



ABN 29 057 616 896

**DRAFT BEACH MANAGEMENT PLAN
FORESHORE RESERVE, KIOLOA BEACH**

**KIOLOA BEACH HOLIDAY PARK
LOT 128 DP 40869
MURRAMARANG ROAD
KIOLOA**

Prepared for:
MR. T. VAN BERGEN

SEPTEMBER 2007

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LOT 128 DP 40869
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Prepared by:

Mr Stephen Richardson
Master of Appl. Science (Environmental Management and Restoration) CSU
Bachelor of Town Planning (1st Class Hon) UNSW
Graduate Diploma in Environmental Management
C.P.P.
M.P.I.A.

In Consultation with:

Mr Peter Cowman
Bachelor of Science in Agriculture (Sydney University)
M.A.I.A.S.T.



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PETER COWMAN, B.Sc.Agr., M.A.I.A.S.T.
STEPHEN RICHARDSON, M. Appl. Sc., B.T.P., Grad. Dip. Env. Mgt, CPP, MPIA
STUART DIXON, B. Urb & Reg Plan, CPP, MPIA
COLIN STODDART, Cert. T.C.P. (NSW), Ass. Dip T.C.P.

Phone: (02) 4423 6198
(02) 4423 6199

Facsimile: (02) 4423 1569
Email: info@cowmanstoddart.com.au
Website: www.cowmanstoddart.com.au

The Holt Centre
31 Kinghorne Street
Nowra NSW 2541

Postal Address:
PO Box 738
Nowra NSW 2541

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Beach Management Plan

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1.0 INTRODUCTION

This draft Beach Management Plan has been prepared in support of a development application made on behalf of the Kioloa Beach Holiday Park which seeks to legitimise existing short term sites (caravans) and camping sites within the Kioloa Beach Holiday Park. The sites which are the subject of this application have been in existence for many years and no additional development or vegetation clearing is envisaged by this proposal.

The development application is a Major Project for the purposes of the Environmental Planning & Assessment Act and the Minister for Planning is the consent authority for the application. The Director-General of Planning issued requirements for the preparation of the Environmental Assessment that is required to accompany the development application.

The Director-General's requirements in part included a requirement for a Beach Management Plan to be prepared over the area of coastal foreshore along the frontage of the Kioloa Beach Holiday Park. The Beach Management Plan is required to identify and locate existing structures and public usage and proposed management options.

This document is a **draft** Beach Management Plan as it is anticipated that Plan will need to be modified following approval to incorporate modifications required by relevant government agencies. Such modifications would be incorporated into a final document.

2.0 BACKGROUND

At Kioloa, on O'Hara Head and surrounds, there is a variety of Crown reserves and undedicated Crown lands that are earmarked for rationalisation into a single reserve for the purposes of Public Recreation and Coastal Environmental Protection. Council is already responsible for management of some of the existing Crown reserves. The remainder of the Crown land has been managed by the New South Wales Department of Lands. A proposed new reserve covering all these individual reserves would be managed by Shoalhaven City Council through the Shoalhaven City Foreshore Reserves Trust.

The new Crown reserve is to be formed from an amalgamation of a variety of Crown reserves and undedicated Crown lands. The Crown land is to be reserved for the purpose of public recreation and coastal environmental protection. A land assessment under the Crown Lands Act was carried out in 1991. Shoalhaven City Council and the Department of Lands have prepared a Plan of Management for this reserve.

Whilst the O'Hara Head Reserve Plan of Management does not relate directly to the Kioloa Beach Holiday Park, Appendix 4 to the Plan addresses specific management issues that relate to the Kioloa Beach Holiday Park and its adjoining foreshore reserve. The following is an outline of these issues:

Sewage Effluent Disposal

The current holiday park operator has made significant improvements to both the quality and quantity of sewage effluent that is disposed of to absorption trenches in the reserve. The sewage effluent has been greatly improved in quality by construction of a new treatment facility in the holiday park. It has also been reduced in volume by effluent reuse.

Council environmental officers recently approved the upgrade to the sewage treatment and disposal system at the Kioloa Beach Holiday Park. A condition of the approval required that the system be operated without use of the northernmost trenches for a trial period to see whether or not they are required in the long term.

Maintenance

The proprietor of Kioloa Beach Holiday Park mows the grassy parts of the reserve, removes litter and removes unsafe limbs from trees. This could continue under license. There are also maintenance requirements for structures such as fences, bollards, signs and walking tracks.

Facilities / Showers

There are a number of freestanding shower heads on the grassy area behind the beach. Water to shower heads is provided by the Kioloa Beach Holiday Park. There is a wind sock that is used by helicopter pilots that land from time to time near the Coastal Patrol or elsewhere.

Use of Reserve by Kioloa Beach Holiday Park Patrons

In peak holiday times, patrons of the Kioloa Beach Holiday Park use the reserve east of the leased area intensively. Uses include relaxing and playing games, accessing beach, drying towels and clothes, etc. Some of this activity results in equipment such as seats, tables, barbecues, bicycles, hammocks, swings, washing lines, etc being spread through the reserve.

Whilst most of these uses are appropriate for a recreation reserve, there may be a tendency for some camp sites (though not tents) to spill out of the holiday park and exclusively occupy parts of the reserve. Equipment should not be “stored” in the reserve for the duration of patrons’ holidays.

Beach Access and Dune Protection

There is pedestrian access to Kioloa Beach at various points across the dune to the east of the holiday park. Patrons of the holiday park simply walk across the reserve from the park. For residents from the village of Kioloa access to the beach is freely available to the north of the holiday park and the park operator allows access through the main entry of the park. Residents of the village have apparently had informal access through the whole of the holiday park to the beach in the past, but this is no longer available.

The dune area between the ocean and the Kioloa Beach Holiday Park does not appear to be undergoing long term recession and there have been improvements to native vegetation management on the dune. However there are areas of localised vegetation loss and consequent erosion, particularly at Butlers Point. Currently, there is some control over which parts of the dune are used by people to access the beach, with some fencing, boardwalk and signage installed and maintained by the proprietor of the Kioloa Beach Holiday Park. Despite this limited control, people tend to use obvious tracks to the beach, some of which have structures associated with them and some of which do not. Some further rationalisation and rehabilitation of duplicated and unnecessary tracks, by installation of fencing, viewing platforms, walkways and revegetation is appropriate.

Weeds

There is a range of weed species present amongst the diverse native vegetation on the reserve. The infestations are not exceptional in relation to citywide trends.

Dumped Soil

Many piles of clay were dumped throughout the northern part of the reserve some time ago. Where left undisturbed, native vegetation has slowly begun to re-establish on this material. The cost and environmental disturbance that would be caused by an attempt to remove the clay are considered to outweigh any benefit that may be gained by their removal. However if some areas have vehicle access restricted then further stabilisation of the material could be achieved.

Northern Car Park

This is the area between the northern boundary of the Kioloa Beach Holiday Park and Butlers Creek. During summer, the area is heavily used as a car park and pedestrian access way for people going to Kioloa Beach.

The area is also used for parking by patrons of the Kioloa Beach Holiday Park. There are many dirt vehicle tracks and near the creek, it appears that people use the area for wheel spins and other unsafe and damaging driver behaviours. Uncontrolled vehicle and pedestrian access has led to vegetation damage, soil compaction and soil erosion. There is poor access for pedestrians with low levels of mobility and those with children in strollers.

In busy times, there could be some conflict between pedestrians and vehicles.

There is a need for some rationalisation and rehabilitation of duplicated and unnecessary vehicle tracks, by installation of bollards, with ripping of compacted soil and planting where necessary.

Creek Bank Erosion

In the northern part of the reserve there is a section of the bank of Butlers Creek that is subject to active erosion. This is caused by swimmers climbing up the bank from the creek. A rope swing was attached to a dead tree at this location but it has been removed. Revegetation of the creek bank and diversion of storm water away from the eroding area would be appropriate.

As required by the Director-General's requirements for the Environmental Assessment for the legitimisation of existing caravan and comp sites within the adjoining Kioloa Holiday Park, this draft Beach Management Plan has been prepared to address the issues raised by the Plan of Management as it relates to the Kioloa Beach Holiday Park and its adjacent foreshore reserve to Kioloa Beach.

3.0 VEGETATION COMMUNITIES

The EA is supported by a Flora & Fauna Assessment prepared by GAIA Research.

The vegetation communities identified by this assessment were:

- Forest Red Gum *Eucalyptus tereticornis* woodland;
- Bangalay *E. botryoides* forest on coastal sands;
- Swamp Oak *Casuarina glauca* forest and
- Exotic grassland.

Forest Red Gum *Eucalyptus tereticornis* woodland

According to GAIA Research this community has been extensively cleared within the south coast region. Within the Shoalhaven the community is a composite of various associations. These associations occur on various soil types (volcanic, clay and sandstone) and have a variety of associations with canopy and mid-canopy species. There is a need to clarify the distribution and floristic diversity within the various communities where Forest Red Gum is a key canopy species.

Lowland Grassy Woodland in the South East Corner bioregion is proposed for listing as an endangered ecological community under the *TSC Act (1995)*. In the Comprehensive Regional Assessment of southern New South Wales Thomas *et al.* (2000) define it as forest ecosystem 54.

Coastal Forest Red Gum forest is an open medium to tall forest, dominated by *Eucalyptus tereticornis*, with *E. botryoides* and *Angophora floribunda*. *Acacia mearnsii*, *Allocasuarina littoralis*, *Casuarina glauca*, *Exocarpus cupressiformis* and *Pittosporum undulatum* occasionally occur as small trees to 9 metres tall. The lower shrub understorey includes *Acacia longifolia var. sophorae* and *Bursaria spinosa*. The ground cover is dominated by *Imperata cylindrica* and *Lomandra spp.* With forbs including *Dichondra repens*, *Glycine clandestine*, and the fern *Cheilanthes sieberi*. Unfortunately at the study site according to GAIA Research the shrub and ground cover layers have been either removed or highly modified.

Bangalay *E. botryoides* forest on coastal sands

Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions is listed on the *TSC Act (1995)* as an endangered ecological community. This is the name given, according to GAIA Research, to the ecological community associated with coastal sand plains of marine or Aeolian origin. In the Sydney-South Coast region, this community includes 'Ecotonal

Coastal Hind Dune Swamp Oak-Bangalay Shrub Forest' (ecosystem 27) excluding those stands that are dominated by *Casuarina glauca* and 'Coastal Sands Shrub/Fern Forest' (ecosystem 28) of Thomas *et al.* (2000).

Bangalay Sand Forest of the Sydney Basin and South East Corner bioregions typically has a dense to open tree canopy, approximately 5 – 20 m tall, depending on exposure and disturbance history. The most common tree species include *Eucalyptus botryoides* (Bangalay) and *Banksia integrifolia* subsp. *integrifolia* (Coast Banksia), while *Eucalyptus pilularis* (Blackbutt) and *Acmena smithii* (Lilly Pilly) may occur in more sheltered situations, and *Casuarina glauca* (Swamp Oak) may occur on dunes exposed to salt-bearing sea breezes.

Much of this community has been removed from the foreshore reserve area. The remaining dune area according to GAIA Research comprises a mixture of this community, and Swamp Oak forest remnants.

Swamp Oak *Casuarina glauca* forest

Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions is listed on the TSC Act (1995) as an endangered ecological community. In the Comprehensive Regional Assessment of southern New South Wales (Thomas *et al.* 2000), this community includes 'Coastal Wet Heath Swamp Forest' (forest ecosystem 24), 'South Coast Swamp Forest' complex (forest ecosystem 25) and those parts of 'Ecotonal Coastal Swamp Forest' (forest ecosystem 27) dominated by *Casuarina glauca*. This forest was restricted to a small area around the ponds.

According to GAIA Research this community occurs along the banks (in a highly modified state) of Butlers Creek.

Annexure 1 is a copy of Annexure B from the Flora and Fauna Assessment Report prepared by GAIA Research detailing flora identified on the property.

Annexure 2 is a part copy of Appendix 2 providing a plant species list included in the O'Hara Head Reserve Plan of Management prepared by the Department of Lands and Shoalhaven City Council.

4.0 THE DRAFT BEACH MANAGEMENT PLAN

Figure 1 identifies the Kioloa Beach foreshore reserve adjacent the Kioloa Beach Holiday Park. The plan supports this draft Beach Management Plan.

The Plan delineates five (5) separate areas within the foreshore reserve which require specific measures to be undertaken. This section of the draft Beach Management Plan addresses each of the five (5) areas separately.

4.1 AREA A

Issues

Area A is the most south-easterly site situated within the foreshore reserve. Two old walking tracks to the beach within this area have already been closed and revegetation has taken place. This area contains two existing boardwalks (one situated on the southern periphery of the area). (Refer **Plate 1**.)



Plate 1: View of existing timber boardwalk providing access to beach through dune area.

The main issue with this portion of the foreshore reserve is the spread / infestation of grass (kikuyu) as an understorey plant. As a result the native dune understorey vegetation has diminished.

Objective

The removal of kikuyu grass and the revegetation of the understorey with indigenous native plant species to re-establish the natural dune vegetation so as to:

- maintain and improve the visual amenity of this area;
- rehabilitate and stabilise disturbed areas of the reserve;
- eradicate weeds.

Actions

- In order to minimise disturbance to a large section of the dunal system, it is proposed that the kikuyu infestation should be removed and revegetation should be undertaken. Small discrete areas within this area should be treated at any one time to prevent excessive disturbance to the dune system.
- Each area infested by kikuyu to be revegetated should be fenced off to preclude access prior to revegetation works commencing. Fencing should consist of 1200 mm high treated pine and rail / wire.
- The existing kikuyu grass cover is to be removed. A cover of either mulch or jute matting is to be placed over the area to be revegetated.
- The affected area is to be revegetated using a combination of colonising plants such as *Isolepis Nodosa*, *Juncus spp.* or *Lomandra longifolia* *Acacia sophorae*, *Leptospermum laevigatum*, *Banksia integrifolia* and *Leuopogon parviflorus*. Plants are to be planted on a one (1) metre centre grid basis.
- On-going monitoring of the area to remove further weed infestation.

4.2 AREA B

Issues

Area B is situated immediately to the north of Area A. Three informal walking tracks are situated within this area. As with Area A this area also suffers from infestations of kikuyu grass into the understorey of the dune vegetation.

A small portion of this area has previously been fenced off and undertaken revegetation works.

Objective

The rehabilitation of disturbed areas and the revegetation of the understorey with indigenous native plant species to re-establish the natural dune vegetation so as to:

- maintain and improve the visual amenity of this area;
- eradicate weeds;
- rationalise pedestrian access to prevent further disturbance to the dune system by rationalising the number of walking tracks through this area;
- rehabilitate and stabilise disturbed areas of the reserve.

Actions

- Informal walking tracks noted as T1 and T2 as identified on **Figure 1** are to be closed off to public access. The closure of these tracks is to be undertaken with fencing. Fencing should consist of 1200 mm high treated pine and rail / wire.
- The disturbed tracks are to be protected with a cover of mulch or jute matting.
- The affected area is to be revegetated using a combination of colonising plants such as *Isolepis Nodosa*, *Juncus spp.* or *Lomandra longifolia*, *Acacia sophorae*, *Leptospermum laervigatum*, *Banksia integrifolia* and *Leuopogon parviflorus*. Plants are to be planted on a one (1) metre centre grid basis.
- Informal walking track noted as T3 on **Figure 1** is to be upgraded with a timber boardwalk similar to those existing board walks constructed along the foreshore reserve.
- Each area infested by kikuyu to be revegetated should be fenced off to preclude access prior to revegetation works commencing. Fencing should consist of 1200 mm high treated pine and rail / wire.
- The existing kikuyu grass cover is to be removed. A cover of either mulch or jute matting is to be placed over the area.
- The affected area is to be revegetated using a combination of colonising plants such as *Isolepis Nodosa*, *Juncus spp.* or *Lomandra longifolia*, *Acacia sophorae*, *Leptospermum laervigatum*, *Banksia integrifolia* and *Leuopogon parviflorus*. Plants are to be planted on a one (1) metre grid basis.
- On-going monitoring of the area to remove further weed infestation.

4.3 AREA C

Issues

Area C is situated immediately to the north of Area B. This area has experienced significant loss of dune vegetation and contains three informal walking tracks. Dunal

vegetation has all but been removed and the area has a cover of introduced grass (kikuyu).

Objectives

The rehabilitation of disturbed areas and the revegetation of the understorey with indigenous native plant species to re-establish the natural dune vegetation so as to:

- maintain and improve the visual amenity of this area;
- eradicate weeds;
- restrict pedestrian access to prevent further disturbance to the dune system by rationalising the number of walking tracks through this area;
- rehabilitate and stabilise disturbed areas of the reserve;
- revegetate and restore dune vegetation

Actions

- Informal walking tracks noted with “T” as identified on **Figure 1** are to be closed off to public access. The closure of these tracks is to be undertaken with fencing. Fencing should consist of 1200 mm high treated pine and rail / wire.
- The disturbed tracks are to be protected with a cover of mulch or weed prevention matting.
- The affected area is to be revegetated using a combination of colonising plants such as *Isolepis Nodosa*, *Juncus spp.* or *Lomandra longifolia*, *Acacia sophorae*, *Leptospermum laevigatum*, *Banksia integrifolia* and *Leuopogon parviflorus*. Plants are to be planted on a one (1) metre grid basis.
- The informal walking track comprising a simple chain and timber path is to be removed and upgraded with a timber boardwalk similar to those existing board walks constructed along the foreshore reserve.
- The remaining area within this area which is covered by kikuyu should be fenced off to preclude access prior to revegetation works commencing. Fencing should consist of 1200 mm high treated pine and rail / wire.
- The existing kikuyu grass cover is to be removed. A cover of either mulch or jute matting is to be placed over the area.
- The affected area is to be revegetated using a combination of colonising plants such as *Isolepis Nodosa*, *Juncus spp.* or *Lomandra longifolia*, *Acacia sophorae*,

Leptospermum laervigatum, *Banksia integrifolia* and *Leuopogon parviflorus*. Plants are to be planted on a one (1) metre grid basis.

- On-going monitoring of the area to remove further weed infestation.

4.4 AREA D

Issue

Area D comprises an area situated along the banks of Butler Creek within proximity of the creeks entrance to the foreshore area. A small area within the foreshore vegetation has lost its shrub understorey and is now infested with kikuyu grassland.

Objectives

The rehabilitation of the kikuyu infested foreshore and the revegetation of the understorey with indigenous native plant species to re-establish the natural riparian vegetation along this creek so as to:

- maintain and improve the visual amenity of this area;
- eradicate weeds;
- restrict pedestrian access to prevent further disturbance to the riparian vegetation and creek banks;
- rehabilitate and stabilise disturbed areas of the reserve;
- revegetate and restore riparian vegetation

Actions

- The area infested by kikuyu should be fenced off to preclude access prior to revegetation works commencing. Fencing should consist of 1200 mm high treated pine and rail / wire.
- The existing kikuyu grass cover is to be removed. A cover of either mulch or jute matting is to be placed over the area.
- The affected area is to be revegetated using a combination of colonising plants such as *Isolepis Nodosa*, *Juncus spp.* or *Lomandra longifolia*, *Acacia sophorae*, *Leptospermum laervigatum*, *Banksia integrifolia* and *Leuopogon parviflorus*. Plants are to be planted on a one (1) metre grid basis.
- Ongoing monitoring of the area to remove further weed infestation.

4.5 AREA E

Issues

Area E comprises the informal northern car park area situated between the Kioloa Beach Holiday Park and Butlers Creek. This area has suffered from the following:

- Dumped Soil

Piles of clay were dumped throughout the northern part of the reserve some time ago. Where left undisturbed, native vegetation has slowly begun to re-establish on this material. According to the O'Hara Plan of Management the cost and environmental disturbance that would be caused by an attempt to remove the clay is considered to outweigh any benefit that may be gained by their removal. However if some areas have vehicle access restricted then further stabilisation of the material could be achieved.

- Northern Car Park

This is the area between the northern boundary of the Kioloa Beach Holiday Park and Butlers Creek. During summer, the area is heavily used as a car park and pedestrian access way for people going to Kioloa Beach. The area is also used for parking by some patrons of the Kioloa Beach Holiday Park.

There are many dirt vehicle tracks near the creek, and it appears that people use the area for wheel spins and other unsafe and damaging driver behaviour. It should be noted that this area is used by the broader general public; and not solely patrons of the Holiday Park. Uncontrolled vehicle and pedestrian access has lead to vegetation damage, soil compaction and soil erosion (refer **Plate 2**). There is poor access for pedestrians with low levels of mobility and those with children in strollers.

In busy times, there could be some conflict between pedestrians and drivers.

There is a need for some rationalisation and rehabilitation of duplicated and unnecessary vehicle tracks, by installation of bollards, with ripping and planting where necessary.

- Creek Bank Erosion

In the northern part of the reserve there is a section of the bank of Butlers Creek that is undergoing unnatural erosion (refer **Plate 3**). This has been caused by swimmers climbing up the bank from the creek. A rope swing was attached to a dead tree at this location but it has been removed. The tree has now collapsed into the creek

(refer **Plate 4**). Revegetation of creek bank and diversion of storm water away from eroding area would be appropriate.



Plate 2: View of “Northern Car Park” area adjacent to Kioloa Beach Holiday Park. Note compacted ground denuded of vegetation.



Plate 3: View of eroded bank along Butler Creek.



Plate 4: View of tree that has collapsed into creek.

Objectives

The rationalisation and the rehabilitation of the informal vehicle tracks throughout this area and the revegetation of the understorey with indigenous native plant species to re-establish the natural riparian vegetation along this creek so as to:

- maintain and improve the visual amenity of this area;
- eradicate weeds;
- restrict vehicle access to prevent further disturbance to the riparian vegetation and creek banks;
- rehabilitate and stabilise disturbed areas of the reserve;
- revegetate and restore riparian vegetation

Actions

- In order to rationalise vehicle tracks through this area it is proposed that treated pine bollards and rail / wire fencing (1200 mm) high) be placed directly across the reserve in the location shown of **Figure 1**. This would preclude vehicle access to that portion of this reserve which has suffered from uncontrolled vehicle access.

This area has become largely denuded of vegetation, compacted and is experiencing soil erosion.

- Once the area has been fenced off, the denuded compacted areas should be lightly tilled to break up the compacted top soil without mixing the lower clay soils into the topsoil.
- This area is then to be mulched, and left for natural vegetation regeneration of this area to occur.
- On-going monitoring is to be undertaken to eradicate weed growth as it occurs.
- The eroded portion of the bank is to be fenced off to prevent access to the public. Fencing should consist of 1200 mm high treated pine and rail / wire.
- A small earth berm is to be placed above this section of the bank to redirect surface runoff away from the eroded site.
- The tree that has collapsed into the creek is to be retained to provide a marine habitat.
- The eroded bank of the creek is to be re-shaped to create a gentle batter (3 horizontal: 1 vertical). This batter slope is to be topsoiled and mulched.
- The area is to be revegetated using a combination of colonising plants such as *Lomandra longifolia*, *Acacia sophorae*, *Leptospermum laevigatum*, *Banksia integrifolia* and *Leuopogon parviflorus*. Plants are to be planted on a one (1) metre grid basis.
- The fencing around this area is to be retained until such time as the area is revegetated.

4.6 WEED CONSTROL STRATEGY

The main weed on the foreshore reserve is kikuyu grass which has prevented native vegetation from becoming established.

It is intended to spray the kikuyu with Roundup herbicide (Glyphosate) when the grass is actively growing. The site will not be disturbed for 3 – 4 weeks to allow the herbicide to be translocated to the root system and for the grass to die off.

The herbicide should be applied from a backpack at a dilution with water of 100:1. Operators should have some understanding of safety procedures and should be supplied with gloves, overalls and disposable respirators.

The dead grass will then be physically removed and the land prepared for planting tube stock of native species.

Prior to planting the area is to be mulched (minimum 100 mm) or jute matting.

4.7 GENERAL MANAGEMENT OF FORESHORE RESERVE AREA

- The southern effluent disposal trenches are to be decommissioned in accordance with the recommendations of the “*Report on Sewage Management*” prepared by Pacific Engineering & Management dated 13th February 2007.
- The existing grassed areas of the reserve area is to be continued to be maintained (mowed) by the Kioloa Beach Holiday Park proprietor as is currently the case. Mowing however is to be limited to existing grassed areas and is to be restricted from those dune areas that are to be revegetated and regenerated under this Beach Management Plan.
- The foreshore reserve area is not to be used for camping activities or associated storage of camping equipment associated with the adjoining Kioloa Beach Holiday Park operations. In this regard small signs are to be posted are to be erected every 50 metres along the timber fencing delineating the edge of the Kioloa Beach Holiday Park and the adjoining foreshore reserve instructing patrons to not place camping items within the reserve. Patrons are also to be advised of this requirement when booking in. Kioloa Beach Holiday Park management are to actively discourage the use of the adjoining foreshore reserve for camping and associated activities

5.0 IMPLEMENTATION

The responsibility for ensuring the recommendations of the Draft Beach Management Plan are implemented will be the owner/leaseholder of the Kioloa Beach Holiday Park. It is proposed that a clause to this effect will be attached as a condition of sale when the lease is sold or transferred.

Areas A – D

It is envisaged that works will be carried out in stages, with work carried out mainly during winter months. It is proposed that within each section a length of approximately 75 metres would be carried out per annum with all works associated with these areas completed within 48 months of development approval.

Mulching of the revegetated areas is envisaged to be on-going.

Initial removal of Kikuyu and revegetation would centre on the access tracks that are proposed to be closed.

Area E

It is envisaged that the bollard/fence to be erected in this area would be completed within six (6) months of development approval. Light ripping and mulching of this area would be undertaken simultaneously with the erection of the fencing/bollards.

The area is then proposed to be left for 12 months to naturally regenerate.

The re-shaping of the eroded creek bank would also be expected to be initially undertaken when the light ripping of the adjacent area is undertaken. Revegetation of the re-shaped batter is to be undertaken upon completion of reshaping of the buffer.

6.0 MONITORING TO SUBSTANTIATE SATISFACTORY COMPLETION/PROGRESS

The following criteria will be used to substantiate whether the recommendations of the Draft Plan of Management have been satisfactorily completed.

For every 12 months following works in each area a review is to be undertaken by Park Management to assess the following:

1. Whether all physical structures (boardwalk, bollards) are still in place and if in good condition. If not these structures are to be replaced.
2. Whether all plantings have established. If plants have not established – replant.
3. A review will need to be undertaken to ensure that there is no weeds establishing. If weeds are re-establishing the measures outlined in Section 4.6 are to be repeated.
4. A check that all ground works/ground cover (ie. mulch or jute matting) are still in good condition. A check should also be undertaken to ensure there is no evidence of soil erosion occurring. If ground cover is insufficient additional cover is to be undertaken.

Following each monitoring a report is to be submitted to the Department of Planning and Shoalhaven City Council detailing the results of the monitoring undertaken; and any rectification works that have been required to be carried out.

FIGURES

FIGURE 1

Draft Kioloa Beach Reserve Beach Management Plan

ANNEXURES

ANNEXURE 1

Extract – Appendix B
Flora & Fauna Assessment

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