

Sarina Coastal Sustainable Landscapes Project

Campwin Beach



Protection and Rehabilitation of Sarina Beaches Coastline



Supported by BHP Billiton Mitsubishi Alliance (BMA)





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1.0 Introduction

Coastal management and rehabilitation works will be undertaken by council staff at Campwin Beach from July 2007 to June 2010 as part of the *Sarina Coastal Sustainable Landscapes Project*.

The works will implement, but are not limited to, priority actions identified in the *Sarina Beaches Management Guidelines for Coastal Zones* (Sarina Shire Council, 2006) with the aim to 'improve the environmental condition of the esplanades and dunes associated with each of the populated Sarina Shire beaches'. The recommendations in the guidelines were based on monitoring the condition of the foredunes in the Sarina beaches which found that the environmental condition of most beaches requires urgent improvement. A copy of the guidelines is available at

http://www.sarina.qld.gov.au/SLCMA_COASTAL_MANAGEMENT_GUIDELINES.pdf or follow the links to the project on www.mwnrm.com.au.

Coastal management is defined as 'the protection, conservation, rehabilitation, management and ecologically sustainable development of the coastal zone' under Queensland's *Coastal Protection and Management Act 1995*. This project will implement best management practices to address the key issues of: dune vegetation zonation and complexity; vegetative waste; beach access; weeds and non-native vegetation; erosion; wildlife and turtle nesting.

The project is delivered by Sarina Shire Council (Mackay Regional Council) in partnership with Sarina Landcare Catchment Management Association (SLCMA) & Mackay Whitsunday Natural Resource Management Group (MWNRM) with generous support of BHP Billiton Mitsubishi Alliance (BMA). More information on the project is available by following the links to the project on www.mwnrm.com.au.

2.0 Scope of Works

The rehabilitation and enhancement plan applies to the coastal esplanade between the rocks of Leper Reef at the southern end and extends to the rocky headland at the northern end of the beach (refer to Figure 1a – Zone A). The project includes the council-managed Reserve for Beach Protection located between Sarina Beach and Campwin Beach which supports significant mangrove and saltpan (samphire) vegetation (refer to Figure 1b – Zone B).



Project activities include:

- Revegetation along esplanade with native species to support dune structure and enhance coastal vegetation buffer against storm events. Emphasis will be placed on thickening areas where coastal vegetation has been cleared in addition to larger plantings on areas of esplanade where there is no adjacent houses.
- Juvenile coconuts will be removed as part of the project to reduce further issues associated with buildup of vegetative waste. Further, council may decide to remove selected mature coconuts where desired, but will not undertake broad-scale removal of mature coconuts
- Interpretive turtle nesting signage will be installed at a walkway on the foreshore.
- Review and modify street and residential lighting to protect turtle nesting areas as nesting turtles and hatchlings can be disturbed and disorientated by lights.
- Throughout the project, ongoing maintenance of the foreshore will be undertaken to minimise weed infestations and facilitate re-establishment of native vegetation.
- Fencing to restrict unauthorized vehicle access to saltpans
- Installation of regulatory signage (vehicular access restrictions)
- Coastal fencing will be constructed along the sandy dune sections of the Campwin Beach esplanade to rationalize public access, protect dunal vegetation and restrict area of maintained lawns

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Figure 1a – Aerial Photo Zone A Campwin Beach Esplanade and dunes

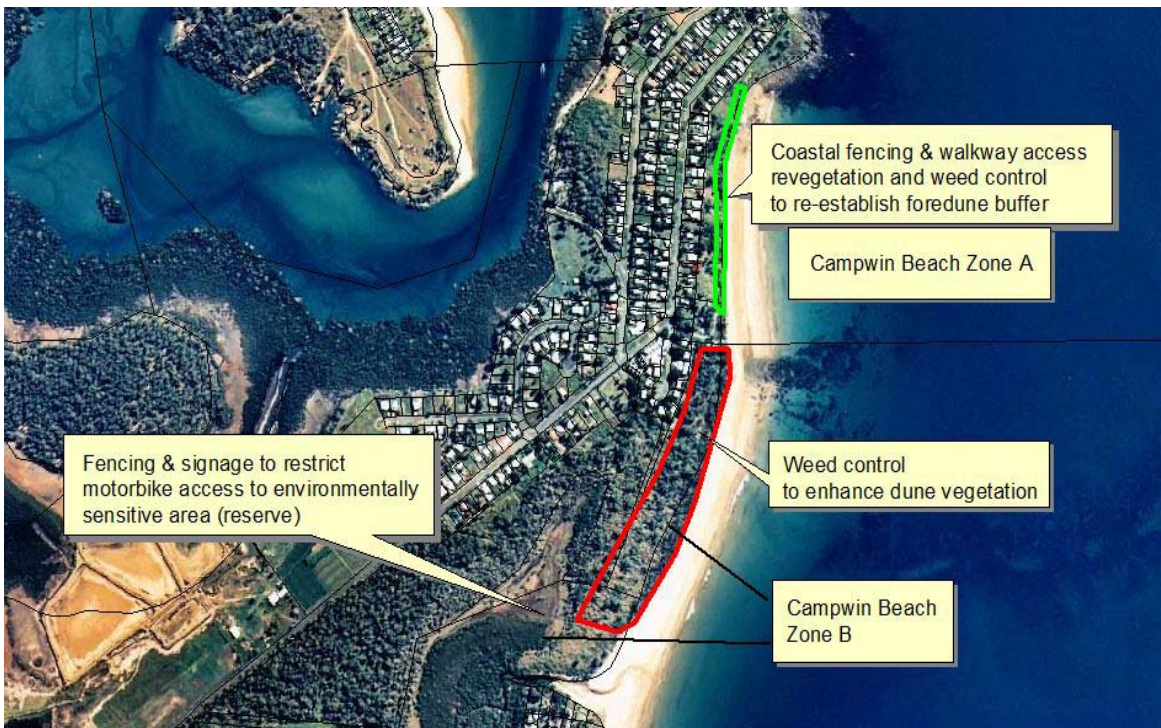


Figure 1b - Zone A & B including scope of works

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3.0 Site Description

The following information for Campwin Beach is from the *Sarina Beaches Management Guidelines for Coastal Zones* (2006).

- Extensive mown lawn to dunes areas are preventing natural regeneration to occur and leads to a monoculture of garden couch.
- Natural foredunes should have distinct zones of vegetation. In some areas there is good zonation, however the majority of Campwin Beach has reduced woody vegetation on the landward dune edge and an absence of shrubs.
- Esplanade and council reserves are heavily impacted by a high number of weed species which suppress regeneration of native species and dominate areas to the exclusion of native species.
- Lantana (*Lantana camara*) and prickly pear (*Opuntia stricta*) are both present at Campwin Creek and are declared weeds which are targeted for removal.
- Environmental weeds such as Guinea grass (*Panicum maximum*) and couch (*Digitaria eriantha*) are also present and pose a fire risk due to the large flammable fuel loads they create.
- Dune forest contained in the council reserve is a naturally restricted community vulnerable to weed invasion and hot fires. It contains regenerating beach scrub (dunal rainforest) which is important habitat for a large number of fauna species.
- Dense mature coconuts & associated build up of waste impacts on aesthetics and provides habitat for vermin. Some juvenile coconuts are growing on esplanade.
- Recent fire has killed mature Casuarinas along a section of foreshore.
- A patch of revegetation on the southern end of beach was undertaken with a coastcare grant by the local progress association and includes fencing, sand ladder construction and weed control. This is a great model for coastal restoration and the current project builds upon it's success.

4.0 Rehabilitation Treatment

A number of broad treatments will be used within the Campwin Beach coastal esplanade (Refer to *Table 1* below). Retention and restoration of native vegetation is the most important factor in maintaining dune structure and biodiversity and allows beaches the best protection against erosion under adverse conditions.



Table 1: Restoration techniques to be used at Campwin Beach Coastal Esplanade

Techniques	Comment
Natural regeneration	<i>Encouraging the natural regeneration of native species is the best method for restoration of an area. For this to occur a viable seed bank must be present, and re-growth must include all native plant species from each stratum level. In areas where natural regeneration is to occur, mowing will be stopped and the area clearly marked for exclusion from pedestrians and public. In these areas, ongoing maintenance is required to minimise re-growth of weed species.</i>
Revegetation	<i>Where planting, local native vegetation is required due to insufficient cover or re-growth of native species. Local native species will be sourced and replanted within an area as per density guide. Correct soil and bed preparation techniques will be carried out prior to planting and ongoing maintenance of the site will be undertaken.</i>
Staged weed removal	<i>Weed removal will be carried out in a staged approach. Particularly useful in removal of non-native vegetation along the dune scarp. Large woody weeds will be removed slowly to ensure the replaced native vegetation provides sufficient habitat value and protection against erosion before more removal of woody weeds.</i>
Physical weed removal	<i>Physical weed removal, including hand pulling, chipping or cutting weeds is effective in small infestations in environmentally sensitive areas.</i>
Mechanical weed removal	<i>Mowing or brush cutting will suppress weed growth, discourage seeding and spread. This method will be used particularly in areas bordering large infestations. Care will be taken to reduce potential disturbance as excessive mowing and brush cutting can facilitate further weed growth and reduce regeneration of native vegetation.</i>
Herbicide weed removal	<i>The application of herbicides will include foliage or basal spraying, cut/paste & stem injection where applicable. Spraying may be carried out on large or robust weed infestation, particularly to gain initial control of an infestation. However the majority of spraying will be small scale 'spot spray' applications to minimise non-target impacts Roundup Bi-active® will be the most common herbicide used due to its low toxicity to wildlife and humans.</i>

4.1 Weed Management

Zone A - The esplanade contains numerous environmental weeds and non-native vegetation that is preventing the natural regeneration process to occur. Weeds within the site will be removed through a staged approach, with erosion potential and site fragility being the overriding principles. The strategy is to reduce and contain weed infestations and to facilitate natural regeneration of native species.



Weed control will involve both manual (e.g. hand pulling, brush cutting) and chemical methods until the seed stock is depleted or native vegetation has established to prevent weed re-growth. To reduce the incidences of erosion in dune areas, it is important to maintain vegetative cover. To meet this objective, some treated weeds will be left on site to enhance the regeneration process. No weeds will be removed on the frontal dune scarp without direct replacement with native species.

Chemical control will primarily involve using *Roundup Bi-active*® due to its low toxicity to wildlife and humans and rapid breakdown once applied. As native plants re-establish, the area will be checked for other environmental weeds and treated if necessary.

Weeds will be managed by the Council Beach Team for the duration of the project to ensure sites are well maintained and then by volunteers and Parks and Gardens staff under their operational works schedule.

Dumping of garden waste is an on-going concern at Campwin Beach and can introduce further environmental weeds into sensitive coastal vegetation. Council will enforce local laws prohibiting the dumping of waste and target dumping 'hotspots' to stop the practice.

Zone B - The salt pan area does not have a major weed problem as the saline ground layer prevents weed establishment. However the fringing freehold land and esplanade supports native vegetation that is infested with weeds and permission from the landowner will be sought to control weeds in selected high value areas.

The foredunes in Zone B are degraded as a result of past clearing and disturbance and are targeted for weed control. In particular Lantana, guava and other environmental weeds will be treated to facilitate natural regeneration of native coastal vegetation. The treated weeds will be left on-site to ensure there is cover whilst the native dune vegetation is re-established.



Table 2. Weed species identified from Sarina Shire Beaches	
Botanical Name	Common Name
Trees	
<i>Cocos nucifera</i>	coconut palm
<i>Mangifera indica</i>	mango
Shrubs	
<i>Euphorbia cyathophora</i>	painted spurge
<i>Lantana camara</i>	lantana – DECLARED*
<i>Leucaena leucocephala</i>	leucaena
<i>Macroptilium atropurpureum</i>	siratro
<i>Protasparagus</i> sp.	asparagus fern
Forbs	
<i>Achyranthes aspera</i>	chaff-flower
<i>Agave</i> sp	yucca
<i>Aloe</i> sp	Aloe
<i>Apocynaceae</i> sp.	periwinkle
<i>Bidens pilosa</i>	cobbler's pegs
<i>Bryophyllum</i> sp	mother of millions
<i>Conyza</i> sp.	fleabane
<i>Gazania</i> sp.	gazania
<i>Gomphrena celosioides</i>	gomphrena weed
<i>Mimosa pudica</i>	sensitive plant
<i>Opuntia stricta</i>	prickly pear – DECLARED*
<i>Sansevieria trifasciata</i>	mother-in-law's tongue
<i>Stachytarpheta jamaicensis</i>	light blue snakeweed
<i>Stylosanthes</i> sp.	
<i>Fabaceae</i> sp. 1	thistle
<i>Wedelia trilobata</i>	Singapore Daisy
Grasses	
<i>Cenchrus ciliaris</i>	buffel grass
<i>Cynadon nlemfuensis</i>	African stargrass
<i>Digitaria eriantha</i>	couch
<i>Panicum maximum</i>	guinea grass
<i>Panicum maximum</i> var. <i>triaglume</i>	
<i>Brachiaria mutica</i>	para grass
Vines	
<i>Passiflora foetida</i>	stinking passion flower
<i>Passiflora suberosa</i>	corky passion flower

Source: Sarina Shire Beach Management Guidelines for Coastal Zones; SLCMA Pers Comm.

* Declared plants under the [Land Protection \(Pest and Stock Route Management\) Act 2002](#)

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4.2 Natural Regeneration

Native vegetation plays an important role in the formation and stabilization of coastal areas with the root systems of native species more suited to stabilizing coastal areas.

Natural regeneration of *Casuarina equisetifolia* (horsetail she oak) has taken place along some areas of the esplanade and appears to have provided a good seed stock for future establishment.

The council reserve has good regeneration of native canopy trees and beach scrub pioneer species as it has not experienced fire for several years.

Targeted weed control is aimed at facilitating the natural regeneration process.

4.3 Revegetation

All of the species selected are local indigenous coastal species, and will follow as close as practical to the natural vegetation succession inherent in this coastal zone.

4.3.1 Planting

Plant species used within this site have been identified from field studies of the native vegetation still remaining within this site and other sites within the local area and as per recommendations in the *Sarina Beaches Management Guidelines for Coastal Zones*. The plants for this site will be a mixture low growing shrubs, groundcovers and trees and will be installed as tube stock.

Table 4: Selected Species for Revegetation at Campwin beach

Species Name	Common Name	Numbers
<i>Casuarina equisetifolia</i>	Horsetail she-oak	280
<i>Clerodendrum inerme</i>	Scrambling clerodendrum	100
<i>Vitex trifolia</i>	Coastal Vitex	100
<i>Hibiscus tiliaceus</i>	Native Hibiscus	45
<i>Cupaniopsis anacardioides</i>	Tuckeroo	45
<i>Scaevola sericea</i>	Sea Lettuce	40
<i>Pandanus sp.</i>	Pandanus	45
<i>Clerodendrum floribundum</i>	Lolly Bush	45
	Total	700



4.3.2 Planting Density

The table below will be used as a guide for planting density. Under different circumstances this may be altered to accommodate needs within the site

Growth Form	Planting Density
Coastal Dunes	1 tree every 4m
	1 shrub every 2-3m
	1 groundcover every 1-2m

Ground covers will be used to run down dune scarp with the purpose of trapping and stabilizing windblown sand. A filtered buffer will be established within this zone using trees and shrubs for the protection of plantings landward of this zone.

Where mortalities of planted tube stock occur, they will be replaced with similar species consistent with the planting tables.

4.3.3 Plant Nutrition

Coastal vegetation does not require a high level of nutrition so a regular fertilizer program is not recommended. Plants will receive *Terracottem*® upon planting (a physical soil conditioner enriched with fertilizers and a root growth starter compound, designed to improve the water and nutrient retention capacity, structure, aeration, quality and performance of growing media).

4.3.4 Water Schedule

Plants will receive adequate water for establishment and monitored by beach team to improve survival rate. Watering will be conducted by Beach Team for duration of the project as needed and by Parks and Gardens staff in accordance with Council water restriction policy.

5.0 Fencing and Beach Access

Zone A -To reduce erosion and destruction of sand dune vegetation the beaches should only be accessed at designated points by appropriately designed tracks and sand ladders.

Bollard fencing (a 600mm high, post and rail fence) will be installed along a 450m section of the esplanade from the existing fence on the southern end of the beach and incorporate existing beach access walkways. This will provide a vegetation zone defining the revegetation area, limiting mowing to edge of dune and define pedestrian access through this sensitive area.

An additional beach access walkway will be installed to provide entry mid-way along the esplanade and native vegetation will be established adjacent to



walkway to support dune structure. No formalised pathways will be constructed on the landward side of the Esplanade.

Zone B - A post and rail fence will be erected in strategic areas along the saltpan area south west of Campwin Beach to prevent unauthorized motor vehicle and motor cycle access to this sensitive area. Signage stating motor vehicles prohibited will be erected at all entrances to the saltpan. (see figure 3)

6.0 Minor Earthworks

In collaboration with Council, work will be undertaken to prevent further erosion on a drain at the northern end of the beach. A rock gabion stepped down the drain to slow the flow and contribute to the stabilisation of this area, a pit will be installed at the top of the drain to collect storm water from residences. Trees and shrubs will be planted along the bank of the drain to help stabilise this area.

7.0 Signage

Interpretive/educational signage regarding marine turtle nesting will be installed in an appropriate position on the Esplanade (figure 2 below).

Marine turtles - sharing our shores

Marine turtles use this beach during the nesting and hatching season from October to March

Marine turtles first appeared during the age of the dinosaur and have often been called the ancient mariners of the sea. All marine turtles face serious threats to their survival and are most vulnerable during the nesting and hatching stages.

Six of the world's seven species of marine turtle live and feed in waters off the Queensland coast. Flatback, Green and endangered Loggerhead turtles nest on mainland beaches and offshore islands in the central Queensland coast region.

Female turtles come ashore only to lay eggs, which hatch and begin the turtle life cycle anew.

Green Turtle
Chelonia mydas
Large turtles with high-domed olive green carapaces. Females lay up to five clutches of more than 100 eggs each season.

Flatback Turtle
Nesotheria macrotis
Has a low-domed, olive grey carapace with up-turned edges. The Flatback nests only on Australian beaches and is our region's most abundant nesting turtle.

Turtles are easily disturbed by light, noise and movement

- Observe turtles *quietly* from a distance.
- Avoid shining lights directly on turtles.
- Let hatchlings *make their own way* across the beach to the ocean.
- Dogs can frighten and chase turtles. Please keep dogs under control.
- When boating, look out for turtles and avoid collisions.
- Vehicles and motorbikes are requested to stay off beaches and dunes.

Marine turtles are protected under the Queensland Nature Conservation Act 1992. Penalties apply for interfering with or harming them.

TO REPORT DEAD OR STRANDED TURTLES: RING THE MARINE STRANDINGS HOTLINE ON 1300 130 372

Australian Government, NRM, Mackay Regional Council, Queensland Government Environmental Protection Agency, Queensland Parks and Wildlife Service.

A Mackay & District Turtle Watch Assoc Initiative

Figure 2 Turtle interpretive sign developed for the project in partnership with Mackay & District Turtle Watch Association Inc.



Signage will be erected in Zone B (*figure 3 below*)



Figure 3 Environmentally Sensitive Area Sign

8.0 Turtle-Friendly Lighting

A monitoring survey of street & residential lighting will be undertaken to identify lighting hazardous to nesting marine turtles & hatchlings. Once identified, consultation with stakeholders will be carried out to identify and implement solutions.

9.0 Community Involvement

It is envisaged that Council will encourage residents (& community groups) at Campwin Beach to become involved with on-ground activities, whether through the development of a community rehabilitation plot, or on areas adjacent to private property.

Sarina Landcare will facilitate formation of a Coastcare volunteer group of local residents and provide support for ongoing vegetation and biodiversity management practices.

10.0 Monitoring and Maintenance

The Beach Team will monitor and maintain the area for the duration of the project with the main focus on vegetation establishment and weed suppression. This site will be maintained by Parks and Gardens Staff under their operational works schedule.

Where mortalities of planted tube stock occur, they will be replaced with similar species consistent with the planting tables.



Monitoring will be undertaken periodically using the methods outlined in the *Sarina Beaches Management Guidelines for Coastal Zones* (Sarina Shire Council, 2006) to assess the effectiveness of on-ground works in improving the condition of esplanades and dunes at the Sarina beaches.

11.0 Exclusions

Park facilities and designated open spaces are excluded from plan.

Large scale mature coconut tree removal is excluded from this plan, however council may decide to remove selected trees.

Council will not provide walkways on inland edge of esplanade to join with all access points.