Satin Flycatcher	<i>Myiagra cyanoleuca</i>	Tall forests, preferring wetter habitats such as heavily forested gullies, but not rainforests	Extremely limited marginal habitat; never recorded	Not likely; not significant
Orange-bellied Parrot	<i>Neophema chrysogaster</i>	Moors and sedgelands with many creeklines and clumps of paperbarks and tea-trees	No habitat	None
Rufous Fantail	<i>Rhipidura rufifrons</i>	Rainforest, dense wet forests, swamp woodlands and mangroves	Limited habitat except along Crookhaven River; never recorded	Not likely; not significant
Regent Honeyeater	<i>Xanthomyza phrygia</i>	Range of eucalypt forests; prefers fertile sites along creek flats or river basins; semi-cleared agricultural areas	Limited habitat; never recorded	Not likely; not significant
Red Goshawk	<i>Erythrorchis radiatus</i>	Sub-coastal areas in wooded and forested land, favours subtropical rainforest.	Some potential habitat; never recorded	Not likely; not significant
Swift Parrot	<i>Lathamus discolor</i>	Dry sclerophyll forests and woodlands, suburban parks and gardens	Limited habitat; never recorded	Not likely; not significant
Australian Painted Snipe	<i>Rostratula ustralis</i>	Shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans	Peripheral habitat only along Crookhaven River	Not likely; not significant

Common Name	Scientific Name	Habitat Preferences	Relevant Habitat	Impacts
<b>Mammals</b>				
Tiger Quoll	<i>Dasyurus maculatus maculatus</i>	Wide range of mature un-disturbed moist forest	Limited potential habitat; never recorded	Not likely; not significant
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	Sandstone cliffs and fertile woodland valley habitat	Some potential foraging habitat; never recorded	Not likely; not significant
Long-nosed Potoroo (SE mainland)	<i>Potorous tridactylus tridactylus</i>	Dense vegetation in eucalypt forest or coastal heath and scrubs.	Limited habitat; not recorded populations)	Unlikely, not significant
New Holland Mouse	<i>Pseudomys novaehollandiae</i>	Open heathland, open woodland with high floristic diversity; soft substrates for digging	Some potential habitat; never recorded	Unlikely, not significant
Grey-headed Flying Fox	<i>Pteropus poliocephalus</i>	Rainforests, open forests, closed and open woodlands, <i>Melaleuca</i> swamps and <i>Banksia</i> woodlands	Limited potential habitat; not recorded on site	Unlikely
<b>Amphibians</b>				
Giant Burrowing Frog	<i>Heleioporus australiacus</i>	Wide range of native forest communities; wide range of water course types	No potential habitat; never recorded	Not likely; not significant
<b>Plants</b>				
Leafless Tongue-orchid	<i>Cryptostylis hunteriana</i>	Coastal districts, heathlands, heathy woodlands, sedgeland, forests, <i>Xanthorrhoea resinosa</i> plains often with sandy moist soil	Limited potential habitat; never recorded	Not likely; not significant
White-flowered Wax Plant	<i>Cynanchum elegans</i>	Steeper slopes, mainly at the ecotone between dry subtropical rainforest and sclerophyll forest/woodland communities	No suitable potential habitat; never recorded	Not likely; not significant
East Lynne Midge-orchid	<i>Genoplesium vernale</i>	Shrubby open eucalypt forest, dominated by <i>Eucalyptus piperita</i> , <i>Corymbia gummifera</i> and <i>E.globoidea</i> or <i>C.maculata</i> .	Limited potential habitat; never recorded	Not likely; not significant

Common Name	Scientific Name	Habitat Preferences	Relevant Habitat	Impact
Biconvex Paperbark	<i>Melaleuca biconvexa</i>	Low sedgeland, swampy areas	No suitable habitat; never recorded	Not likely; not significant
Rice Flower	<i>Pimelea spicata</i>	Well-structured clay soils on coastal headlands	No suitable habitat; never recorded	Not likely; not significant
Thick-lipped Spider Orchid	<i>Caledenia tessellata</i>	Grassy dry sclerophyll woodland on clay loam or sandy soils	Limited potential habitat; never recorded	Not likely; not significant
Jervis Bay Leek Orchid	<i>Prasophyllum affine</i>	Low sedgeland with poorly drained clay soils	No suitable Habitat; never recorded	Not likely; not significant
Villous Mintbush	<i>Prostanthera densa</i>	Sclerophyll forest and shrubland on coastal headlands and near coastal ranges	No suitable Habitat; never recorded	Not likely; not significant
Illawarra Greenhood	<i>Pterostylis gibbosa</i>	Open forest or woodland with poor drainage	Very limited Potential Habitat; never recorded	Not likely; not significant
Eastern Underground Orchid	<i>Rhizanthella slateri</i>	Eucalypt forest	Potential Habitat; never recorded	Not likely; not significant

**Table 5 Places on the RNE**

Place	Nature	Relevance	Impacts
Penguin Head Geological Site	Natural Significance	Not relevant	None
Jervis Bay and Surrounds	Natural Significance	Periphery of site	None
Roseby Park Aboriginal Area	Indigenous	Not relevant	None
Berry District	Historic	Not relevant	None
Union Church	Historic	Not relevant	None
Coolangatta Estate (all buildings/remains)	Historic	Not relevant	None
Beecroft Peninsula	Nationally Important Wetland	Not relevant	None
Jervis Bay	Nationally Important Wetland	Not relevant	None
Shoalhaven/Crookhaven Estuary	Nationally Important Wetland	Adjacent to site	Negligible impact because of development design
Lake Wollumboola	Nationally Important Wetland	To the south; mostly in a different catchment	None
Seven Mile Beach National Park	National Park	Not relevant	No Impact
Brundee Swamp	State/Territory Reserve	Not relevant	No impact
Comerong Island	State/Territory Reserve	Not relevant	No impact
Saltwater Swamp	State/Territory Reserve	Not relevant	No impact
Seven Mile Beach	State/Territory Reserve	Not relevant	No impact

**Table 6 Threatened Ecological Communities**

Community	Nature	Relevance	Impacts
Littoral Rainforest and Coastal Vine Thickets of Eastern Australia	Critically Endangered Ecological Community	Not relevant	None

**Table 7 Invasive Species**

Common Name	Scientific Name	Present or Likely?	Issue	Solution
Goat	<i>Capra hircus</i>	No	None – not present	None required
Domestic Cat	<i>Felis catus</i>	Yes	Predation	Kill
Rabbit	<i>Oryctolagus cuniculus</i>	Yes	Grazing and competition	Kill
Pig	<i>Sus scrofa</i>	Unlikely	None – not present	None required
Red Fox	<i>Vulpes vulpes</i>	Yes	Predation	Baiting; kill
Alligator Weed	<i>Alternanthera philoxeroides</i>	No	Invasion; competition	None required
Bridal Creeper	<i>Asparagus asparagoides</i>	No	Invasion; competition	Control
Cabomba Washington Grass	<i>Cabomba caroliniana</i>	No	Invasion; competition	Control
Bitou Bush	<i>Chrysanthemoides monilifera</i>	Yes	Invasion; competition	Poisoning; removal
Lantana	<i>Lantana camara</i>	Yes	Invasion; competition	Poisoning; removal
Chilean Needle Grass	<i>Nassella neesiana</i>	No	Invasion; competition	Control
Serrated Tussock	<i>Nassella trichotoma</i>	No	Invasion; competition	Control
Radiata Pine	<i>Pinus radiata</i>	No	Invasion; competition	Control
Blackberry	<i>Rubus fruticosus aggregate</i>	No	Invasion; competition	Poisoning; removal
Willows except Weeping Willow, Pussy Willow	<i>Salix spp.</i>	No	Invasion; competition	Control
Salvinia, Giant Salvinia, Aquarium Watermoss	<i>Salvinia molesta</i>	No	Invasion; competition	Control
Gorse	<i>Ulex europaeus</i>	No	Invasion; competition	Control