

FLORA, FAUNA & SEVEN PART TESTS OF SIGNIFICANCE

PROPOSED BULK LIQUIDS STORAGE FACILITY

KOORAGANG ISLAND

NEWCASTLE LOCAL GOVERNMENT AREA.

FOR

HLA ENSR PTY LIMITED

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EXECUTIVE SUMMARY

HLA ENSR commissioned Environmental Appraisal to undertake a flora and fauna study and associated series of Seven Part Tests of Significance under Section 5A of the Environmental Planning & Assessment Act, 1979 for the proposed Marstel Terminals bulk liquids facility at Greenleaf Road, Kooragang Island within the Newcastle Local Government Area.

The flora and fauna assessment was also to assess whether the subject site or indeed the proposal will have a significant effect on threatened species, populations and endangered ecological communities as described and listed under the terms of the NSW Threatened Species Conservation Act, 1995 and the Commonwealth's Environment Protection & Biodiversity Conservation Act, 1999.

No threatened species of flora were recorded at the site as listed under the schedules of the Threatened Species Conservation Act, 1995. There are several threatened species of avifauna which may occur within the vicinity of the subject site but are primarily associated with the nearby Hunter River tidal and inter-tidal areas. In relation to other threatened species of fauna, only the Grey-headed Flying Fox *Pteropus poliocephalus* (Schedule 2, Threatened Species Conservation Act, 1995) is expected to fly over the subject site on a frequent basis. The threatened species that were selected to be tested against the Seven Part Test of Significance process, were selected based on those species that have been known to occur on Kooragang Island or immediate environs or are known to occur within the Newcastle Local Government Area or where potentially suitable habitat is present within or adjacent to the subject site or immediate environs. The subject site does not contain any endangered population and endangered ecological communities.

There are no Ramsar (wetlands of international significance) present within or adjacent to the subject site, however, the Kooragang Island Nature Reserve which is listed as a Ramsar site is located to the north of the area. This site will not be affected by the proposal and will not contravene nor compromise this international wetlands convention treaty to which Australia is a signatory.

There will be no impact to threatened species, populations or endangered ecological communities as listed and described under the terms of the NSW Threatened Species Conservation Act, 1995 and the Commonwealth's Environment Protection & Biodiversity Conservation Act, 1999 as a result of this proposal. Therefore, a Species Impact Statement is not required in this instance.

STATE LICENCING REQUIREMENTS & APPROVALS

The field assessments were undertaken with the following State legislative licences and approval:

- * NSW National Parks & Wildlife Service
Scientific Investigation Licence: S12268
- * Dept of Primary Industries: Animal Research Authority:
- * Dept of Primary Industries: Animal Care & Ethics Committee Approval:

GLOSSARY OF TERMS

Anthropogenic waste:	Waste materials eg: dumped bricks, tyres, household rubbish, bottles etc
Arboreal:	Pertaining to trees
Arborescent:	Tree-like in form or appearance.
Aural:	Listening
Bassian:	Fauna of temperate regions of Australian, generally the area from SE. Queensland, eastern NSW, Victoria and SE. South Australia. Excluding the tropical (Torresian) and arid zone (Eyrean) regions of Australia.
Biota:	The flora and fauna of a given region.
Bioregional:	A regional perspective of plant and animal assemblages.
Critical-weight range fauna:	Medium-size mammals that have been significantly affected by European settlement and associated introduction of carnivorous mammals viz: cat, fox and dog. Many native mammals outside of this ‘critical-weight range’ have not been affected by these introductions.
Exotic:	An introduced plant or animal not native or indigenous.
FM Act:	Fisheries Management Act, 1994
Indigenous:	A native plant or animal to any given area.
Lek	A temporary male territory for the sole purpose of attracting females.
Mesic (cf: xeric):	Plants that have a high degree of moisture content of the leaves. Rainforest species are generally mesomorphic.

Rhizome:	A horizontal underground stem or root.
ROTAP:	‘Rare Or Threatened Australian Plants’
Sap-site tree:	An individual tree that is used by several fauna species to extract phloem (sap/kino) from the cambium layer of selected tree species as a food source. The Yellow-bellied Glider is one of the best known examples that extracts sap from selected tree species. Sap-site trees are usually distinguished by characteristic ‘V’ shaped incisions into the outer bark.
Scientific Committee:	The scientific committee of persons appointed under the NSW Threatened Species Conservation Act, 1995.
Seral:	An underdeveloped stage of a plant community or plant succession.
Sphere-of-influence:	Environmental or biological factors outside of a given study site that influence the biota within a study site.
Sympatric:	The ability of animals or plants having similar or near parallel ecological requirements cohabiting with another related or similar species within the same habitat.
TSC Act:	NSW Threatened Species Conservation Act, 1995.
Trap-Nights:	The number of traps set per night in a given area. Eg: 20 traps set for one night = 20 trap-nights.
Vegetatively (asexually):	Vegetative reproduction. Non-sexual reproduction.
Xeric (cf: mesomorphic):	Plants that have a low moisture content of the leaves. Normally plants found in dry forests or woodlands and adapted to dry environmental conditions in this instance.

1.0 INTRODUCTION & BACKGROUND & CADASTURE:

HLA ENSR PTY LIMITED commissioned Environmental Appraisal to undertake a flora and fauna study and associated series of Seven Part Tests of Significance under Section 5A of the Environmental Planning & Assessment Act, 1979 for the proposed bulk liquids storage facility at Greenleaf Road, Kooragang Island within the Newcastle Local Government Area. The flora and fauna surveys were to assess whether the subject site or indeed the proposal will have a significant effect on threatened species, populations and endangered ecological communities as described and listed under the terms of the NSW Threatened Species Conservation Act, 1995 and the Commonwealth's Environment Protection & Biodiversity Conservation Act, 1999.

The proposed development site will be referred hereafter as the 'subject site'. The broader area external to the subject site will be referred as the 'study area'. The subject site is located on the south-eastern corner of Kooragang Island near Walsh Point. The Hunter River North Channel and the Stockton Channel are situated to the east of the subject site. The subject site consist of four (4) lots (Lots 1-4) and are virtually cleared and disturbed with limited native vegetation remaining. These lots are collectively referred to as the subject site.

The flora and fauna studies were to assess the subject site's existing assemblages of flora and fauna including an assessment of threatened species, populations and endangered ecological communities listed under the NSW Threatened Species Conservation Act, 1995 and the Commonwealth's Environment Protection & Biodiversity Conservation Act, 1999. In relation to the threatened species selected to be tested against the Seven Part Test of Significance appended to this ecological assessment report, these threatened species were selected based on that these species have been known to occur on Kooragang Island or immediate environs or are known to occur within the Newcastle Local Government Area or where potential suitable habitat is present within or adjacent to the subject site or immediate environs thus warranting consideration in the 'significance assessment process.

The subject site can be found on the Newcastle 1: 25,000 topographical map (Series 9232-2-S). The grid coordinates to the approximate centre of the subject site are 385600 East and 6359100 North. There are no creeks, streams, drainage lines, swamps, wetlands or other aquatic habitats present within the subject site. There are no significant habitat features present on the site including tree hollows, caves, rock shelters, bushrocks or outcrops. There is however, some understorey vegetation including dense understorey

‘thickets’ of scrub, however this is mostly dominated by exotic weeds including Bitou Bush.

2.0 RELEVANT LEGISLATION & POLICY DOCUMENTS:

The NSW Threatened Species Conservation Act, 1995 is administered by the NSW National Parks & Wildlife Service a division of the now Department of Environment & Climate Change. The flora and fauna habitat assessment considered legislative aspects of the Threatened Species Conservation Act (TSC Act), 1995, Section 5A of the Environmental Planning & Assessment Act, (EP& A Act) 1979 and Section 37 of the New South Wales Fisheries Management Act, 1994. The Commonwealth’s Environment Protection & Biodiversity Conservation Act, 1999 is also relevant to the proposal in relation to threatened species, populations and endangered ecological communities and migratory birds.

It is mandatory by State legislation that consideration be given to threatened species of fauna and flora, endangered populations and endangered ecological communities under the TSC Act, the EP&A Act and the Fisheries Management Act respectively. In the instance where it can be demonstrated that threatened species, endangered populations or endangered ecological communities occur or are considered likely to occur within the subject site, then a Seven Part Test of Significance (Section 5A of the EP&A Act, 1979) must be applied to those threatened species, endangered populations or endangered ecological communities. Seven Part Tests of Significance must be undertaken and incorporated into this flora and fauna assessment. The TSC Act consists of two broad categories of threatened species viz: E1 (Endangered) and V (Vulnerable). These two classifications are defined as follows:

E1: E1 (Endangered) meaning “species is likely to become extinct in nature in NSW unless the circumstances and factors threatening its survival or evolutionary developments cease to operate; or, its numbers have been reduced to such a critical level, or its habitats have been so drastically reduced, that it is in immediate danger of extinction; or, it might already be extinct, but it is not presumed extinct”.

V: The coding V ‘Vulnerable’ is defined “species that is likely to become endangered unless the circumstances and factors threatening its survival or evolutionary development cease to operate”

The State legislative process enables the determination and likely impacts on threatened species, endangered populations or endangered ecological communities under the terms of the TSC Act. The TSC Act undergoes periodic review for refinement purposes, as new information is coming to light on flora and fauna species existing population status through time. As a consequence, the Scientific Committee (established under the terms of the TSC Act) has prepared amendments to the initial Act to include addendum determinations to incorporate additional flora and fauna species, endangered populations (under Part 2, Schedule 1) and endangered ecological communities (Part 3, Schedule 1).

The Scientific Committee has also made a determination to declare several key threatening processes under the Act. These listings include the predation by the European Fox *Vulpes vulpes*, Mosquito Fish *Gambusia holbrooki* and clearing of native vegetation and recent determinations to include 'Bushrock Removal' and 'Competition from honeybees *Apis mellifera*' as 'Key Threatening Processes' in Schedule 3 of the Act. These and other key threatening processes were all considered during this ecological assessment. Direct or relevant key threatening processes considered during the ecological assessment include Bitou Bush invasion, predation by the European Red Fox, predation by the feral cat, clearing of native vegetation and competition by feral honeybee as 'Key Threatening Processes' under Schedule 3 of the Act.

The introduced Mosquito Fish *Gambusia holbrooki* sterilises the breeding habitat to the Green & Golden Bell Frog and the Green-thighed Frog. Breeding sites of the Green & Golden Bell Frog is almost completely restricted to water bodies lacking the *Gambusia holbrooki* (NPWS Final Determination, Predation by *Gambusia holbrooki*, Key Threatening Process, 1999). The Mosquito Fish is unlikely to be present within the subject site due to the lack of waterbodies.

As the TSC Act is in a state of regular review to suit the conservation needs of the State, in time it is expected that additional threatened species (including invertebrates), endangered populations and endangered ecological communities will be incorporated into the Act. For instance, the Gang Gang Cockatoo, Grey-headed Flying Fox *Pteropus poliocephalus* and the Eastern Pygmy Possum *Cercartetus nanus* had been listed in a preliminary determination to be included as threatened species under the terms of the NSW TSC Act. These species are now legally declared as threatened species under the Act.

The National Parks & Wildlife Service has recently drafted a Discussion Paper on proposed amendments to Section 5A of the Environmental Planning & Assessment Act (EP&A Act), 1979 resulting from the NSW Parliament's recent review of the Threatened Species Conservation Act, 1995. The Parliament has recommended that the former Eight

Part Test of Significance under Section 5A of the EP&A Act be reviewed. This review has now occurred and that the Seven Part Test of Significance process applies to threatened species, populations and endangered ecological communities. The amendments to the EP&A Act include that consideration be given to threatened species of fish and marine vegetation listed in Schedules 4 and 5 of the Fisheries Management Act, 1994.

The Threatened Species Conservation Amendment (Biodiversity Banking) Bill of 2006 is also relevant to the proposal. The Bill was introduced in June, 2006 to establish a biodiversity banking and offsets scheme. With the establishment of biobank areas of land, agreements can be entered into between the Minister for Environment and the owners of the land in question. Biodiversity credits can be created in relation to management actions proposed to be carried out within biobank sites that improve biodiversity values of a given area of land.

Finally, the subject site is not affected by the planning instruments State Environmental Planning Policy-19 (Bushland in Urban Areas) as Newcastle is not listed as an LGA to be considered relevant to SEPP-19. State Environmental Planning Policy-44 (Koala Habitat Protection) is not applicable to the subject site as there are no Koala food plants present on-site. Moreover, SEPP-14 (Coastal Wetlands) is also not relevant as there are no wetlands present within the subject site or on the peninsula of Walsh Point. However, there are several SEPP-14 wetlands present to the north of the subject site, however they are not in close proximity to the subject site.

STATE ENVIRONMENTAL PLANNING POLICY-14 (COASTAL WETLANDS)

There are several designated and registered State Environmental Planning Policy-14 (Coastal Wetlands) present on Kooragang Island including wetland #823 (Kooragang Island Nature Reserve) and wetland #846, wetland #847, wetland #848 and wetland #849. The nearest SEPP-14 wetlands to the subject site include wetland #849 which is situated opposite Fullerton Road along the foreshore of the Stockton Channel on the Stockton Peninsula approximately 1 kilometre north-east of the subject site. Wetland #847 is located north-east of the Stockton Bridge approximately 2.5 kilometres north-east of the subject site. Wetland #846 is located north-west of the Stockton Bridge overpass located approximately 2.5 kilometres north-west of the subject site. There are no SEPP-14 wetlands located on the Walsh Point Peninsula ie: south of the Stockton Bridge overpass and none occur on adjacent to the Greenleaf Road. The proposal will have no effect on SEPP-14 coastal wetlands in the locality.

STATE ENVIRONMENTAL PLANNING POLICY-19 (BUSHLAND IN URBAN AREAS)

The Newcastle Local Government Area is not obliged to administer SEPP-19 (Bushland in Urban Areas) and is exempt from this state government policy.

STATE ENVIRONMENTAL PLANNING POLICY-44 (KOALA HABITAT PROTECTION)

The subject site is not applicable to State Environmental Planning Policy-44 (Koala Habitat Protection) and that the subject site does not qualify as ‘potential Koala habitat’ under the terms of SEPP-44.

CAMBA: (China-Australia Migratory Bird Agreement)

There are no listed CAMBA (China-Australia Migratory Bird Agreement) sites present within or immediately adjacent to the subject site.

JAMBA: (Japan-Australia Migratory Bird Agreement)

There are no JAMBA (Japan-Australia Migratory Agreement) sites present within or immediately adjacent to the subject site.

RAMSAR

There are no Ramsar (wetlands of international significance) present within or adjacent to the subject site. However, the Kooragang Island Nature Reserve is listed as a Ramsar site. Australia is a signatory to this international wetlands conservation agreement, however this Ramsar site will not be affected by the proposal and that the proposal will not contravene nor compromise this international wetlands convention treaty.

There are eleven (11) Ramsar wetland sites in New South Wales with the Kooragang Island Nature Reserve being registered as a Ramsar site on the 21st of February, 1984. This reserve attracts a number of significant wetland birds including the bar-tailed godwit, greenshank, terek sandpiper and the eastern curlew.

ENVIRONMENT PROTECTION & BIODIVERSITY CONSERVATION ACT, 1999.

The Commonwealth's Environment Protection & Biodiversity Conservation Act, 1999 is relevant to the proposal. An assessment of matters of national environmental significance, including nationally threatened species and list of migratory birds had been considered in accordance with Commonwealth guidelines and that the relevant sections of the Environment Protection & Biodiversity Conservation Act, 1999 were also considered in relation to the proposal.

3.0 BIOREGIONAL CONTEXT

The Newcastle Local Government Area's natural environment consists of open forests, woodlands, riparian communities, mangrove and estuarine communities, wetlands and aquatic habitats. Broader district and Hunter Valley regional conservation areas include Kooragang Island Nature Reserve, Glenrock State Conservation Area, Werakata National Park to the west and the Myall Lakes and Tomaree National Parks and the Karuah Nature Reserve to the north. The Barrington Tops National Park and the Mount Royal National Park are located to the north-west of Newcastle. The above national parks, state conservation areas and nature reserves dedicated under the National Park & Wildlife Act represent a very broad-range of environments and habitats from coastal habitats including estuarine and sand mass habitats, lacustrine habitats, heathland, scrubs, swamplands, rainforests and open and closed forests. The Barrington Tops National Park also contains alpine areas including Antarctic Beech dominated forests. There are also several State Forests present in the region and consist of bulk open forest and woodland areas. These areas are also considered to be important wildlife habitat areas. The Kooragang Nature Reserve is the closest conservation area to the subject site.

Botanically, the study area is located within the North Coast Botanical Subdivision of New South Wales (Harden, 1992). This botanical sub-division contains an extremely rich biodiversity of flora and fauna in NSW and is representative within a vast variety of habitats. It is represented by a high degree of threatened species of both flora and fauna that are poorly represented in the current localised national park estate. The faunal assemblages are typically Bassian, with the occasional Torresian faunal assemblage occurrence in summer months when visitation by tropical migratory avifauna occurs usually between the months of October to March. There are several species of flora and fauna that have geographical limits to the broader locality.

Most of the localised flora and faunal studies remain as unpublished reports for specific Development Applications, however, there are several flora and faunal reports that pertain to the broader area of the Newcastle LGA and environs.

4.0 DEGREE OF DISTURBANCE

The subject site encapsulating all four lots and immediate environs are highly disturbed from previous activities and uses of the site including both above ground and surface disturbance to the soil substrate. The vegetation remaining within the subject site is primarily pasture grasses and environmental weeds including a high degree of Bitou Bush. There are no areas of natural vegetation remaining within the subject site although there are a few small trees located within the south-eastern corner of the site mainly *Casuarina glauca* trees. It is likely that these trees were planted on-site. The entire area of Lots 1 and 2 are fully fenced, however Lots 3 and 4 are mown or slashed cleared open paddock areas with no fencing or other infrastructure and no trees, shrubs or any other native vegetation in Lots 3 and 4. Lots 1 and 2 are approximately 95% cleared. Coal chitters are exposed and present within Lots 1 and 2. Some pieces of concrete and timber, rubble and sheet metal are also present. There is a derelict shed present near the south-eastern corner.

5.0 THE PROPOSAL:

It is proposed that the site be developed for the purposes of establishing a bulk fuel storage facility and associated infrastructure. The proposed facility will be used for the receipt, storage, blending and distribution of high quality fuels and biofuels (biodiesel and ethanol) for customers throughout the Hunter region (HLA Enviroscience Pty Limited, 2007). For greater detail on the proposal, refer to the Development Application pertaining to the subject site.

THREATENED SPECIES DATA

The following tables outline known threatened species of flora and fauna that have been previously recorded on Kooragang Island or immediate environs such as the Hunter River estuary or are known to occur within the broader Newcastle Local Government Area or potential habitat for threatened species is present within or adjacent to the subject site. Table 1 indicates threatened flora, whereas Table 2 indicates threatened species of fauna as listed under the terms of the NSW Threatened Species Conservation Act, 1995. Table 3 described known ROTAPs (Rare Or Threatened Australian Plants) that are known to occur within the Newcastle Local Government Area.

TABLE 1

THREATENED FLORA

FAMILY NAME	SCIENTIFIC NAME, LEGAL STATUS & No OF RECORDS	HABITAT POTENTIAL
Tremanaceae	<i>Tetratheca juncea</i> (V)	There is no potential or suitable habitat present within the subject site for this species.
Orchidaceae	<i>Diuris praecox</i> (V)	Species not recorded within the subject site. Grows in sclerophyll forest (Harden, 1993).
Zannichelliaceae	<i>Zannichellia palustris</i> (E1)	No suitable habitat present on-site. Species not recorded within the subject site.
Myrtaceae	<i>Eucalyptus parramattensis</i> spp. <i>Decadens</i> (V)	Species is absent from the subject site.
Myrtaceae	<i>Eucalyptus camfieldii</i> (V)	Species is absent from the subject site.

* 'V' denotes Vulnerable coding
'E1' denotes Endangered coding

TABLE 2
THREATENED FAUNA

VERNACULAR NAME	SCIENTIFIC NAME & No OF RECORDS	RELEVANCE OF HABITAT ON SITE
Green & Golden Bell Frog	<i>Litoria aurea</i> (E1)	No suitable habitat present within the subject site.
Osprey	<i>Pandion haliaetus</i>	No habitat present within the subject site but may forage within nearby open water.
Magpie Goose	<i>Anseranus semipalmata</i>	No suitable grazing or nesting habitat present on site.
Blue-billed Duck	<i>Oxyura australis</i>	No habitat present on-site.
Freckled Duck	<i>Stictonetta naevosa</i>	No suitable habitat present on-site.
Black-necked Stork (Jabiru)	<i>Ephippiorhynchus asiaticus</i> (E1)	No suitable habitat present on-site.
Square-tailed Kite	<i>Lophoictinia isura</i> (V)	No suitable habitat present on-site.
Great Knot	<i>Calidris tenuirostris</i>	No suitable habitat present on-site.
Broad-billed Sandpiper	<i>Limicola falcinellus</i>	No suitable habitat present on-site.
Black Bittern	<i>Ixobrychus flavicollis</i> (V)	No suitable habitat present on-site but potential habitat located nearby.
Australasian Bittern	<i>Botaurus poiciloptilus</i> (V)	No suitable habitat present on-site but potential habitat located nearby.
Black-tailed Godwit	<i>Limosa limosa</i> (V)	No suitable habitat present on-site.
Terek Sandpiper	<i>Xenus cinereus</i> (V)	No suitable habitat present on-site.
Providence Petrel	<i>Pterodroma solandri</i> (V)	No suitable habitat present on-site
Comb-crested Jacana	<i>Irediparra gallinacea</i> (V)	No suitable habitat present on-site.
Sooty Oystercatcher	<i>Haematopus fuliginosus</i> (V)	No suitable habitat present on-site.
Pied oystercatcher	<i>Haematopus longirostris</i> (V)	No suitable habitat present on-site but potential habitat located nearby.
Greater Sand Plover	<i>Charadrius leschenaultii</i> (V)	No suitable habitat present on-site.
Lesser Sand	<i>Charadrius mongolus</i> (V)	No suitable habitat present on-site.

Plover		
Painted Snipe	<i>Rostratula benghalensis</i> (V)	No suitable habitat present on-site.
Little Tern	<i>Sterna albifrons</i> (E1)	No suitable habitat present on-site
Turquoise Parrot	<i>Neophema pulchella</i> (V)	No suitable habitat present on-site.
Swift Parrot	<i>Lathamus discolor</i> (E1)	No suitable habitat present on-site.
Powerful Owl	<i>Ninox strenua</i> (V)	No suitable habitat present on-site. No roosts or nesting sites are present for the Powerful Owl.
Barking Owl	<i>Ninox connivens</i> (V)	No suitable habitat present on-site. No roosts or nesting sites are present within the subject site.
Masked Owl	<i>Tyto novaehollandiae</i> (V)	No suitable habitat present on-site and no roosting or nesting sites are present.
Wompoo Fruit Dove	<i>Ptilinopus magnificus</i> (V)	No suitable habitat present on-site.
Rose-crown Fruit Dove	<i>Ptilinopus regina</i> (V)	No suitable habitat present on-site.
Superb Fruit Dove	<i>Ptilinopus superbus</i> (V)	No suitable habitat present on-site.
Regent Honeyeater	<i>Xanthomyza phrygia</i> (E1)	No suitable habitat present on-site.
Bush Stone Curlew	<i>Burhinus grallarius</i> (E1)	Marginal habitat present but highly unlikely to ever occur.
Koala	<i>Phascolarctos cinereus</i> (V)	No suitable habitat present on-site. SEPP-44 (Koala Habitat Protection) does not apply to the subject site in this instance.
Squirrel Glider	<i>Petaurus norfolcensis</i> (V)	No suitable habitat present on-site.
Grey-headed Flying Fox	<i>Pteropus poliocephalus</i> (V)	Species likely to pass overhead of the subject site on a frequent basis.
Large-footed Myotis (Fishing Bat)	<i>Myotis adversus</i> (V)	This species may forage along the nearby Hunter River and may actually pass over the subject site during foraging activities, however there is virtually no suitable foraging habitat present on-site and there are no tee hollows present within the subject site that would restrict the occurrence of the species.

Common Bent-winged Bat	<i>Miniopterus schreibersii</i> (V)	Potential marginal foraging habitat only. There are no caves or similar artificial roosting habitats present within the subject site for the species.
Little Bent-winged Bat	<i>Miniopterus australis</i> (V)	Potential foraging habitat only. There are no caves or similar artificial roosting habitats present within the subject site for the species.
Yellow-bellied Sheath-tailed Bat	<i>Saccolaimus flaviventris</i> (V)	There are no suitable roosting habitats present within the subject site for the species due to the paucity of tree hollows.
Greater Broad-nosed Bat	<i>Scoteanax rueppellii</i> (V)	There are no suitable roosting habitats present within the subject site for the species due to the paucity of tree hollows.
Eastern Free-tailed Bat	<i>Mormopterus norfolcensis</i> (V)	There are no suitable roosting habitats present within the subject site for the species due to the paucity of tree hollows.
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i> (V)	There are no suitable roosting habitats present within the subject site for the species due to the paucity of tree hollows.

* **E1 denotes ‘Endangered’:**

* **V denotes ‘Vulnerable’**

Other marine species (with the exception of avifauna) were ignored for the purposes of this ecological assessment due to the terrestrial nature of the subject site. Other species that have been recorded for the broader area include the Dugong, Green Turtle, Humpback Whale and the New Zealand Fur Seal.

BOLD TYPE INDICATES THAT A SEVEN PART TEST OF SIGNIFICANCE HAS BEEN APPLIED TO THE THREATENED SPECIES.

The threatened species selected to be tested against the Seven Part Test of Significance appended to this ecological assessment report, these threatened species were selected based on relevance in that these species have been known to occur on Kooragang Island or immediate environs or are known to occur within the Newcastle Local Government Area or where potential suitable habitat is present within or adjacent to the subject site or immediate environs thus warranting consideration in the 'significance assessment process.

TABLE 3

ROTAPs

(RARE OR THREATENED AUSTRALIAN PLANTS)

FAMILY NAME	SCIENTIFIC NAME	OCCURRENCE WITHIN THE SUBJECT SITE
Myrtaceae	<i>Eucalyptus fergusonii</i> subsp. <i>fergusonii</i>	Not recorded
Zamiaceae	<i>Macrozamia flexuosa</i>	Not recorded

None of the above ROTAP species were found within the subject site and are unlikely to occur.

6.0 VEGETATION & FLORISTICS METHODOLOGY:

The vegetation within the subject site and associated floristics were assessed entirely on foot and were conducted throughout the subject site. It must be emphasised that there is no indigenous vegetation community present on-site *per se*. Vascular plant species (including the introduced species) were factored into the overall ecological assessment. The height of any canopy trees, structure, ecological significance and floristic composition were ascertained on-site. All life forms were targeted including trees, shrubs, sub-shrubs, climbers, ferns, graminoides, monocotyledons and herbaceous representatives that may have occurred were taken into account and described. Vegetation transects and random meander based assessments had both been undertaken within the subject site. Special emphasis was placed on locating threatened species of flora and ROTAP (RARE OR THREATENED AUSTRALIAN PLANTS), uncommon species, species

with poor representation in existing regional National Park estate and species of flora with known geographical limits of the locality. The entire subject site (incorporating all four lots) as an entity had been surveyed for its floristic species composition.

7.0 FAUNA- FIELD SURVEY METHODOLOGY:

The subject site's fauna habitat areas have been degraded to the extent that only 'urbanised' or rather 'industrial' wildlife species are present. There is no appropriate or suitable habitat for threatened species or species of local or regional significance although several threatened species may pass over the subject site or may occur in close proximity to the subject site at any stage namely aquatic species especially avifauna that may forage along the foreshore of the nearby Hunter River.

Nonetheless, the subject site faunal composition and threatened species potential had been assessed and ascertained in relation to the local ecological significance of those habitats in relation to the overall context of the locality of the subject site at Kooragang Island, the broader Newcastle LGA and environs and the Sydney basin bioregion. The faunal field assessments were variable and operated by directly targeting potential threatened species of fauna known to occur within the district. No trapping methods were undertaken during the field assessment phase due to the lack of suitable habitat for native terrestrial mammals and the high chance of theft of traps or vandalism. Moreover, any small mammals present would be confined to introduced species such as Pacific Black Rat *Rattus rattus* or the introduced House Mouse *Mus musculus*.

The degree of disturbance and the interaction with other natural areas and associated habitats were also assessed in relation to dispersal, immigration or emigration of species or populations. Habitat fragmentation and the severing of wildlife corridors and the occurrence of anthropogenic barriers, structures or mechanical inhibitors were also considered during the ecological assessments. The occurrence of keystone or critical food plants were considered for threatened species potential, for example: the inflorescence periods of the various eucalypt species.

The field assessments undertaken within the subject site had been undertaken on the 26th of May, 2007. The methodologies utilised during the field assessment phase were as follows:

AVIFAUNA (BIRDS):

- * Random and opportunistic site assessments for birds were carried out to locate and identify daylight active birds by direct visualisation and aural means within the subject site and immediate environs including species that may have foraged along the foreshore of the Hunter River.
- * Roosting owls (including both threatened and non-threatened species) were sought within dense vegetation throughout the subject site including the associated small grove of dense trees located in the south-eastern corner of the site.
- * Owl white-wash excreta, regurgitated pellets and primary-wing feathers were sought within dense vegetation in the south-eastern corner.
- * Nuclear flocking of small insectivorous birds had been sought in dense understorey vegetation within the subject site even though this was mainly within the dense cluster of Bitou Bush.
- * Overhead migratory birds were considered throughout the study period should the area be traversed by populations or flocks of migratory or nomadic species eg: the Regent Honeyeater (TSC Act), Painted Honeyeater (TSC Act) and the Yellow-faced Honeyeater. Nuclear flocking of small insectivorous birds were sought and identified in dense understorey, mid-storey and canopy vegetation.
- * Scats, fur, latrine sites and skeletal materials of mammals were sought throughout the subject site. Scat searches for terrestrial and arboreal mammals such as possums were also sought. Latrine sites pertaining to the Spotted-tailed (Tiger) Quoll were also sought within the subject site although this was extremely unlikely.

HERPTOFAUNA (REPTILES & AMPHIBIANS)

There are no areas of bushrocks, rock shelters, rocky outcrops or similar habitats present within the subject site that may have otherwise provided significant sheltering habitat for reptile species. Reptiles and amphibians were sought under debris, under pieces of timber, rubble and concrete and any small rocks that were present. There are no waterbodies present on-site.

8.0 RESULTS VEGETATION & FLORISTICS

The vegetation present within the subject site cannot be considered to contain an indigenous or native vegetation community per se due to the high degree of ecological and physical disturbance to the site. Nonetheless, several native or indigenous species are present and includes trees, shrubs and monocotyledons. The species present are confined to a few individuals or solitary plants and include the Swamp Oak *Casuarina glauca*, Broad-leaved Hickory *Acacia falciformis*, Melaleuca *Melaleuca armillaris*, Sydney Golden Wattle *Acacia longifolia* var *sophorae* are the only native species present. Other plant species present includes monocotyledons such as the Bitou Bush *Chrysanthemoides monilifera* (exotic), Fennel *Foeniculum vulgare* (exotic), Cobblers Peg *Bidens pilosa* (exotic), Fireweed *Senecio madagascariensis*, (exotic), Prickly Pear *Opuntia stricta* (exotic and noxious), Scurvy Weed *Commelina cyanea* (exotic), Horehound *Marrubium vulgare* (exotic), Couch *Cynodon dactylon*, a Windmill Grass *Chloris truncata*, Lovegrass *Eragrostis* sp, Summer Grass *Digitaria sanguinalis*, Buffalo Grass *Stenotaphrum secundatum* (exotic), Three-awned Spear Grass *Aristida vagrans* and the Whisky Grass *Andropogon virginicus* (exotic) are also present.

The Castor Oil Plant *Ricinus communis* (exotic) and the Giant Reed *Arundo donax* (also exotic) are located immediately outside of the subject site boundaries.

COMMENTS:

No threatened species of flora were recorded within the subject site including all threatened species of flora outlined in **Table 1** (Threatened Flora) and in **Table 3** (ROTAPs) were recorded and none are expected to occur. The proposal will not have a significant effect on threatened species of flora or ROTAPs and species of local or regional significance.

8.0 RESULTS-FAUNA

Several species of fauna were recorded, however these were mainly avians including both native and exotic or introduced species. The species recorded were limited but the following species were recorded. The Eastern Silver-eye, Rainbow Lorikeet, Galah, Pied Wagtail, Superb Blue Wren and the Welcome Swallow. The White-breasted Sea Eagle was also observed soaring overhead of the subject site no doubt searching for prey within the Hunter River below. Other non-passerines observed outside of the subject site but within the immediate vicinity of the site included the Pied Cormorant and the White Ibis. The Straw-necked Ibis was observed foraging within Lots 3 and 4, probably feeding on the small plague of grasshoppers observed during the field assessment phase. A 'kill-site' indicative of the Peregrine Falcon *Falco peregrinus* was noted to occur in the small grove of trees located in the south-eastern corner of Lot 1. There are several skeletal carcasses of racing pigeons snagged in the trees or on the ground. Other avians recorded included

the Spotted Turtle Dove (exotic), Domestic Pigeon (exotic), Indian Mynah (exotic) and the House Sparrow (exotic).

No nocturnal avians are likely to utilise the site with the possible exception of the Barn Owl *Tyto alba*. The Barn Owl frequently hunts in disturbed environments and can be found in industrial and city areas (personal observation). The locally common species such as the Boobook Owl *Ninox novaeseelandiae* and the Tawny Frogmouth *Podargus strigoides* and the Australian Owlet Nightjar *Aegotheles cristatus* (locally significant) and the White-throated Nightjar *Eurostopodus mystacalis* are highly unlikely to utilise the site due to the lack of suitable habitat for these nocturnal avians. Certainly, there is no habitat present for threatened species of owls including the Barking Owl *Ninox connivens* (Schedule 2, Threatened Species Conservation Act, 1995), Powerful Owl *Ninox strenua* (Schedule 2, Threatened Species Conservation Act, 1995) and the Masked Owl *Tyto novaehollandiae* (also Schedule 2, Threatened Species Conservation Act, 1995).

A number of threatened species, including the Speckled Warbler *Pyrrholaemus sagittatus*, Brown Treecreeper *Climacteris picumnus*, Hooded Robin *Melanodryas cucullata*, Grey-crowned Babbler (eastern subspecies) *Pomatostomus temporalis temporalis* and Turquoise Parrot *Neophema pulchella* were considered during the field assessment phase. However, no threatened species were recorded within the subject site. The Black-chinned Honeyeater *Melithreptus gularis*, Regent Honeyeater *Xanthomyza phrygia* and Swift Parrot *Lathamus discolor* are nomadic, irregular visitors to the region, the latter two species primarily occurring here during the winter months. In particular the Regent Honeyeater and Swift Parrot appear to depend on winter-flowering eucalypts and mistletoes in the area as winter nectar resources. These species are highly unlikely to ever forage within the subject site as their habitats (for all of the above species) is absent from the subject site. The Glossy Black Cockatoo *Calyptorhynchus lathami* is known to occur in the wider locality. Although this species is known to occupy a variety of forest habitats, key habitat variables for this species are areas of suitable *Allocasuarina* forage trees, and large hollows for nesting. The subject site does not contain individuals of the food plant *Allocasuarina torulosa* and there are no hollow-bearing trees that would provide suitable nesting sites for Glossy Black Cockatoos.

In relation to mammals, a juvenile European Fox *Vulpes vulpes* was recorded fleeing one of the Bitou Bush thickets during the field assessment phase. This fox was flushed from one of the thickets and run into another much larger thicket. The subject site and environs also contains a population of European Rabbits *Oryctolagus cuniculus*. The European Fox is probably supported by the occurrence of the rabbits. No other mammals were observed and none are likely to occur with the exception of the introduced Pacific Black Rat and the introduced House Mouse. It is also possible that the Grey-headed Flying Fox *Pteropus poliocephalus* (Schedule 2, Threatened Species Conservation Act, 1995) would frequently pass over the subject site en-route to other ecological destinations, but the subject site does not contain any food resources to the species and has no roosting site capabilities for the species. Common Brush-tailed Possum *Trichosurus vulpecula*, Sugar Glider *Petaurus breviceps*, and the Yellow-footed

Antechinus Antechinus flavipes are highly unlikely to occur due to the decimation of habitat and that with the exception of the Grey-headed Flying Fox, no other threatened species of mammals are likely to pass through the subject site. In relation to microbats, the Eastern (Common) Bent-wing Bat *Miniopterus schreibersii oceanensis*, Little Bent-winged Bat *Miniopterus australis*, Fishing Bat *Myotis adversus* and Eastern Freetail Bat *Mormopterus norfolkensis* (all listed on Schedule 2 of the NSW Threatened Species Conservation Act, 1995) may forage within the locality, however the proposal is highly unlikely to have a significant effect on these species. None are likely to roost within the subject site as suitable roosting sites are absent from the site.

Only two species of reptiles had been recorded within the subject site. These species was the Striped Skink *Ctenotus robustus* and the Garden Skink *Lampropholis guichenoti*. Very few other reptile species are expected to occur due to the degree of disturbance, limited availability of sheltering habitat and the disjunct nature of the site. However, it is possible that the Golden Water Skink *Sphenomorphus quoyii* and the Blue-tongued Skink *Tiliqua scincoides* may also be present as these species are known to inhabit disturbed and semi-disturbed environments including urban and industrial areas especially near water as in the case with the Golden Water Skink.

Several threatened species of reptiles have been recorded for the Hunter region including the Broad-headed Snake, Pale-headed Snake, Stephen's Banded Snake and the Rosenberg's Monitor. None of the above species were recorded and are unlikely to occur on the site due to the lack of suitable habitat for each respective species. However, relatively common species that have been recorded within the broader district including the Yellow-faced Whip Snake *Demanisa psammophis*, Common Black Snake *Pseudechis porphyriacus*, White's Skink *Egernia whitii*, Jacky Dragon *Amphiloburus muricatus* and Lace Monitor *Varanus varius* are unlikely to occur as the site is too degraded.

Other common species in the region including the Eastern Stone Gecko *Diplodactylus vittatus*, Thick-tailed Gecko *Underwoodisaurus milii*, Burton's Snake-lizard *Lialis burtonis*, Common Scaly-foot *Pygopus lepidopodus*, Wall Skink *Cryptoblepharus virgatus*, Copper-tailed Skink *Ctenotus taeniolatus*, Cunningham's Skink *Egernia cunninghami*, Grass Skink *Lampropholis guichenoti*, South-eastern Morethia Skink *Morethia boulengeri*, Common Bearded Dragon *Pogona barbata*, Eastern Water Dragon *Physignathus lesueurii*, Diamond Python *Morelia spilota*, Swamp Snake *Hemiaspis signata*, Common Death Adder *Acanthophis antarcticus*, Eastern Small-eyed Snake *Cryptophis nigrescens* and the Eastern Brown Snake *Pseudonaja textilis* are unlikely to occur within the subject site due to habitat degradation both on and off site within the immediate environs of the site.

The only amphibian recorded was the Clicking Frog *Crinia signifera*. It is likely that the Brown-striped Marsh Frog *Limnodynastes peroni* and the Keferstein's Tree Frog *Litoria dentata* are also present as these species are frequently found in disturbed environments adjacent to saline and semi-saline areas such as the Hunter River. Other common species in the locality such as the Peron's Tree Frog *Litoria peronii*, Verreaux's Tree Frog

Litoria verreauxi, Eastern Banjo Frog *Limnodynastes dumerili*, Lesueur's Frog *Litoria lesueurii* and the Great Green Tree Frog *Litoria caerulea* are not expected to occur.

No other reptile or anuran (frog) species are expected to occur including threatened species such as the Green & Golden Bell Frog *Litoria aurea* (E1, Threatened Species Conservation Act, 1995), Green-thighed Frog *Litoria brevipalmata* (Schedule 2, Threatened Species Conservation Act, 1995), Littlejohn's Tree Frog *Litoria littlejohnii* (Schedule 2, Threatened Species Conservation Act, 1995), Wallum Frog *Crinia tinnula* (Schedule 2, Threatened Species Conservation Act, 1995) and the Stuttering Frog *Mixophyes balbus* (Schedule 2, Threatened Species Conservation Act, 1995).

The Green and Golden Bell Frog *Litoria aurea* has been associated with almost every type of water body except fast flowing streams (Pyke & White 1996). Sites which support breeding populations usually contain water bodies which are still, shallow, ephemeral, unpolluted, unshaded, with aquatic plants and free of *Gambusia* and other predatory fish, with terrestrial habitats that consists of grassy areas and vegetation no higher than woodlands, and a range of diurnal shelter sites. In NSW the species also occupies disturbed habitats and breeding largely occurs in ephemeral ponds (Pyke and White 1996), possibly because most natural habitats are degraded or lost in NSW (Gillespie 1996). However, there is no habitat for the species present on-site.

9.0 DISCUSSION

THREATENED SPECIES, POPULATIONS AND ENDANGERED ECOLOGICAL COMMUNITIES:

9.1 ENDANGERED ECOLOGICAL COMMUNITIES:

Several endangered ecological communities have now been registered as occurring within the Hunter Valley region and indeed the greater Sydney bioregion that extends up into the Hunter Valley. These endangered ecological communities are further described and discussed in greater detail below.

Lower Hunter Spotted Gum-Ironbark Forest in the Sydney Basin Bioregion-endangered ecological community: (Part 3 of Schedule 1 of the NSW Threatened Species Conservation Act, 1995)

The Lower Hunter Spotted Gum-Ironbark Forest in the Sydney Basin Bioregion-endangered ecological community is listed on Part 3, Schedule 1 of the NSW Threatened Species Conservation Act, 1995. The Lower Hunter Spotted Gum-Ironbark Forest is dominated by *Corymbia maculata* (Spotted Gum) and *Eucalyptus fibrosa* (Broad-leaved Ironbark) while *Eucalyptus punctata* (Grey Gum) and *Eucalyptus crebra* (Narrow-leaved Ironbark) occur occasionally and that the understorey generally consists of the tall shrub *Acacia parvipinnula* and the prickly shrubs *Daviesia ulicifolia*, *Bursaria spinosa*, *Melaleuca nodosa* and *Lissanthe strigosa* (Final Determination, 2005). Although the Lower Hunter Spotted Gum-Ironbark Forest in the Sydney Basin Bioregion-endangered ecological community has been recorded within the Newcastle Local Government Area, none of the above floristics are characteristic of the subject site and the subject site does not contain habitat for this endangered ecological community.

Hunter Lowland Redgum Forest-endangered ecological community: (Part 3 of Schedule 1 of the NSW Threatened Species Conservation Act, 1995).

The Hunter Valley Lowland Redgum Forest endangered ecological community occurs on gentle slopes, depressions and drainage flats on Permian sediments of the Hunter Valley floor. The tree species strongly associated with the Hunter Valley Lowland Redgum Forest is generally *Eucalyptus tereticornis* and *Eucalyptus punctata*, however other tree species also occur to a lesser degree of representation include *Angophora floribunda*, *Eucalyptus crebra*, *Eucalyptus molucanna* and *Corymbia maculata*. The Hunter Valley Lowland Redgum Forest may also grade into Spotted Gum-Ironbark Forest. Less than 500 hectares of the community remain and now occur in a highly fragmented state. Only about 2% is preserved within the Werakata National Park and the remainder remain in private ownership. None of the above floristics is characteristic of the subject site and that site does not contain habitat for this endangered ecological community.

Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions-Endangered Ecological Community: (Part 3 of Schedule 1 of the NSW Threatened Species Conservation Act, 1995).

The Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions-Endangered Ecological Community is listed as an endangered ecological community on Part 3 of Schedule 1 of the NSW Threatened Species Conservation Act, 1995. The Scientific Committee (as appointed under the Threatened Species Conservation Act, 1995) has determined that the community is a mosaic of vegetation types occurring on waterlogged estuarine alluvial soils and strongly influenced by periodic poor drainage conditions. The Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions-Endangered Ecological Community is also characterised by several species of swamp forest plants. The subject site does not qualify as Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions-Endangered Ecological Community.

THREATENED SPECIES:

9.2 FLORA:

***Eucalyptus parramattensis* subsp. *Decadens*
(Schedule 2, Threatened Species Conservation Act, 1995).**

Eucalyptus parramattensis subsp. *Decadens* has been recorded for the area according to the DEC's Atlas database records for the locality and the Newcastle LGA. *Eucalyptus parramattensis* subsp. *Decadens* is a sub-species of the Parramatta Red Gum occurring in the region and is listed as a vulnerable species in Schedule 2, Threatened Species Conservation Act, (1995) and is also listed as vulnerable under the Commonwealth's Environmental Protection & Biodiversity Conservation Act, 1999.

Eucalyptus parramattensis subsp. *Decadens* is a woodland tree from 8-15 metres in height. The Kurri Kurri meta-population is bordered by Cessnock-Kurri Kurri in the north and Mulbring-Aberdare in the south and generally occurs on deep, low nutrient sand deposits subject to periodic inundation or where water tables are high (Threatened Species Profile, Department of Environment & Conservation, 2005 update).

Very little is known about the biology and ecology of *Eucalyptus parramattensis* subsp. *Decadens* although in the Kurri Kurri area, the species occurs within the Kurri Sand Swamp Woodland endangered ecological community as a co-dominant with *Angophora bakeri* and has additional high ecological value within this vegetation community as old trees have well developed tree hollows and that these hollows are critical for nest or den sites for several species of birds and mammals including possums and gliders. The species is under threat from fragmentation and habitat loss, sand mining, road construction and developments including industrial and residential developments, weed invasion namely Bitou Bush and Lantana high frequency fires and modification of drainage patterns (Threatened Species Profile, Department of Environment & Conservation, 2005 update). Although the species has been recorded for the Newcastle Local Government Area, the species was not recorded within the subject site and that the proposal will not have a significant effect on *Eucalyptus parramattensis* subsp. *Decadens*.

HEART-LEAVED STRINGYBARK *Eucalyptus camfieldii* (Schedule 1, Threatened Species Conservation Act, 1995)

The Heart-leaved Stringybark *Eucalyptus camfieldii* was not recorded within the subject site. *Eucalyptus camfieldii* can be found on a variety of soil landscapes including sandy soils. A significant effect by the proposal on *Eucalyptus camfieldii* is highly unlikely to eventuate.

***Tetratheca juncea* (Schedule 2, Threatened Species Conservation Act, 1995).**

Tetratheca juncea is a prostrate shrub with stems up to 1 metre in length and occurs on sandy, occasionally swampy heath and in dry sclerophyll forest (Harden, 1992). The flowering period for *Tetratheca juncea* is from July to December and is found from Bulahdelah to Lake Macquarie (Harden, op cit), however the species is also present as far south as Doyalson (personal observation). The subject site was targeted for the occurrence of *Tetratheca juncea*, however the species was not recorded and that the proposal will not have a significant effect on the species.

***Zannichellia palustris* (Endangered 1, Threatened Species Conservation Act, 1995)**

Zannichellia palustris is a rhizomatous aquatic plant occurring in fresh or slightly saline stationary or slowly flowing water (Harden, 1993). These habitat parameters are not present within the subject site. This species was not recorded within the subject site and that a significant effect on *Zannichellia palustris* is unlikely to occur as a result of the proposal.

Rough Double-tail Orchid *Diuris praecox*: (Schedule 2, Threatened Species Conservation Act, 1995)

The Rough Double-tail Orchid *Diuris praecox* was not recorded within the subject site. Harden (1993) states that *Diuris praecox* occurs from Ourimbah in the south to Nelson Bay in the north and grows in sclerophyll forest in coastal and near coastal districts. This species is difficult to detect when the species is not in-flower and is generally cryptic when not in-flower. However, the species is unlikely to occur within the subject site as *Diuris praecox* occurs on 'old dunes and rocky hills in sand or sandstone derived soils in coastal dry forest or heath. It is considered that the species is absent from the subject site based on habitat parameters.

9.3 FAUNA:

Grey-headed Flying Fox *Pteropus poliocephalus* (Schedule 2, Threatened Species Conservation Act, 1995)

The Grey-headed Flying Fox *Pteropus poliocephalus* is likely to pass over the subject site on a frequent basis as the species forages widely within the region. However, there are no food plants for the species present on-site and that there are no current or potential roosting or camp sites of the Grey-headed Flying Fox present within or adjacent to the subject site. The proposal will not have a significant effect on the Grey-headed Flying Fox.

**Koala *Phascolarctos cinereus*:
(Schedule 2, Threatened Species Conservation Act, 1995)**

The Koala had not been recorded within the subject site and that evidence of the Koala utilising the subject site had not been observed. There are no Koala food plants as listed in Schedule 2 of State Environmental Planning Policy-44 (Koala Habitat Protection) present within the subject site.

No scats, positively identified Koala scratch marks or individuals of the Koala were observed within the subject site. The known geographic distribution of the Koala is north Queensland, south-eastern Queensland, and coastal NSW, parts of coastal and inland Victoria and small residual colonies in South Australia. State Environmental Planning Policy-44 (Koala Habitat Protection) does not apply to the subject site and to the proposal in this instance.

**Spotted-tailed (Tiger) Quoll *Dasyurus maculata*: (Schedule 2,
Threatened Species Conservation Act, 1995)**

The Spotted-tailed Quoll is a terrestrial and arboreal carnivorous marsupial and its body weight lies within the 'critical weight-range' of Australian mammals. This species occurs within both forested and woodland habitats and has been recorded for the Newcastle Local Government Area. There is considerable variation in habitat preferences for the Spotted-tailed Quoll and is demonstrated from the various locations and habitats where this species occurs within the region. There is no habitat present on-site for the species. During the field assessment, no scats or latrine sites were observed at any location within the subject site. The known distribution of the Spotted-tailed Quoll is from south-east Queensland, coastal NSW, north-eastern Victoria and Tasmania. The proposal will not have a significant effect on the Spotted-tailed Quoll.

**Glossy Black Cockatoo *Calyptorhynchus lathami*: (Schedule 2,
Threatened Species Conservation Act, 1995)**

The Glossy Black Cockatoo is an extremely conspicuous large black cockatoo and is a specialist niche feeder of the Forest Oak *Allocasuarina torulosa* located in open forests (personal observation). The Glossy Black Cockatoo occurs from central coastal Queensland, eastern NSW and north-eastern Victoria. There is an isolated population on

Kangaroo Island in South Australia (Slater, Slater & Slater, 1992). The Glossy Black Cockatoo is listed as vulnerable within the Threatened Species Conservation Act, 1995. The primary food plant for this species within the bioregion is the Forest Oak *Allocasuarina torulosa* (personal observation). The Glossy Black Cockatoo when feeding on this food plant species tends to chew the fruiting cones of the plant and discards the cones onto the forest floor. No Forest Oak trees were recorded within the subject site even though the allied tree species *Casuarina glauca* is present. However, no chewed fruiting cones of this species were recorded.

There is no evidence that the Glossy Black Cockatoo had been feeding on the allied tree species *Casuarina glauca*. These trees had been examined for evidence of chewed fruiting cones pertaining to the Glossy Black Cockatoo as a precautionary measure, however, no evidence was found to substantiate the utility of these trees by the Glossy Black Cockatoo and no chewed cones were located. A significant effect on the Glossy Black Cockatoo is unlikely to occur as a result of the proposal.

Powerful Owl *Ninox strenua*: (Schedule 2, Threatened Species Conservation Act, 1995)

The Powerful Owl occurs in open forests habitats within the region (personal observation) and (O'Brien, 1990). The Powerful Owl prefers to roost within deep gullies and rainforest habitats where adequate canopy shelter is afforded. The subject site does not contain steep gullies or rainforest habitats.

The Powerful Owl (and all other species of owls known to occur within the bioregion) had been sought throughout the entire subject site. Owl white-wash excreta, pellets, primary wing feathers and other signs of owls were sought. No evidence of the Powerful Owl had been located within the subject site. The Powerful Owl is known to predate on the Grey-headed Flying Fox and other arboreal mammals such as possum species. There are no nesting or appropriate roosting sites available within the subject site for the Powerful Owl. The known distribution of the Powerful Owl is south-eastern Australia from the Dawson River, Queensland to south-east South Australia (Slater et al, 1992). The proposal is unlikely to have a significant effect on the Powerful Owl.

**Barking Owl *Ninox connivens*:
(Schedule 2, Threatened Species Conservation Act, 1995)**

Records of the Barking Owl are accumulating within the greater Hunter, Sydney and North Coast bioregions. The known distribution of the Barking Owl is arid and coastal regions in most parts of northern and eastern Australia and the south-west of Western Australia. The consultant has previously recorded the Barking Owl only on two occasions within the Sydney bioregion and is considered to be very rare in the Sydney bioregion. The consultant believes that many of the recent records of the Barking Owl are possibly inaccurate records, this is based on the reliance of calls thought to be Barking Owls by inexperienced consultants, mistakenly identifying calls of the Sooty Owl. The Sooty Owl produces a 'bomb-drop' call which sounds similar to that of a load scream in which the Barking Owl is reputed to produce. If the species were identified by the 'barking call' of the Barking Owl, then these records are likely to be accurate. The Barking Owl was not recorded during the field assessment phase and there is no suitable habitat present on-site.

**Masked Owl *Tyto novaehollandiae*
(Schedule 2, Threatened Species Conservation Act, 1995)**

The Masked Owl was not recorded and the species is highly unlikely to utilise the site. The Masked Owl occurs mainly in coastal and sub-coastal forests and woodlands and occur at higher densities in regions with the greatest local diversity of forest and woodland structural formations (Debus, 1994). The proposal is unlikely to have a significant effect on the Masked Owl due to the lack of substantial habitat within the subject site.

Regent Honeyeater *Xanthomyza phrygia*: (Schedule 1, Threatened Species Conservation Act, 1995)

The Regent Honeyeater *Xanthomyza phrygia* is listed in Schedule 1 (Endangered) of the NSW Threatened Species Conservation Act, 1995 and is classified as endangered under the Commonwealth Endangered Species Protection Act, 1999 and has been recorded within the Newcastle LGA. Individuals or populations of the Regent Honeyeater may occur within the district and the broader region at any given time especially during the winter season and may remain generally undetected as nomadic individuals, residual flocks or transient immature birds. The species locally feeds on Spotted Gums and Forest Red Gums as these tree species are winter flowering species. None of these tree species are present within the subject site.

The Regent Honeyeater occurs mainly in the box-ironbark open forests and riparian stands of *Casuarina* on the inland slopes of the Great Dividing Range (Menkhorst, Schedvin and Geering, 1998). However, the Regent Honeyeater also occurs in coastal open forests including Swamp Mahogany *Eucalyptus robusta* forests (Swamp Mahogany is also absent from the site). None of the major food plants are present within the subject site. The Regent Honeyeater was not recorded during the ecological assessment of the subject site. A significant effect on the Regent Honeyeater is unlikely.

Swift Parrot *Lathamus discolor*: (Schedule 1, Threatened Species Conservation Act, 1995)

The Swift Parrot is listed as an endangered species in both the state and Commonwealth legislation and has been recorded within the Newcastle LGA. The winter flowering food plant species the Swift Parrot depends on locally are Spotted Gum *Corymbia maculata* and the Forest Red Gum *E. tereticornis*. On the Central Coast, the Swift Parrot also feeds on the inflorescence of *Melaleuca quinquenervia* (personal observation). A significant effect on the Swift Parrot is unlikely to occur as a result of the proposal. There are no food plants for the species present within the subject site.

Black Bittern *Ixobrychus flavicollis*: (Schedule 2, Threatened Species Conservation Act, 1995)

The Black Bittern is listed as vulnerable under the terms of the Threatened Species Conservation Act, 1995. This species was not recorded within the subject site or in other adjacent areas during the field assessment phase. The Black Bittern occurs in a range of habitats including in flooded grasslands, woodland, forest, rainforests and mangrove communities. The Black Bittern is expected to occur in the locality where appropriate habitat exists for the species especially along the banks of the Hunter River. The species may occur within the dense reedland east of the subject site and immediate environs, however the proposal will not disturb any areas of habitat.

Pied Oystercatcher *Haematopus fuliginosus*: (Schedule 2, Threatened Species Conservation Act, 1995)

The Pied Oystercatcher is a species that prefers habitats consisting of sandy beaches, mudflats and estuaries around the perimeter of Australia. The Pied Oystercatcher is listed as vulnerable under the terms of the Threatened Species Conservation Act, 1995. The

Pied Oystercatcher was not recorded within the subject site and that the subject site does not contain habitat of the species. The Pied Oystercatcher is more likely to forage along the nearby Hunter River as this area is more suitable habitat for the species. Therefore the proposal will not have a significant effect on the Pied Oystercatcher or its habitat.

Wallum Frog *Crinia tinnula*: (Schedule 2, Threatened Species Conservation Act, 1995)

The Wallum Frog *Crinia tinnula* had been sought within the subject site however *Crinia tinnula* had not been recorded during the field assessment phase and habitat for the species is absent from the site even though the allied species *Crinia signifera* is present. *Crinia tinnula* is particularly sensitive to habitat disturbance and its habitat is easily sterilised by disturbance to its habitat. *Crinia tinnula* is unlikely to be present within subject site or immediate environs due to the lack of suitable habitat. *Crinia tinnula* was not recorded within the subject site and is not expected to be present therefore a significant effect on the species is unlikely in this instance. Even though this small cryptic species is difficult to observe in the field, the species has a highly distinctive breeding call and is easily detected when present.

Green-thighed Frog *Litoria brevipalmata*: (Schedule 2, Threatened Species Conservation Act, 1995)

The Green-thighed Frog *Litoria brevipalmata* has been previously recorded by the consultant within the Ourimbah State Forest on a number of occasions and in a number of localities in the late 1970's and early 1980's. It is possible that this species is present elsewhere within the Hunter catchment but not within the Newcastle CBD and Kooragang Island. A seven Part Test is not applied to the species due to lack of suitable habitat on-site.

Green & Golden Bell Frog *Litoria aurea*: (Schedule 1, Threatened Species Conservation Act, 1995)

The Green & Golden Bell Frog was targeted during the field assessment phase. The species was sought within the site's weedy vegetation and under debris. However, the species was not recorded and is considered highly unlikely to occur. Predation by Mosquito Fish *Gambusia holbrooki* on the tadpoles and eggs of frogs is listed as a key threatening process and the presence of the Mosquito Fish is likely to sterilise any

breeding habitat to the Green & Golden Bell Frog. Breeding sites of the Green & Golden Bell Frog is almost completely restricted to water bodies lacking the *Gambusia holbrooki* (NPWS Final Determination, Predation by *Gambusia holbrooki*, Key Threatening Process, 1999). The proposal is unlikely to have a significant effect on the Green & Golden Bell Frog.

9.4 LOCALLY & REGIONALLY SIGNIFICANT SPECIES:

In addition to the threatened species of flora and fauna considered during the field assessment phase, several locally and regionally significant species were also surveyed for their occurrence including the ROTAPs Cycad *Macrozamia flexuosa* and Mountain Grevillea *Grevillea montana*. The White-breasted Sea Eagle *Haliaeetus leucogaster* was observed soaring over the subject site and the Hunter River, however the subject site does not contain habitat for the species in any form including as a resource for hunting, drinking, foraging, nesting and breeding. There are no substantial trees remaining on the property that would be suitable as a vantage point or 'lookout' post for the species. Indirect evidence of the use of the south-western corner of Lot 1 by the Peregrine Falcon *Falco peregrinus* had been ascertained. This assumption was made as a result of the discovery of several domestic/racing pigeon carcasses being located in this corner. These pigeons had been killed and consumed on-site and the carcasses dropped onto the ground below this kill/consumption site. It was noted that the roof of a building across the road from the site had a large population of domestic pigeons; a very reliable source of food for the Peregrine Falcon. The Peregrine Falcon is a well known domestic pigeon predator and occurs in both natural and human environments including capital cities where there are usually domestic pigeons.

9.5 ENDANGERED POPULATIONS & ENDANGERED ECOLOGICAL COMMUNITIES:

In relation to known endangered populations, there are only a few that are listed for the greater Hunter region including the Koala at Hawkes Nest/Tea Gardens area within the Port Stephens LGA and the endangered population of the River Red Gum *Eucalyptus camaldulensis* listed for the Hunter Catchment area and the endangered population of the orchid *Cymbidium canaliculatum* also for the Hunter Catchment area. However, the River Red Gum and the orchid *Cymbidium canaliculatum* were not recorded within the subject site and it is unlikely that either of these plant species are present within or adjacent to the subject site. The Koala at Hawkes Nest/Tea Gardens area within the Port Stephens LGA has no ecological affiliation with the subject site. It is concluded that none of the above endangered populations are adjacent to or have any ecological or biological affiliation with the subject site.

In regards to endangered ecological communities, it is possible that the environs of the subject site originally contained the Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions' endangered ecological community, however the subject site does not contain this vegetation community and the proposal will not have a significant effect on this endangered ecological community either directly or indirectly. There are no endangered ecological communities present within or adjacent to the subject site.

9.6 WILDLIFE CORRIDORS & HABITAT FRAGMENTATION

The proposed bulk liquid storage facility and associated infrastructure will not sever any wildlife corridors within either the subject site or indeed to the broader locality. The subject site (incorporating all lots 1-4) is completely degraded and disturbed ecologically. There are no wildlife corridor units present within the Walsh Point precinct of Kooragang Island. The subject site is located entirely within a heavy industrial area of the island. The proposed bulk liquids storage facility and associated infrastructure will not result in the fragmentation of habitat as it is reiterated that the subject site is highly disturbed ecologically and is already 'fragmented' from other habitat values in the locality. In conclusion, the proposal will not cause wildlife habitat corridor severance or cause significant wildlife habitat fragmentation.

10.0 CONCLUSIONS & RECOMMENDATIONS:

It is concluded that the proposed Marstel Terminals bulk fuel storage facility will not have a significant effect on threatened species (of flora or fauna), populations or endangered ecological communities as listed under the NSW Threatened Species Conservation Act, 1995 or the Commonwealth's Environment Protection & Biodiversity Conservation Act, 1999 or the NSW Fisheries Management Act, 1994. It is possible that the environs of the subject site previously contains the 'Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions' endangered ecological community, however there is no trace of this community present on-site.

No threatened species, populations and endangered ecological communities are present within the subject site. It was considered likely that the Grey-headed Flying Fox *Pteropus poliocephalus* (Schedule 2, Threatened Species Conservation Act, 1995) would pass overhead of the subject site on a frequent basis as the species would forage widely within the Newcastle Local Government Area during their nightly foraging activities searching for blossoming or flowering tree species namely eucalypts. However, the subject site has

no ecological value to the Grey-headed Flying Fox for foraging or feeding purposes or roosting purposes. It is also possible that the Common Bent-winged Bat (Schedule 2, Threatened Species Conservation Act, 1995) and the Large-footed Myotis (also Schedule 2, Threatened Species Conservation Act, 1995) would also pass over the subject site during their foraging activities, however there are no habitat values for either of these species present within the subject site including roosting sites. The subject site contains little or no habitat value to threatened species of flora or fauna or species of local or regional significance. Although the Peregrine Falcon is not a threatened species, it is considered to be a species of local significance. The rate of decomposition of the skeletal remains of the domestic/racing pigeons presumably killed by the Peregrine Falcon suggest that the Peregrine Falcon had not utilised the site for several months as there were no 'fresh' or recent kills on-site. It is likely that this individual Peregrine Falcon has a number of kill or prey-consumption sites within the locality and that the subject site's south-western corner containing a small groves of trees would not be a critical site locality for the Peregrine Falcon. Following the establishment of the proposed bulk fuel facility, the Peregrine Falcon is still likely to hunt and predate on the locality's population of domestic pigeons and would continue to occur in the vicinity as this species can be highly urbanised and prospers within the built environment. Finally, in relation to the White-breasted Sea Eagle, this species will continue to forage along the Hunter River and that the subject site is totally inconsequential to the White-breasted Sea Eagle.

In relation to the remaining threatened species, populations and endangered ecological communities as listed and described under the terms of the NSW TSC Act, 1995 and the Commonwealth's Environment Protection & Biodiversity Conservation Act, 1999 a significant effect on those threatened species, populations and endangered ecological communities (including the remaining threatened species of flora and fauna listed in Tables 1 and 2 of this flora and fauna assessment report and the Rare Or Threatened Australian Plants (ROTAPs) listed in Table 3) is unlikely to occur as a result of the proposal.

In relation to SEPP-44 (Koala Habitat Protection), the subject site does not qualify as 'Potential Koala Habitat' nor does it qualify as 'Core Koala Habitat' under the terms of State Environmental Planning Policy-44 (Koala Habitat Protection). Therefore, further provisions of SEPP-44 do not apply.

Finally, the subject site contains numerous exotic plants and animals. Three in particular which are major ecological pest species in Australia. These species consist of the Bitou Bush, the European Fox and the European Rabbit; all three are listed as key threatening processes. The proposal will not exacerbate or spread the occurrence of these introduced pest species within the locality as to have an effect on threatened species, populations or

endangered ecological communities. The establishment of the bulk liquids terminal will result in the removal and eradication of the Bitou Bush from the site, therefore this action will result in the elimination of sheltering habitat or the den site of the European Fox and consequently the removal of the European Rabbit from the site which also shelters within the Bitou Bush thickets.

To minimise impacts on the flora and fauna biodiversity within the locality, the following recommendation is made in relation to the proposal. Due to high degree of disturbance to the subject site, there can be very little that can be made in relation to recommendations based on ecological grounds.

- * That the subject site's population of the Bitou Bush be totally removed from the subject site and disposed of in accordance with the Newcastle City Council's weed disposal policies. Council's weed control officer should be contacted for specific advice in relation to the disposal of this ecological weed to ensure that seed propagules of the Bitou Bush are not accidentally dispersed from the site during clearing operations. Bitou Bush invasion into indigenous vegetation communities is a key threatening process.

APPENDIX 1

SEVEN PART TEST OF SIGNIFICANCE

SWAMP OAK FLOODPLAIN FOREST OF THE NSW NORTH COAST, SYDNEY BASIN & SOUTH EAST CORNER BIOREGIONS 'ENDANGERED ECOLOGICAL COMMUNITY'

5A 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats.

- (1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:
 - (a) each of the factors listed in subsection (2)
 - (b) any assessment guidelines.
- (2) The following factors must be taken into account in making a determination under this section:
 - (a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,**

No, the 'Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions' is not a species *per se* as the Swamp Oak Floodplain Forest is a community or assemblage of flora and fauna occurring within certain ecological parameters as defined in the Final Determination representing this community. This section of the Seven Part Test does not apply to the proposal or to this Significance Assessment process.

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

No, there are no formally declared endangered populations of the Swamp Oak Floodplain Forest vegetation community within the Newcastle LGA under the terms of the Threatened Species Conservation Act, 1995. The Swamp Oak Floodplain Forest is a community or assemblage of flora and fauna occurring within certain ecological parameters as defined in the Final Determination of the community. The community is itself 'endangered' and the population criteria (b) does not apply to the proposal or to the Significance Assessment process in this instance.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

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

No, it is unlikely that there will be an adverse effect on the localised occurrence of the Swamp Oak Floodplain Forest that would result in the placement of the community at risk of localised extinction as a result of the action proposed.

The proposal will not result in the removal of any area of Swamp Oak Floodplain Forest habitat and that the proposal will not have a significant effect on this vegetation community and the proposal will not cause a localised extinction of the Swamp Oak Floodplain Forest endangered ecological community.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

No, there will be no modification of Swamp Oak Floodplain Forest endangered ecological community that will place the local occurrence of the community at risk of extinction. Although there are some Swamp Oak *Casuarina glauca* present on-site, the proposal will not result in the removal of any native vegetation community.

- (d) in relation to the habitat of a threatened species, population or ecological community:**
- (i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and**

The proposal and any associated works will not remove or modify Swamp Oak Floodplain Forest vegetation community or its habitat Swamp Oak Floodplain Forest within the North Coast, Sydney Basin and South East Corner bioregions in NSW is absent from the subject site.

- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and**

No, as the area to be developed is entirely disturbed and cleared of native vegetation. There are a few peripheral Swamp Oak trees located along the south-eastern boundary of Lot 1. These trees can easily be retained, but the removal of these trees would not be a significant ecological issue. No area of habitat of the Swamp Oak Floodplain Forest will be fragmented or isolated from other areas of habitat pertaining to the Swamp Oak Floodplain Forest in this instance.

- (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,**

There will be no significant area of habitat of the Swamp Oak Floodplain Forest that will be removed, modified, fragmented or isolated in this instance and that the proposal will not have an effect on the long-term survival of the Swamp Oak Floodplain Forest in the locality.

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

No, the action proposed will not have an adverse on critical habitat of the Swamp Oak Floodplain Forest as no critical habitat has been assigned to the community at this stage.

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

Any future development of the subject site would be consistent with the objectives of a recovery plan and any threat abatement plans pertaining to the community in the future.

However, a Recovery Plan for Swamp Oak Floodplain Forest has not at this stage been prepared and approved.

(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.

No, there will be no removal of habitat of the Swamp Oak Floodplain Forest in this instance and that the proposal will not trigger any of the key threatening process including 'clearing of native vegetation' in this instance. The proposal will result in the removal of Bitou Bush; Bitou Bush invasion into native vegetation communities is a key threatening process.

APPENDIX 2

SEVEN PART TEST OF SIGNIFICANCE

BLACK BITTERN *Ixobrychus flavicollis*

5A 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats

- (1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:
 - (a) each of the factors listed in subsection (2)
 - (b) any assessment guidelines.
- (2) The following factors must be taken into account in making a determination under this section:

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

No, the area proposed for the development is already in a disturbed ecological condition. There are no reeds or other similar habitat present within the subject site, however there is a dense reed thicket located immediately outside of the subject site's eastern boundary located along the foreshore of the Hunter River North Channel. This dense reedland is dominated by the introduced reed known as the Giant Reed *Arundo donax*. This reedland is potential habitat for the Black Bittern, nonetheless, the proposal will not include the removal or disturbance of this reedland. The Black Bittern was not recorded and that there are no nests sites present within the subject site.

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

No, there are no endangered populations of the Black Bittern present within the Hunter region or the Sydney basin bioregion at this stage.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

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

Not applicable.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable.

(d) in relation to the habitat of a threatened species, population or ecological community:

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

No area of Black Bittern habitat will be removed or modified in this instance. The perceived Black Bittern habitat is the reedland habitat located outside of the eastern boundary of the subject site.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

No, the subject site is already isolated and fragmented from areas of suitable habitat. The proposal would not further fragment or isolate habitat of the species within the subject site or in the locality. The species is also capable of flying from one remnant area of habitat to another in any given locality.

(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 area of potential importance of habitat to the Black Bittern is the reedland located outside of the eastern boundary of the site. There will be no removal, modification, fragmentation or isolation of habitat of the species as a result of the proposal.

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

No, no critical habitat of the Black Bittern has been declared under state or federal legislation at this stage.

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

No recovery plans or threat abatement plans pertaining to the Black Bittern has been declared under state or federal legislation at this stage.

(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.

No, clearing of native vegetation and predation by the European Fox are key threatening processes that affect the Black Bittern, however the proposal will not involve removal of native vegetation and will not result in an increase in the population of the European Fox. However, the development of the site will result in the removal of the subject site's European Fox as the fox will simply be eradicated from the site.

APPENDIX 3

SEVEN PART TEST OF SIGNIFICANCE

PIED OYSTERCATCHER *Haematopus longirostris*

5A 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats

- (1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:
 - (a) each of the factors listed in subsection (2)
 - (b) any assessment guidelines.
- (2) The following factors must be taken into account in making a determination under this section:

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

No, the area proposed for the reconstruction of the facility is already in a disturbed ecological condition. This disturbed area is located throughout all four lots. There are limited potential foraging areas for the Pied Oystercatcher present as the perceived potential habitat of the species is along the rocky foreshore immediately to the east of the subject site. The Pied Oystercatcher was not recorded and that there are no nests sites present within or adjacent to the subject site. The proposed development will not have an adverse effect on any part of the life-cycle of the species to the extent that a local viable population would be placed at risk of extinction.

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

No, there are no endangered populations of the Pied Oystercatcher present within the Sydney basin (including the Hunter) bioregion at this stage.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

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

Not applicable.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

This section of the Sven Part Test is not applicable to the Pied Oystercatcher.

(d) in relation to the habitat of a threatened species, population or ecological community:

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

No significant area of habitat is present within the subject site. The habitat for the Pied Oystercatcher is located outside of the subject site namely the rocky foreshore along the Hunter River.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

No, the subject site is already isolated and fragmented from areas of suitable habitat for the species. The proposed development of the site would not further fragment or isolate habitat of the species within the subject site. The species is also capable of flying from one remnant area of habitat to another in any given locality. The Pied Oystercatcher was not recorded within the subject site or immediate environs. The species may however forage along the rocky foreshore habitat area east of the subject site along the Hunter River.

(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,

There is no significant important habitat to the Pied Oystercatcher present within the subject site's proposed development site. Significant removal, modification, fragmentation or isolation of habitat of the species will not take place in this instance as the habitat for the species remains external to the site.

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

No, no critical habitat of the Pied Oystercatcher has been declared under state or federal legislation at this stage.

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

No recovery plans or threat abatement plans pertaining to the Pied Oystercatcher have been declared under state or federal legislation at this stage.

(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.

No, clearing of native vegetation and predation by the European Fox are key threatening processes that affect the Pied Oystercatcher, however the proposal will not involve clearing of native vegetation and will not result in an increase in the population of the European Fox as a result of the proposal, only a decrease in the fox as the fox will be eradicated from the site once development commences.

APPENDIX 4

SEVEN PART TEST OF SIGNIFICANCE

BARKING OWL *Ninox connivens*

5A 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats

- (1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:
 - (a) each of the factors listed in subsection (2)
 - (b) any assessment guidelines.
- (2) The following factors must be taken into account in making a determination under this section:

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

No, the action proposed is unlikely to have an adverse effect on the life-cycle on the Barking Owl that may result in the localised extinction of the Barking Owl. The species was not recorded and is unlikely to be affected. The species prefers open forests and woodland communities. The subject site is too degraded to sustain the Barking Owl.

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

No, there are no endangered populations of the Barking Owl present within the Newcastle Local Government Area.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

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

Not applicable as the Barking Owl is a species in its own right and does not constitute an ecological community *per se*.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable as above.

(d) in relation to the habitat of a threatened species, population or ecological community:

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

The proposed development site does not contain any foraging habitat to that of the Barking Owl although this species is also known to predate on ground dwelling mammals. The European rabbit is present within the site (personal observation) and the species is known to predate on it. However, in relation to the species overall habitat, very limited or no area of potential habitat will be removed in this instance.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

No, no area of habitat will become fragmented or isolated as a result of the proposal. The Barking Owl can disperse through or over fragmented habitat but habitat fragmentation will not take place in this instance.

(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,

No significant area of habitat will become removed, modified, fragmented or isolated as a result of the proposal to the extent that a long-term effect on the species is likely.

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

No, no area of habitat of the Barking Owl has been identified as critical habitat under the terms of the Threatened Species Conservation Act, 1995 or the Commonwealth's Environment Protection & Biodiversity Conservation Act, 1999 at this stage as the species is not eligible for listing for critical habitat status as the species is not listed as an endangered species.

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

A Recovery Plan for the Barking Owl has been prepared. The proposal will be consistent with the Recovery Plan for the species.

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

No, as clearing of native vegetation to accommodate the proposal will not trigger the key threatening processes 'clearing of native vegetation' in this instance. Additional key threatening processes are also likely to be relevant to the Barking Owl (NPWS, draft Recovery Plan, 2003). Other key threatening processes include continued loss of native hollow bearing trees. There are no hollow-bearing trees present within the subject site.

APPENDIX 5

SEVEN PART TEST OF SIGNIFICANCE

POWERFUL OWL *Ninox strenua*

5A 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats

- (1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:
 - (a) each of the factors listed in subsection (2)
 - (b) any assessment guidelines.
- (2) The following factors must be taken into account in making a determination under this section:
 - (a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,**

No, the development of the subject site will not have an adverse effect on the life cycle of the Powerful Owl to the extent that would place the species at risk of localised extinction. There will be no significant removal of habitat, no removal of nesting or roosting sites and no significant removal of prey-food items or their habitat. The Powerful Owl is well known to prey on the Grey-headed Flying Fox when these large bats forage in canopy trees to feed on the blossoms. It is at this time the Powerful Owl predate on the Grey-headed Flying Fox, this large species of flying fox is an important prey item to the Powerful Owl in the region and the Grey-headed Flying Fox is likely to forage in the area. However, as the subject site is no important habitat for the Grey-headed Flying Fox, the development of the subject site will not result in the significant reduction of the Powerful Owl via the removal of its prey food namely the Grey-headed Flying Fox.

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

No, there are no endangered populations of the Powerful Owl listed at this stage.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

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

Not applicable.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable.

(d) in relation to the habitat of a threatened species, population or ecological community:

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

No significant area of Powerful Owl habitat will be removed. There are no roosting sites present within the subject site and that suitable nest sites are also absent for the species.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

No, the subject site is already fragmented and isolated from other bulk forests in the locality. Any future development of the subject site will not cause significant habitat fragmentation or isolation. The site is already isolated and fragmented. The Powerful Owl is also capable to forage from within one parcel of remnant vegetation to another.

(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,

There are no significantly important habitat characteristics present within the subject site for the Powerful Owl.

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

No, there is no designated critical habitat for the Powerful Owl at this stage.

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

No, the development of the subject site will not be inconsistent with the recovery plan for large forest owls, there are no threat abatement plans currently adopted for any threatening processes for the Powerful Owl at this stage.

(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.

No, as clearing of native vegetation to accommodate the proposal will not trigger the key threatening processes 'clearing of native vegetation' in this instance as there is no 'native vegetation communities' present on-site. Other key threatening processes include continued loss of native hollow bearing trees and removal of coarse woody debris due to fire wood harvesting practices and competition from feral honeybees.

APPENDIX 6

SEVEN PART TEST OF SIGNIFICANCE

SWIFT PARROT *Lathamus discolor*

5A 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats

- (1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:
 - (a) each of the factors listed in subsection (2)
 - (b) any assessment guidelines.
- (2) The following factors must be taken into account in making a determination under this section:

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

No, there is no significant area of habitat pertaining to the Swift Parrot present within the subject site. Any development within the subject site would not have an adverse effect on any stage of the life-cycle of the Swift Parrot in the locality and that the development of the subject site would not place the species at risk of a localised extinction.

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

There are no endangered populations of the Swift Parrot in NSW as the species is itself endangered.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

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

No, the Swift Parrot does not constitute an ecological community. This question is not applicable in this instance.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable.

(d) in relation to the habitat of a threatened species, population or ecological community:

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

No, there is no significant habitat of the Swift Parrot present on-site. No significant area of habitat will be removed in this instance as considerable open forest habitat for the species occurs elsewhere in the region for the species.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

No, the development of the subject site for the purposes of the proposal in its entirety will not result in the significant further fragmentation or isolation or isolation of habitat as the species is highly capable of flying from one remnant area to another. The subject site is already in a highly fragmented and isolated state ecologically.

(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,

There is no important Swift Parrot habitat present within the subject site even though the species is likely to forage within the locality.

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

No, the hypothetical development of the subject site would not have an adverse effect on any Swift Parrot 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,

Any future development of the subject site will be consistent with the objectives of a recovery plan and any threat abatement plans that may be finalised on either the state or federal level.

(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.

No, as the relevant key threatening processes to the Swift Parrot are clearing of native vegetation and predation by the feral cat. The development of the subject site would not constitute significant clearing of native vegetation. Finally, the proposal will not exacerbate the key threatening process 'predation by the feral cat'.

APPENDIX 7

SEVEN PART TEST OF SIGNIFICANCE

GLOSSY BLACK COCKATOO *Calyptorhynchus lathamii*

5A 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats

- (1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:
 - (a) each of the factors listed in subsection (2)
 - (b) any assessment guidelines.
- (2) The following factors must be taken into account in making a determination under this section:

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

No, the subject site does not support viable habitat of the Glossy Black Cockatoo. The Glossy Black Cockatoo forages in a variety of open forest and woodland habitats. However, the Glossy Black Cockatoo is a specialist feeder preferring to forage on the fruiting cones of the Forest Oak *Allocasuarina torulosa* in the Sydney basin bioregion (personal observation). There are no Forest Oak trees present within the subject site. Therefore, any future development of the subject site would not have an adverse effect on the Glossy Black Cockatoo. The subject site's few Swamp Oaks *Casuarina glauca* were also examined and assessed for the use by the Glossy Black Cockatoo, however no evidence could be found to link the use of these trees by the species including chewed fruiting cones.

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

No, there are no endangered populations of the Glossy Black Cockatoo present within the Sydney basin bioregion at this stage including none listed for the Newcastle LGA.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

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

Not applicable.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable.

(d) in relation to the habitat of a threatened species, population or ecological community:

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

No area of habitat is present within the subject site. There are no food trees and that nest sites (suitable large tree hollows) are also absent. However, it is likely that the Glossy Black Cockatoo would also pass over the subject site on an ad hoc basis but are unlikely to alight within the site.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

No, the subject site is already isolated and fragmented from areas of suitable habitat. Any future development of the subject site would not further fragment or isolate habitat of the species within the subject site. The species is also capable of flying from one remnant area of habitat to another in any given locality.

(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,

There is no important habitat to the Glossy Black Cockatoo present within the subject site so as to cause removal, modification, fragmentation or isolation of habitat of the species.

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

No, no critical habitat of the Glossy Black Cockatoo has been declared under state or federal legislation at this stage.

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

No recovery plans or threat abatement plans pertaining to the Glossy Black Cockatoo has been declared under state or federal legislation at this stage.

(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.

No, clearing of native vegetation and high frequency fires are key threatening processes that affect the habitat of the Glossy Black Cockatoo, however there is no significant habitat of the Glossy Black Cockatoo present within the subject site due to the lack of suitable food trees and the absence of nesting sites (large tree hollows).

APPENDIX 8

SEVEN PART TEST OF SIGNIFICANCE

REGENT HONEYEATER *Xanthomyza phrygia*

5A 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats

- (1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:
 - (a) each of the factors listed in subsection (2)
 - (b) any assessment guidelines.
- (2) The following factors must be taken into account in making a determination under this section:

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

No, it is unlikely that there is a local viable population of the Regent Honeyeater present within the locality of the subject site even though the area may be visited by nomadic individuals or flocks of the species. The subject site does not contain primary habitat food trees for the Regent Honeyeater and that the development of the subject site will not have an adverse effect on the life-cycle of the species or any stage of its life-cycle to place a local viable population at risk of localised extinction.

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

No, there are no endangered populations of the Regent Honeyeater as the species is itself endangered.

- (c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

The Regent Honeyeater does not constitute an ecological community. This section of the Seven Part Test is not applicable in this instance.

- (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**

Not applicable.

- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,**

Not applicable.

- (d) in relation to the habitat of a threatened species, population or ecological community:

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

There is no significant extent or area of Regent Honeyeater habitat to be removed or modified as a result of any proposals within the subject site.

- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and**

No, the subject site is already fragmented and isolated from other areas of habitat and that the development of the subject site could proceed without further significant fragmentation or isolation of habitat of the species.

- (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,**

There is no significant area of habitat of the Regent Honeyeater present within the subject site that would effect the long-term survival of the Regent Honeyeater in the locality.

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

No, there is no designated critical habitat declared for the Regent Honeyeater at this stage.

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

The proposal within the subject site will be consistent with the objectives of the Regent Honeyeater Recovery Plan. There are no listed relevant threat abatement plans for the species. Feral cats and possibly stray cats are likely to be present within the subject site. Cats may be a threat to the species in some instances, however the development of the site would remove any feral or stray cats from the site.

(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.

No, the most relevant key threatening processes to the Regent Honeyeater are clearing of native vegetation and predation by the feral cat. The proposal would not constitute clearing of native vegetation under the Act and that there is no significant area of habitat of the Regent Honeyeater present within the subject site to constitute clearing of habitat for the species *per se*. The development of the site would remove any feral or stray cats from the site.

APPENDIX 9

SEVEN PART TEST OF SIGNIFICANCE

GREY-HEADED FLYING FOX *Pteropus poliocephalus*

5A 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats

- (1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:
 - (a) each of the factors listed in subsection (2)
 - (b) any assessment guidelines.
- (2) The following factors must be taken into account in making a determination under this section:
 - (a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,**

No, the life cycle of the Grey-headed Flying Fox is unlikely to be disrupted by the proposal to the extent to place a viable local population of the species at risk of extinction as the subject site is too small to support a viable population of this species. It is expected that the Grey-headed Flying Fox pass over the subject site on a frequent basis but is unlikely to alight in trees within the subject site's south-western corner due to the lack of food trees within the subject site. The subject site and the broader study area does not contain suitable roosting habitat of the Grey-headed Flying Fox as the subject site is too small and exposed and contains no suitable roosting sites for the species. The proposal would have no effect on any stage of the life-cycle of the species that would have an effect on any local viable population of the species.

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

There are no currently listed “endangered population” of the Grey-headed Flying Fox under the terms of the Threatened Species Conservation Act, 1995 at this stage.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

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

The Grey-headed Flying Fox is not an endangered or critically endangered ecological community, therefore this section does not apply to the species.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

The Grey-headed Flying Fox is not an endangered or critically endangered ecological community, therefore this section does not apply to the species.

(d) in relation to the habitat of a threatened species, population or ecological community:

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

There will be no removal of Grey-headed Flying Fox foraging habitat as a result of the proposal. There are no food trees or roosting sites for the species within the subject site. The Grey-headed Flying Fox is likely to forage very widely within the districts open forest and woodlands and even in city areas and industrial areas.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

No, the Grey-headed Flying Fox is capable of flying from one tree to another, across road, paddocks, bare open ground or remnant vegetation. The species easily disperses by flight from one area to another.

(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 is of no significant importance as a potential roosting or feeding site for the Grey-headed Flying Fox. The proposal would not have an effect on the long-term survival of the species in the locality.

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

No critical habitat has been formally designated to the species at this stage.

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

There are no recovery or threat abatement plans applicable to the species at this stage. Any future development of the subject site will be consistent with the objectives of a recovery plan and any threat abatement 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.

Clearing of native vegetation and high frequency fires are formally declared as key threatening processes under the terms of the Threatened Species Conservation Act, 1995 that applies to the Grey-headed Flying Fox. However, there will be no gross clearing of habitat and that there will be no anticipated increase in the frequency of fires as a result of the proposal.

APPENDIX 10

SEVEN PART TEST OF SIGNIFICANCE

SPOTTED-TAILED (TIGER) QUOLL *Dasyurus maculatus*

5A 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats

- (1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:
 - (a) each of the factors listed in subsection (2)
 - (b) any assessment guidelines.
- (2) The following factors must be taken into account in making a determination under this section:
 - (a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,**

No, the Spotted-tailed Quoll was not recorded during the field assessment and that there is no habitat for the species present within the subject site. The Spotted-tailed Quoll is extremely rare in the district. Therefore any future development of the subject site would not result in the localised extinction of a viable population of Spotted-tailed Quoll.

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

No, there are no endangered populations of the Spotted-tailed Quoll declared at this stage.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

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

No, the Spotted-tailed Quoll does not constitute an endangered ecological community. This section of the Significance Test does not apply.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable as above.

(d) in relation to the habitat of a threatened species, population or ecological community:

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

As the species is probably absent from the subject site and that the site is highly degraded there will be no habitat of the species removed or modified. The subject site no longer supports viable habitat of the Spotted-tailed Quoll as the subject site has been considerably altered by past landuse activities of the area.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

No, the subject site is already isolated and fragmented from other areas of suitable habitat in the locality.

(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 does not support significant habitat of the Spotted-tailed Quoll. Therefore, any future development of the subject site will not removed modify, fragment or isolate habitat of the species and that there will be no effects on the long-term survival of the Spotted-tailed Quoll. The species is probably absent for the locality.

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

No, there is no formally declared critical habitat that pertains to the Spotted-tailed Quoll.

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

There are no recovery plans or threat abatement plans attributed to the Spotted-tailed Quoll at this stage. A relevant Commonwealth approved Threat Abatement Plan is the Predation by the European Fox, however the development of the site will not result in the increase in the local population of the European Fox. The fox is present within the subject site's Bitou Bush thickets. The fox will be eradicated as a result of the development of the site.

(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.

No, clearing operations is a class of activity that is well recognised as a key threatening process to the habitat of threatened dasyurids (marsupial carnivores) and as such clearing of native vegetation is declared as a key threatening process under the terms of the Threatened Species Conservation Act, 1995 which applies to the Spotted-tailed Quoll. However, the proposal will not result in gross clearing of habitat of the Spotted-tailed Quoll as the species is probably absent from the subject site.

APPENDIX 11

SEVEN PART TEST OF SIGNIFICANCE

KOALA *Phascolarctos cinereus*

5A 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats

- (1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:
 - (a) each of the factors listed in subsection (2)
 - (b) any assessment guidelines.
- (2) The following factors must be taken into account in making a determination under this section:
 - (a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,**

No, any future development within the subject site would not likely result in an adverse effect on the life cycle of the Koala to the extent that a local viable population of the Koala would be placed at risk of extinction. The Koala was not recorded within the subject site and that no scats or Koala positive scratch marks on trees were located. No evidence had been located to indicate that the subject site is of any significant importance to the Koala. It is expected that the Koala is extinct within the immediate locality.

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

No, there are no endangered populations of the Koala present within the Newcastle Local Government Area. The nearest endangered population of the Koala to the subject site is the Hawkes Nest endangered population of the Koala within the Port Stephens LGA. Any future development or actions undertaken within the subject site would have no effect on the Hawkes Nest endangered population of the Koala.

- (c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

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

Not applicable.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable.

- (d) in relation to the habitat of a threatened species, population or ecological community:

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

No area of Core Koala habitat will be removed as the subject site does not contain even potential Koala habitat. The species is unlikely to be present within the locality and the subject site is inconsequential to the Koala.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

No, there is no area of habitat pertaining to the Koala present within the subject site. There are also no Koala food plants present within the subject site.

(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 does not contain important habitat to the Koala. There is no residing colony of the species present anywhere within the locality.

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

No, there is no critical habitat of the Koala listed for the Newcastle Local Government Area at this stage.

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

Any future development of the subject site will be consistent with any recovery or threat abatement plans for the Koala. It appears that there is no viable Koala habitat present within or adjacent to the subject site.

(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.

No, clearing operations is a class of activity that is well recognised as a key threatening process to the habitat of threatened mammals and as such clearing of native vegetation is declared as a key threatening process under the terms of the Threatened Species Conservation Act, 1995 which applies to the species. However, the proposal will not result in gross clearing of habitat of the Koala as the species is probably absent from the locality.

APPENDIX 12

SEVEN PART TEST OF SIGNIFICANCE

COMMON BENT-WINGED BAT *Miniopterus schreibersii*

5A ‘Significant effect on threatened species, populations and endangered ecological communities, or their habitats

- (1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:
 - (a) each of the factors listed in subsection (2)
 - (b) any assessment guidelines.
- (2) The following factors must be taken into account in making a determination under this section:
 - (a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,**

No, the life cycle of the Common Bent-winged Bat is not likely to be adversely affected by any future development of the subject site. The subject site does not contain roosting habitat of the Common Bent-winged Bat even though foraging habitat for the species is potentially present throughout the locality. The Common Bent-winged Bat is chiefly a cave dwelling species. There are no caves or similar appropriate roosting microhabitats present within the subject site. There is no risk of a localised extinction of a viable population of the Common Bent-winged Bat arising from any future development or activities that may take place within the subject site.

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

No, there are no “endangered populations” declared for the Common Bent-winged Bat at this stage under the terms of the Threatened Species Conservation Act, 1995 at this stage.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

The Common Bent-winged Bat is a species in its own right and does not constitute a community. This section of the Significance Test does not apply to the Common Bent-winged Bat.

(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 Common Bent-winged Bat is a species in its own right and does not constitute a community. This section of the Significance Test does not apply to the Common Bent-winged Bat.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

The Common Bent-winged Bat is a species in its own right and does not constitute a community. This section of the Significance Test also does not apply to the Common Bent-winged Bat.

(d) in relation to the habitat of a threatened species, population or ecological community:

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

No significant area of habitat of the species will be removed or modified should the subject site be developed. Considerable foraging habitat areas remain in other areas of the locality.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

No, as the proposal will not fragment habitat or will it result in the isolation of habitat of the species in this instance. The subject site is already in a highly fragmented and isolated state.

(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,

There is no significant area or important area of habitat of the Common Bent-winged Bat present within the subject site with the exception of potential foraging habitat which is throughout the locality.

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

No, there is no designated critical habitat pertaining to the Common Bent-winged Bat at this stage.

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

There are no recovery plans or threat abatement plans for the Common Bent-winged Bat at this stage either on a state or federal context.

(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.

No, the clearing of native vegetation and high frequency fires are expected to be relevant key threatening processes applicable to the Common Bent-winged Bat. However, the proposal would not constitute significant clearing of native vegetation habitat of the species in this context and will not result in the increase in the frequency of fires.

APPENDIX 13

SEVEN PART TEST OF SIGNIFICANCE

LARGE-FOOTED MYOTIS *Myotis adversus*

5A 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats

- (1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:
 - (a) each of the factors listed in subsection (2)
 - (b) any assessment guidelines.
- (2) The following factors must be taken into account in making a determination under this section:
 - (a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,**

No, the subject site does not contain suitable habitat for the species however the adjacent Hunter River is potential foraging habitat for the Large-footed Myotis. Should the subject site be further developed in the future, then this action would not have an adverse effect on a local viable population of the species, as the primary habitat of the species is the nearby riparian area (Hunter River). There are no suitable roosting hollows present within the subject site that may have otherwise been a roosting site for the Large-footed Myotis.

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

There are no endangered populations of the Large-footed Myotis at this stage under either state or federal legislation.

- (c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

Not applicable.

- (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**

Not applicable

- (ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,**

Also not applicable as the Large-footed Myotis is a species in its own right and does not constitute an ecological community *per se*.

- (d) in relation to the habitat of a threatened species, population or ecological community:

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

No significant area of habitat would be removed or modified as a result of the proposal. The entire subject site is already modified and that there is no habitat to be removed in this instance. The habitat of the Large-footed Myotis is the adjacent Hunter River riparian area that is the primary habitat for the species.

- (ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and**

No, as the subject site's proposed development area is already in a highly modified, fragmented and isolated state. The primary habitat area of the Large-footed Myotis is the Hunter River will not be impacted by the development proposal.

(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,

There is no significant area of habitat of the Large-footed Myotis present within the subject site's development area. The prime habitat for the species remains within the adjacent Hunter River area. The development of the subject site would have no significant effect on the long-term survival of the Large-footed Myotis in the locality.

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

No, there is no designated critical habitat declared for the Large-footed Myotis either in state or federal spheres at this stage.

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

No recovery or threat abatement plans have been developed for the Large-footed Myotis at this stage.

(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.

Clearing operations in areas of native vegetation and high frequency fires are likely to be relevant key threatening processes applicable to the habitat of the Large-footed Myotis. However, the proposal will not result in clearing of habitat of the species and that the proposal will not result in an increase in the frequency of fires in the locality.

APPENDIX 14

SEVEN PART TEST OF SIGNIFICANCE

GREEN & GOLDEN BELL FROG *Litoria aurea*

5A 'Significant effect on threatened species, populations and endangered ecological communities, or their habitats

- (1) For the purposes of this Act and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or endangered ecological communities, or their habitats:
 - (a) each of the factors listed in subsection (2)
 - (b) any assessment guidelines.
- (2) The following factors must be taken into account in making a determination under this section:
 - (a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,**

No, the Green & Golden Bell Frog was not recorded within the subject site and there is no significant area of habitat of the Green & Golden Bell Frog present within the subject site and that the development of the subject site would not have an adverse effect on, or cause disruption to at any stage of the life-cycle during the course or stage of the species development to such an extent that would have an effect on a local viable population of the species to be placed at risk of localised extinction. The stages of the life cycle considered include from the egg production stage, larval (tadpole), interphase during metamorphosis through to the adult (frog morph) stage. The species was not recorded and is unlikely to be present on-site even though the species has previously been recorded for the Kooragang Island.

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

No, there are no endangered populations of the species present in New South Wales. The Green & Golden Bell Frog is itself endangered.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

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

No, the Green & Golden Bell Frog is a species in its own entity and does not constitute an ecological community. Not applicable.

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable.

(d) in relation to the habitat of a threatened species, population or ecological community:

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

There is no significant area of habitat of the Green & Golden Bell Frog present within the subject site's proposed development area. Therefore, there will be no habitat that would otherwise be removed or modified in this instance.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

No, no area of habitat would become fragmented or isolated as a result of any development of the subject site. There is no significant area of habitat of the Green & Golden Bell Frog present within the subject site's development precinct.

(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 has no significant area of importance to the Green & Golden Bell Frog or to any stage of development to the species including egg-laying sites, tadpole microhabitats or to the adult (frog) stage of metamorphosis. The subject site's proposed development area is inconsequential to the Green & Golden Bell Frog as a species and to any stage of its development during the life cycle of the species.

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

No, there is no critical habitat for the Green & Golden Bell Frog present within the subject site and that the development of the subject site will not have an adverse effect on critical habitat of the species either directly or indirectly.

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

Any future development of the subject site will be consistent with the objectives of a recovery plan and any threat abatement plans, as there is no area of habitat of the species to be inconsistent with the above 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.

No, the development of the subject site would not constitute or form part of a key threatening process and would not result in the operation or increase the impact of a key threatening process as there is no habitat present for the species. Relevant key threatening processes that has an effect on the Green & Golden Bell Frog include predation on the eggs and tadpole (larval) stages on the Green & Golden Bell Frog by the introduced Mosquito Fish *Gambusia holbrooki*. The Mosquito Fish sterilises Green & Golden Bell Frog breeding habitat. The proposed development of the subject site would not result in the increase in the population of the Mosquito Fish in this instance.