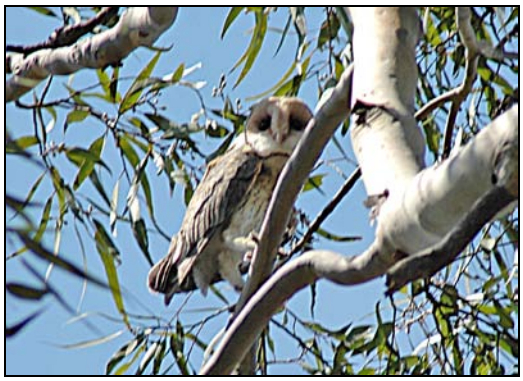
Revised 7 Part Test

STAGE 14, NORTH WALLARAH PENINSULA



MAY 2010

www.nghenvironmental.com.au

Document Verification

Job title: Stage 14 Murrays Beach Masked Owl Response & 7 Part Test.

Project File Name		C:\Users\jacqui\Desktop\Walarah march 2010\Stage 14 response & 7pt\May 2010 submission to council\Revised_7_part_test_v3.doc					
Revision	Date	Prepared by		Checked by		Approved by	
1st draft	13 May 2010	Name	Dr Jacqueline Coughlan	Name	Nick Graham Higgs	Name	Nick Graham Higgs

Table of Contents

1 INTRODUCTION AND BACKGROUND

In February 2010 a report was prepared to address potential impacts on the Masked Owl from proposed development in Stage 14 Murrays Beach (nghenvironmental 2010). That report comprised substantial background information in response to key issues raised by Dr Rod Kavanagh and a 7 part test (assessment of significance) pursuant to part 5a of the EP&A Act. This report provides an updated 7 part test which incorporates new information gathered during surveys conducted in February to May 2010. John Young has now spent over 200 hours of field survey time by day and night over Wallarah Peninsula observing and studying the Masked Owl pair utilising Stage 14, and testing his informed predictions on the local population of Masked Owl.

The discussion paper remains valid unless modified or updated by this report and cover letters. In summary, the landscape context remains largely unchanged, with updated information now available to confirm predictions of the local population and availability of alternative nest and roost sites for the Masked Owl pair utilising Stage 14.

Availability of Alternative Nest and Roost Sites

The question of availability of alternate nest and roost sites is important in being able to predict potential impact on the population of Masked Owls on the Wallarah Peninsula. Specifically, the question previously asked was whether, in the event that the pair abandons the nest site in Stage 14 (an event considered unlikely by John Young), they have an alternative nest site to go to, thereby avoiding the complete failure of breeding for that pair. A related question was whether those 'alternative' resources are already utilised by other pairs of forest owls.

Surveys conducted during the 2010 breeding season by John Young have added substantially to our knowledge of the distribution and abundance of large forest owls on Stockland land and the greater Wallarah Peninsula.

A total of 14 suitable alternative nest/roost trees have now been identified within 250 m east to 750 m east south-east of the Stage 14 development in addition to the five already being used (refer Figure 1)

Seven of these are sited within secured conservation lands (Wallarah National Park, Habitat Corridor and foreshore lands) and a further two are sited in an area not yet subject to development consent and bounded by habitat corridor to the east and west. These nine alternatives have been described by John Young as very high quality alternative hollow-bearing tree resources that would more than adequately provide alternative nesting sites. These complement the resources within the existing and approved development areas that the pair currently uses or could use. John Young has also confirmed that none of these alternative resources are being utilised by other pairs of forest owls for nesting or roosting purposes.

Thus in the unlikely event that the pair abandons the site in Stage 14, it is the opinion of John Young that there are more than adequate numbers of hollow bearing trees that the birds could move to.

Local Population of Masked Owls

It is now confirmed that an additional two pairs of Masked Owls occur on the Wallarah Peninsula – one in the Wallarah National Park east of the Pacific Highway and south of Stockland land and another in the Northern Sector of Stockland land.

Figure 1 displays the locations of the alternative nesting and roosting resources and the additional individual Masked Owl pairs identified during the March 2010 breeding season surveys.

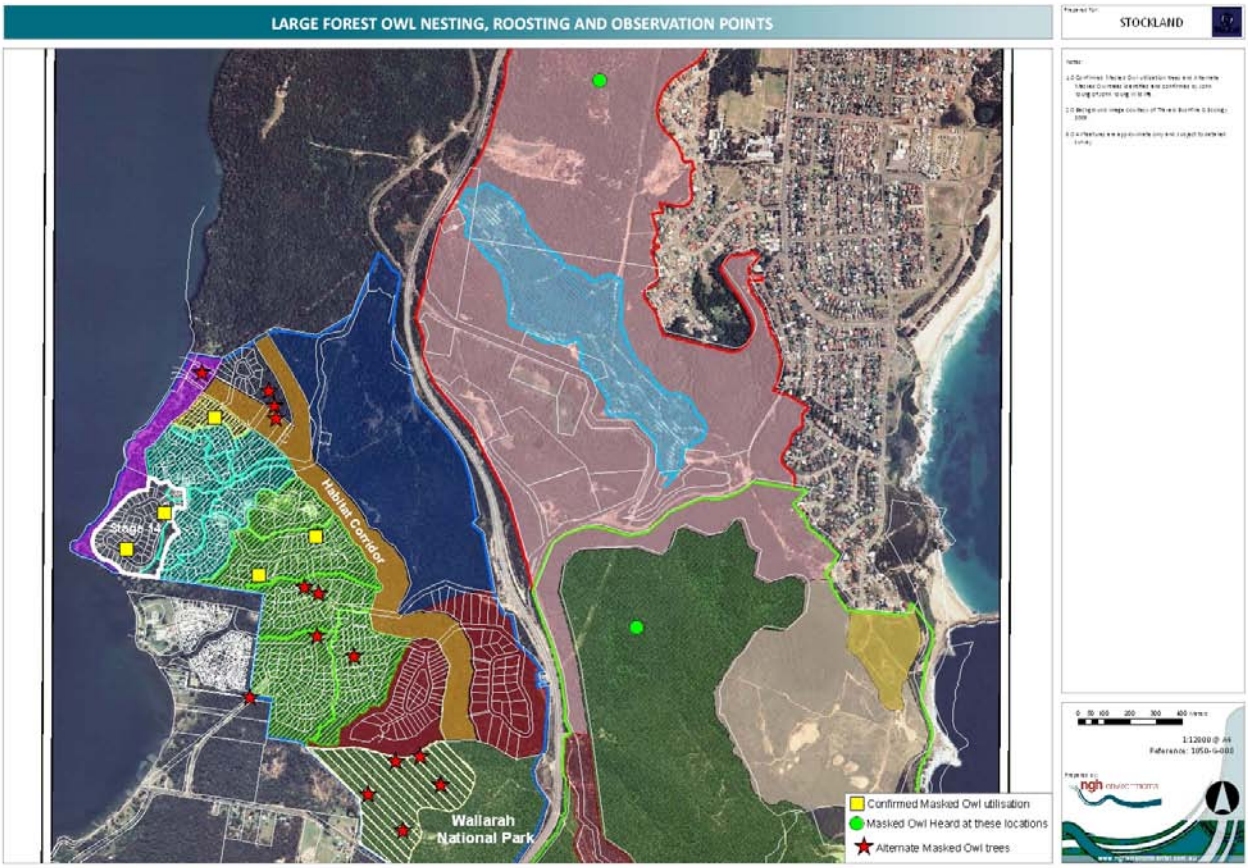


Figure 1. Masked Owl alternative Nest/Roost Trees and additional Masked Owl observations

The Stage 14 development proposal will not contribute to a cumulative impact on the Masked Owl population. As outlined above sufficient secure resources are available for this pair that will not be impacted by proposed residential developments. The potential for subsequent developments to contribute to cumulative impacts on other pairs of forest owls on the Wallarah Peninsula should be considered at the time of future applications over relevant development areas.

2 LIKELIHOOD OF IMPACT

Substantial existing information and expert opinion as outlined in the previously submitted discussion paper lead to a conclusion that the development proposed at Stage 14 will not have a significant impact on the breeding pair of Masked Owls, and further that the population of Masked Owls on the Wallarah Peninsula will almost certainly not be placed at risk of extinction as a result of the development of Stage 14.

In support of this conclusion the following points are noted:

a) Of all the Australian Owl species Masked Owls appear to be the most resilient to disturbance – a fact acknowledged by both Mr Young and Dr Kavanagh.

b) The owls have successfully bred and fledged one young at the Stage 14 nest site (and are nesting again at present), persisting through the construction and occupation of a dwelling on Lot 29 some 25 m away from the nest tree, suggesting they are resilient to disturbance.

c) The proposed buffers around the nest and roost tree have been agreed to by both owl experts.

d) Substantial alternative nesting and roosting resources have been identified by an owl expert in adjacent forested areas that have been dedicated for conservation as a direct outcome of the North Wallarah Peninsula residential project.

e) In a landscape context, more than adequate habitat resources[1] are protected for a Masked Owl pair in the North Wallarah Peninsula area, with some 400 ha of forested habitat protected by various conservation zonings or riparian protection.

f) There is confirmation that three pairs of Masked Owls occur on the Northern Wallarah Peninsula area which includes Stockland landholdings and Wallarah National Park.

The Recovery Plan for Large Forest Owls (DECC 2006) lists objectives and management actions recommended to ensure that viable populations of the species continue in the wild in NSW in each region where it presently occurs. There are substantial indications that the Masked Owl pair at Stage 14 are resilient enough to handle the slow encroachment of low impact development and will persist. Protective buffers and other safeguards have been implemented in an attempt to increase the probably that they persist. The monitoring of the response of the owls to this unique development will provide vital information that will contribute to a better understanding of

[1] Based on Dr Kavanagh requirement for 400 ha protected in perpetuity within a 2km radius.

Masked Owl response to sensitive residential development and enable better assessments to be made on impacts of residential development on owl conservation.

It is our considered expert opinion that Stage 14 development is unlikely to result in a significant effect on Masked Owls, drawing from evidence presented in the discussion paper (ngh environmental 2010) and the 7 part test of significance incorporating the most up to date survey information on the species on the Wallarah Peninsula and specifically on Stockland land. Accordingly a Species Impact Statement is not considered necessary. The discussion paper and 7 part test (nghenvironmental 2010) has been reviewed by Dr Rod Kavanagh and on the basis of data presented in that report Dr Kavanagh believed that an SIS was not required. Since the time of that report, surveys have revealed additional information that strengthen our view that the Masked Owl pair in Stage 14 will not be significantly impacted by the proposed development, and nor would a local population of the species.

Table 1 Summary of responseTable 1 below summarises our response to the key points raised by Dr Kavanagh and justification for our finding of no significant impact and no requirement for SIS.

Table 1 Summary of response

Issue Identified by Dr Kavanagh	Stockland Response
Adequacy of Buffers	Buffers to be implemented as per agreed by owl experts.
Landscape context	Assessment of protected lands within a 2 km radius of the nest, under several scenarios suggests more than adequate availability of habitat.
Availability of alternate nest and roost sites	There are a confirmed 10 alternative nest and roost trees (7 in identified conservation areas) within the home range of the stage 14 Masked Owl pair that would not be rendered 'unavailable' by predicted density of other large forest owl pairs.
Monitoring Program	Stockland has committed to this should the development proceed and monitoring can form part of any approval condition. *Monitoring cannot be achieved within a SIS.*
Masked Owl Management Plan	Stockland have committed to the preparation and implementation of a MOMP relating to Stage 14 and that can form part of any approval condition. *Management cannot be achieved within an SIS.*

3 7 PART TEST

Section 5A of the *Environmental Planning and Assessment Act 1979* (EPA Act) states that in the administration of s78A, there are seven factors that must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats. Those factors are listed in part 2 of s5A and are known as a seven part test. If a seven part test concludes that a significant impact is likely on any of the above then the proponent is required to prepare a Species Impact Statement (SIS). Threatened species and habitat have the same meaning as in the *Threatened Species Conservation Act 1995* (TSC Act).

The Seven Part Test aims to improve the standard of consideration afforded to threatened species, populations and ecological communities, and their habitats throughout the planning and assessment process and to ensure this consideration is transparent. Listed under the *Threatened Species Conservation Amendment Act 2002* (TSCA Act), the revised factors affect s5A EP&A Act, s94 *Threatened Species Conservation Act 1995* (TSC Act) and s220ZZ *Fisheries Management Act 1994* (FM Act).

The seven factors to be considered when determining whether an action, development or activity is likely to significantly affect threatened species, populations or communities, or their habitats, are addressed below for the Masked Owl at Stage 14 Murrays Beach. This section should be read in conjunction with the substantial background information provided in the previously submitted Discussion Paper (nghenvironmental 2010) and in preceding sections of this report. In preparing this assessment the Threatened Species Assessment Guidelines (DECC 2007) have been taken into account, as required under s 5A (1)(b) of the EPA Act.

The Masked Owl is listed as Vulnerable on Schedule 2 of the TSC Act.

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

Masked Owls breed annually between March and September peaking in May to July. The distinctive courtship behaviour can begin as early as February. The birds nest in large hollows of old eucalypts. The nest hollow is typically greater than 40 cm wide and greater than 100 cm deep. There is no relationship with distance to streams (DECC 2006). Roosting hollows can also be used as nest sites and are usually located in dense forested gullies. Caves and cliffs are also used as roost sites. A pair is faithful to a nesting hollow but may also use alternative breeding hollows in the territory in different years (DECC 2006 quoting data from various sources).

The pair of Masked Owls in Stage 14 bred in the 2009 season and fledged one young. This breeding event occurred within 25 m of house construction in Stage 1-7 with no effect on the life cycle of the birds. Surveys during the 2010 breeding season (commenced in April and ongoing) have confirmed the pair is again nesting in the known stage 14 nest tree. In addition, these

surveys have confirmed the existence of 10 alternate nest and roost trees (7 high quality resources are in identified conservation areas) (displayed in Figure1).

Protective measures will be put in place including a 50 m buffer around the nest tree and a 30 m buffer around the roost tree, controls on subdivision civil construction activity during the breeding season and retention of perch trees.

Masked Owls are the most resilient of all Australian Owls and there is substantial evidence that they can tolerate disturbance around their roost and nest trees (including vegetation clearance, human occupation, and construction activity). It is the expert opinion of owl specialist Mr Young that given evidence of their successful breeding during disturbance in 2009, their ongoing presence in Stage 14 and with all recommended safeguards put in place there will be no impact on the breeding pair of Owls in Stage 14. In the event that the owls do not select the Stage 14 trees again to breed there are ample alternative nest and roost sites in forest within their home range, including numerous protected in the Wallarah National Park and other conservation areas.

It is thus highly improbable that the local population of Masked Owls will be placed at risk of extinction as a result of the proposed development at Murrays Beach.

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

Not applicable

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

(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

The subject site has an area of 8.5 ha. Residential development encircles the site on its northern, eastern and south-eastern boundaries. The shores of Lake Macquarie form the western and south western boundaries of the site. House construction has occurred to within 25 m of the known nest tree. The habitat within which the owl nest tree is located is already highly modified; selected canopy trees have been removed and the understorey has been reduced to less than 5% cover and is regularly slashed.

Mature trees will be removed for the proposed development but canopy connectivity will be retained with a tree retention rate in the order of 50%. Between 46 and 54 of the hollow bearing trees on the site will be retained. The majority (68%) of those to be removed contain only small hollows, unsuitable for Masked Owls or their prey. There is arboreal connectivity only across the site, canopy connectivity to the Foreshore Reserve area and nearby riparian zones will be retained. Within the general locality (Lake Sector) there are designated and approved habitat corridors linking the Foreshore Reserve to Wallarah National Park, all connected to a large patch of similar native vegetation greater than 500 ha.

No breeding or roosting habitat for the owls will be removed and the existing roost and nest tree will be protected in an exclusive buffer zone. Identified perch trees will also be retained. The site is not thought to provide important foraging habitat (Mr Young *pers. comm.)*. Supplementary roosting habitat in the form of three custom designed nest boxes will be placed in Stage 14 approximately 100 m from the existing roost tree.

An additional 14 alternative nest and roost trees have been identified by John Young, seven of which are in conservation 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

The proposal will not result in any increased fragmentation or isolation. Connectivity to other tracts of forest will be retained through the foreshore reserve and habitat corridor to the National Park.

The site itself is currently altered and surrounded by residential development to within 25m of the nest tree and the environment was such during the last breeding season. Further development at Stage 14 will result in some further loss of trees but canopy connectivity will be retained through a higher than usual tree retention rate (in the order of 50%).

A Habitat Corridor is situated to the north-east of Stage 14. In addition Stage 14 is bound to the north and west by the Foreshore Reserve. The presence of these corridors means that the removal of vegetation from within the site will not isolate areas of habitat. These corridors will provide a link between habitats to the south within Wallarah National Park and habitats to the north (zoned for protection). This corridor is generally 100 metres in width. It branches into two corridors in the northern section of the Lake Sector. These branches provide connectivity to both the habitats to the north (outside of Lake Sector) and to Foreshore Reserve. The northern link to the Foreshore Reserve includes an area of Swamp Mahogany, which adds to the overall diversity within the corridor and aids the movement of fauna, thereby increasing connectivity. Stage 14 currently has little connectivity to the south.

There is some level of fragmentation in the area immediately surrounding stage 14 as a result of development that has occurred to date. However the foraging behaviour of this species is such that some level of fragmentation and disturbed forested landscapes are known to be an ecological advantage for this species' predatory habits.

The presence of the Owl in Tree 6171 beside already constructed urban footprints including dwellings and roads suggests that the birds may not be directly affected by adjoining site conditions and further, that they may have in fact acclimatised to slowly encroaching development (Mr Young *pers. comm.).*

Thus there will be no further fragmentation of roosting, breeding or foraging habitat and fundamental values for roosting, breeding and foraging will be retained. This is according to owl expert Mr Young, and based on the surrounding development activities incurred in close proximity until now.

(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

Elements of the site are important for breeding habitat in the form of a hollow bearing nest tree and roost tree used by the male. Both of these trees are to be protected and the breeding cycle will be protected by avoiding civil construction during the breeding season in close proximity to the trees. The site does not provide important foraging habitat and the owls are likely to travel many kilometres from the site to forage.

In conclusion, the loss of habitat within the Stage 14 precinct is ecologically acceptable given that:

- The remnant vegetation is mostly comprised of canopy species only whereby less than 5% of the shrub layer remains, already significantly reducing the potential of threatened species occurrence.
- Approximately 50% of trees will be retained as they provide hollow bearing resources and a winter flowering resource for fauna.
- Better areas (or at least equivalent) of vegetation will be conserved within the Foreshore Reserve, community drainage reserves, habitat corridors and within Wallarah National Park.
- The proposed landscape planning involves the planting of *E. tereticornis* trees and associated community species within the Foreshore Reserve, drainage lines and road reserve (in the order of 450 trees), providing for longer term landscape succession and tree resources.

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

No critical habitat has been declared for this species.

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

The DECC (2006) Recovery Plan for Large Forest Owls identifies eight overall objectives each with a number of priority actions within it. Table 2 below outlines recovery actions to which Stockland

intend to contribute through this project and which we recommend be drafted into development consent conditions.

Table 2 Recovery Actions for Large forest Owls

Recovery Plan Objective	Recovery Plan Objective details	Stockland Response
Objective 1	Model and map owl habitat and validate with surveys.	Stockland have commenced survey and mapping of owl habitat and breeding pairs within their land holdings on the Wallarah Peninsula. The work commenced in October 2009 and will continue throughout the 2010 breeding season. Survey results can be provided to DECCW to assist with validation of their models.
Objective 2	Monitor Owl population parameters (numbers, distribution, territory fidelity and breeding success).	Stockland will monitor the post development breeding success and territory fidelity of the Stage 14 breeding pair. John Young and Dr Jacqui Coughlan have committed to publishing the results of the monitoring program and other surveys in a peer reviewed scientific journal.
Objective 3	Audit Forestry Prescriptions.	Whilst this action relates to forestry operations there are no existing guidelines on appropriate buffers for residential developments. Stockland will undertake post-development monitoring to confirm the efficacy of the nest and roost tree buffers, adopted from forestry prescriptions.
Objective 4	Ensure the impacts on large forest owls and their habitats are adequately assessed during planning and environmental assessment processes.	Whilst it is the responsibility of DECCW to disseminate guidelines and tools to assist consent authorities and consultants to assess and mitigate impacts on large forest owls, data gained post-development on this project will make a significant contribution to understanding the impacts and mitigation related to such developments for the Masked Owl. Specifically, in regard to objective 4.2 outlined below.
Objective 4.2	Monitor and report on the effectiveness of concurrence and licence conditions that have previously been applied to reduce the impacts of developments on the three large forest owl species or their habitats. This involves pos-development monitoring.	Stockland is proposing to conduct monitoring and reporting in accordance with this objective. Specifically, post-development monitoring in accordance with consent conditions will provide precisely the outcome recommended under this priority action and could contribute to the development of guidelines that may be used to mitigate the impacts of developments on the Masked Owl outside conservation reserves and

Recovery Plan Objective	Recovery Plan Objective details	Stockland Response
		State forests.
Objective 5.	Minimise further loss and fragmentation of habitat by protection and more informed management of significant owl habitat (including protection of individual nest sites).	The nest site on Stage 14 is to be protected within a 50 m radius buffer zone. Surveys conducted to date by Stockland will provide a significant contribution to more informed management of owl habitat. A significant contribution to protection of owl habitat was made with the dedication of the 180 ha Wallarah National Park.
Objective 5.3	Encourage private landholders to undertake management options to conserve and/or actively manage large forest owl habitat (and particularly nest sites) through incentive Property Vegetation Plans, Voluntary Conservation Agreements or other management initiatives.	This has been actioned since the original conceptual planning stages by provision of extensive forest conservation areas and connective corridors throughout the Lake Sector and most notably the conservation by the developer of the Wallarah National Park (180 ha).
Objective 6	Undertake Research on key areas of biology and ecology including trialling nest boxes for owls and their prey.	Stockland have committed to undertake post-development monitoring including monitoring of nest box use at Stage 14.
Objective 6.1	Seek an ARC Linkage grant or other joint funding opportunity to initiate research into identified key areas of the biology and ecology of the large forest Owls.	Survey on the Large Forest Owls in the North Wallarah Peninsula commenced in 2009 as part of the Stockland development assessment process. Monitoring and data collection in Stage 14 will continue for at least 3 years post development. This will result in approximately five years worth of data on the Masked Owl. To date the monitoring has been conducted by John Young and he has made a commitment to publish the data in a peer reviewed scientific journal with Dr. Jacqui Coughlan. Given John Young's enormous experience and the combined length of the survey and monitoring program, the contribution of this knowledge to our existing knowledge will be potentially greater than a 3 yr PhD study.
Objective 7	Increase Community Awareness and involvement in owl conservation.	Stockland to consider future possibilities for raising community awareness.

Thus, the development is consistent with the objectives and actions of the relevant recovery plan and will contribute significantly to achieving those objectives as they relate to Masked Owls.

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.

A key threatening process is defined in the *TSC Act* (1995) as a process that threatens, or could threaten, the survival or evolutionary development of species, populations or ecological communities.

Key threatening processes relevant to the proposal include:

- clearing of native vegetation
- loss of hollow-bearing trees
- Removal of dead wood and dead trees

The removal of native vegetation on the subject site is not likely to significantly affect the Masked Owl due to the extent of canopy vegetation to be retained, the lack of existing terrestrial vegetation structure and better quality natural vegetation within the local area; all of which has been validated in the biodiversity strategy (CLUMP 2000 and ESMP 2003).

The main threat to this species is likely to be the clearing of forest for agriculture and intensive logging (Garnett 2000) which remove old trees containing suitable nesting hollows. In addition the vigorous regrowth following logging is thought to limited foraging habitat availability.

Hollow-bearing tree surveys have identified and mapped hollows according to class categories based on the size and numbers of hollows present (Travers 2009). Field assessment to finalise the road and lot layout has been undertaken to ensure that hollow-bearing trees are best incorporated into the proposal according to their class. The majority of trees bearing medium to large hollows will be retained, overall tree retention will be in the order of 50%. Supplementary habitat will provided in the form of three specially designed nest boxes to be placed around Stage 14.

The nest tree and roost tree will be retained and strictly protected under supervision of Mr Young.

Therefore the development will not exacerbate any of threatening processes to the extent that they will impact on the Masked Owls pair in Stage 14, nor the Masked Owl Population of the Wallarah Peninsula.

Conclusion

Based on the information presented in this document (and past Discussion Paper) and the assessment against the Section 5A heads of consideration, it is considered unlikely that the proposed development in Stage 14 will have a significant effect on the pair of breeding Masked Owls. Further, this report concludes that it is highly unlikely that the proposed development is likely to have an adverse effect on the life cycle of the species such that the local population of the Masked Owl is placed at risk of extinction.

This is in view of the following key facts:

- The pair has successfully bred on the site during construction and subsequent occupation of a dwelling.
- Protective buffers as agreed by owl exerts will be put in place around the roost and nest trees.
- There are substantial additional roost and nest trees available in forested habitats within the bird's home range, including high quality resources within conservation areas.
- No breeding or foraging habitat is being removed.
- In a landscape context, more than adequate habitat resources are protected for a Masked Owl pair in the North Wallarah Peninsula area, with some 400 ha of forested habitat protected by various conservation zonings or riparian protection.

Appendix A QUALIFICATIONS OF MR JOHN YOUNG AND DR JACQUELINE COUGHLAN

Mr John Young – John Young Wildlife Enterprises.

Mr Young's principal area of interest is Australian birdlife and as a result of more than 30 years observing, researching and filming bird behaviour he is one of Australia's leading authorities on the breeding biology of birds, in particular owls. Over the last 30 years he's been involved with numerous projects for television, film, books, periodicals, university studies and conservation projects.

He is an acknowledged expert at locating breeding birds in the wild and has found more than 600 species of Australian birds. He discovered the first nests ever found for several species including the lesser sooty owl, the red boobook owl and the green-backed honeyeater. In more recent times, he has worked with the Queensland and NSW Parks and Wildlife Services to locate nests and capture live young of the near-extinct eastern bristlebird.

He consults on an ongoing basis to the EPA, State Parks & Wildlife Services and various commercial organizations on a range of projects including habitat protection, the location and preservation of rare and endangered species and environmentally-responsible property development.

Dr Jacqueline Coughlan BSc, PhD, Grad Dip Env. Law. Principal Ecologist nghenvironmental.

Dr Coughlan joined **ngh**environmental a year ago as Biodiversity Manager Sydney. Her practical ecological skills in terrestrial and freshwater ecology have been developed over 20 years in several states. She has designed, conducted and managed numerous fauna and flora surveys in New South Wales, Queensland and Western Australia. Dr Coughlan is experienced in all vertebrate fauna survey techniques including specialist threatened species surveys and habitat assessments and has conducted surveys in a broad range of environments including forest, woodland, grassland, mangrove, wetland, coastal and island communities. Dr Coughlan's specialist skills in bird ecology have been used in impact assessment in Australia and internationally in grasslands and wetlands of Inner Mongolia.

Dr Coughlan has a Graduate Diploma in Environmental Law from Sydney University (2009) and has a thorough working knowledge of State and Commonwealth environmental legislation. Her PhD (2000) focused on the ecology of bird communities in rare dry rainforest vegetation in far north Queensland. The work has been published in Conservation of Australia's Forest Fauna (Lunney 2004).

Dr Coughlan has worked for a broad range of private and government clients including Department of Defence, NSW RTA, British Gas, WWF, Stockland Developments, Landcom, Sydney Water and NSW Maritime and has been engaged by several legal firms to provide expert witness statements to cases in the Land and Environment Court regarding fauna issues.