Niche Environment and Heritage
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Attention: Mathew Bell

Senior Ecologist

MidCoast Council

Breese Parade

PO Box 450, Forster NSW 2428

Via email: Mathew.Bell@MidCoast.nsw.gov.au

16 November 2016

Dear Mathew

RE: Pacific Palms – Preliminary BioBanking Assessment

As requested, Niche Environment and Heritage Pty Ltd (Niche) has completed this preliminary BioBank assessment report for Lot 1 DP 653396, Lot 83 DP 753168 & Lot 427 DP 861736 Boomerang Drive, Pacific Palms (study area) (Figure 1 and Figure 2).

The purpose of the preliminary assessment is to assist MidCoast Council in future planning for the site.

It is our understanding that the Planning Proposal for the Pacific Palms Study Area is to maintain approximately 62.3 hectares of land in E2 Environmental Protection, and rezone approximately 3.6 hectares to the north of the existing caravan park to RE2 Private Recreation to allow for future caravan park expansion and provide for a subdivision to excise an existing dwelling on Lot 427 from the remainder of the E2 land.

Likely impact

The area has been subject to a number of ecological studies. These studies have identified the following as potentially occurring within the study area

- Threatened Ecological Communities (TECs): River-Flat Eucalypt Forest on Coastal Floodplains, Swamp sclerophyll forest on coastal floodplains, Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions, and Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions
- Threatened fauna: Koala habitat, Grey-headed Flying Fox and Glossy Black Cockatoo
- Threatened flora: none recorded to date.

The area of potential development impact to the north of the caravan park was assessed by Conacher Travers (2005). This assessment recorded the Koala, Grey-headed Flying Fox and Glossy Black Cockatoo which concluded non-significant impacts.

In addition, the record of the Stephens Banded Snake from Blueys Beach (Niche 2016) requires consideration in the context of this study area.

Based on the proposed plan, the proposed development may impact approximately 2.51 hectares of native vegetation with the following considerations:

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- Indirect impacts (increase sedimentation, runoff, noise etc.) into surrounding bushland.
- Approximately 2.51 hectares of fauna habitat.
- Approximately 2.51 hectares of Koala habitat.
- Potential impact to hollow-bearing trees – potential impacts on hollow using species credit species including the Eastern Pygmy-Possum (*Cercatetus nanus*) and Stephens Banded Snake (*Hoplocephalus stephensii*).

Preliminary BioBank assessment

To assist council in understanding potential offsetting and conservation outcomes for the site, a preliminary BioBank assessment has been the completed using two BioBanking scenarios using the latest version of the BioBanking Credit Calculator (BBCC) (version 4.0):

1. BioBank scenario: Estimate of the credits per hectare should the vegetation types in the study area be managed in perpetuity.
2. Development Scenario: Estimate of the credits per hectare should the vegetation types in the study area be cleared as in the Planning Proposal.

The BBCC was run by Luke Baker, Accredited BioBanking Assessor based on Council's detailed vegetation mapping. A summary of the two scenarios is provided in Table 1.

Details of the entries into the calculator for both scenario are provided in Attachment A.

The BioBanking Credit Profile Report for each scenario is provided in Attachment B.

Table 1. Preliminary BioBank calculations

Biometric Vegetation Type	Area	Credits required/ generated	Credits per hectare
Development site			
HU931, Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and lower North Coast	0.07	5	71
HU783, Flooded Gum - Brush Box - Tallowwood mesic tall open forest on ranges of the lower North Coast	0.34	24	70.5
Not native vegetation	1.20	-	-
HU770, Tallowwood - Smooth-barked Apple - Blackbutt grassy open forest of the Central and lower North Coast	2.10	151	72
Total (native vegetation)	**2.51**	**158**	
BioBank site			
HU770, Tallowwood - Smooth-barked Apple - Blackbutt grassy open forest of the Central and lower North Coast	37.4	278	**7**
HU783, Flooded Gum - Brush Box - Tallowwood mesic tall open forest on ranges of the lower North Coast	3.22	24	**7**
HU931, Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and lower North Coast	11.01	62	**6**

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HU941, Swamp Oak - Sea Rush - *Baumea juncea* swamp forest on coastal lowlands of the Central Coast and lower North Coast	4.57	26	**6**
HU960, Saltmarsh Estuarine Complex	3.92	22	**6**
HU961, Mangrove woodland	0.06	0 – BBCC did not produce a result.	**-**
Non-native	1.59	-	**-**
Total (native vegetation)	60.18	412	

Species Credits

Should Koala habitat be deemed to be impacted as a result of the 2.51 hectares of vegetation clearing then approximately 65 Koala credits may need to be retired. Assuming 51.63 ha of Koala habitat occurs within the conservation area, this would generate 367 Koala credits, which would satisfy the development offset requirement.

Two other species are considered likely to be present and can be considered for species credits, should they be determined to be present on the site. These are the Eastern Pygmy-Possum and Stephens Banded Snake. Calculations for these species are dependent on accurate hollow counts on which to base the calculations.

Offset requirement

In summary, the development would require 158 ecosystem credits.

Should the land to be retained be established as a BioBank site, it would likely satisfy the impacts of the development as it contains the required number of ecosystem credits for each vegetation type that may be impacted.

The proposed BioBank site would also likely satisfy the Koala offset requirement should it be required.

Recommendations

The following are recommended to consider in association with this report:

- Should a BioBank assessment be deemed a suitable approach by council, floristic plot data to meet the requirements of the BBAM would need to be collected a both the BioBank site and development site.
- The vegetation zones may need to be further refined to take into consideration areas of weed intensity, particularly along the edges of the site.
- OEH may require further fauna surveys within the development area given the previous surveys were completed in 2005. In particular, for threatened fauna that are not predicted species that would require offsetting under the BBAM.
- OEH may require further floristic surveys to confirm the absence of threatened flora within the proposed development area given previous surveys were completed in 2005.

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- Further consultation with OEH should be undertaken in regards to 'Additionally' given the site is currently zoned E2. If compulsory management actions (landholder must control weeds, retain logs etc) and/or prohibition of certain activities (no removal of logs) are required by the landholder under the zoning requirements, such actions may discount the credits generated if the site is used as BioBank site. It is unclear at this stage what discount OEH would accept for any additionally. This should be discussed with OEH.
- Red flag variation would be required in accordance with the BBAM for impacts to any TECs and threatened biodiversity.

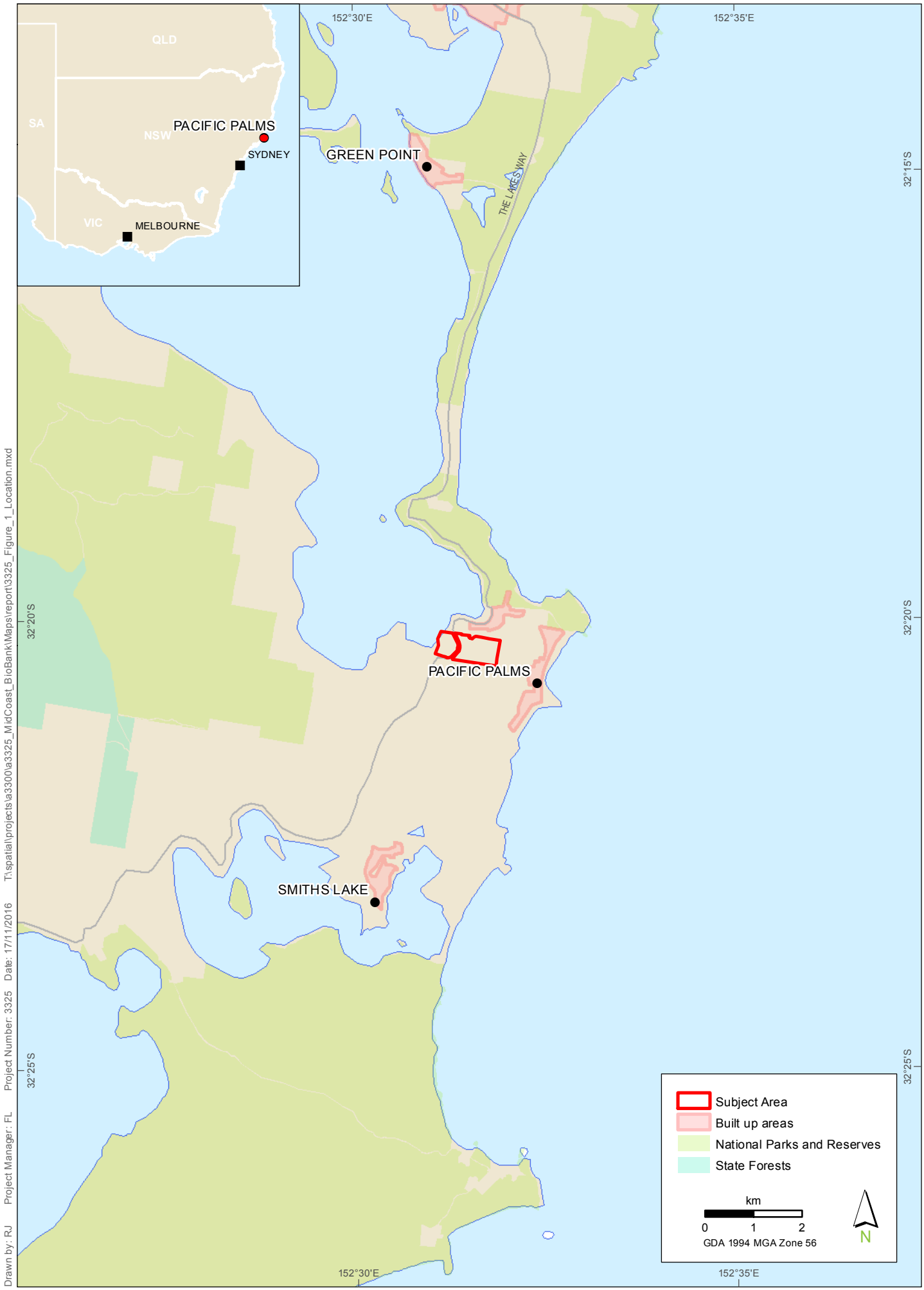
I trust the information provided in this report is sufficient for your purposes. Should you require any further information please do not hesitate to contact me as required.

Yours sincerely,

Luke Baker

Senior Ecologist and Accredited BioBanking Assessor

Niche Environment and Heritage Pty Ltd



Location map

Pacific Palms BioBank Assessment

FIGURE 1

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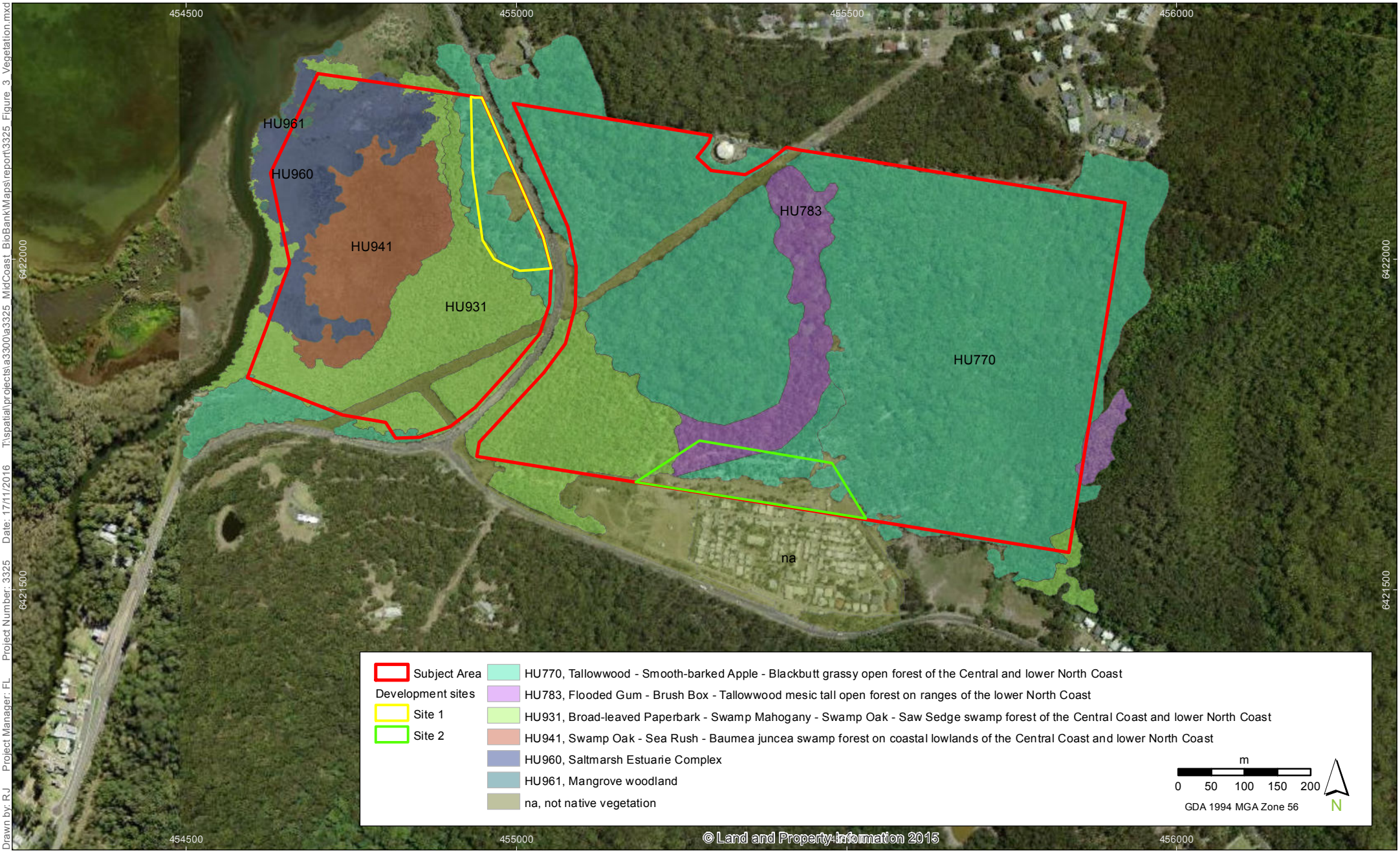
Site Map

Pacific Palms BioBank Assessment

FIGURE 2

Imagery: (c) LPI Aug 2013



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BioMetric vegetation communities

Pacific Palms BioBank Assessment

FIGURE 3

Imagery: (c) LPI Aug 2013

Landscape Assessment: CMA regions and patch size

Pacific Palms BioBank Assessment

FIGURE 4

Imagery: (c) LPI Aug 2013

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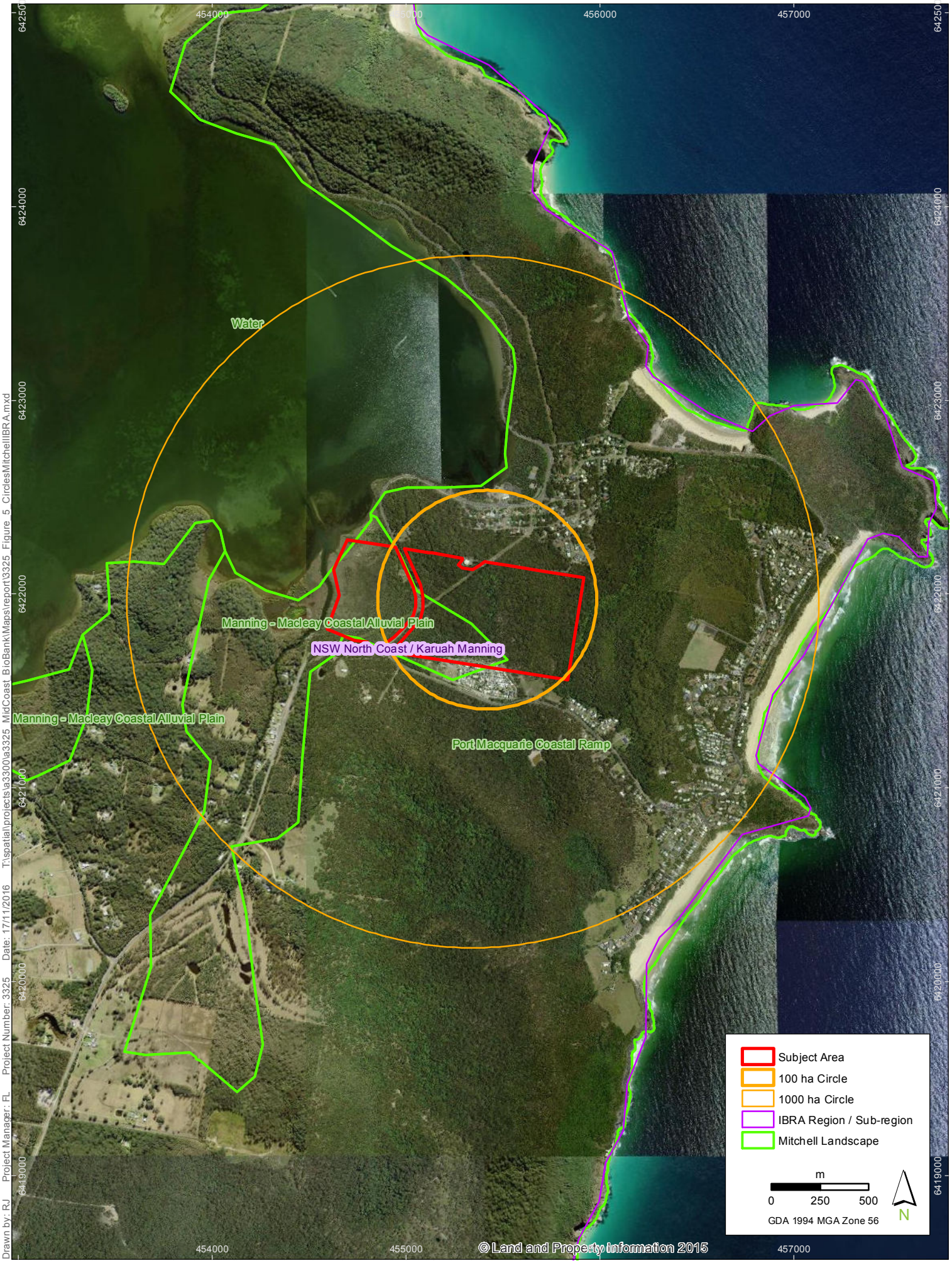
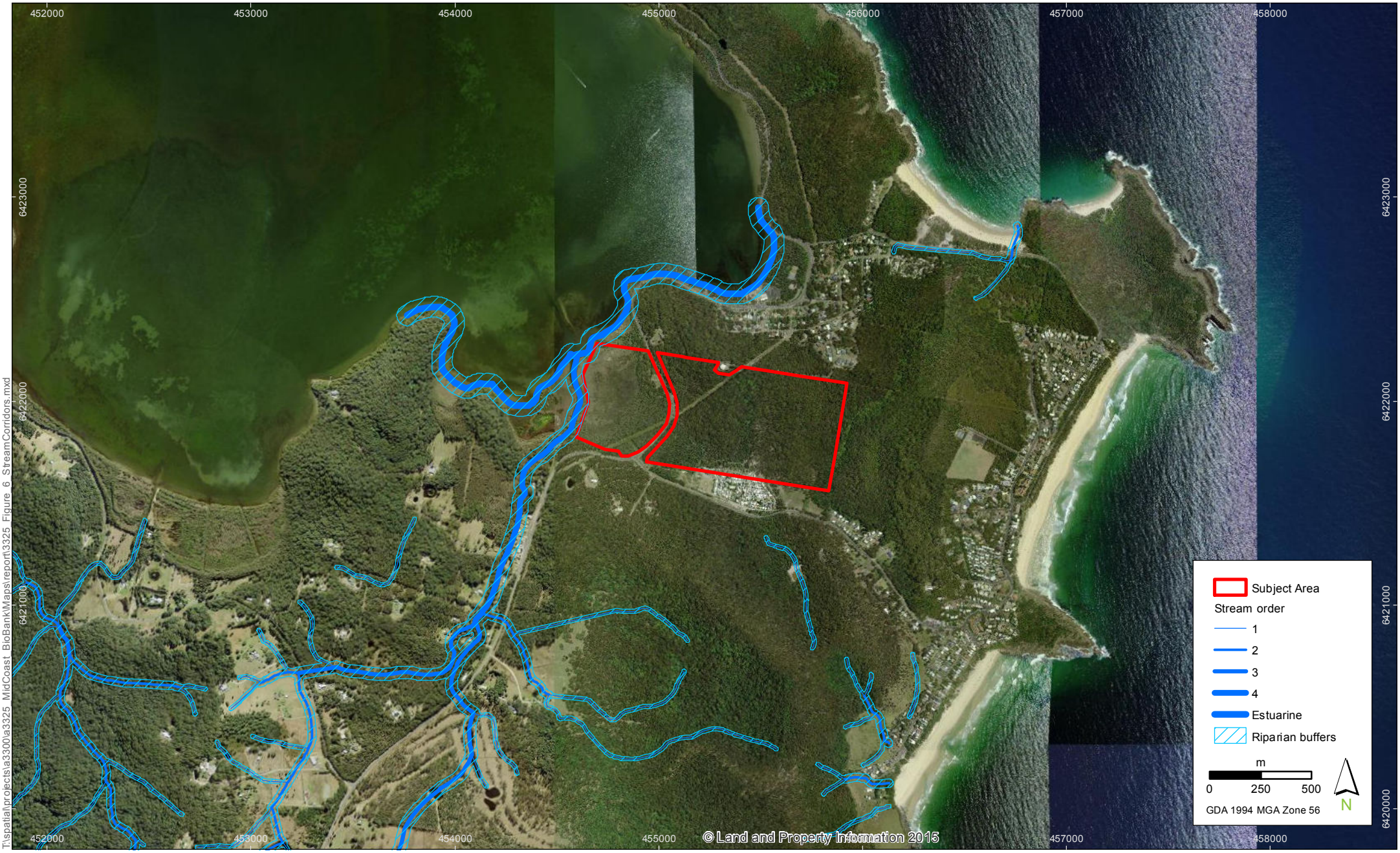


Landscape assessment circles: Mitchell Landscapes and IBRA sub-region

Pacific Palms BioBank Assessment

FIGURE 5

Imagery: (c) LPI Aug 2013



Drawn by: RJ Project Manager: FL Project Number: 3325 Date: 17/11/2016
T:\spatial\projects\a3300\a3325_MidCoast_BioBankMaps\report\3325_Figure_6_StreamCorridors.mxd

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Strategic location

Pacific Palms BioBank Assessment

FIGURE 6

Imagery: (c) LPI Aug 2013

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ATTACHMENT A - CREDIT CALCULATOR INPUTS

Site details

The opening tabs of the BBCC include details of the site location. The site is located in the Hunter-Central Rivers CMA. The proposed site is shown in Figure 4.

Landscape value

Assessment circles

The FBA specifies the layout of the Assessment Circles. To assess the current and future extent of native vegetation cover for the development/BioBank site, the assessor must:

1. Identify an inner and an outer assessment circle in the ratio of 1:10 from the following combinations;

Inner assessment circle (ha)	Outer assessment circle (ha)
100	1,000
200	2,000
300	3,000
400	4,000
500	5,000
1,000	10,000

2. Centre the inner and outer assessment circles on the area of the development site that will involve the greatest decrease in native vegetation cover; and
3. Using a GIS, calculate the current and future extent of native vegetation cover in the inner and outer assessment circles in hectares and convert these to a five per cent threshold increment from zero to 100 (i.e. 0-5, 6-10, 11-15…96-100). The future extent is based on the likely decreased cover within the development site itself.

Assessment circles

A single 1,000 hectare outer circle and a 100 hectare inner circle were utilised for this assessment and centred on the area of greatest increase on the BioBank site and decrease in cover over the potential development site (Figure 5).

The native vegetation cover scores are provided in Table 2.

Given the study area is already vegetated, no change in vegetation cover would occurs as a result of the BioBank site. Based on the disturbance to 2 hectares as per the sites Planning Proposal, this too would not result in any change to native vegetation cover at a 100 hectare or 1,000 hectare circle.

Table 2 is a summary of the native vegetation cover assessment.

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Table 2. Assessment of landscape native vegetation cover

Landscape factor	Entry	
IBRA subregion	NSW North Coast / Karuah Manning	
Mitchell Landscape	Port Macquarie Coastal Ramp (used in assessment due to most of site occurring within this Mitchell Landscape), and Manning - Macleay Coastal Alluvial Plain	
Patch size	2,000 ha	
	Before BioBank	After BioBank
% Native Vegetation Cover in 1000ha Circle	66-70 %	66-70 % (no change)
% Native Vegetation Cover in 100ha Circle	81-85 %	81-85 % (no change)
	After development (2 ha clearing)	After Development (2 ha clearing)
% Native Vegetation Cover in 1000ha Circle	66-70 %	66-70 % (no change)
% Native Vegetation Cover in 100ha Circle	81-85 %	81-85 % (no change)

The landscape assessment resulted in a Landscape Score of 12.00 for both scenarios after a patch size of 2,000 hectares was entered, and the vegetation zone was given a 'Moderate to Good' condition.

Connectivity assessment

Strategic location
A development site is in a strategic location if it includes land that is:

1. An area identified by the Assessor as being part of a state significant biodiversity link and in a plan approved by the Chief Executive of OEH, or
2. An area identified by the Assessor as being part of a regional significant biodiversity link and in a plan approved by the Chief Executive of OEH, or
3. Streams of the following orders and buffers;

- A riparian buffer of 50 metres on one or both sides of a 6th order stream or higher, or
- A riparian buffer of 40 metres on one or both sides of a 4th or 5th order stream, or
- A riparian buffer of 30 metres on one or both sides of a 3rd order stream, or

4. Wetlands;

- A riparian buffer of 50 metres for an important wetland as mapped in the DIWA database, or
- A riparian buffer of 50 metres for an estuarine area.
- A riparian buffer of 20 metres for a local wetland.

An assessment of the stream order (Appendix 2 of BBAM 2014) of the local creeks and rivers was made with GIS by examining a combination of the NSW Hydrological Database and digital 1:25,000 topographic maps.

Figure 6 demonstrates that the site occurs immediately to the east of a strategic location.

Assessment of primary connecting link

A connectivity width value of >30-100 m was entered into the calculator as the primary connecting link occurs off the site. Given the site is already vegetated, no change to the primary connectivity link would occur and therefore no change to this score would occur as a result of the establishment of the BioBank site. Similarly, no change would occur should only 2 hectares be cleared as proposed in the current planning proposal for the site.

Assessment of patch size

The final component of the landscape assessment is the patch size to which the development site belongs. Patch size is defined in the BBAM (2014) as an area of native vegetation that:

a) occurs on the BioBank Site;

b) is in moderate to good condition; and

c) includes clumps of wooded vegetation no more than 100 metres apart, also in moderate to good condition.

The patch may extend beyond the BioBank site and onto adjoining land.

The patch size of the native vegetation on the study area extends into the surrounding bushland. This area is greater than 1000ha, and thus a nominal patch size of 1,100 hectares, which is greater than the 1,000 hectare maximum allowed by the FBA has been chosen (i.e. the maximum score for patch size is applicable).

Predicted threatened species

Geographic and habitat features

The geographic and habitat features tab in the BBCC is designed to further filter threatened fauna whose habitats cannot be reliably predicted by PCTs as surrogates and also for all threatened flora.

Answers to the geographic questions in the BBCC and those species predicted to occur on-site are provided in the tables below.

Table 3. Geographic questions

Impact?	Common name	Scientific name	Feature
☑	Big Nellie Hakea	*Hakea archaeoides*	land containing open forest on rocky, sheltered slopes or in deep gullies
☑	Stuttering Frog	*Mixophyes balbus*	rainforest or tall open wet forest with understorey and/or leaf litter and within 100 m of streams

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Impact?	Common name	Scientific name	Feature
☑	Giant Barred Frog	*Mixophyes iteratus*	land below 1000 m in altitude and within 40 m of rainforest or eucalypt forest with deep leaf litter
☑	Large-eared Pied Bat	*Chalinolobus dwyeri*	land containing escarpments, cliffs, caves, deep crevices, old mine shafts or tunnels
☑	Pale-headed Snake	*Hoplocephalus bitorquatus*	land within 40 m of watercourses, containing hollow-bearing trees, loose bark and/or fallen timber
☑	Rufous Bettong	*Aepyprymnus rufescens*	land north of Gloucester in Karuah Manning CMA subregion
☑	Brush-tailed Rock-wallaby	*Petrogale penicillata*	land within 1 km of rock outcrops or clifflines
☑	Common Planigale	*Planigale maculata*	rainforest, eucalypt forest, heathland, marshland, grassland or rocky areas
☑	Green-thighed Frog	*Litoria brevipalmata*	land within 100 m of semi-permanent or ephemeral ponds or depressions containing leaf litter
☑	Biconvex Paperbark	*Melaleuca biconvexa*	swamps, swamp margins or creek edges
☑	Wallum Froglet	*Crinia tinnula*	land within 40 m of swamps, wet or dry heaths or sedge grasslands
☑	Black Bittern	*Ixobrychus flavicollis*	land within 40 m of freshwater and estuarine wetlands, in areas of permanent water and dense vegetation or emergent aquatic vegetation
☑	Eastern Osprey	*Pandion cristatus*	land within 40 m of fresh/brackish/saline waters of larger rivers or creeks; estuaries, coastal lagoons, lakes and/or inshore marine waters
☑	Giant Dragonfly	*Petalura gigantea*	land within 100 m of coastal or upland swamps, bogs or wetlands
☑	Black-necked Stork	*Ephippiorhynchus asiaticus*	land within 40 m of freshwater or saline wetlands (eg saltmarsh, mangroves, mudflats, swamps, billabongs, floodplains, watercourse pools, wet heathland and/or farm dams)
☑	*Eucalyptus parramattensis subsp. decadens*	*Eucalyptus parramattensis subsp. decadens*	land within northern section of sub-region, associated with poorly drained sand deposits within 10km radius of Kurri Kurri in Wyong CMA subregion
☑	Green and Golden Bell Frog	*Litoria aurea*	land within 100 m of emergent aquatic or riparian vegetation
☑	*Maundia triglochinoides*	*Maundia triglochinoides*	swamps or shallow fresh water on clay
☑	Charmhaven Apple	*Angophora inopina*	land within 5 km of Wallaroo Nature Reserve in Upper Hunter CMA subregion
☑	Australasian Bittern	*Botaurus poiciloptilus*	land east of Cessnock in Hunter CMA subregion
☑	Terek Sandpiper	*Xenus cinereus*	Mangroves and intertidal mudflats or sandflats within inlets, bays, harbours, estuaries, lagoons, ocean beaches and/or sandy spits
☑	Pied Oystercatcher	*Haematopus longirostris*	land within 40 m of high water mark on beaches, sandbars, margins of estuaries or lagoons

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Impact?	Common name	Scientific name	Feature
☑	Greater Sand-plover	*Charadrius leschenaultii*	intertidal mudflats or sandflats within inlets, bays, harbours, estuaries, lagoons or ocean beaches or sandy spits
☑	Lesser Sand-plover	*Charadrius mongolus*	intertidal mudflats or sandflats within inlets, bays, harbours, estuaries, lagoons or ocean beaches or sandy spits
☑	*Zannichellia palustris*	*Zannichellia palustris*	land containing freshwater bodies
☑	Little Tern	*Sternula albifrons*	land within 40 m of inshore coastal waters or shallow waters of estuaries, coastal lagoons and/or lakes
☑	Beach Stone-curlew	*Esacus magnirostris*	Sheltered areas in mangroves, estuaries or sand surrounded by short grass or scattered shrubs.
☑	Broad-billed Sandpiper	*Limicola falcinellus*	intertidal mudflats or sandflats within inlets, bays, harbours, estuaries, lagoons, ocean beaches and/or sandy spits

Table 4. Predicted threatened species

Common name	Scientific name *	TS offset multiplier
Australian Painted Snipe	*Rostratula australis*	1.3
Barking Owl	*Ninox connivens*	3.0
Black-tailed Godwit	*Limosa limosa*	2.6
Bush Stone-curlew	*Burhinus grallarius*	2.6
Common Blossom-bat	*Syconycteris australis*	1.2
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	2.2
Eastern Freetail-bat	*Mormopterus norfolkensis*	2.2
Eastern Grass Owl	*Tyto longimembris*	1.3
Gang-gang Cockatoo	*Callocephalon fimbriatum*	2.0
Glossy Black-Cockatoo	*Calyptorhynchus lathami*	1.8
Great Knot	*Calidris tenuirostris*	2.6
Greater Broad-nosed Bat	*Scoteanax rueppellii*	2.2
Little Eagle	*Hieraaetus morphnoides*	1.4
Little Lorikeet	*Glossopsitta pusilla*	1.8
Long-nosed Potoroo	*Potorous tridactylus*	1.3

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Masked Owl	*Tyto novaehollandiae*	3.0
Powerful Owl	*Ninox strenua*	3.0
Red-legged Pademelon	*Thylogale stigmatica*	2.6
Rose-crowned Fruit-dove	*Ptilinopus regina*	1.3
Sanderling	*Calidris alba*	2.6
Scarlet Robin	*Petroica boodang*	1.3
Sooty Owl	*Tyto tenebricosa*	3.0
Spotted Harrier	*Circus assimilis*	1.4
Spotted-tailed Quoll	*Dasyurus maculatus*	2.6
Square-tailed Kite	*Lophoictinia isura*	1.4
Squirrel Glider	*Petaurus norfolcensis*	2.2
Superb Fruit-dove	*Ptilinopus superbus*	1.3
Swift Parrot	*Lathamus discolor*	1.3
Turquoise Parrot	*Neophema pulchella*	1.8
Varied Sittella	*Daphoenositta chrysoptera*	1.3
White-fronted Chat	*Epthianura albifrons*	0.8
Wompoo Fruit-dove	*Ptilinopus magnificus*	1.3
Yellow-bellied Glider	*Petaurus australis*	2.3
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	2.2

Identified populations

No 'identified populations', as defined in the BBAM, have yet been defined. Note that 'identified populations' are wholly different from threatened populations or species as listed on the TSC Act.

Vegetation Zones

Plant Community Types and condition

Council's vegetation mapping has utilised in this assessment. Council's mapping has been provided in Figure 3, with amendments to the occurrence of Brush Box Wet Sclerophyll Forest (HU783, Flooded Gum - Brush Box - Tallowwood mesic tall open forest) which extended through the gully of the study area. Each vegetation community was aligned to the best fit Biometric Vegetation Type (BVT) used in the BBAM (Table 4). Alignment to Threatened Ecological Communities (TECs) listed under the NSW Threatened Species Conservation Act 1995 has also been provided in the table below.

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Table 5. Vegetation alignment

Council vegetation mapping	Best fit BVT	Alignment to TECs
Blackbutt/ Tallowwood coastal dry sclerophyll Forest	HU770, Tallowwood - Smooth-barked Apple - Blackbutt grassy open forest of the Central and lower North Coast	River-Flat Eucalypt Forest on Coastal Floodplains
Mangrove forest	HU961, Mangrove woodland	-
Cabbage Tree Palm rainforest	HU783, Flooded Gum - Brush Box - Tallowwood mesic tall open forest on ranges of the lower North Coast (best fit)	Possible Lowland Rainforest in NSW North Coast and Sydney Basin Bioregion
Swamp Oak swamp forest and woodland	HU931, Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and lower North Coast	Swamp sclerophyll forest on coastal floodplains
Broad-leaved Paperbark/ Swamps Oak swamp forest and woodland	HU931, Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and lower North Coast	Swamp sclerophyll forest on coastal floodplains
Broad-leaved Paperbark/ Swamps Oak/ Swamps Mahogany/ Cabbage Tree Palm swamp sclerophyll forest		
Juncus saltmarsh rushland	HU960, Saltmarsh Estuarie Complex	Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions
Mixed freshwater Meadow – derived	Possibly the adjacent vegetation communities - HN	-
Baumea saltmarsh sedgeland	HU941, Swamp Oak - Sea Rush - *Baumea juncea* swamp forest on coastal lowlands of the Central Coast and lower North Coast	Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions

No BioBanking plot and transect data was collected during the brief site inspection by Niche. It is likely however, that the vegetation would be within, or toward the lower range of benchmark condition. A score within benchmark for each BioBanking attribute was therefore entered into the BBCC for each of the vegetation types for both scenarios. The scores are provided below.

Table 6. BioBanking attribute scores

Plot Name	NPS	NOS	NMS	NGCG	NGCS	NGCO	EPC	NTH	OR	FL
HU770	44	30	30	15	15	15	2	2	1	20
HU783	44	30	20	15	7	20	3	1	1	12
HU941	15	25	25	12	7	20	1	0	1	12
HU960	5	0	0	0	2	50	0	0	1	0
HU931	24	30	30	20	20	20	4	1	1	10
HU961	2	60	0	0	0	0	0	0	1	0

Attribute Codes: NPS – Native Plant Species Richness, NOS – Native Over-storey cover, NMS – Native Mid-storey cover, NGCG – Native Groundcover Grasses, NGCS - Native Groundcover Shrubs, NGCO - Native Groundcover Other, EPC – Exotic Plant Cover, NTH – Number of Trees with Hollows, OR – Over-storey Regeneration, FL – Length of Fallen Logs.

Site values

The default scores for site values were allowed for each of the BioBanking attributes for each scenario.

Ecosystem Credits

The approximate credits generated should the site be established as a BioBank site is provided in Table 7.

Table 7. Ecosystem credits generate (BioBank site scenario)

Biometric Vegetation Type	Area	Credits required/ generated	Credits per hectare
HU770, Tallowwood - Smooth-barked Apple - Blackbutt grassy open forest of the Central and lower North Coast	37.4	278	**7**
HU783, Flooded Gum - Brush Box - Tallowwood mesic tall open forest on ranges of the lower North Coast	3.22	24	**7**
HU931, Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and lower North Coast	11.01	62	**6**
HU941, Swamp Oak - Sea Rush - *Baumea juncea* swamp forest on coastal lowlands of the Central Coast and lower North Coast	4.57	26	**6**
HU960, Saltmarsh Estuarine Complex	3.92	22	**6**
HU961, Mangrove woodland	0.06	0 – BBCC did not produce a result.	**-**
Non-native	1.59	-	**-**
Total (native vegetation)	60.18	412	

The approximate credits required should the development proceed is provided in Table 8 below.

Table 8. Ecosystem credits generate (Development site scenario)

Biometric Vegetation Type	Area	Credits required	Credits per hectare
Development site			
HU931, Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and lower North Coast	0.07	5	71
HU783, Flooded Gum - Brush Box - Tallowwood mesic tall open forest on ranges of the lower North Coast	0.34	24	70.5
Not native vegetation	1.20	-	-

HU770, Tallowwood - Smooth-barked Apple - Blackbutt grassy open forest of the Central and lower North Coast	2.10	151	72
Total (native vegetation)	**2.51**	**158**	

Species Credits

Approximately 65 Koala Species Credits may be required should the development site contain 2.51 hectares of Koala habitat.

Assuming 51.63 of Koala habitat occurs within the proposed BioBank site, this would generate 367 Koala credits.

An additional two species credit species are also considered likely to be on-site at this time, the Stephens Banded Snake and Eastern Pygmy Possum. Attempting to calculate credits for these two species is dependent on the numbers of hollows present and is likely to require more detailed mapping of hollow-bearing trees to be confident in the calculations.

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ATTACHMENT B - CREDIT PROFILE REPORT

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Attention: Mathew Bell

Senior Ecologist

MidCoast Council

Breese Parade

PO Box 450, Forster NSW 2428

Via email: Mathew.Bell@MidCoast.nsw.gov.au

16 November 2016

Dear Mathew

RE: Pacific Palms – Preliminary BioBanking Assessment

As requested, Niche Environment and Heritage Pty Ltd (Niche) has completed this preliminary BioBank assessment report for Lot 1 DP 653396, Lot 83 DP 753168 & Lot 427 DP 861736 Boomerang Drive, Pacific Palms (study area) (Figure 1 and Figure 2).

The purpose of the preliminary assessment is to assist MidCoast Council in future planning for the site.

It is our understanding that the Planning Proposal for the Pacific Palms Study Area is to maintain approximately 62.3 hectares of land in E2 Environmental Protection, and rezone approximately 3.6 hectares to the north of the existing caravan park to RE2 Private Recreation to allow for future caravan park expansion and provide for a subdivision to excise an existing dwelling on Lot 427 from the remainder of the E2 land.

Likely impact

The area has been subject to a number of ecological studies. These studies have identified the following as potentially occurring within the study area

- Threatened Ecological Communities (TECs): River-Flat Eucalypt Forest on Coastal Floodplains, Swamp sclerophyll forest on coastal floodplains, Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions, and Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions
- Threatened fauna: Koala habitat, Grey-headed Flying Fox and Glossy Black Cockatoo
- Threatened flora: none recorded to date.

The area of potential development impact to the north of the caravan park was assessed by Conacher Travers (2005). This assessment recorded the Koala, Grey-headed Flying Fox and Glossy Black Cockatoo which concluded non-significant impacts.

In addition, the record of the Stephens Banded Snake from Blueys Beach (Niche 2016) requires consideration in the context of this study area.

Based on the proposed plan, the proposed development may impact approximately 2.51 hectares of native vegetation with the following considerations:

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- Indirect impacts (increase sedimentation, runoff, noise etc.) into surrounding bushland.
- Approximately 2.51 hectares of fauna habitat.
- Approximately 2.51 hectares of Koala habitat.
- Potential impact to hollow-bearing trees – potential impacts on hollow using species credit species including the Eastern Pygmy-Possum (*Cercatetus nanus*) and Stephens Banded Snake (*Hoplocephalus stephensii*).

Preliminary BioBank assessment

To assist council in understanding potential offsetting and conservation outcomes for the site, a preliminary BioBank assessment has been the completed using two BioBanking scenarios using the latest version of the BioBanking Credit Calculator (BBCC) (version 4.0):

1. BioBank scenario: Estimate of the credits per hectare should the vegetation types in the study area be managed in perpetuity.
2. Development Scenario: Estimate of the credits per hectare should the vegetation types in the study area be cleared as in the Planning Proposal.

The BBCC was run by Luke Baker, Accredited BioBanking Assessor based on Council's detailed vegetation mapping. A summary of the two scenarios is provided in Table 1.

Details of the entries into the calculator for both scenario are provided in Attachment A.

The BioBanking Credit Profile Report for each scenario is provided in Attachment B.

Table 1. Preliminary BioBank calculations

Biometric Vegetation Type	Area	Credits required/ generated	Credits per hectare
Development site			
HU931, Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and lower North Coast	0.07	5	71
HU783, Flooded Gum - Brush Box - Tallowwood mesic tall open forest on ranges of the lower North Coast	0.34	24	70.5
Not native vegetation	1.20	-	-
HU770, Tallowwood - Smooth-barked Apple - Blackbutt grassy open forest of the Central and lower North Coast	2.10	151	72
Total (native vegetation)	**2.51**	**158**	
BioBank site			
HU770, Tallowwood - Smooth-barked Apple - Blackbutt grassy open forest of the Central and lower North Coast	37.4	278	**7**
HU783, Flooded Gum - Brush Box - Tallowwood mesic tall open forest on ranges of the lower North Coast	3.22	24	**7**
HU931, Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and lower North Coast	11.01	62	**6**

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HU941, Swamp Oak - Sea Rush - *Baumea juncea* swamp forest on coastal lowlands of the Central Coast and lower North Coast	4.57	26	**6**
HU960, Saltmarsh Estuarine Complex	3.92	22	**6**
HU961, Mangrove woodland	0.06	0 – BBCC did not produce a result.	**-**
Non-native	1.59	-	**-**
Total (native vegetation)	60.18	412	

Species Credits

Should Koala habitat be deemed to be impacted as a result of the 2.51 hectares of vegetation clearing then approximately 65 Koala credits may need to be retired. Assuming 51.63 ha of Koala habitat occurs within the conservation area, this would generate 367 Koala credits, which would satisfy the development offset requirement.

Two other species are considered likely to be present and can be considered for species credits, should they be determined to be present on the site. These are the Eastern Pygmy-Possum and Stephens Banded Snake. Calculations for these species are dependent on accurate hollow counts on which to base the calculations.

Offset requirement

In summary, the development would require 158 ecosystem credits.

Should the land to be retained be established as a BioBank site, it would likely satisfy the impacts of the development as it contains the required number of ecosystem credits for each vegetation type that may be impacted.

The proposed BioBank site would also likely satisfy the Koala offset requirement should it be required.

Recommendations

The following are recommended to consider in association with this report:

- Should a BioBank assessment be deemed a suitable approach by council, floristic plot data to meet the requirements of the BBAM would need to be collected a both the BioBank site and development site.
- The vegetation zones may need to be further refined to take into consideration areas of weed intensity, particularly along the edges of the site.
- OEH may require further fauna surveys within the development area given the previous surveys were completed in 2005. In particular, for threatened fauna that are not predicted species that would require offsetting under the BBAM.
- OEH may require further floristic surveys to confirm the absence of threatened flora within the proposed development area given previous surveys were completed in 2005.

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- Further consultation with OEH should be undertaken in regards to 'Additionally' given the site is currently zoned E2. If compulsory management actions (landholder must control weeds, retain logs etc) and/or prohibition of certain activities (no removal of logs) are required by the landholder under the zoning requirements, such actions may discount the credits generated if the site is used as BioBank site. It is unclear at this stage what discount OEH would accept for any additionally. This should be discussed with OEH.
- Red flag variation would be required in accordance with the BBAM for impacts to any TECs and threatened biodiversity.

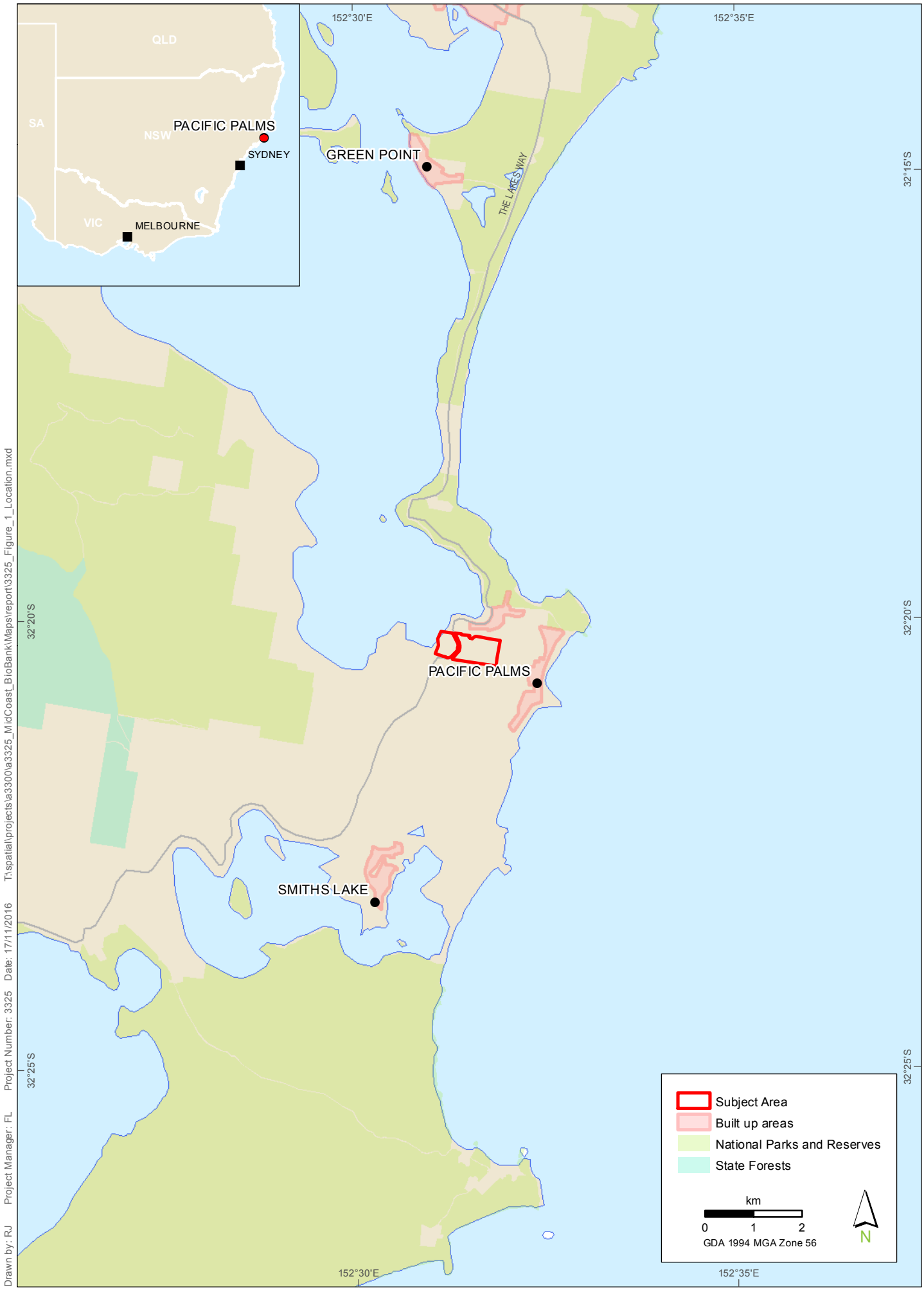
I trust the information provided in this report is sufficient for your purposes. Should you require any further information please do not hesitate to contact me as required.

Yours sincerely,

Luke Baker

Senior Ecologist and Accredited BioBanking Assessor

Niche Environment and Heritage Pty Ltd



Location map

Pacific Palms BioBank Assessment

FIGURE 1

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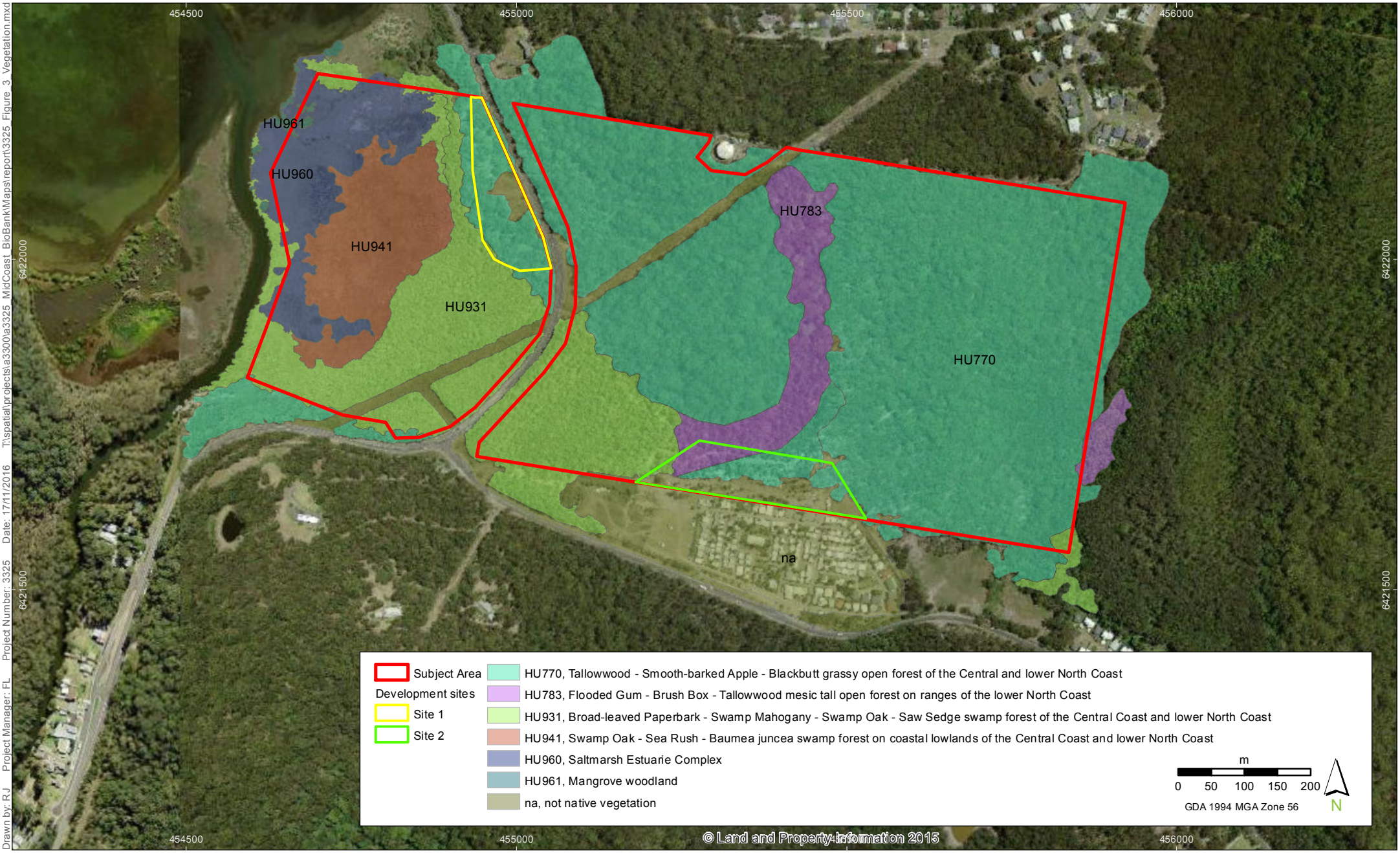
Site Map

Pacific Palms BioBank Assessment

FIGURE 2

Imagery: (c) LPI Aug 2013



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BioMetric vegetation communities

Pacific Palms BioBank Assessment

FIGURE 3

Imagery: (c) LPI Aug 2013

Landscape Assessment: CMA regions and patch size

Pacific Palms BioBank Assessment

FIGURE 4

Imagery: (c) LPI Aug 2013

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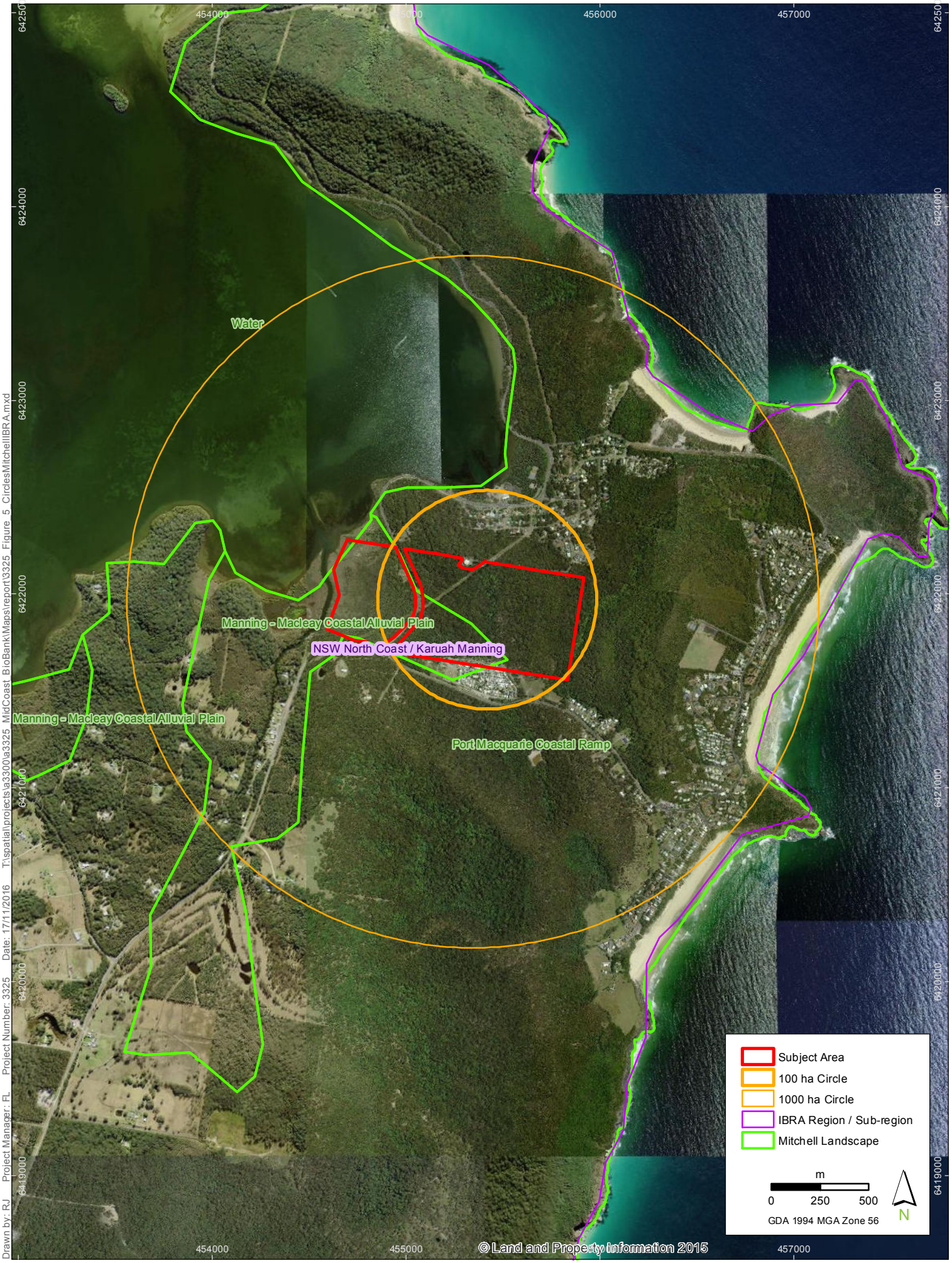
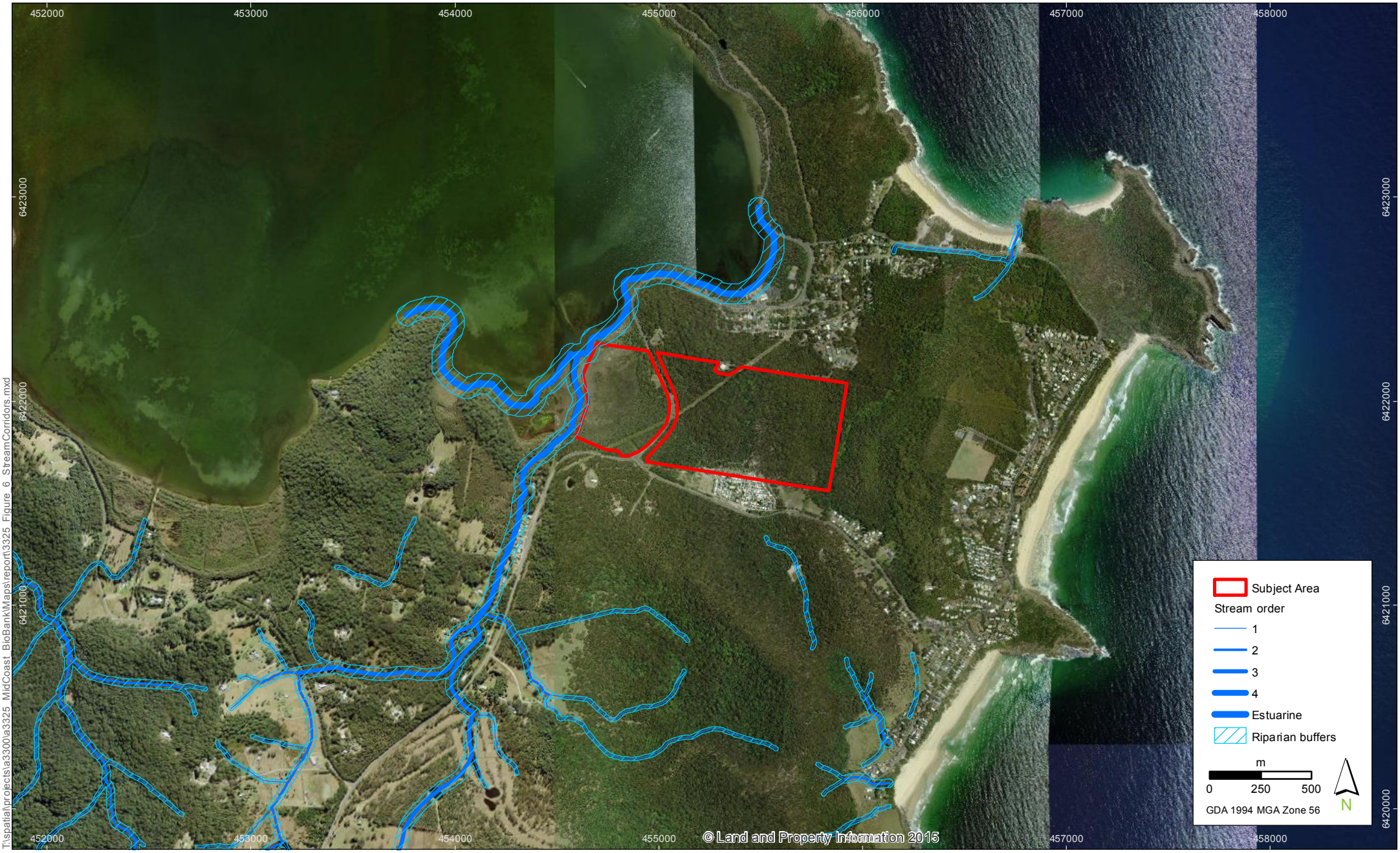


Landscape assessment circles: Mitchell Landscapes and IBRA sub-region

Pacific Palms BioBank Assessment

FIGURE 5

Imagery: (c) LPI Aug 2013



Drawn by: RJ Project Manager: FL Project Number: 3325 Date: 17/11/2016
T:\spatial\projects\a3300\a3325_MidCoast_BioBankMaps\report\3325_Figure_6_StreamCorridors.mxd

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Strategic location

Pacific Palms BioBank Assessment

FIGURE 6

Imagery: (c) LPI Aug 2013

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ATTACHMENT A - CREDIT CALCULATOR INPUTS

Site details

The opening tabs of the BBCC include details of the site location. The site is located in the Hunter-Central Rivers CMA. The proposed site is shown in Figure 4.

Landscape value

Assessment circles

The FBA specifies the layout of the Assessment Circles. To assess the current and future extent of native vegetation cover for the development/BioBank site, the assessor must:

1. Identify an inner and an outer assessment circle in the ratio of 1:10 from the following combinations;

Inner assessment circle (ha)	Outer assessment circle (ha)
100	1,000
200	2,000
300	3,000
400	4,000
500	5,000
1,000	10,000

2. Centre the inner and outer assessment circles on the area of the development site that will involve the greatest decrease in native vegetation cover; and
3. Using a GIS, calculate the current and future extent of native vegetation cover in the inner and outer assessment circles in hectares and convert these to a five per cent threshold increment from zero to 100 (i.e. 0-5, 6-10, 11-15…96-100). The future extent is based on the likely decreased cover within the development site itself.

Assessment circles

A single 1,000 hectare outer circle and a 100 hectare inner circle were utilised for this assessment and centred on the area of greatest increase on the BioBank site and decrease in cover over the potential development site (Figure 5).

The native vegetation cover scores are provided in Table 2.

Given the study area is already vegetated, no change in vegetation cover would occurs as a result of the BioBank site. Based on the disturbance to 2 hectares as per the sites Planning Proposal, this too would not result in any change to native vegetation cover at a 100 hectare or 1,000 hectare circle.

Table 2 is a summary of the native vegetation cover assessment.

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Table 2. Assessment of landscape native vegetation cover

Landscape factor	Entry	
IBRA subregion	NSW North Coast / Karuah Manning	
Mitchell Landscape	Port Macquarie Coastal Ramp (used in assessment due to most of site occurring within this Mitchell Landscape), and Manning - Macleay Coastal Alluvial Plain	
Patch size	2,000 ha	
	Before BioBank	After BioBank
% Native Vegetation Cover in 1000ha Circle	66-70 %	66-70 % (no change)
% Native Vegetation Cover in 100ha Circle	81-85 %	81-85 % (no change)
	After development (2 ha clearing)	After Development (2 ha clearing)
% Native Vegetation Cover in 1000ha Circle	66-70 %	66-70 % (no change)
% Native Vegetation Cover in 100ha Circle	81-85 %	81-85 % (no change)

The landscape assessment resulted in a Landscape Score of 12.00 for both scenarios after a patch size of 2,000 hectares was entered, and the vegetation zone was given a 'Moderate to Good' condition.

Connectivity assessment

Strategic location
A development site is in a strategic location if it includes land that is:

1. An area identified by the Assessor as being part of a state significant biodiversity link and in a plan approved by the Chief Executive of OEH, or
2. An area identified by the Assessor as being part of a regional significant biodiversity link and in a plan approved by the Chief Executive of OEH, or
3. Streams of the following orders and buffers;

- A riparian buffer of 50 metres on one or both sides of a 6th order stream or higher, or
- A riparian buffer of 40 metres on one or both sides of a 4th or 5th order stream, or
- A riparian buffer of 30 metres on one or both sides of a 3rd order stream, or

4. Wetlands;

- A riparian buffer of 50 metres for an important wetland as mapped in the DIWA database, or
- A riparian buffer of 50 metres for an estuarine area.
- A riparian buffer of 20 metres for a local wetland.

An assessment of the stream order (Appendix 2 of BBAM 2014) of the local creeks and rivers was made with GIS by examining a combination of the NSW Hydrological Database and digital 1:25,000 topographic maps.

Figure 6 demonstrates that the site occurs immediately to the east of a strategic location.

Assessment of primary connecting link

A connectivity width value of >30-100 m was entered into the calculator as the primary connecting link occurs off the site. Given the site is already vegetated, no change to the primary connectivity link would occur and therefore no change to this score would occur as a result of the establishment of the BioBank site. Similarly, no change would occur should only 2 hectares be cleared as proposed in the current planning proposal for the site.

Assessment of patch size

The final component of the landscape assessment is the patch size to which the development site belongs. Patch size is defined in the BBAM (2014) as an area of native vegetation that:

a) occurs on the BioBank Site;

b) is in moderate to good condition; and

c) includes clumps of wooded vegetation no more than 100 metres apart, also in moderate to good condition.

The patch may extend beyond the BioBank site and onto adjoining land.

The patch size of the native vegetation on the study area extends into the surrounding bushland. This area is greater than 1000ha, and thus a nominal patch size of 1,100 hectares, which is greater than the 1,000 hectare maximum allowed by the FBA has been chosen (i.e. the maximum score for patch size is applicable).

Predicted threatened species

Geographic and habitat features

The geographic and habitat features tab in the BBCC is designed to further filter threatened fauna whose habitats cannot be reliably predicted by PCTs as surrogates and also for all threatened flora.

Answers to the geographic questions in the BBCC and those species predicted to occur on-site are provided in the tables below.

Table 3. Geographic questions

Impact?	Common name	Scientific name	Feature
☑	Big Nellie Hakea	*Hakea archaeoides*	land containing open forest on rocky, sheltered slopes or in deep gullies
☑	Stuttering Frog	*Mixophyes balbus*	rainforest or tall open wet forest with understorey and/or leaf litter and within 100 m of streams

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Impact?	Common name	Scientific name	Feature
☑	Giant Barred Frog	*Mixophyes iteratus*	land below 1000 m in altitude and within 40 m of rainforest or eucalypt forest with deep leaf litter
☑	Large-eared Pied Bat	*Chalinolobus dwyeri*	land containing escarpments, cliffs, caves, deep crevices, old mine shafts or tunnels
☑	Pale-headed Snake	*Hoplocephalus bitorquatus*	land within 40 m of watercourses, containing hollow-bearing trees, loose bark and/or fallen timber
☑	Rufous Bettong	*Aepyprymnus rufescens*	land north of Gloucester in Karuah Manning CMA subregion
☑	Brush-tailed Rock-wallaby	*Petrogale penicillata*	land within 1 km of rock outcrops or clifflines
☑	Common Planigale	*Planigale maculata*	rainforest, eucalypt forest, heathland, marshland, grassland or rocky areas
☑	Green-thighed Frog	*Litoria brevipalmata*	land within 100 m of semi-permanent or ephemeral ponds or depressions containing leaf litter
☑	Biconvex Paperbark	*Melaleuca biconvexa*	swamps, swamp margins or creek edges
☑	Wallum Froglet	*Crinia tinnula*	land within 40 m of swamps, wet or dry heaths or sedge grasslands
☑	Black Bittern	*Ixobrychus flavicollis*	land within 40 m of freshwater and estuarine wetlands, in areas of permanent water and dense vegetation or emergent aquatic vegetation
☑	Eastern Osprey	*Pandion cristatus*	land within 40 m of fresh/brackish/saline waters of larger rivers or creeks; estuaries, coastal lagoons, lakes and/or inshore marine waters
☑	Giant Dragonfly	*Petalura gigantea*	land within 100 m of coastal or upland swamps, bogs or wetlands
☑	Black-necked Stork	*Ephippiorhynchus asiaticus*	land within 40 m of freshwater or saline wetlands (eg saltmarsh, mangroves, mudflats, swamps, billabongs, floodplains, watercourse pools, wet heathland and/or farm dams)
☑	*Eucalyptus parramattensis subsp. decadens*	*Eucalyptus parramattensis subsp. decadens*	land within northern section of sub-region, associated with poorly drained sand deposits within 10km radius of Kurri Kurri in Wyong CMA subregion
☑	Green and Golden Bell Frog	*Litoria aurea*	land within 100 m of emergent aquatic or riparian vegetation
☑	*Maundia triglochinoides*	*Maundia triglochinoides*	swamps or shallow fresh water on clay
☑	Charmhaven Apple	*Angophora inopina*	land within 5 km of Wallaroo Nature Reserve in Upper Hunter CMA subregion
☑	Australasian Bittern	*Botaurus poiciloptilus*	land east of Cessnock in Hunter CMA subregion
☑	Terek Sandpiper	*Xenus cinereus*	Mangroves and intertidal mudflats or sandflats within inlets, bays, harbours, estuaries, lagoons, ocean beaches and/or sandy spits
☑	Pied Oystercatcher	*Haematopus longirostris*	land within 40 m of high water mark on beaches, sandbars, margins of estuaries or lagoons

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Impact?	Common name	Scientific name	Feature
☑	Greater Sand-plover	*Charadrius leschenaultii*	intertidal mudflats or sandflats within inlets, bays, harbours, estuaries, lagoons or ocean beaches or sandy spits
☑	Lesser Sand-plover	*Charadrius mongolus*	intertidal mudflats or sandflats within inlets, bays, harbours, estuaries, lagoons or ocean beaches or sandy spits
☑	*Zannichellia palustris*	*Zannichellia palustris*	land containing freshwater bodies
☑	Little Tern	*Sternula albifrons*	land within 40 m of inshore coastal waters or shallow waters of estuaries, coastal lagoons and/or lakes
☑	Beach Stone-curlew	*Esacus magnirostris*	Sheltered areas in mangroves, estuaries or sand surrounded by short grass or scattered shrubs.
☑	Broad-billed Sandpiper	*Limicola falcinellus*	intertidal mudflats or sandflats within inlets, bays, harbours, estuaries, lagoons, ocean beaches and/or sandy spits

Table 4. Predicted threatened species

Common name	Scientific name *	TS offset multiplier
Australian Painted Snipe	*Rostratula australis*	1.3
Barking Owl	*Ninox connivens*	3.0
Black-tailed Godwit	*Limosa limosa*	2.6
Bush Stone-curlew	*Burhinus grallarius*	2.6
Common Blossom-bat	*Syconycteris australis*	1.2
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	2.2
Eastern Freetail-bat	*Mormopterus norfolkensis*	2.2
Eastern Grass Owl	*Tyto longimembris*	1.3
Gang-gang Cockatoo	*Callocephalon fimbriatum*	2.0
Glossy Black-Cockatoo	*Calyptorhynchus lathami*	1.8
Great Knot	*Calidris tenuirostris*	2.6
Greater Broad-nosed Bat	*Scoteanax rueppellii*	2.2
Little Eagle	*Hieraaetus morphnoides*	1.4
Little Lorikeet	*Glossopsitta pusilla*	1.8
Long-nosed Potoroo	*Potorous tridactylus*	1.3

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Masked Owl	*Tyto novaehollandiae*	3.0
Powerful Owl	*Ninox strenua*	3.0
Red-legged Pademelon	*Thylogale stigmatica*	2.6
Rose-crowned Fruit-dove	*Ptilinopus regina*	1.3
Sanderling	*Calidris alba*	2.6
Scarlet Robin	*Petroica boodang*	1.3
Sooty Owl	*Tyto tenebricosa*	3.0
Spotted Harrier	*Circus assimilis*	1.4
Spotted-tailed Quoll	*Dasyurus maculatus*	2.6
Square-tailed Kite	*Lophoictinia isura*	1.4
Squirrel Glider	*Petaurus norfolcensis*	2.2
Superb Fruit-dove	*Ptilinopus superbus*	1.3
Swift Parrot	*Lathamus discolor*	1.3
Turquoise Parrot	*Neophema pulchella*	1.8
Varied Sittella	*Daphoenositta chrysoptera*	1.3
White-fronted Chat	*Epthianura albifrons*	0.8
Wompoo Fruit-dove	*Ptilinopus magnificus*	1.3
Yellow-bellied Glider	*Petaurus australis*	2.3
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	2.2

Identified populations

No 'identified populations', as defined in the BBAM, have yet been defined. Note that 'identified populations' are wholly different from threatened populations or species as listed on the TSC Act.

Vegetation Zones

Plant Community Types and condition

Council's vegetation mapping has utilised in this assessment. Council's mapping has been provided in Figure 3, with amendments to the occurrence of Brush Box Wet Sclerophyll Forest (HU783, Flooded Gum - Brush Box - Tallowwood mesic tall open forest) which extended through the gully of the study area. Each vegetation community was aligned to the best fit Biometric Vegetation Type (BVT) used in the BBAM (Table 4). Alignment to Threatened Ecological Communities (TECs) listed under the NSW Threatened Species Conservation Act 1995 has also been provided in the table below.

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Table 5. Vegetation alignment

Council vegetation mapping	Best fit BVT	Alignment to TECs
Blackbutt/ Tallowwood coastal dry sclerophyll Forest	HU770, Tallowwood - Smooth-barked Apple - Blackbutt grassy open forest of the Central and lower North Coast	River-Flat Eucalypt Forest on Coastal Floodplains
Mangrove forest	HU961, Mangrove woodland	-
Cabbage Tree Palm rainforest	HU783, Flooded Gum - Brush Box - Tallowwood mesic tall open forest on ranges of the lower North Coast (best fit)	Possible Lowland Rainforest in NSW North Coast and Sydney Basin Bioregion
Swamp Oak swamp forest and woodland	HU931, Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and lower North Coast	Swamp sclerophyll forest on coastal floodplains
Broad-leaved Paperbark/ Swamps Oak swamp forest and woodland	HU931, Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and lower North Coast	Swamp sclerophyll forest on coastal floodplains
Broad-leaved Paperbark/ Swamps Oak/ Swamps Mahogany/ Cabbage Tree Palm swamp sclerophyll forest		
Juncus saltmarsh rushland	HU960, Saltmarsh Estuarie Complex	Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions
Mixed freshwater Meadow – derived	Possibly the adjacent vegetation communities - HN	-
Baumea saltmarsh sedgeland	HU941, Swamp Oak - Sea Rush - *Baumea juncea* swamp forest on coastal lowlands of the Central Coast and lower North Coast	Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions

No BioBanking plot and transect data was collected during the brief site inspection by Niche. It is likely however, that the vegetation would be within, or toward the lower range of benchmark condition. A score within benchmark for each BioBanking attribute was therefore entered into the BBCC for each of the vegetation types for both scenarios. The scores are provided below.

Table 6. BioBanking attribute scores

Plot Name	NPS	NOS	NMS	NGCG	NGCS	NGCO	EPC	NTH	OR	FL
HU770	44	30	30	15	15	15	2	2	1	20
HU783	44	30	20	15	7	20	3	1	1	12
HU941	15	25	25	12	7	20	1	0	1	12
HU960	5	0	0	0	2	50	0	0	1	0
HU931	24	30	30	20	20	20	4	1	1	10
HU961	2	60	0	0	0	0	0	0	1	0

Attribute Codes: NPS – Native Plant Species Richness, NOS – Native Over-storey cover, NMS – Native Mid-storey cover, NGCG – Native Groundcover Grasses, NGCS - Native Groundcover Shrubs, NGCO - Native Groundcover Other, EPC – Exotic Plant Cover, NTH – Number of Trees with Hollows, OR – Over-storey Regeneration, FL – Length of Fallen Logs.

Site values

The default scores for site values were allowed for each of the BioBanking attributes for each scenario.

Ecosystem Credits

The approximate credits generated should the site be established as a BioBank site is provided in Table 7.

Table 7. Ecosystem credits generate (BioBank site scenario)

Biometric Vegetation Type	Area	Credits required/ generated	Credits per hectare
HU770, Tallowwood - Smooth-barked Apple - Blackbutt grassy open forest of the Central and lower North Coast	37.4	278	**7**
HU783, Flooded Gum - Brush Box - Tallowwood mesic tall open forest on ranges of the lower North Coast	3.22	24	**7**
HU931, Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and lower North Coast	11.01	62	**6**
HU941, Swamp Oak - Sea Rush - *Baumea juncea* swamp forest on coastal lowlands of the Central Coast and lower North Coast	4.57	26	**6**
HU960, Saltmarsh Estuarine Complex	3.92	22	**6**
HU961, Mangrove woodland	0.06	0 – BBCC did not produce a result.	**-**
Non-native	1.59	-	**-**
Total (native vegetation)	60.18	412	

The approximate credits required should the development proceed is provided in Table 8 below.

Table 8. Ecosystem credits generate (Development site scenario)

Biometric Vegetation Type	Area	Credits required	Credits per hectare
Development site			
HU931, Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and lower North Coast	0.07	5	71
HU783, Flooded Gum - Brush Box - Tallowwood mesic tall open forest on ranges of the lower North Coast	0.34	24	70.5
Not native vegetation	1.20	-	-

HU770, Tallowwood - Smooth-barked Apple - Blackbutt grassy open forest of the Central and lower North Coast	2.10	151	72
Total (native vegetation)	**2.51**	**158**	

Species Credits

Approximately 65 Koala Species Credits may be required should the development site contain 2.51 hectares of Koala habitat.

Assuming 51.63 of Koala habitat occurs within the proposed BioBank site, this would generate 367 Koala credits.

An additional two species credit species are also considered likely to be on-site at this time, the Stephens Banded Snake and Eastern Pygmy Possum. Attempting to calculate credits for these two species is dependent on the numbers of hollows present and is likely to require more detailed mapping of hollow-bearing trees to be confident in the calculations.

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ATTACHMENT B - CREDIT PROFILE REPORT

BioBanking credit report

This report identifies the number and type of credits required at a BIOBANK SITE

Date of report: 17/11/2016 Time: 9:54:25PM Calculator version: v4.0

Biobank details

Proposal ID: 0112/2016/4072B

Proposal name: 3325 Pacific Palms BioBank

Proposal address:

Proponent name: MidCoast Council

Proponent address:

Proponent phone:

Assessor name: Luke Baker

Assessor address:

Assessor phone:

Assessor accreditation: 0112

Additional information required for approval:

- ☐ Use of local benchmark
- ☐ Expert report...
- ☐ Request for additional gain in site value

Ecosystem credits summary

Plant Community type	Area (ha)	Credits created
Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast	11.01	62.00
Flooded Gum - Brush Box - Tallowwood mesic tall open forest on ranges of the lower North Coast	3.22	24.00
Grey Mangrove low closed forest	0.06	0.00
Saltmarsh Estuarine Complex	3.92	22.00
Swamp Oak - Sea Rush - Baumea juncea swamp forest on coastal lowlands of the Central Coast and Lower North Coast	4.57	26.00
Tallowwood - Smooth-barked Apple - Blackbutt grass tall open forest of the Central and lower North Coast	37.40	278.00
Total	60.18	412

Credit profiles

1. Tallowwood - Smooth-barked Apple - Blackbutt grass tall open forest of the Central and lower North Coast, (HU770)

Number of ecosystem credits created	278
IBRA sub-region	Karuah Manning

2. Flooded Gum - Brush Box - Tallowwood mesic tall open forest on ranges of the lower North Coast, (HU783)

Number of ecosystem credits created	24
IBRA sub-region	Karuah Manning

3. Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast, (HU931)

Number of ecosystem credits created	62
IBRA sub-region	Karuah Manning

4. Swamp Oak - Sea Rush - Baumea juncea swamp forest on coastal lowlands of the Central Coast and Lower North Coast, (HU941)

Number of ecosystem credits created	26
IBRA sub-region	Karuah Manning

5. Saltmarsh Estuarine Complex, (HU960)

Number of ecosystem credits created	22
IBRA sub-region	Karuah Manning

6. Grey Mangrove low closed forest, (HU961)

Number of ecosystem credits created	0
IBRA sub-region	Karuah Manning

Species credits summary

Common name	Scientific name	Extent of impact Ha or individuals	Number of species credits created
Koala	Phascolarctos cinereus	51.63	367

Additional management actions

Additional management actions are required for:

Vegetation type or threatened species	Management action details
Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast	Exclude commercial apiaries
Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast	Exclude miscellaneous feral species
Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast	Feral and/or over-abundant native herbivore control
Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast	Fox control
Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast	Slashing
Flooded Gum - Brush Box - Tallowwood mesic tall open forest on ranges of the lower North Coast	Exclude commercial apiaries
Flooded Gum - Brush Box - Tallowwood mesic tall open forest on ranges of the lower North Coast	Exclude miscellaneous feral species
Flooded Gum - Brush Box - Tallowwood mesic tall open forest on ranges of the lower North Coast	Feral and/or over-abundant native herbivore control
Flooded Gum - Brush Box - Tallowwood mesic tall open forest on ranges of the lower North Coast	Fox control
Grey Mangrove low closed forest	Control exotic pest fish species (within dams)
Grey Mangrove low closed forest	Control of feral pigs
Grey Mangrove low closed forest	Exclude miscellaneous feral species
Grey Mangrove low closed forest	Feral and/or over-abundant native herbivore control
Grey Mangrove low closed forest	Fox control
Grey Mangrove low closed forest	Maintain or re-introduce natural flow regimes
Koala	Exclude miscellaneous feral species
Koala	Slashing
Saltmarsh Estuarine Complex	Control exotic pest fish species (within dams)
Saltmarsh Estuarine Complex	Control of feral pigs
Saltmarsh Estuarine Complex	Exclude miscellaneous feral species

Saltmarsh Estuarine Complex	Feral and/or over-abundant native herbivore control
Saltmarsh Estuarine Complex	Fox control
Saltmarsh Estuarine Complex	Maintain or re-introduce natural flow regimes
Swamp Oak - Sea Rush - Baumea juncea swamp forest on coastal lowlands of the Central Coast and Lower North Coast	Exclude miscellaneous feral species
Swamp Oak - Sea Rush - Baumea juncea swamp forest on coastal lowlands of the Central Coast and Lower North Coast	Feral and/or over-abundant native herbivore control
Swamp Oak - Sea Rush - Baumea juncea swamp forest on coastal lowlands of the Central Coast and Lower North Coast	Fox control
Tallowwood - Smooth-barked Apple - Blackbutt grass tall open forest of the Central and lower North Coast	Exclude commercial apiaries
Tallowwood - Smooth-barked Apple - Blackbutt grass tall open forest of the Central and lower North Coast	Exclude miscellaneous feral species
Tallowwood - Smooth-barked Apple - Blackbutt grass tall open forest of the Central and lower North Coast	Feral and/or over-abundant native herbivore control
Tallowwood - Smooth-barked Apple - Blackbutt grass tall open forest of the Central and lower North Coast	Fox control
Tallowwood - Smooth-barked Apple - Blackbutt grass tall open forest of the Central and lower North Coast	Slashing

BioBanking credit report

This report identifies the number and type of credits required at a DEVELOPMENT SITE.

Date of report: 17/11/2016 Time: 9:52:29PM Calculator version: v4.0

Development details

Proposal ID: 0112/2016/4075D

Proposal name: 3325 Pacific Palms Development

Proposal address:

Proponent name: MidCoast Council

Proponent address:

Proponent phone:

Assessor name: Luke Baker

Assessor address:

Assessor phone:

Assessor accreditation: 0112

Improving or maintaining biodiversity

An application for a red flag determination is required for the following red flag areas

Red flag	Reason
Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast	Vegetation type being > 70% cleared; or it contains an endangered ecological community;
Tallowwood - Smooth-barked Apple - Blackbutt grass tall open forest of the Central and lower North Coast	Vegetation type being > 70% cleared; or it contains an endangered ecological community;
Flooded Gum - Brush Box - Tallowwood mesic tall open forest on ranges of the lower North Coast	Vegetation type being > 70% cleared; or it contains an endangered ecological community;

The application for a red flag determination should address the criteria set out in the BioBanking Assessment Methodology. Please note that a biobanking statement cannot be issued unless the determination is approved.

Additional information required for approval:

- [ ] Change to percent cleared for a vegetation type/s
- [ ] Use of local benchmark
- [ ] Change negligible loss
- [ ] Expert report...
- [x] Request for additional gain in site value
- [ ] Predicted threatened species not on site
- [ ] Change threatened species response to gain (Tg value)

Ecosystem credits summary

Plant Community type	Area (ha)	Credits required	Red flag
Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast	0.07	5.46	Yes
Flooded Gum - Brush Box - Tallowwood mesic tall open forest on ranges of the lower North Coast	0.34	24.00	No
Tallowwood - Smooth-barked Apple - Blackbutt grass tall open forest of the Central and lower North Coast	2.10	151.00	Yes
Total	2.51	180	

Credit profiles

1. Tallowwood - Smooth-barked Apple - Blackbutt grass tall open forest of the Central and lower North Coast, (HU770)

Number of ecosystem credits created	151
IBRA sub-region	Karuah Manning

Offset options - vegetation types	Offset options - CMA sub-regions
Tallowwood - Smooth-barked Apple - Blackbutt grass tall open forest of the Central and lower North Coast, (HU770) Tallowwood - Small-fruited Grey Gum - Kangaroo Grass grassy tall open forest on foothills of the lower North Coast, (HU762) Pink Bloodwood - Thin-leaved Stringybark - Grey Ironbark shrub - grass open forest on ranges of the lower North Coast, (HU772) White Mahogany - Spotted Gum - Grey Myrtle semi-mesic shrubby open forest of the central and lower Hunter Valley, (HU798)	Karuah Manning and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

2. Flooded Gum - Brush Box - Tallowwood mesic tall open forest on ranges of the lower North Coast, (HU783)

Number of ecosystem credits created	24
IBRA sub-region	Karuah Manning

Offset options - vegetation types	Offset options - CMA sub-regions
Flooded Gum - Brush Box - Tallowwood mesic tall open forest on ranges of the lower North Coast, (HU783) Blackbutt - Turpentine - Sydney Blue Gum mesic tall open forest on ranges of the Central Coast, (HU782)	Karuah Manning and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

3. Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast, (HU931)

Number of ecosystem credits created	5
IBRA sub-region	Karuah Manning

Offset options - vegetation types	Offset options - CMA sub-regions
Broad-leaved Paperbark - Swamp Mahogany - Swamp Oak - Saw Sedge swamp forest of the Central Coast and Lower North Coast, (HU931) Swamp Mahogany swamp forest on coastal lowlands of the NSW North Coast Bioregion and northern Sydney Basin Bioregion, (HU633) Prickly-leaved Paperbark forest on coastal lowlands of the Central Coast and Lower North Coast, (HU930) Swamp Mahogany - Flax-leaved Paperbark swamp forest on coastal lowlands of the Central Coast, (HU932) Melaleuca biconvexa - Swamp Mahogany - Cabbage Palm swamp forest of the Central Coast, (HU937)	Karuah Manning and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

Swamp paperbark - Baumea juncea swamp shrubland on coastal lowlands of the Central Coast and Lower North Coast, (HU944) Swamp Oak - Weeping Grass grassy riparian forest of the Hunter Valley, (HU945)	

Species credits summary

Common name	Scientific name	Extent of impact Ha or individuals	Number of species credits created
Koala	Phascolarctos cinereus	2.51	65