REVIEW OF ENVIRONMENTAL FACTORS

NOTE: This Review of Environmental Factors (REF) is for projects that have minor and predictable impacts, and require a Part 5 assessment under the EPA Act 1979.

Instruction to users of this template:

Where requested to Click here to enter text and no response is required, please enter 'NA'.

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INTRODUCTION

Project name:	Main and Clarkes Beach Dune Recovery Project	**Project number:**	PM22_1301

Project budget: $175,380

Work order number: W2757.212 Beach Access W2757.433 Project Management

Project manager: Chloe Dowsett / Malcolm Robertson

CONSTRUCTION WORK MUST NOT COMMENCE UNLESS:

- The person completing this REF has signed the completed document, verifying that each of the steps has been satisfied and no further assessment or investigation is required; AND
- The Determining Officer has signed the completed document to verify that the assessment has been adequately completed, the conclusion as to the likely environmental impact of the project is reasonable, and the project can proceed subject to relevant control measures and conditions in any approval, licence or permit; AND
- Prior to the project commencing the required approvals, licences and permits have been obtained as outlined in Section 5; AND
- All relevant construction personnel are aware of:
  - The project details in Section 1
  - The project's environmental impacts in Section 6
  - The project's specific control measures in Section 6
  - The conditions in any approval, licence or permit in Section 5
  - Their responsibilities detailed in this REF.

NOTE: If any environmental issue is identified or if any environmental control measure is required, the following is to occur:

- Where a construction drawing is prepared as part of the construction work pack, the environmental control measures should be listed in the schedule on that drawing and/or the CEMP
- For more complicated projects the environmental control measures should be included in a project-specific construction and environmental management plan.

NOTE: If any approval, licence or permit is required then copies of these MUST be included in the construction work pack that is submitted to the Construction Manager for the project.

NOTE: Projects may require a more detailed assessment of particular issues (eg a specialist ecology or heritage report). In these cases, this document should accompany this REF as an appendix, and the findings should be considered in the assessment and identification of control measures.

NOTE: Some minor projects are exempt development. There is a separate checklist to be completed if you think your project is exempt. Where the project meets the exempt criteria and the exempt criteria checklist has been completed, a REF is not required.

NOTE: Projects requiring a Part 4 planning approval require a Statement of Environmental Effects and approval from Council. DO NOT USE this REF template for these matters. For further details of assessing whether a project is exempt development or requires approval under Part 4, refer to relevant flow charts.

Section 1 PROJECT DETAILS

NOTE: Prior to completing this REF a site inspection is to be undertaken by the officer completing the assessment.

1.1 Site inspection

A site inspection was undertaken by the person completing this REF	☒ Yes	Click here to enter date.	2021 and 2022 numerous site inspections

1.2 Location of activity

Please attach a locality plan, map, photographs, diagrams and a site plan (as necessary) showing the location and layout of the proposed activity, and provide the following details of the location of the proposed activity site. If Council land, is it Community or Operational land?

Site commonly known as *(if applicable)*	Main and Clarkes Beach, Byron Bay			
Street address *(if applicable)*	*No:* Enter number.	*Street name:* Click here to enter text.		
	Town, village or locality:	Byron Bay		
Title reference	*Lot and deposited plan (or strata plan):*	Lot 18 DP1269368		
Site reference	*Easting: (6 digits)* 560593		*Northing: (7 digits)* 6831475	
	Nearest cross street or streets:	Lawson Street		
	Site owner and tenure:	Crown Land – Reserve 82000		
	Land classification (Community or Operational, if applicable):	N/A (Council Managed Crown Reserve)		

Site map or aerial image

The location, land ownership and management arrangement of the project site is shown in Figure 1 and Figure 2.

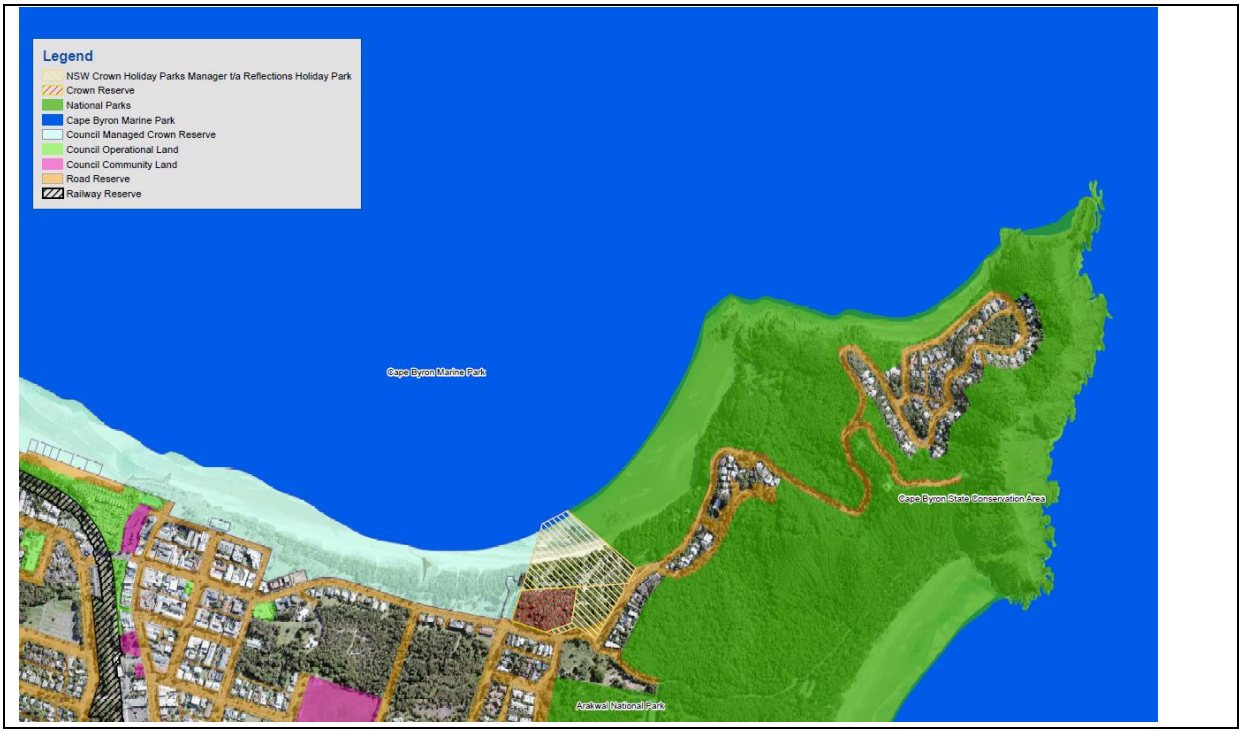


Figure 1: ***Aerial Image – Land ownership and management arrangements for the broader area***

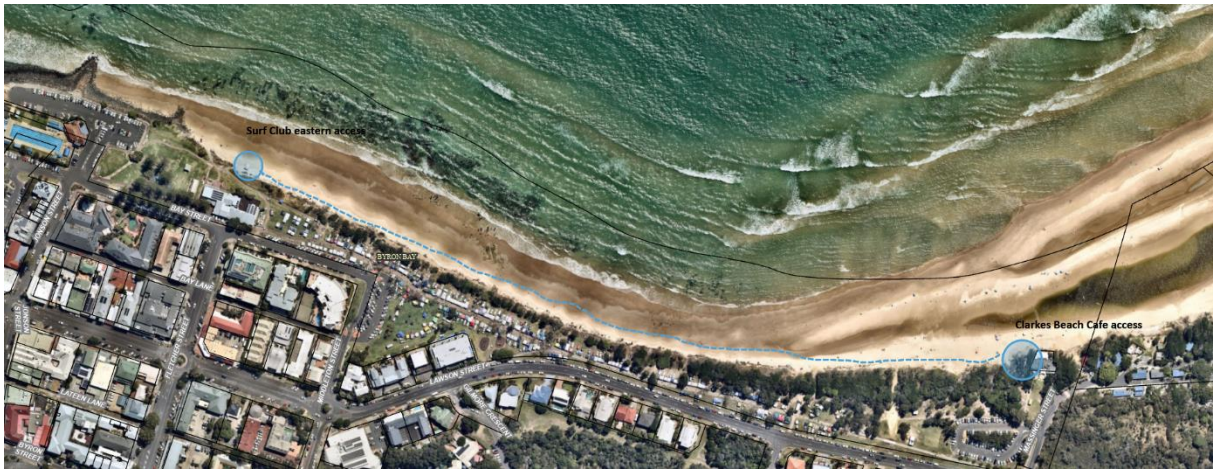


Figure 2: ***Image – spatial extent of project area, Byron Bay***

1.3 Description of the proposed activity

Description of the proposed activity – include pre-construction, construction, operation and remediation

Introduction

Council has been successful in obtaining State Government funding from the Department of Planning and Environment's Coastal and Estuary Grants Program – Implementation Stream for the '**Byron Bay - Main and Clarkes Beach Dune Recovery Project'.**

The aim of the project is to:

- rehabilitate and restore the dune system to assist in the recovery of its form and function;
- restore/rehabilitate the dune ecosystem and habitat; and
- improve the public's beach safety, access and amenity.

The project will involve 'beach scraping and dune reprofiling' which involves moving (via mechanical means) small volumes of sand (i.e. small in the context of annual littoral transport volumes). Sand is harvested from the swash zone and lower part of the beach, to the back of the beach to help reinstate the frontal and incipient dune.

Project components include:

- Planning documentation and approvals;
- Community and stakeholder engagement;
- Surveys and monitoring;
- Beach scraping and dune reprofiling works;
- Restoration of (and decommission of unsafe) public beach access ways;
- Vegetation restoration works (including ongoing maintenance); and
- Fencing of beach access ways and dune area.

Background

Coastal erosion has been a challenging issue for the Byron Shire Council and Byron Bay community for many decades. Since the 1950s, 60s and 70s, cyclones and east coast lows have caused extensive damage to the Byron Bay coastline, with these events most likely to occur during summer and autumn months.

After a period of relative calm, since 2016, and rapidly increasing since mid-2019, Clarkes Beach and Main Beach in Byron Bay became subject to significant coastal erosion which has resulted in significant losses of sand from the beach and frontal dune; damage and subsequent closure of beach access ways; and significant loss and damage of dune vegetation. Several erosion events caused by sand supply deficit, storm wave attack, combined with elevated water levels during large spring tides have resulted in significant dune scarping along the majority of the dune system within the reserve.

In 2021, a large volume of sand returned to the Byron Bay embayment, assisting in the partial recovery of the eroded beaches. Parts of the eroded dune scarp have since slumped and now appear to have stabilised to a more natural angle. However, much of the dune system within the reserve remains in an eroded state. Many beach access ways remain closed due to safety concerns.

Where public safety risks have been identified Council has undertaken action to manage these risks through the management/reinstatement of beach access ways (where possible) and clearing of fallen vegetation when required.

The current erosion cell in the embayment (as of July 2022) is west of the coastal protection works at Main Beach. Serious erosion and lowering of the beach is being experienced at this location (fronting the First Sun Caravan Park; Cavvanbah Beach to Belongil). It is anticipated that this erosion cell will continue to move North-westwards, preceding the large sand slug as it moves through the embayment as a result of littoral transport.

Objective of the Project

The dune recovery project aims to help rehabilitate and restore safety, amenity and access within the sand dune ecosystems of Main and Clarkes Beach within the Byron Bay Embayment.

This is to be achieved through a beach scraping and dune reprofiling campaign; dune revegetation; installation of public accessway and dune fencing; along with other ‘soft stabilisation’ techniques as described below as per the ‘Coastal Dune Management Manual’ (Department of and Water Conservation, 2001).

‘Soft’ dune stabilisation methods based on best practice coastal dune management may include:

- dune reforming or rebuilding using earth moving equipment (such as ‘beach scraping’);
- dune-forming fencing;
- restoration and revegetation of plant communities;
- weed removal;
- protective fencing to limit pedestrian access;
- construction and maintenance of beach access ways; and
- signage/education.

Council has previously undertaken beach scraping programs at New Brighton Beach (north of Byron Bay) on three occasions. Numerous historical scraping activities have also been completed over the years at New Brighton Beach. Scraping works have been deemed a success, with the 2017 sand volumes still *in situ* and almost completely covered in dune vegetation.

Some lessons learnt from these past projects are:

- the best time to beach scrape is when dunes are in an eroded/scarped state to assist in natural dune recovery; and
- allow more budget for the maintenance/follow up activities (planting) and restoration of access ways.

The expected outcomes of the project are:

- restoration/rehabilitation of dune ecosystems and habitat
- protection of cultural heritage
- restoration of public beach access ways
- improved beach amenity
- improved benefit for the Byron Bay community.

The project is expected to commence late 2022 and continue into 2023.

The project is expected to be undertaken through a variety of scopes of work:

1. **Restoration and decommission of public beach access ways**

Along the approximate 750m length of Main and Clarkes Beach between the western access of the Byron Beach Café to the eastern access of the Byron Bay Surf Life Saving Club there are 12 public beach access ways. These are illustrated as Access #1 to Access #12 in Figure 3.

Figure 3: ***Map of Main and Clarkes Beach access pathways***

There are four beach access (4) geobag structures in the dunes at Access #3, #4, #5 and #6. All four are single layer geotextile sand container (geobag) revetments. They function to provide beach access during an eroded beach state.

In response to the erosion event of December 2020, a Beach Access Restoration Plan* was developed by Council (February 2021) which outlines which accessways are recommended to be retained (and restored) and which accessways are recommended to be decommissioned. The decommissioning and restoration of beach access ways will be completed prior or during the beach scraping and dune reprofiling works respectively over the length of the work site.

Decommission:

Presently the accessways that are closed (illustrated by the red symbol in Figure 4) are to be decommissioned permanently due to the adequacy of remaining accessways. Decommissioning unnecessary accessways provides an opportunity to re-establish important dune habitat that has been significantly impacted by erosion.

***Note:** The name of the access ways are the same as outline in the Beach Access Restoration Plan, however the #'s are slightly different.

These include:

- Access #5 Dening Park West Access
- Access #7 Lawson Street Access (40 Lawson)
- Access #12 Clarkes (Byron Beach) Café

Figure 4: ***Map of Main and Clarkes Beach access pathways to stay open or close***

Access #5 Dening Park West (Figure 5**)** has existing geobags that were damaged during the event and is not suitable for public use.

Works will involve:

- Removal of damaged geobags/ and other parts of access structure that are visible at the time or easy to dig out.
- Removal of material and/or any visible or easily extractable waste from the area (timber board and chain, posts, debris, etc).
- Push any dead and fallen vegetation into the base of the dune to assist in dune recovery (note living vegetation will not to be removed from the site).

Figure 5: ***Dening Park West Access – 20 December 2020***

Access #7 Lawson Street Access (40 Lawson) (Figure 6) was damaged during the event and not suitable for public use. This access was originally recommended for retaining, however is now recommended to be closed.

Works will involve:

- Removal of material and/or any visible or easily extractable waste from the area (timber board and chain, posts, debris, etc).
- Push any dead and fallen vegetation into the base of the dune to assist in dune recovery (note living vegetation will not to be removed from the site).

Figure 6: ***Lawson Street Access (40 Lawson) – 20 December 2020***

Access #12 Clarkes (Byron Beach) Café (Figure 7) was damaged during the event, has a steep escarpment and is not suitable for public use.

Works will involve:

- Removal of material and/or any visible or easily extractable waste from the area (timber board and chain, posts, debris, etc).
- Push any dead and fallen vegetation into the base of the dune to assist in dune recovery (note living vegetation will not to be removed from the site).

Figure 7: ***Clarkes (Byron Beach) Café – 13 January 2021***

Restoration:

Presently all accessways that are to be restored permanently and opened include:

- Access #3 Dening Park Peace Pole Access
- Access #4 Middleton Street Access
- Access #6 Dening Park East Access

- Access #8 50 Lawson Access
- Access #9 Cowper Street Access
- Access #10 Emergency Vehicle Access (62 Lawson)
- Access #11 Clarkes Beach (Ex-disabled access)

Access #3 Dening Park Peace Pole Access (Figure 8**)** provides access with the sand bags providing a stairway to the beach (when in an eroded state). Needs restoration to ensure ongoing safe access suitable for public use.

This will involve:

- Relocation of detached geobags back onto the structure (if possible).
- Removal of damaged or deflated geobags.
- Removal of material and/or any visible or easily extractable waste from the area (timber board and chain, posts, debris, etc).
- Reprofile access track to allow safe gradient for public access.

Figure 8: ***Dening Park Peace Pole Access – 13 January 2021***

Access #4 Middleton Street Access (Figure 9**)** provides access with the sand bags providing a stairway to the beach (when in an eroded state). Needs restoration to ensure ongoing safe access suitable for public use.

This will involve:

- Relocation of detached geobags back onto the structure (if possible).
- Removal of damaged or deflated geobags.
- Removal of material and/or any visible or easily extractable waste from the area (timber board and chain, posts, debris, etc).
- Reprofile access track to allow safe gradient for public access.

Figure 9: ***Middleton Street Access – 13 January 2021***

Access #6 Dening Park East Access was originally recommended to be permanently closed, as it had failed and no longer provided a functional beach access. However it continues to be more used by pedestrians and provides and more strategic and mid-way access between those adjacent. It also has a beach shower which is used regularly. It provides access with the sandbags providing a stairway to the beach (when in an eroded state) and needs restoration to ensure ongoing safe access suitable for public use.

This will involve:

- Relocation of detached geobags back onto the structure (if possible).
- Removal of damaged or deflated geobags.
- Removal of material and/or any visible or easily extractable waste from the area (timber board and chain, posts, debris, etc).
- Reprofile access track to allow safe gradient for public access.

Figure 10: ***Dening Park East Access – 13 January 2021***

Figure 11: ***Dening Park East Access – 18 August 2022***

Access #8 Lawson Street Access (50 Lawson) (Figure 12 & Figure 13**)** was originally recommended to be permanently closed, due to steep scarps but beach recovery has commenced and the scarping is no longer too steep/unsafe. This access also has the beach shower and is a high use area. It provides access with the sand bags providing a stairway to the beach (when in an eroded state) and needs repair to ensure ongoing safe access suitable for public use.

This will involve:

- Removal of material and/or any visible or easily extractable waste from the area (timber board and chain, posts, debris, etc).
- Push any dead and fallen vegetation into the base of the dune to assist in dune recovery (note living vegetation will not to be removed from the site).
- Reprofile access track to allow safe gradient for public access.

Figure 12: ***Lawson Street Access (50 Lawson) – 13 Januray 2021***

Figure 13: ***Lawson Street Access (50 Lawson) – 18 August 2022***

Access #9 Cowper Street Access (Figure 14**)** is immediately adjacent to the operational hub for Go Sea Kayaks. There is high demand for this access. Works to date have successfully opened this path for safe pedestrian access.

Works will involve:

- Removal of material and/or any visible or easily extractable waste from the area (timber board and chain, posts, debris, etc).
- Push any dead and fallen vegetation into the base of the dune to assist in dune recovery (note living vegetation will not to be removed from the site).
- Reprofile access track to allow safe gradient for public access.

Figure 14: ***Cowper Street Access – 13 January 2021***

Access #10 Emergency Vehicle Access (62 Lawson) (Figure 15**)** provides the nominated emergency vehicle access and is an essential access.

Works will involve:

- Removal of material and/or any visible or easily extractable waste from the area (timber board and chain, posts, debris, etc).
- Push any dead and fallen vegetation into the base of the dune to assist in dune recovery (note living vegetation will not to be removed from the site).

- Reprofile access track to allow safe gradient for public access.

Figure 15: ***Emergency Vehicale Access – 13 January 2021***

Access #11 Clarkes Beach (Ex-disabled access) no longer provides disabled access. The previous disabled access pathway structure was damaged in the event most of the material / concrete blocks have been removed. The access will be maintained as a general pedestrian access point.

Figure 16: Clarkes Beach (Ex-Disabled) Access – 15 December 2020

Figure 17: ***Clarkes Beach (Ex-Disabled) Access – 13 January 2021***

2. Beach scraping and dune reprofiling works

'Beach reprofiling' or 'scraping' is "the movement of small to medium quantities of sand from the lower part of the littoral beach system to the dune, using mechanical means" to restore dunes. Beach scraping is being undertaken for beach safety, improving access and amenity (environmental and social).

Beach and dune reprofiling accelerates the natural beach re-building process of returning sand to the subaerial beach and foredunes that occurs under non-storm conditions. By moving small amounts of sand from the intertidal zone and placing it above the wave run-up limit, accretion of the lower beach is accelerated because a flatter profile exists. Flatter profiles promote accretion, whereas steeper profiles are prone to erosion. A paper by Carley et al (2009) outlines the feasibility of beach scraping as a coastal management option.

Beach scraping/reprofiling does not introduce new sand to the littoral system, but redistributes sand within the system, and can assist the natural dune rebuilding recovery process (volume and height).

A general outline of beach scraping and dune reprofiling is provided in Figure 18.

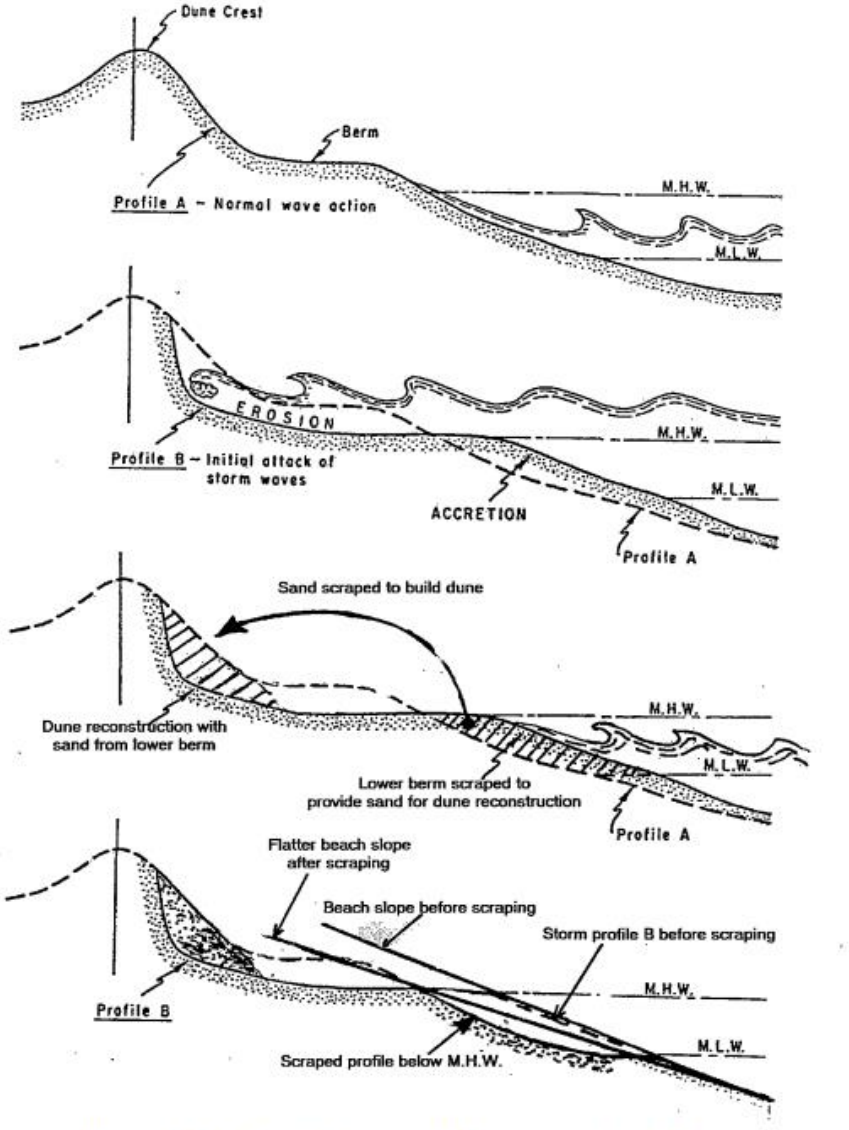


Figure 1: Beach scraping concept (Source: Lex Nielsen)

Figure 18: ***Concept of beach scraping (Carley et al, 2009)***

It is generally accepted that beach scraping of 0.2m to 0.5m depth per run is unlikely to have adverse impacts on downcoast neighbouring beaches, if undertaken from the seaward side of the berm during accretionary conditions (i.e. while beaches are building, not eroding) (Carley et al, 2009). The premise is that nature provides most of the energy and it is an efficient way of accelerating beach recovery.

Source material from the beach will be scraped by two machines (D6 Swampy Dozer) from the intertidal zone to a depth of 20 cm to 30 cm (aiming for 20 cm but acknowledging normal operator inconsistency). The use of two dozer machines to undertake the scraping works is more efficient and has less impact on the broader community with the works able to be undertaken within a short timeframe. The dozers will push the sand all the way to the foredune. An excavator then sculpts the sand and shapes it at the dune (14-20 tonne excavator). This process is repeated over multiple runs on successive tidal cycles (to allow for sand replenishment of the intertidal zone) to achieve the desired dune restoration volume (Figure 19).

Figure 19: ***Excavator working in the intertidal zone building sand piles; bobcat pushing sand onto the dune face (New Brighton, October 2017).***

The works will seek to redistribute up to 10m3/m of sand to the frontal dune. Due to scrape depth limitations, it is expected that this will be achieved by undertaking multiple scrape runs (passes) along the east/west extent of the works over a 1-2 week period.

It is noted that a significant volume of sand has been lost from the dune located between the Reflections Holliday Park and the Byron Bay Surf Club since 2018. This project will by no means be able reinstate the original pre-storm dune volumes, with 10m3/m reprofiling representing only a small percentage of the original volume.

Works will focus on the high priority erosion area located between the eastern access of the Byron Bay Surf Club and approx. 40-46 Lawson Street (or up to Cowper Street stormwater outlet) – an approximate extent of 350 m (Figure 20). Minor scraping works may be undertaken to the east between the Clarkes Beach Café and 40-46 Lawson Street pending project budget availability post completion of the priority works (approx. extent of 350m).

Figure 20: ***Estimated scraping zone (approx. 40m wide extent) within the CBMP Habitat Protection Zone focussing on the priority erosion area***

Works generally progress from east to west pending mean swell direction at the time of and over the forecast of the works. The active work zone will progressively move along the beach to limit nuisance to adjacent residents, businesses, passers-by and beach users by no more than a day at a time.

The second pass scraping works (and any subsequent passes) is also to commence at the eastern end of the site working west. This approach is considered to allow greater replenishment of intertidal sand from east to west (under prevailing SE swell regime), such that upon commencement of the second (and subsequent passes), it is hoped that wave induced sediment transport will have resulted in longshore accretion of the intertidal zone. The commencement location (east or west) will be discussed and confirmed at the commencement of each pass.

A technical briefing will be provided at the beginning of the scraping works regarding scrape depth, previous approaches to stockpiling and moving sand, and placement design at the dune interface.

3. Dune vegetation works

A Dune Vegetation Management Plan (VMP) will be prepared for the project area which includes follow-up maintenance and replanting for up to 12 months (fertilizing, weeding and watering as required). The plan will include dedicated plantings, seeding and cuttings at an appropriate species density and diversity using locally indigenous species. The Dune Vegetation Management Plan will be implemented after the beach scraping, dune reprofiling works and fencing works have been completed and over the entire extent of the restored dune system.

Prior to the beach scraping works, some tasks may need to be undertaken, such as removal and potting of any established plants, i.e. plants that may not withstand sand burial in the scraping area, such Pigface, Dianella, Sedges or trees. Spinifex can be buried and will naturally reinstate. Other ground cover species (e.g. Beach bean and Goats' foot) can be lifted (roots will be attached) and dropped back over dune profile after works.

There is limited hind dune vegetation (currently only 1 row of larger trees in some sections behind the mid dune species) before the existing landward fencing. As such, there is an opportunity to expand the vegetated dune buffer area further landward within the grassed reserve through fencing (up to 4m or more landward in some places). A small area within the grassed reserve adjacent the estimated scraping zone will also be planted out to expand the vegetated dune buffer zone landward (located between approx. Access #5 Dening Park Peace Pole Access and Access #10 Lawson Street Access (50 Lawson) (refer Figure 21) . All existing fencing on the landward side of the dune will remain in place (i.e. not removed) and the secondary fencing will create a further barrier and containment area for dune vegetation. This fencing will tie into the beach accessway fencing.

Figure 21: Proposed planning of landward vegetation buffer

The Dune Vegetation Management Plan will concentrate on species appropriate for foredune environments within Primary (Incipient Foredune), Secondary (Established Foredune) and Hind Dune vegetation zone zones as illustrated below in Figure 22.

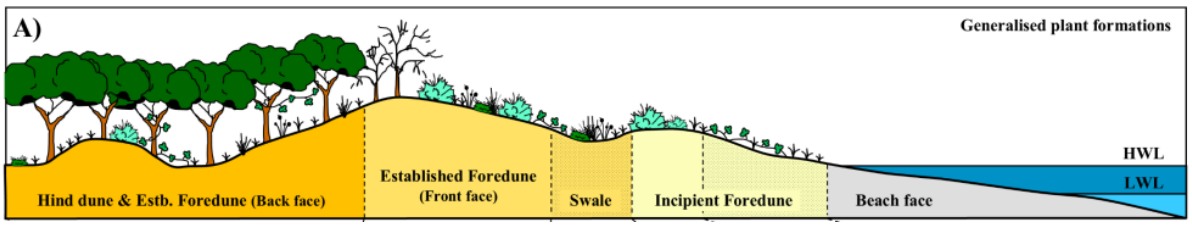


Figure 22: ***Dominant species and general plant zonation found across north coast foredune environments (Doyle, 2019).***

Dune plantings will utilise plants endemic to the location and that existed at the location prior to the erosion events; aiming to restore the beach and dune to as close a natural setting as possible. Vegetation establishment is key to stabilisation of the dune and retention of sand volumes, and hence the overall success of the project.

The VMP will also include additional focussed revegetation works in the vicinity of the decommissioned beach access and stormwater management works adjacent the Clarkes Beach Café. This includes:

- Planting of 31 trees with tree guards.
- Planting of 60 groundcover Lomandra, Dianella, Ficinia.

Fencing works

Fencing of beach access ways

The dune fencing alongside the beach access ways will be reinstated - repaired and/or newly erected. Where existing fence posts can be retained or reused, this is preferred. Fencing will consist of timber posts and 3-line Bayco® wire, similar to previous work at the location and New Brighton. The alignment and location of fencing of the beach access ways will focus on streamlining pedestrian access straight to the beach, rather than allowing to cut left or right onto the newly established dune.

Fencing of dune area

New fencing will be installed along the newly formed dune area for the entire project area between the Surf Club & the Beach Café, with access limited to formalised public access ways (Figure 23). The dune fencing will tie-in to the eastern and western extents in a smooth alignment. Lessons learnt from recent work undertaken at New Brighton is to have the fencing positioned slightly up the frontal crest of the dune, above the potential wave run-up zone.

The exact position of the fencing will be confirmed in discussion with Council on-site once the beach scraping works have commenced.

Signage

Corflute dune signage will be erected along the fenced dune area.

Figure 23: ***Photos of dune signage at New Brighton Beach.***

Pre-construction:

- Site inspections and contractor engagement
- Pre-beach scraping survey for the section of beach subject to scraping.
- Pre project ecological inspection. Any nests found to be highlighted with a painted timber stake.
- Removal and potting of any established plants that may not withstand sand burial in the scraping area
- Harvesting of Spinifex seeds (if available)
- Completion of this REF and any risk assessments, safety paperwork
- Consultation with agencies and stakeholders
- Obtaining permits/licences
- Broader community engagement.
- Cultural Heritage Awareness Induction for staff.

Construction:

- Pre-project briefing with project team, contractors and invited Key Stakeholders (Arakwal / TBLALC).

- Daily pre-work inspections.
- Scraping of sand (nominal depth 20-30cm per scrape) sourced from the intertidal zone and placed on the back of beach for dune rebuilding
- Build dune to existing crest level and raise low points, increase dune sand volume.
- Public access control during duration of works in the work zone.
- Repair and reconstruct 'open' formal public beach access ways
- Decommission 'closed' formal public beach access ways
- Repair and reconstruct seaward extent of dune fencing
- Install dune and beach access way signage

Post-construction:

- Implement Dune Vegetation Management Plan (revegetation works - plantings, cuttings, watering/weeding)
- Repair and reconstruct dune fencing
- Additional beach and dune surveys and analysis of beach and dune changes
- Documentation of the project and formal reporting
- Dune Care event with GCAT (local dune care group)

Size of the proposed activity footprint

The proposed activity footprint is as per the approximations provided in the table below. The primary project area (Area 1, 2 & 3) covers approximately 2.675 hectares. The additional project area (Area 4) is approximately 1.75ha. Total volume of sand scraped is estimated to be up to 7500m3 (10m3 for each metre, over 750 length of beach).

Area 1	**Dune Vegetation Management Area (includes fencing and access ways)**	750 long x 10m wide	7,500m2
Area 2	**Expanded landward buffer Vegetation Management Area (includes fencing and access ways)**	350 long x 5m wide	1,750m2
Area 3	**Beach scraping of western priority erosion zone (intertidal area)**	350m (length) x 50m (width)	17,500m2
		Total	**26,750m2 or 2.675 ha**
Area 4	**Additional beach scraping of eastern erosion zone (intertidal area) (pending budget availability)**	350m (length) x 50m (width)	17,500m2

Table 1*: Approximations of proposed activity footprint*

As outlined above primary project area covers 2.675 hectares with the beach scraping being focussed on the high priority erosion area between the eastern access of the Byron Bay Surf Club and 40-46 Lawson Street (around 350m). Other areas may also be considered pending budget and sand availability.

The Dune Vegetation Management Plan focuses on an extent of dune up to 750m long and 10m wide (depending on how much sand is reprofiled). The expanded area of the landward buffer is approx.350 in length and up to 5m wide.

Focus is on key erosion areas with sand harvesting to occur within the intertidal area in the Habitat Protection Zone of the Cape Byron Marine Park (no works in the Sanctuary Zone).

The project footprint is fully contained within the Council Managed Crown Reserve (R82000).

The extent of the sand harvesting is within the intertidal zone (below the Mean High-Water Mark - MHWM) of the Cape Byron Marine Park (Habitat Protection Zone). No works will occur below lowest low water mark (LLWM). Dune rebuilding works and dune rehabilitation are not within the Cape Byron Marine Park (Habitat Protection Zone).

Ancillary activities, such as advertising or other signage (including any temporary sign, banner or structure promoting an event or sponsorship arrangement), roads, infrastructure, bushfire hazard reduction

New signage will be installed to promote the use of the formal beach access ways and advise the community about staying of the dunes and new plants. Council uses two dune signs for beaches as outlined below.

Temporary signage will be erected during works for public safety, i.e. closure of access ways and/or temporary barrier fencing while works are being undertaken.

Proposed construction methods, materials and equipment

Methodology:

In situ beach sand will be scraped/harvested by two machines (Dozer) in a borrow area below the high tide mark. The borrow area will likely be around a 40-50m wide scrape zone, due to machine efficiency. [*The maximum distance a dozer can push material is 50m to stay within capacity and efficiency of machine*]. Beach sand will be scraped in the borrow area to a depth of 20-30cm (aiming for 20cm but acknowledging normal operator inconsistency). The correlation of a 200mm cut along 50m distance will achieve 10m3 of sand for each metre of dune. Excavation must not disturb coffee rock.

The dozers will push sand into a bund/s along a windrow on the beach above the high tide mark. The dozers will work during the window of the tides, focussing on gaining sand within a short timeframe between high and low tide. Outside of the tide window when work can't be undertaken in the intertidal zone, an excavator (on stand-by in the compound) will move the sand up the frontal face of the dune to reshape and reprofiling the dune. The dozers may also shape sand and marry into existing dune. The height of sand placement will be governed by the existing dune (around 5-7m). If possible a seaward design slope of 1V:5H for sand dune design will adopted only so far as the sand allows. This this will be unachievable in some areas, e.g. *if the dune is 5 metres high, then the slope is 25 metres long and the area of that cross-sectional triangle is 62m2, which is above the 10m2 target.*

Works will focus on days when the tides are low enough to do the work (i.e. spring tides).

The works will seek to relocate up to 10m3/m of sand to the incipient dune over 350m extent. This may be facilitated through repeated passes.

Decommission and restoration of beach access ways will be completed at the same time as the beach scraping works over the length of the work site. This will be undertaken using an excavator. Access points will be closed to limit pedestrian management.

Safety (pedestrian) spotters will manage the works area to ensure people management.

The works will be undertaken as sections from east to west – the work zone will move in a westward direction. The extent of the works zone on the beach is likely to be around 50m (alongshore) x 100m (perpendicular).

Materials to be used:

- Fencing materials (timber fence posts, Bayco® wire)
- Plants and planting materials/equipment.
- Corflute signage
- Temporary barriers
- Loading frame for filling sand bags
- Beach sand (sourced from the beach and not removed from site)

Equipment:

- 14-20 tonne Excavator
- D6 Swampy Dozer x 2
- 4WD ute

Receivables, storage and on-site management of materials used in construction (eg stockpiles and lay-down areas)

Machinery and equipment will be stored at the Clarkes Beach (Lawson Street) car park within a site compound (Figure 24). Council will provide access for the Contractor to use the Crown Land Reserve R82000 for a site compound taking into account the operation of nearby businesses, community events, traffic management, and general community safety and awareness. No machinery will be left

on the scraped dune system or beach due to public safety and possible impact of swell or tides on machinery.

Figure 24: ***Clarkes Beach car park, and machinery and equipment site compound location.***

Earthworks or site clearing, including extent of vegetation to be removed

General earthworks:

Earthworks are limited to the beach scraping and dune formation as outlined in this REF methodology.

Vegetation assessment:

No native vegetation is planned to be removed. There are some large Casuarinas within the reserve that are nearing the end of their life with some becoming senescent. Any pruning or removal of 'park' trees within the reserve would is not considered part of this project and considered as unrelated general maintenance.

There may be some vegetation on the dune scarp that has fallen and is no longer alive. This vegetation will not be removed from site but relocated at the base of the dune toe. This is Council's normal process for dealing with impacted erosion dune vegetation.

Waste material to be reused or discarded

Waste type:

Waste removal of any old decommissioned geobags. Noting that all sand in the geobags will be kept on the beach.

Waste removal of old fencing and wire.
Removal of any old rubbish uncovered.

Volume:

Up to 20 old geobags (maximum weight is estimated to be up to 1 tonne.

Disposal or reuse location:

Collected by machine or in 4WD and transferred to the Council resource waste facility at Myocum.

Sustainability measures, including choice of materials (such as recycled content) and water and energy efficiency

There is existing recycled water within reserve R82000 which will be used for watering plants.

Machines will be turned off when not in use to save diesel and limit fumes.

All native plants will be sourced locally.

Environmental safeguards and mitigation measures

Potential area of impact	Safeguards or mitigation measures	Comments (if applicable)
Erosion and sediment control	Site compound will be as small as possible to reduce ground disturbance. Stop work if wind blown sand is a problem. Implement Stop Work procedure and further investigation if any contaminated soil is thought to be encountered (i.e. different smell or looks different colour).	Click here to enter text.
Waterways	Prestart daily checks of plant to check for fuel and hydraulic leaks prior to commencing work each day. All waste will be removed from site. Implement Stop Work procedure and further investigation if any contaminated soil is thought to be encountered (i.e. different smell or looks different colour). All machines will be refueled at the site compound (off the beach). Spill kits to be onsite (beach and within site compound) if any leaks occur. All plant will be washed down at the site compound to ensure no contaminants enter the Marine Park.	Click here to enter text.
Noise and vibration	Construction equipment will be turned off when not in use. Notification to nearby stakeholders about the possibility of vibration & noise impacts. Review work and noise mitigation if impacts are beyond reasonable / complaints are received.	Click here to enter text.

Potential area of impact	Safeguards or mitigation measures	Comments (if applicable)
Air quality	Construction equipment will be turned off when not in use. Stop work if windblown sand is a problem.	Click here to enter text.
Non-Aboriginal heritage	NA	Click here to enter text.
Aboriginal heritage	Staff/contractors to undertake a Cultural Heritage Awareness Induction. Stop Work procedure should shell middens or Aboriginal artefacts be identified onsite. A Cultural Site monitor will be onsite during certain phases (back beach works, access ways and re-profiling).	Impact to the cultural heritage is **expected to be positive** as the project will rehabilitate and restore the dunes, thereby protecting any objects within the dune system.
Biodiversity	Operators are proficient in this work and operation of machinery within the beach/dune area. A declaration will be completed by the plant operators prior to floating to document the plant was clean upon arrival Implement a stop work policy when fauna enter the immediate work site where injury is possible. All plant to be washed down daily to ensure no weeds enter the Marine Park. A pre-project inspection of the dune and completion of daily pre-site checks. Any nest sites will be marked and works will avoid the nest. Completion of daily site checks and timing of the works to avoid key shorebird activity and turtle nesting periods. Undertake preliminary survey for biological species composition and distribution at this location and to highlight any concerns related to biological assemblages at this location. Limit beach scrape depth to 20cm. Ensure live pipis are collected periodically from scraped sand and taken back to below the tide line.	Long-term impacts to biodiversity are **expected to be positive** as the project will restore dunal habitat and increase vegetation.
Trees and vegetation	NA.	Any impacts to dune flora are **expected to be positive** as the project is a rehabilitation project and aims to restore the dunal habitat and vegetation.

Potential area of impact	Safeguards or mitigation measures	Comments (if applicable)
Traffic, transport and parking	Pedestrians will be managed by an on-site Spotter/Safety person. The project area will be restricted to the general public – i.e., there will be no alongshore access during works. Pedestrians will have a number of open access ways they can use as an alternative. Signs on star pickets will be installed at the closed access points. Delivery of machines on floats will be managed through traffic control staff.	
Socio-economic	Timing of works not to coincide with school holidays and (where possible) not on Sundays or public holidays. Timing of works will best try to avoid key events and large activities. Event proponents will be alerted to the project works and timing. Use two machines/dozers to be more efficient and shorten the duration of the project and lessen the impact to users of the area. Community and stakeholder engagement plan developed and implemented. One-on-one contact with directly affected businesses. Education and information provided to the broader community on the project. Pedestrians will have a number of open access ways they can use as an alternative. Delivery of machines on floats will be managed through traffic control staff. Beach users will be managed by an on-site Spotter/Safety person. The project area will be restricted to the general public – i.e. there will be no alongshore access during works.	Long-term impacts to the community are **expected to be positive** as the project is a rehabilitation project and aims to restore the dunal habitat and beach amenity and access.
Waste	All machines will be refueled at the site compound (off the beach). No re-fueling to occur on the beach. Spill kits to be onsite if any leaks occur. Only the minimum amount of fuel will be onsite each day to run the machines. Plant operators to document the plant is clean upon arrival prior to works commencing. Prestart daily checks of plant to check for fuel and hydraulic leaks prior to commencing work each day. All waste will be removed from site.	Click here to enter text.

Potential area of impact	Safeguards or mitigation measures	Comments (if applicable)
Visual amenity		Long-term impacts to visual amenity are **expected to be positive** as the project is a rehabilitation project and aims to restore the dunal habitat and beach amenity and access.
Land contamination	Implement Stop Work procedure and further investigation if any contaminated soil is thought to be encountered (i.e. different smell or looks different colour).	Click here to enter text.
Soils and geotech	NA	Click here to enter text.
Miscellaneous	Any long-term impacts to the community and the environment are **expected to be positive** as the project is a rehabilitation project and aims to restore the dunal habitat, protect environmental and cultural values, and improve beach amenity, safety and access.	Click here to enter text.

Construction timetable and staging hours of operation.

Hours of work expected are between 7am to 6pm.

Works are aiming to be completed over a 2 to 4 week timeframe. Work during spring low tide (when work is physically permitted) will dictate the bulk of the work hours. There is a likelihood that work may extend past 6pm in the event of favourable tides. There is also the possibility that work will occur on the weekend, including Sundays.

Estimated commencement date: **1 October 2022**

Estimated completion date: **1 December 2023**

NOTE: If the activity involves building or infrastructure works, it may require certification to Building Code of Australia or Australian Standards prior to commencement.

*This timeframe includes 12 months vegetation maintenance.

1.4 Reasons/objectives for the activity and consideration of alternatives

Provide details of the reasons/objectives for the activity

Alternatives

Option 1:	**Do nothing** – The dunes of Clarkes and Main Beach have experienced significant erosion over the preceding year stemming from the December 2020 event with a significant amount of dune vegetation lost from the area. Council could take no action and let the coastline erode or accrete with natural processes and beach access ways fall into disrepair.
Option 2:	**Basic maintenance -** Council could take action to make safe the area and keep open beach access ways (where possible), while pushing fallen vegetation to the base of the dune (when possible).
Option 3:	**Preferred option -** Beach scraping is a proven management strategy (in parallel with fencing of dune areas, fencing of beach accessways and dune revegetation) to restore dune ecosystems and habitat, improve beach amenity, improve beach access and beach safety.

Justification for preferred option

Option 1

Erosion of the beach and recession of the shoreline has occurred resulting in the removal of the front face of the dune, a significant volume of sand and a large portion of the vegetation within the fenced area (managed by the local Clean and Green Dune Care group). Parts of the dune have slumped and now appear to have stabilised to a more natural angle and recovery of the beach profile has started to occur with a large sand deposit increasing the inshore sand reserves. However, the natural re-building of sand dunes with eroded steep escarpments may take years. The loss of vegetation and ecosystem has been a significant concern for the community calling for Council to take urgent action. Sand dunes are an integral part of the coastal environment and provide a reserve supply of sand for the action of waves during storms, along with habitat for flora and fauna. This area of Byron Bay environment is highly valued by the community and has significant cultural value (Indigenous and non-Indigenous) and biodiversity value. The majority of the length of the dune within the reserve is now steep and high with the toe of the dune impacted during elevated ocean levels and large spring high tides. Coastal erosion and long-term recession at this location poses an immediate and future risk to coastal values and natural assets and a ‘Do Nothing’ approach is considered undesirable in the current circumstances.

Option 2

Council has limited resources to continue reactive management after each erosion event and on-going basic maintenance activities to repair accessways. Until such time as the Coastal Management Program is certified, there is likely to be limited resources to undertake repair and maintenance of beach accessways and dune areas into the future. Over the years, Council has attempted to develop a plan for the Byron Bay Embayment as a priority. There are complex and challenging management issues for this part of the coastline with strong and polarised community views on how to resolve the issues. Council is presently in Stage 2 of the four stage CMP process, and completion of a CMP may be up to 2 years away. A ‘Basic Maintenance’ approach is considered undesirable in the current circumstances.

Option 3

The State Government recently announced increasing funding assistance to councils to restore degraded coastal habitats, improve beach access (reducing number of formal access ways) and

improve amenity. Beach scraping is considered a low-risk and viable short-term coastal management action eligible for funding without the need for a certified Coastal Management Program (CMP). The Management Study completed in 2016 for the 'CZMP for the Byron Bay Embayment' made a number of recommendations for management of the Main and Clarkes Beach precincts including dune revegetation and 'soft' dune stabilisation (i.e. beach scraping).

Under the legislative framework initiated by the NSW coastal reforms, Council has embarked of developing a Coastal Management Program (CMP) for the open coast from Cape Byron to South Golden Beach, which includes Clarkes and Main Beach. A CMP for this area has been prioritised and is presently in Stage 2 of the 4 stage CMP development process.

The **Vision for the CMP** as outlined in the Stage 1 '*Scoping Study for Cape Byron to South Golden Beach'* is as per below:

"Byron's coastline is resilient and protected and retains its iconic natural values now and into the future. Adequately resource and fund management of the iconic and internationally recognised Byron coastline to conserve and promote its inherent natural values.

These inherent values underpin the coasts enviable cultural, amenity, recreational use, local and tourism values and they will be kept central in the development of future management approaches.

Future management approaches will address existing and emerging threats such as climate change through planning for a resilient coastline that is prepared to address multiple challenges in a flexible and adaptive manner; including consideration of novel funding approaches.

This scope of work and proposal is in alignment with the Vision for the CMP and the management strategies outlined in previous coastal plans adopted by Council (though uncertified).

An Operational Plan (OP) Activity 3.1.3.2 has been created for this project. Council has been successful in funding through the State Government's Coastal and Estuary Grants Program on a 1:1 basis for the project.

Council has undertaken beach scraping programs successfully at New Brighton including beach access way management, fencing and dune revegetation. Since 2017 the dune has remained almost completely covered in vegetation. The works will also remove the scarped profile of the fore dune and hence will improve beach access and amenity and accelerate natural dune building processes. Main and Clarkes Beach are very popular among locals and visitors to Byron Shire. There will be improved benefit for the Byron Bay community and this 'Preferred' option is considered the most desirable in the current circumstances.

Section 2 CONSULTATION

Consultation is not compulsory for all REFs but it may be advisable. Specify the details of any consultation, including who was consulted, how, when and the results of the consultation.

Consider whether advice/feedback from any State agencies should be sought/might be beneficial.

If the works are located on land (or water) subject to a determined Native Title claim or an Aboriginal land claim, have you consulted with the Aboriginal traditional owners, eg Bundjalung of Byron Bay Aboriginal Corporation (Arakwal), Jali LALC, Tweed Byron LALC, Ngulingah LALC? Any response to be included as an appendix.

Council Project Consultation:

A Community and Stakeholder Engagement Plan has been prepared for the project in consultation with Council's COMS team. The plan outlines the key groups and stakeholders to be consulted and methods for consultation. Consultation has commenced with some key activities completed outlined below.

An Internal Working Group (IWG) has been developed who meet every 3-4 weeks to discuss the key components and execution of the project.

Stakeholder Consultation

- Presentation to the Coast and ICOLL Advisory Committee on 30 June 2022 outlining the project and components.
- Presentation to the Byron Bay Town Centre Masterplan Guidance Group 6 July 2022.
- Presentation to the Clarkes Beach Agency Working Group (led by Crown Lands) on 22 August 2022.
- Email and phone consultation with the local Dune Care Group – Green and Clean Awareness Team (GCAT). Letter of support is provided at Appendix B.

Agency Advice and Feedback

An early on-site meeting was held with staff from the Arakwal Corporation, Cape Byron Marine Parks Authority and the Department of Planning and Environment (funding partner) on 28 June 2022 to discuss the key project components. Key feedback from this meeting has been incorporated (where able). With the beach scraping works to be undertaken within the Cape Byron Marine Park declared under the Marine Parks Act, a Marine Park permit will be required. A letter was sent to the Manager of DPI- Fisheries (Cape Byron Marine Park) on 26 August 2022, advising the project scope and acknowledging that a Marine Park permit will be required and applied for the project.

The Department of Planning and Environment (DPE) are co-funding the project and have been closely consulted during all project stages, with the regional coastal officer providing key technical input on scope and delivery.

Advice was sought from the Department of Crown Lands as to whether Council being the land manager of the reserve requires a Licence for the works. This advice is provided in Appendix B which outlines that a licence is not required as long as the works are above the low water mark.

Consultation with Traditional Owners

An early on-site meeting was held with staff from the Arakwal Corporation, Cape Byron Marine Parks Authority and the Department of Planning and Environment (funding partner) on 28 June 2022 to discuss the key project components. Key feedback from this meeting has been incorporated (where able).

A letter was sent to the Tweed Byron Local Aboriginal Land Council (TBLALC) on 26 August 2022, advising them of the project and requesting advice in relation to working in an area claimed by traditional owners and in a landscape where Aboriginal cultural heritage is known to be close by. An on-site project walkover was held on 7 September with the LALC and DPE to discuss the project.

Section 3 STATUTORY FRAMEWORK

3.1 Description of relevant environmental planning instruments

This could include SEPPs or LEPs and, if necessary, the relevant zoning, clause, provision or schedule.

3.1.1 State Environmental Planning Policies (SEPPs)

SEPP (Transport and Infrastructure) 2021

Briefly document the relevant part of this SEPP that places your activity in Part 5 of the EPA Act 1979.

Section 2.165 of SEPP (Transport and Infrastructure) permits foreshore management activities without consent on any land when undertaken by a public authority. The relevant sections of the SEPP are as follows:

Division 25 Waterway or foreshore management activities

2.164 Definition

In this Division—

waterway or foreshore management activities means—

(a) riparian corridor and bank management, including erosion control, bank stabilisation, resnagging, weed management, revegetation and the creation of foreshore access ways, and

(b) instream management or dredging to rehabilitate aquatic habitat or to maintain or restore environmental flows or tidal flows for ecological purposes, and

***(c) coastal management and beach nourishment, including erosion control, dune or foreshore stabilisation works, headland management, weed management, revegetation activities and foreshore access ways**, and*

(d) salt interception schemes to improve water quality in surface freshwater systems, and

(e) installation or upgrade of waterway gauging stations for water accounting purposes.

2.165 Development permitted without consent

(1) Despite clause 129A, development for the purpose of waterway or foreshore management activities may be carried out by or on behalf of a public authority without consent on any land.

(2) To avoid doubt, subsection (1) does not permit the subdivision of any land.

(3) In this section, a reference to development for the purpose of waterway or foreshore management activities includes a reference to development for any of the following purposes if the development is in connection with waterway or foreshore management activities—

(a) construction works,

(b) routine maintenance works,

(c) emergency works, including works required as a result of flooding, storms or erosion,

(d) environmental management works.

A REF is being undertaken under Part 5 of the EPA Act 1979 to ensure that all aspects of the project are covered by an environmental assessment.

It should be noted that clause 2.7 of this SEPP explains the relationship between SEPP Transport and Infrastructure and SEPP Resilience and Hazards.

2.7 Relationship to other environmental planning instruments

(1) Except as provided by subclause (2), if there is an inconsistency between this Policy and any other environmental planning instrument, whether made before or after the commencement of this Policy, this Policy prevails to the extent of the inconsistency.

(2) Except as provided by subclauses (3) and (4), if there is an inconsistency between a provision of this Policy and any of the following provisions of another environmental planning instrument, the provision of the ***other instrument prevails*** *to the extent of the inconsistency—*

(a) clauses ……and ***2.16 of State Environmental Planning Policy (Resilience and Hazards) 2021,***

Section 2.16 of SEPP Resilience and Hazards is discussed below.

SEPP (Resilience and Hazards) 2021

If you intend to clear, fill or drain in a SEPP Coastal Wetland or SEPP Littoral Rainforest you cannot use this REF template. Part 4 of the EPA Act 1979 applies. If work (other than the above) is proposed in or near (within 100 metres of) a wetland or littoral rainforest, seek professional assistance.

Part 2.3 Miscellaneous

2.16 Coastal protection works

Note—

Section 4 (1) of the Coastal Management Act 2016 defines coastal protection works to mean—

(a) beach nourishment activities or works, and

(b) activities or works to reduce the impact of coastal hazards on land adjacent to tidal waters, including (but not limited to) seawalls, revetments and groynes.

Section 27 of the Coastal Management Act 2016 also contains provisions dealing with the granting of development consent to development for the purpose of coastal protection works.

(1) Coastal protection works by person other than public authority Development for the purpose of coastal protection works may be carried out on land to which this Chapter applies by a person other than a public authority only with development consent.

Note—

See clause 8A of Schedule 7 to State Environmental Planning Policy (State and Regional Development) 2011, which declares certain development for the purpose of coastal protection works to be regionally significant development for which a Sydney district or regional planning panel is the consent authority.

(2) Coastal protection works by public authority Development for the purpose of coastal protection works may be carried out on land to which this Chapter applies by or on behalf of a public authority—

(a) without development consent—if the coastal protection works are—

(i) identified in the relevant certified coastal management program, or

(ii) beach nourishment, or

(iii) the placing of sandbags for a period of not more than 90 days, or

(iv) routine maintenance works or repairs to any existing coastal protection works, or

(b) with development consent—in any other case.

Beach scraping is different to beach nourishment, as outlined below in accordance with the definitions from the Coastal Management Glossary (Office of Environment and Heritage, 2018).

Beach scraping – also referred to as 'nature assisted beach enhancement' (NABE) is a mechanical intervention to speed up the natural processes of berm and foredune recovery after a storm event.

Beach nourishment – beach restoration or augmentation using clean dredged or fill sand. Dredged sand is usually hydraulically pumped and placed directly onto an eroded beach or placed in the littoral transport system. When the sand is dredged in combination with constructing, improving, or maintaining a navigation project, beach nourishment is a form of beneficial use of dredged material.

In accordance with the *Coastal Management Act 2016*, beach nourishment activities are considered *coastal protection works* (Part 1, Clause 4). This project involves beach scraping and the movement of small quantities of sand for restoration of beach access, improving public safety and beach/environmental amenity. This project does not include works that are considered to be *coastal protection works* under the CM Act. The provisions of SEPP (Transport and Infrastructure) 2021 prevail over the provisions of SEPP (Resilience and Hazards) 2021.

The proposed foreshore management activities are not coastal protection works, do not include beach nourishment, and do not involve the placement of sandbags for more than 90 days.

They don't involve the maintenance or repair of coastal protection works as the access ways don't fall within this definition.

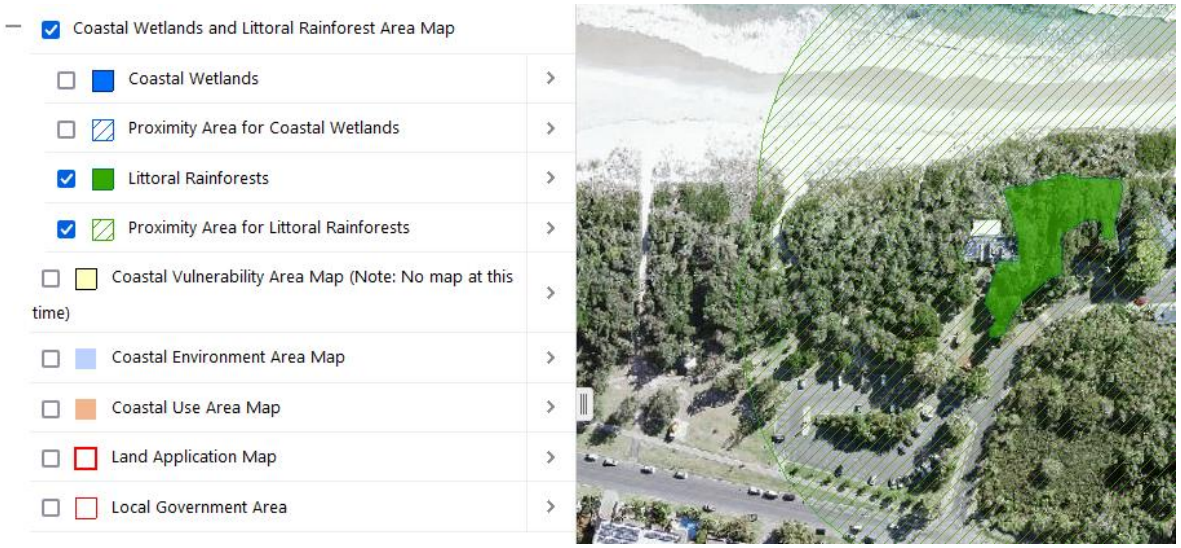
Coastal Environment Area:

The works are entirely located in the Coastal Environment Area but the controls contained in this SEPP do not apply to works under Part 5 of the EP A Act, 1979.

Coastal Use Area:

The works are entirely located in the Coastal Use Area but the controls contained in this SEPP do not apply to works under Part 5 of the EP A Act, 1979.

Littoral Rainforest Proximity Area:



A littoral rainforest buffer affects the subject land near the Beach Café. The works area are not affected by any core areas and not affected by any coastal wetlands core areas or wetland buffers.

The buffer provisions in clause 11 of the SEPP only apply where development otherwise requires development consent. In this case the works are being assessed under Part 5 of the EPA Act, 1979 so the SEPP provisions don't apply.

3.1.2 Byron Local Environmental Plan 2014 (and/or Byron LEP 1988)

Zoning

Check the defined uses in the LEP Dictionary. Check the zones on e-view, confirm it is a Part 5 matter.

The coastal area Main and Clarkes Beach falls within the Coastal Land Zone No 7 (f1) under the Byron Local Environmental Plan (1988). Beach and coastal restoration works are permitted with Council consent in this zone. In this case, SEPP (Transport and Infrastructure) 2021 overrides Byron LEP 1988 and the works can be undertaken under Part 5 of the EPA Act, 1979**.**

Local provisions

Do clauses 5.1 to 5.13 and clauses 6.1 to 6.11 apply?

Is the site Community or Operational land (LEP Schedule 4)? Check Byron Council Land Register.

Is the site listed in LEP Schedule 5 Environmental Heritage – Part 1 (Heritage items)?

Is the site affected by LEP Schedule 5 Environmental Heritage – Part 2 (Heritage conservation areas)?

Clause 33 of LEP provides matters for consideration for development in the 7(f1) zone. These do not apply to works under Part 5 of the EPA Act, 1979.

3.2 Description of any relevant plan of management, policy or procedure

A Plan of Management for Crown Reserve R82000 is not required unless there is going to be a change in the nature and use of the reserve. Council will consider developing a PoM for the reserve

once Council has made a decision on the alignment of the coastal protection works / Main Beach foreshore as part of the Main Beach Shoreline Project and CMP preparation. The decision of alignment of the coastal protection works influences other related work along the foreshore and within the reserve which will also influence the preparation of a PoM for this area.

There is no relevant, certified 'coastal management program' in place for the location, prepared under Part 3 of the *Coastal Management Act 2016*. Council is presently preparing a Coastal Management Program (CMP) for this part of the coastline and is currently in Stage 2 of the 4-stage process.

The Cape Byron Marine Park extends from the mean high water mark (MHWM) seaward to the three nautical mile limit of NSW waters from Brunswick Heads to Lennox Head including tidal lands and waters adjacent the project footprint. The marine park is managed in accordance with the provisions of the Marine Estate Management Act 2014 and its Regulations and management strategies and actions identified in the Cape Byron Marine Park Operational Plan (Marine Parks Authority, 2010).

Tidal lands and tidal waters surrounding Main Beach and Clarkes Beach are deemed Habitat Protection zone while waters in this area which are greater than 150m seaward of the MHWM, are within the Byron Bay Sanctuary Zone. Any development within the Marine Park requires approval under Marine Estate Management legislation.

NOTE: Many Council activities can be considered under Part 5 of the EPA Act 1979. There are some exceptions (see flow charts). If in doubt, consult with Council's planners. Where the project cannot be considered under Part 5, this template should not be used.

Section 4 EXISTING ENVIRONMENT

4.1 Description of the existing environment

The subject land is Crown Land administered under the *Crown Land Management Act 2016*. The project area is located within Crown Reserve R82000 for public recreation managed by Council.

The primary site works area is within the coastal dune and intertidal area of the beach between the Byron Bay Surf Club and the Byron Beach Café. All works are within the Crown Reserve R82000.

The site compound will be located within Council's carpark at Clarkes Beach within R82000. Lawson Street, a main Council road is located to the south of the project area. The project area covers approximately 2.675 hectares. It is approximately 750 metres in length.

4.2 Topography

The soil landscapes for the beach are mainland and barrier beaches and associated foredunes and hind dunes on Quaternary (Holocene) sands. Beach plains with relief up to 5 m, slopes <3%; foredunes with relief to 10 m and slopes 20–50%; hind dunes that have been disturbed.

The present topography of the beach is quite flat due the eroded profile with the back beach dune around 6m AHD. An image from Near Maps 16 July 2022 shows the present condition of the beach profile at the project location and is provided in Appendix A.

4.3 Surrounding land uses

How far away are the nearest dwellings, school, bus stops, etc?

The surrounding land uses consist of recreational green-space, parks, commercial premises (Café and Kayak Companies), residential and holiday premises. The closest street is Lawson Street to the south. There is a large car park to the south of the site and various beach access ways.

Clarkes and Main Beach and the adjacent reserve are an important and popular public space, used for mainly passive recreational beach activities, including swimming, walking, surfing, and related commercial operations such as sea kayaking tours. The reserve is used for walking, picnicking, BBQs, monthly markets, and is the site of two sea kayaking operators. Amenities include ablution blocks, picnic chairs and tables, BBQ's, waste bins, footpaths.

The recreational uses associated with Clarkes Beach have been impacted by the severely eroded beach profile and lack of sand/beach width, and the closure of beach accesses. Clarkes Beach normally provides an important alongshore pedestrian access to The Pass; however this has also been negatively impacted as a result of the severely eroded beach profile, especially at mid to high tide, in addition to the closure of some beach accesses. This project will restore access and beach amenity.

4.4 Geology/Geomorphology

Is the site slip-prone or unstable?

The sand that has formed the beaches and dune systems is essentially mature marine sand derived from the continental shelf, not contemporaneously derived fluvial sand. The sand dune barrier unit at Main and Clarkes Beach comprises younger Holocene outer barrier dunes that abut un-conformably seaward of (or overlie in the case of Holocene transgressive wind drift) the Pleistocene deposits. At this location much of the Holocene sand is now missing and with much older (Pleistocene) dune systems (i.e. indurated sands and "sandrock") commonly outcropping in the beach and surfzone.

Bedrock is generally in excess of 10 metres below the beach. The coastal plain extends around two kilometres from today's shoreline and comprises mainly marine sediment and is highly erodible in the active beach zone. Coffee rock (i.e. indurated sand) has been observed in the eroded dune face and underlying the beach along some parts of Clarkes Beach. Coffee rock is a weak rock that provides some resistance to erosion potentially reducing the extent and rate of beach erosion and longer-term recession where present. There is a known large outcrop of coffee rock offshore (subtidal). Bathymetry of the area is shown below as captured buy LiDAR survey in 2018 (Figure 25). In this survey the presence of indurated sand outcrops is shown. More recent LiDAR is expected to be captured by the Department of Planning and Environment end of August 2022, which can be used to inform this project.

Cycles of erosion and accretion of sands occur as a result of a complex interaction of factors including climate, wind, current and wave patterns, tides and water levels, sediment transport and 'by-passing' and dune vegetation.

Figure 25: ***Coastal topography and nearshore bathymetry within the study site (noting this does not show all of Clarkes Beach).***

4.5 Soil types and properties

Is the site affected by acid sulfate soils and at what depth?

The soil landscapes for the beach are mainland and barrier beaches and associated foredunes and hind dunes on Quaternary (Holocene) sands. The project area sits within the Point Danger to Cape Byron secondary sediment compartment. Over thousands of years of sea level changes, sand has moved shoreward from marine sources originating from the continental shelf and formed today's beaches and dunes.

The project area is mapped as Class 5 in Council's acid sulfate soils (ASS) mapping classification. Class 5 land is where works within 500m (on land <5m AHD) of adjacent Class 1, 3 or 4 land, where the water table is likely to be lowered below 1m AHD on the adjacent Class 1, 2, 3 or 4 land may have an impact of ASS. This project does not involve any works on adjacent ASS classed land nor works that involve excavation or dewatering and/or lowering the water table.

Known sediment size for the location is based on a detailed study completed in 1978 (PWD, 1978) where they analysed 370 surface samples and drilled 50 boreholes along the beach. Inner nearshore surface sediment/sand is light fawn, well to very well sorted, fine-medium grained and composed of well-rounded to sub angular grains of quartz and minor shell.

A review in 2006 (Patterson Britton, 2006) of a limited set of sediment samples in the study area determined the sand can be classified as 'fine sand' with the following mean grain diameters:

- intertidal area – 0.23mm;
- berm – 0.24mm; and
- foredune – 0.24mm

The project will be relocating sand from the intertidal area to the foredune. This sand is expected to be of similar composition and size.

4.6 Waterways

How close are the works to the waterway, and is it a drinking water catchment?

The project area is part of the open coastal beach, protected in the lee of Cape Byron within the Habitat Protection Zone of the Cape Byron Marine Park. The site is within the beach fluctuation zone and the influence of coastal processes, including direct wave action and tidal cycle. The present beach profile at site is moderately eroded and may be subject to further coastal erosion depending on wave height, wave direction and tidal cycles from future storm events.

The majority of works involve scraping and moving sand from the inter-tidal zone to the incipient dune area. The impact on water quality at the beach is likely to be minimal and very short term in nature i.e. marginally increased turbidity in the swash zone, noting however that this is by nature a turbid and dynamic environment with sediment moving cross and along shore as a natural occurrence. The beach scraping works are simply works that accelerate the natural processes within the beach zone.

Other foreshore management works are unlikely to impact on any waterways.

4.7 Flora (including flora of conservation significance)

Check Council's GIS.

Complete a search of the threatened species database in cases where vegetation is to be impacted/removed.

The wider project locality comprises coastal dunes, littoral rainforest and heathlands. Under Council's vegetation mapping (2021) the entire project site consists of Littoral Rainforest on the hind dunes and Wallum Heath on the frontal dunes, though much of the previous Heath has been lost due to recent erosion (Appendix A). Littoral Rainforest is classified as a critically endangered community. Existing vegetation presently within the proposed deposition area of the dunes is predominantly ground covers (Spinifiex, Beach Bean, Casuarina), though this cover has been significant impacted from the recent erosion.

Biodiversity assessments were completed recently in association with the construction of temporary coastal protection works (CPWs) at Clarkes Beach. A comprehensive ecological assessment including a threatened species Test of Significance with respect to location of CPWs at Clarkes Beach was completed (Biodiversity Assessment and Solutions, 2021). The assessment comprised desktop assessment, search of the BioNet Atlas of NSW Wildlife (1.5km radius of the project site), and an on-ground assessment and field survey of the development footprint and immediate surrounding buffer, with regard to the suitability of the habitat for threatened species. This BioNet search returned a record of forty-eight (n = 48) threatened species listed under Schedule 1 of the BC Act 2016. This includes sixteen (n = 16) flora species. The search returned eleven (n = 11) Threatened Ecological Communities (TEC) listed under Schedule 2 of the BC Act 2016 that are known to occur within the Byron Local Government Area (LGA). The assessment found that as a result of significant land use and historical impacts (e.g. clearing, sand mining, development of urban areas), the high use of the

area and the location of the site within a dynamic foreshore subject to coal processes, the site represents limited potential habitat for threatened species to occur (apart from potential habitat for threatened fauna – discussed further below).

Council completed a desktop search of the BioNet Atlas of NSW identified records of ninety-eight (n=98) threatened species listed under Schedule 1 of the BC Act 2016 within a 10km radius of the project site (Appendix D). This includes thirty-two (n = 32) flora species. A search was also undertaken internally of Council's and BioNet records available internally indicating no Council nor BioNet records of threatened flora species within the project area (refer Appendix A & D).

Works will not disturb these vegetation communities, rather the vegetation restoration associated with the project aims to enhance and maintain the communities into the future.

The works may result in some minor smothering of existing vegetation, however, Spinifex is considered a primary dune colonise, doesn't mind being buried and is known to grow through the sand after beach scraping programs. Any plants that may not survive burial may be considered for temporary removal and reinstatement after the works.

On the newly formed incipient dune area there may be greater opportunity for wind erosion of sand until dune vegetation is established. Revegetation works will minimise this by stabilising the dune and resisting erosion. Noting however that in its current state there is only minimal vegetation established along the foredune scarp as a result of recent coastal erosion events. Long term impacts are expected to be neutral once vegetation is established.

4.8 Fauna (including fauna of conservation significance)

Check Council's GIS.

Complete a search of the threatened species database in cases where habitat is to be impacted/removed.

The Test of Significance undertaken by Biodiversity Assessment and Solutions (2021) for threatened fauna with the potential to occur within the development footprint identified eight (n=8) fauna species for further assessment:

- Green Turtle (*Chelonia mydas*)
- Loggerhead Turtle (*Caretta caretta*)
- Pied Oystercatcher (*Haematopus longirostris*)
- Sooty Oystercatcher (*Haematopus fuliginosus)*
- Little Tern *(Sternula albifrons)*
- Great Knot *(Calidris tenuirostris)*
- Koala *(Phascolarctos cinereus)*
- Common Blossom-bat *(Syconycteris australis)*

The ToS concluded that the proposal would not result in a significant impact.

Council completed a desk-top BioNet search identified records of 98 threatened species within a 10km radius of the project site (Appendix D). Of these fauna species, 2 species have been recorded in Council and BioNet records within the project area or in close proximity:

- Green Turtle (*Chelonia mydas*)
- Pied Oystercatcher (*Haematopus longirostris*)

An assessment of the impact of beach scraping works on threatened species potentially affected by the works at New Brighton was undertaken by an ecologist in 2010 (Fitzgerald, 2010). The analysis noted potential impacts to threatened species through noise from beach scraping machinery, emission of exhaust gases, and potential for oil leaks. Beach scraping also has the capacity to disturb fauna of the littoral zone by the presence and activity of machinery, and more distantly through production of noise. Relevant to this project, the analysis noted that it was difficult to establish the likely severity of these effects when the beach is so heavily used by people (and dogs at New Brighton) that beach fauna already experience high levels of disturbance, both during the day and at night.

The project area is a moderately disturbed environment (due to recent coastal erosion) with eroded and scarped dunes and therefore highly unlikely to represent habitat for these listed threatened species. The shorebird species are known to inhabit and nest further west at the entrance of Belongil Creek. The project location is a high use visitation area with ongoing disturbance of the beach through foot traffic and the occasional dogs (noting they are prohibited). Due to the small footprint of the works in terms of overall beach habitat and short-duration / temporary nature of the works the likely impact to threatened species and biodiversity is considered low.

That being said, the location is a highly valued conservation area and adjacent National Park estate. On occasion there have been turtles and shorebirds nesting at the location. Logger head and green turtles' nest between November and January. The timing of the physical scraping works either prior to mid-December or after March will significantly reduce the potential for impact on nesting sea turtles. This timing is in alignment that suggested by the Fitzgerald (2010) ecological assessment.

It is noted that this project aims to increase sand volumes and speed up accretion and natural enhancement of the dune. The objective of the project is to improve the dunal area and provide new habitats in the form of enhanced dunes for beach flora and fauna. Any short-term negative impact is considered to be outweighed by the benefit for potential turtle nesting in the long-term.

Shorebirds may be impacted by disturbance of food sources (intertidal benthic macrofauna), disturbance to foraging, nesting and breeding however the short duration of the weeks and limited footprint will minimise adverse impacts. Timing works in cooler months prior to September and between late November to mid-December may reduce potential conflict with nesting shorebirds, such as Pied Oystercatchers, Little Terns and Beach Stone Curlews, as well as other bird species that may utilise the dune environment for nesting, for example Rainbow Bee Eaters and Pardalotes.

Potential impact on nesting shorebirds, as well as any nesting sea turtles may be further ameliorated by completion of daily fauna checks prior to work commencing. These checks will be completed by the contractor as part of their pre-start checks and work site evaluation. Any nest sites will be clearly marked and works in the vicinity avoided until fledgling chicks or turtles have left the nest site or the site/s is no longer attended.

Rainbow Bee Eaters have been observed adjacent to the works area and have dug nest burrows in the sandy soils on the exposed frontal dune adjacent the Clarkes Beach Café. Beach scraping works and dune reprofiling are not proposed to be undertaken in this area of the dune and other works will avoid or work around these burrows. These birds are seasonal users of this habitat and work is proposed to be undertaken when they are not present.

Prior to the commencement of works a field inspection and assessment along the length of the project area will be undertaken:

- Take photographs of the foredune and dune escarpment;
- Observe vegetation that may be impacted by the works;
- Identify any evidence of bird nesting (including nest entrance tunnels) on the foredune and on the steep dune escarpment;
- Identify other native species in the vicinity of the works area (e.g. snakes, lizards).

Intertidal Benthic Macrofauna

Potential ecological impacts from beach scraping are twofold:

1. the removal of intertidal sand with direct mortality of benthic macrofauna (infauna) e.g. polychaete worms, pipis, crustaceans, molluscs and other invertebrates; and

2. the deposition of sand on the foredune face which may bury vegetation and the infauna of this zone, e.g. ghost crabs, invertebrates.

Movement of equipment has the capacity to crush and kill intertidal organisms, such as pipis, crabs, polychaete worms and other benthic macrofauna. The rates of recovery and intensity of these impacts depends on upon re-colonisation in both the deposition and excavation zones (Speybroek et al 2006). Rates of recovery are species specific and dependent on numerous factors, such as life stage.

A study in 1999 on the biological effects of beach scraping at Wooli, NSW found that infauna species abundance was less for the scraped sites than the unscraped, but there was no significant difference in species diversity between sites.

The impact of beach scraping on inter-tidal benthic macrofauna was monitored as part of the 2010 New Brighton Beach Scraping Trial by a marine scientist from the National Marine Science Centre (NMSC) part of Southern Cross University at Coffs Harbour. Dr Stephen Smith (and colleagues) assessed the impact of scraping on the small invertebrates living within the beach from the upper strandline to the lower tidal limit. A robust ecological monitoring program was implemented to investigate the impact of scraping on the ecology of beaches and thus the overall sustainability and feasibility of this management strategy for future use. The objective of the study was to assess the short-term effect of scraping (immediately after scraping activities ceased) and, if impact was detected, subsequent recovery (i.e. long-term impact) after the conclusion of beach scraping.

The study used a Before-After-Control-Impact model incorporating impact and control sites (at least 5000m from impact sites). Samples were taken immediately before beach scraping occurred and then at the following intervals following the conclusion of the works: 1 day, 1 week, 2 weeks and 4 weeks. The timing of the post-impact sampling events was based on the limited number of published accounts quantifying the temporal scale of recovery of beach infauna to extractive events. Schoeman et al. (2000) experimentally removed 200m2 of sediment to a depth of 0.3m from the intertidal section of a beach in South Africa and found that any putative impacts were no longer evident after approximately 2 weeks. Given the much larger scale of the beach scraping works (a linear distance of 1.31km), the authors anticipated that recovery would take more than 2 weeks and thus factored in sampling intervals up to 4 weeks after the event. An option to conduct additional sampling 8 weeks after the conclusion of scraping was considered should impacts still be evident after 4 weeks. Sediment samples were also taken in order to interpret any potential shifts is biotic data as changes in mean grain sizes of sand is known to be a key driver of biotic patterns in sedimentary environments.

The study failed to detect clear impacts on the beach infauna even 1 day after the final works through this comprehensive and robust study was an unexpected find for the authors. Previous work (assessing impacts of smaller disturbances) has indicated that recovery does not occur before a minimum of 2 weeks post impact (Schoeman et al., 2000).

The authors conclude that there is a number of possible reasons for this:

1. the highly dynamic nature of New Brighton beach is such that organisms are highly adapted to major changes in beach conditions (e.g. loss of sand from storms);
2. the type of impact was relatively benign in terms of factors that are known to affect beach infauna; or
3. the study was not sufficiently robust to detect changes.

The study found that there was no immediate effect on the biodiversity and assemblage patterns (species richness and abundance) of beach infauna and that the deposition of scraped sand did not cause major changes to beach granulometry (or gross modification to habitat). It is suggested in the study that the high energy and dynamic nature of the beach environment means that infauna have the capacity to recover rapidly from physical disturbance.

The intertidal zone is an area of high wave and tidal action and this high energy environment is less likely to be in stable equilibrium assemblage structure under natural conditions. Species within this highly dynamic zone are thought to have adapted to this variable environment which is subject to large physical disturbances such as storms, wave action, tides, sediment transport and turbidity (Batton, 2007). It is believed that species habituating this area recover from disturbance swiftly (Batton, 2007).

To minimise impacts of beach scraping on benthic infauna a scrape depth of 0.2m was recommended for adoption in the New Brighton campaign by Fitzgerald (2010).

Of note is that a single storm event can remove 1m+ of sand from a beach in a matter of hours. This project comprises mere scraping of a 20-30cm depth at a much slower timescale. As such the likelihood of impact to benthic infauna is considered negligible.

However, as an activity such as beach scraping has not been undertaken at this location (or within the Cape Byron Marine Park) to date, it is acknowledged that preliminary surveys are advantageous to understand species composition and distribution at this location and to highlight any concerns related to biological assemblages at this location.

DPE have reached out to the previous author and scientist at the National Marine Science Centre (Coffs Harbour), Dr Stephen Smith to undertake preliminary surveys in the project area to identify infauna assemblages across transects. An outline of the proposed project is at Appendix D. DPE are coordinating the survey and covering the costs of the study. It is anticipated that this study will inform future coastal management projects in the embayment as part of CMP preparation. Outcomes of the study may inform project methodology (i.e. avoid certain areas or location of regionally significant species) and any concerns related to the project.

4.9 Biodiversity values mapping

Check State Government mapping online.

The Biodiversity Values (BV) Map identifies land with high biodiversity value that is particularly sensitive to impacts from development and clearing (Figure 26). The map forms part of the Biodiversity Offsets Scheme Threshold which is one of the triggers for determining whether the Biodiversity Offset Scheme (BOS) applies to a clearing or development proposal. The map is prepared by the Department of Planning and Environment under Part 7 of the Biodiversity Conservation Act 2016 (BC Act). Biodiversity Values have been mapped in the vicinity of the project.

The project involves no clearing of native vegetation. No works are proposed in any area mapped as having high biodiversity value mapping.

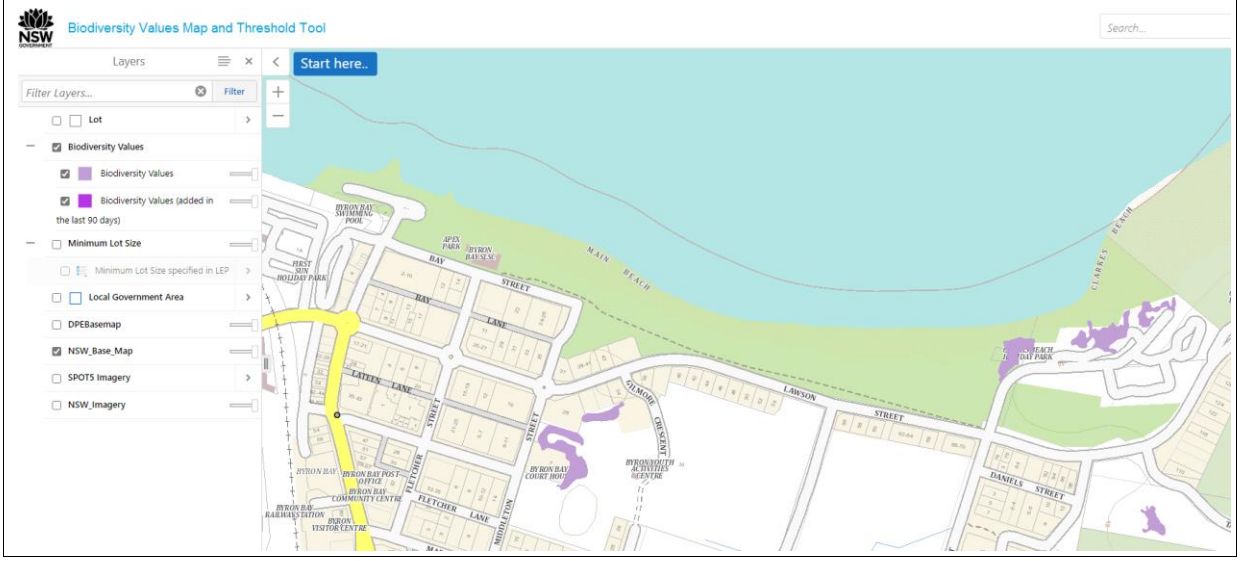


Figure 26: ***Biodiversity Values (BV) Map for the project location.***

4.10 Aboriginal cultural heritage

Undertake an AHIMS search and check Council's GIS.

Check Native Title claim maps and NSW Aboriginal land claim data, and identify traditional owners.

There are a variety of culturally significant areas located in the Byron Bay Embayment that includes pathways, middens, stone arrangement, stone resource sites, ceremonial sites and burials. Some of the sites are listed on the Aboriginal Heritage Information Management Service (AHIMS) site and are in close proximity to the project area (Appendix C). These culturally significant objects, resources and

areas are at risk of loss due to natural coastal processes and are of great significance to the Arakwal People.

The closest (known) sites are the recently discovered shell middens within the Reflections Holiday Park to the east of the project area, and the middens at Palm Valley (The Pass) also to the east. Both of these middens are well outside of the proposed footprint of this project.

The Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW (2010) (the Code), was used to inform the initial assessment of the environmental impacts of the activity to Aboriginal heritage. The Code assists organisations to exercise due diligence when carrying out activities that may harm Aboriginal objects and to determine whether a consent in the form of an Aboriginal Heirtage Impact Permit (AHIP) should be applied for. If it is found through this initial assessment process that Aboriginal objects will or are likley to be harmed, then further investigation and impact assessment is required to prepare information about the types of objects and the nature of the harm.

The primary consideration in this project is the disturbance of the ground surface and activities occuring in a landscape which is often associated with Aboriginal objects. Sand dunes and the beach (within 200m of waters) are landscape features that indicate the likely existence of Aboriginal objects. As outlined above, there are known middens in close proximity to the project location.

The project activities involve shallow excavation of highly mobilsed sand within the beach system, i.e. sand that has been transported recently by waves in the swash zone. This sand will be placed against an already eroded and disturbed dune face through shaping and re-profiling. Restoration and decommission of beach access ways will involve minor excavation and sculpting of the dune (and removal of waste). The location in general has a history of sand mining, with the dunes being highly disturbed and excavated in the past. However, there is potential for disturbance of already disturbed material (i.e. from sand historical sand mining) within the dune, noting that this material is generally found at depth and this project involves minor excavation of sand only.

Working through the due diligence assessment, it is considered unlikely that cultural heritage objects will be impacted by this project and an AHIP is not necessary. On the contrary, this project will assist in the protection of cultural heritage objects that may be located within the dune from future erosion or loss, by re-building/restoring the dunes. The Code advises that the project may proceed with caution, and that if any Aboriginal objects are found, enact the stop work procedure.

Notwithstanding this, Arakwal have expressed concern with the project due to perceived risk to cultural heritage at the location. During an early site walkover and discussion held on 28 June 2022 (Council, DPE, Arakwal and Marine Parks staff), Arakwal Corporation staff raised concerns about the potential for works to impact Aboriginal artefacts and/or heritage items. As Native Title holders, Arakwal hold the belief that all land and waterways in the area are essential to culture, and their conservation must be held in very high regard. Therefore it is the Arakwal community's belief that any external interference of any and all waterways, must be done with sensitivity and respect to the traditional custodians of the country. The Arakwal corporation expects Aboriginal Cultural Heritage monitors to be put in place for all council relevant projects and/or works at all times. As such, Arakwal advised that they consider an Aboriginal Cultural Heritage monitor mandatory for the entire project duration (from their perspective).

Council and DPE staff also met with Tweed Byron Local Aboriginal Land Council (TBLALC) staff for a site walkover and discussion on Wednesday 7 September 2022 to discuss the project works and potential risk to Aboriginal Cultural Heritage. Feedback on-site acknowledged that dune (batter) stabilisation and reshaping the dunes to the ‘angle of repose’ and revegetating as intensively and as quickly as possible is the only practical solution and is in the best interests of all stakeholders. TBLALC also acknowledged that there may be longer term changes (eg; increasing frequency and intensity of storm events) that could make all efforts futile but, right now the problems require remediation works. Informally TBLALC endorsed the beach scraping project and re-building of the dunes noting that they consider the project to be positive and the opposite of causing ‘harm’ to Aboriginal cultural heritage.

Provided in Appendix C is the site report produced by TBLALC which provides an outline of the site walkover and advice and recommendations to Council as to how to minimise any project risks Aboriginal Cultural Heritage (ACH). The report outlines the zero likelihood that the recently deposited beach sand

will contain any ACH objects and reconfirms that rectification of the dune erosion is the best way to protect and preserve the midden deposits and any other ACH that may be present in the dune system. In the opinion of TBLALC there is no potential to cause harm to ACH by scraping fresh sand onto the dune system with due care required when working directly on the dunes.

They confirmed that in general, Aboriginal Cultural Heritage monitoring is not required, (i.e. don't monitor what doesn't need to be monitored) and that any ACH that is encountered, which they consider to be unlikely, should be left in-situ.

As such, it is proposed that any potential risk to disturbance of already disturbed material will be mitigated through the below measures.

- Further consultation with Arakwal to disucss and clarify the project at a follow-up meeting, and discuss further any concerns they may have. A letter and the REF will be provided to Arakwal prior to the meeting.
- Prior to commencement of the project, a Cultural Heritage Awareness Induction will be provided to the work crew on site to ensure they are aware of, and vigilant for the prescence of Aboriginal Cultural Heritage material.
- Pre-start meeting with the project team and invited key stakeholders (e.g. Arakwal, TBLALC, DPE and Marine Parks) on the first day of project commencement.
- Consideration of an Aboriginal Cultural Site monitor onsite during certain phases:
    - Not for the winning of new sand (i.e. winning of highly mobilised sand from the surf zone) but potentially during the back beach dune works where placement of sand against the dune will be undertaken along with dune shaping and re-profiling.
- Stop work should shell middens or any cultural material be encountered onsite. Procedure to be applied in the case o unexpected finds is outlined in TBLALC report. Should any items be uncovered or exposed that may be of cultural signincance, a Cultural Officer will be enaged to asssess. Notification of DPE immediately if any cultural heritage objects found.

Due diligence process step	Comment
Will the activity disturb the ground surface or any culturally modified trees?	Yes. Shallow excavation of dunal areas and reshaping/resculpting around beach accesses. Shallow excavation of highly mobilsed sand with the beach system. Then placement on the dune through shaping and re-profiling.
Are there any relevant confirmed site records or other associated landscape feature information on AHIMS?	Yes. Closest sites are to the east within Reflections Holiday Park and at The Pass. Both of these middens are well outside of the proposed footprint of this project.
Are there any other sources of information of which a person is already aware?	Yes. The EIS's produced for coastal protection works at adjacent areas by Reflections and Crown Lands including AHIPs.
Are there any landscape features that are likely to indicate the presence of Aboriginal objects?	Yes. Within 200m of waters and located within a sand dune system.

Due diligence process step	Comment
If after completing steps above and no information indicates site importance, it is reasonable to conclude that there are no known Aboriginal objects or a low probability of objects occurring in the area of the proposed activity, you can proceed with caution. If the answer to any of the above questions is yes then the following three questions must be answered.	
Can harm to Aboriginal objects listed on AHIMS or identified by other sources of information and/or can the carrying out of the activity at the relevant landscape features be avoided?	Yes. No disturbance of any Aboriginal objects expected.
Does a desktop assessment and visual inspection confirm that there are Aboriginal objects on the site or that they are likely to be there?	No. Desktop assessment and site inspection with the TBLALC did not identify any Aboriginal objects in the proposed work area.
Is further investigation and impact assessment warranted?	No. The TBLALC site walkover has been completed (report provided Appendix C) and no further investigation or impact assessment is warranted.

4.11 Native Title and Crown land management

If Crown land, confirm reserve purpose and address Native Title through Council's Native Title Manager.

Several applications for a Native Title Claim within Byron Shire have been lodged over Crown Land including beaches and coastal waters. The Native Title Claims lodged under the *Aboriginal Land Rights Act 1983* (NSW) must be considered when actions are proposed on Crown land and any works must comply with the Native Title Act 1993.

Since 2001, voluntary Indigenous Land Use Agreements (ILUA) have been registered and apply for the area between Broken Head and Belongil Beach by the Bundjalung People of Byron Bay (Arakwal) People who are recognised as the Traditional Owners of the area. ILUA 2 with Bundjalung People of Byron Bay (Arakwal) People outlines Lot 18 DP1269368 as surrendered meaning Native Title has been extinguished to government via the ILUA 2 area agreement. The entire footprint of the project lies within land that are deemed 'Surrendered Lands' under this agreement.

The more recent ILUA from 2020 also covers the project area and a lot of the Shire. Council is not a party to this ILUA and is unfamiliar with the content of the agreement. It is assumed that this ILUA is between Arakwal and Crown Lands only.

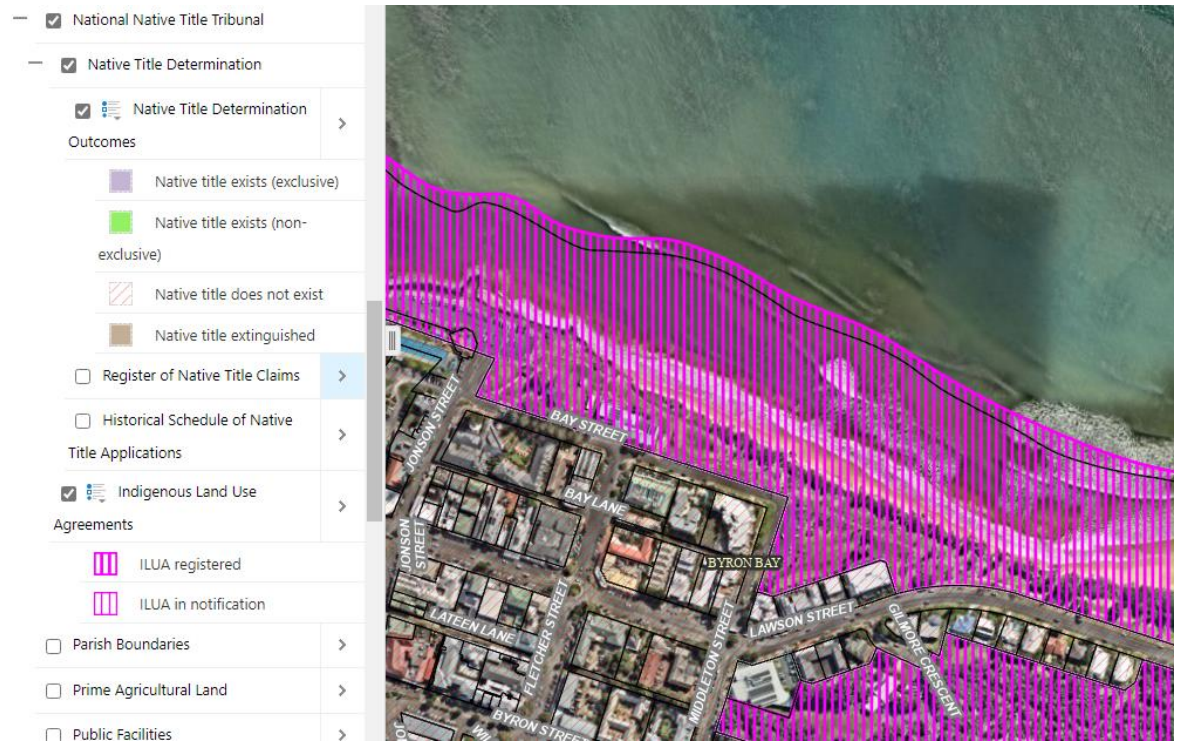


Figure 27: ***Image of Council's mapping system showing Native Title search***

Council's Native Title Manager confirmed that the project is within surrendered lands and Native Title manager advice is not needed. Advice was sought from the Department of Crown Lands as to whether Council being the land manager of the reserve requires a Licence for the works. This advice is provided in Appendix B which outlines that a licence is not required as long as the works are above the low water mark.

4.12 Non-Aboriginal heritage item or place or heritage conservation area

Check LEP, State Government Heritage Register and National Heritage List.

There are no listed non-Aboriginal heritage items within the project area. The closest heritage item is White's Cottage, located on Lot 410 / DP72962 and managed by the NSW Crown Holiday Parks Land Manager, Reflections Holiday Park. Built in 1953, Whites Cottage has local heritage significance with information and inventory sheet in the 2008 Community Based Heritage Study but is not listed on the Byron LEP 1988 or 2014.

4.13 Interests of external stakeholders (e.g. adjoining landowners, lease holders)

Internal

- Councillors
- Executive Team
- Relevant council staff
- Coast and ICOLL Advisory Committee

External

- Byron Shire community
- Adjacent landowners
- Byron Business Community

- Community Roundtable
- Media
- Schools – Byron Bay Public School, Community School, High School.
- Green and Clean Awareness Team (GCAT) Dune Care Group
- Byron Bay Masterplan Guidance Group
- Surf Schools and Kayak Companies
- Byron Beach Café
- Positive Change for Marine Life
- Market operators – Bryon Beachside Market
- Byron Bay Surf Club

Agencies/Authorities/NGO's:

- Arakwal Corporation
- Tweed Byron Local Aboriginal Land Council
- Reflections Holiday Park
- Department of Planning and Environment (DPE) – Environment, Energy and Science
- DPI Fisheries (Marine Parks)
- DPE Crown Lands
- Clarkes Beach Agency Working Group

4.14 Hazards mapping

Is the site affected by bushfire hazard?

Is the land subject to contamination?

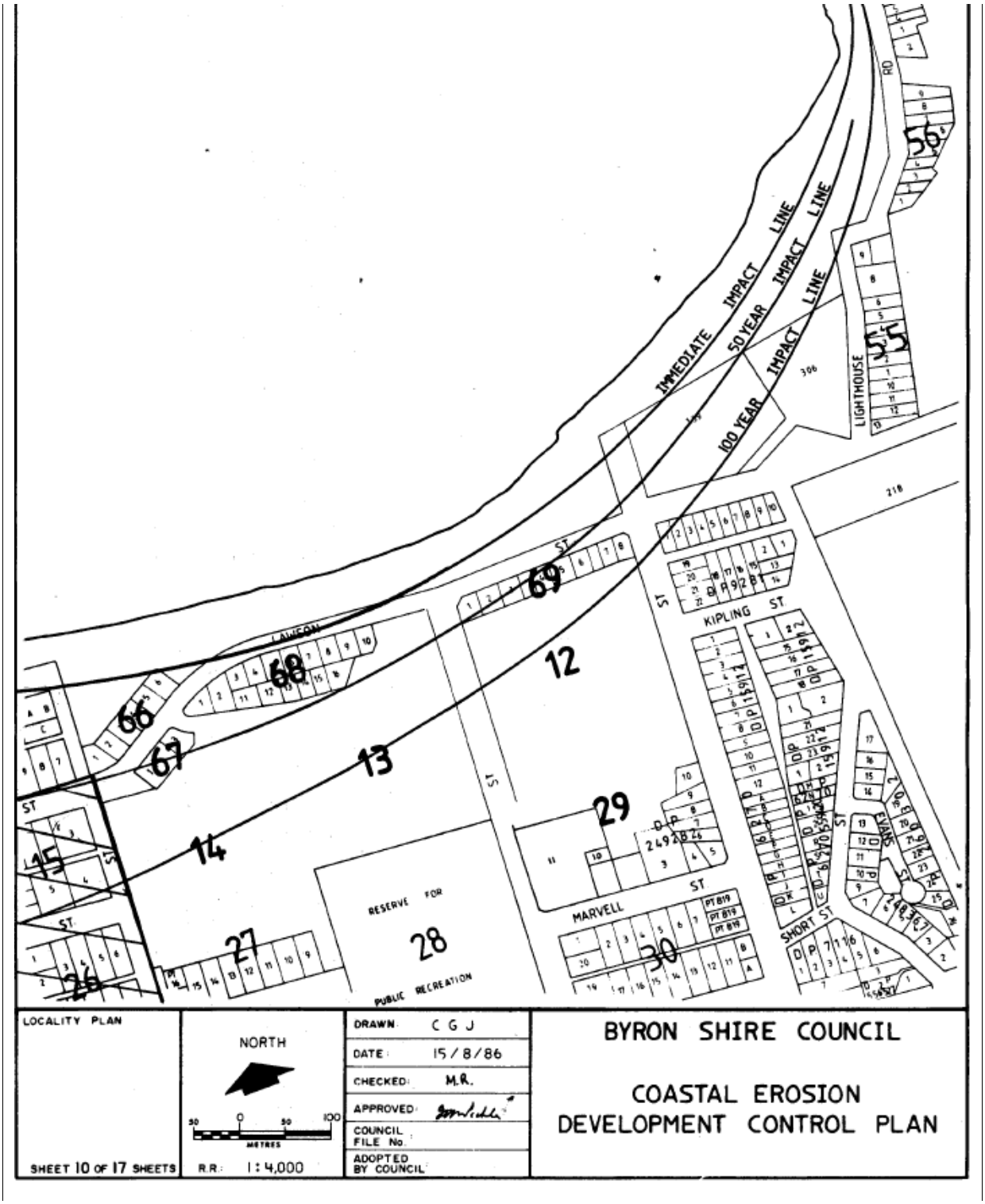
Is the site flood prone?

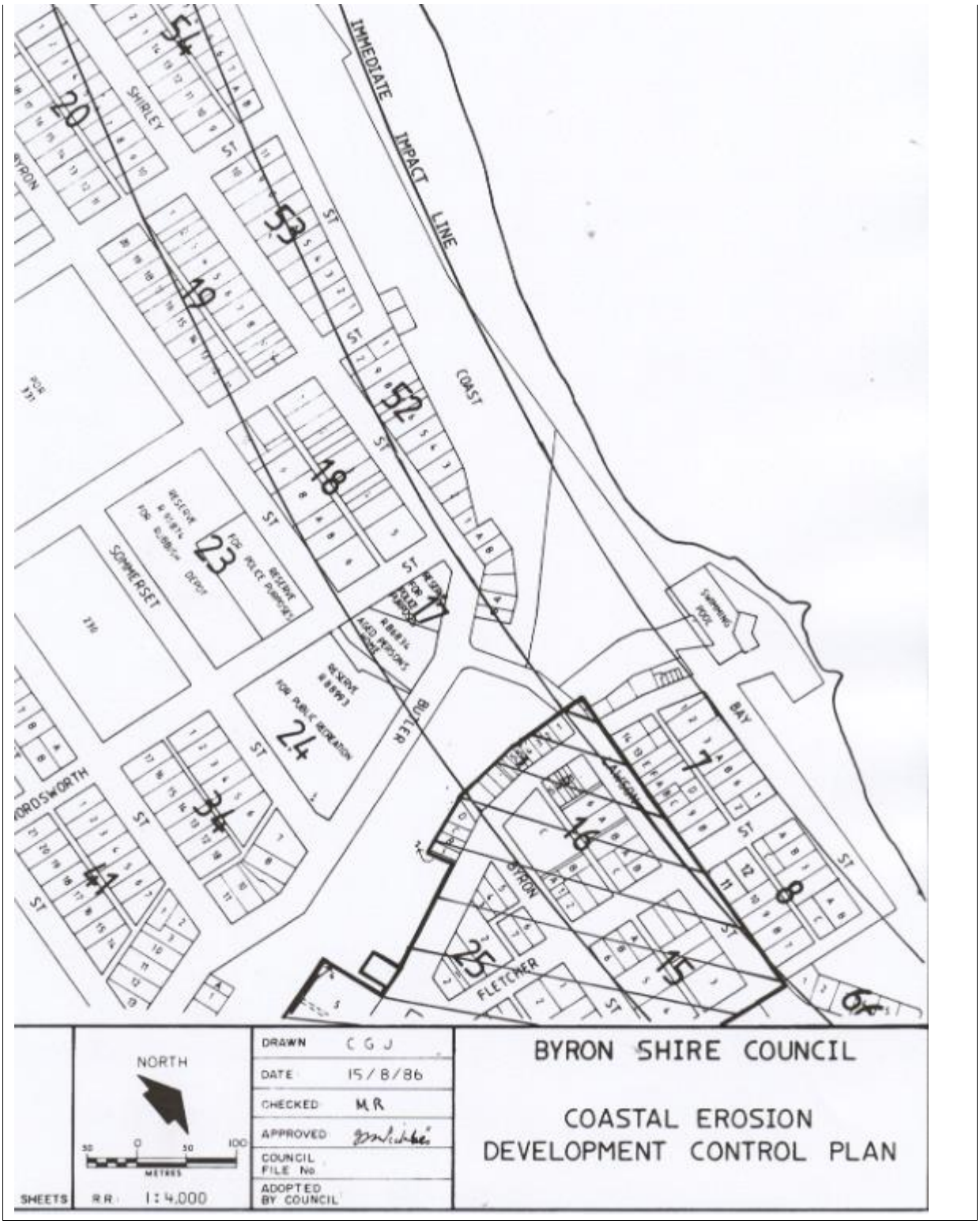
Other

All of the proposed works are within the Immediate Impact Zone as mapped by Council in DCP 2010. Coastal erosion has resulted in the landward movement of the dune escarpment at Main and Clarkes Beach beyond (landward) of the 'immediate hazard line' as detailed in the Byron Shire Coastline Hazard Assessment Update (BMT, 2013). This part of the coast is undergoing a long-term recession trend with significant short and long term temporal variability observed (BMT, 2013). Coastal erosion and long-term recession at this location poses an immediate and future risk to coastal values, public safety and beach amenity at this location.

Natural accretion has occurred in the form of a large volume of sand that has come into the bay and started the infill beaches in the eastern precincts. However, this sand volume/slug is slow moving.

Beach scraping is a proven management strategy in parallel with fencing of dunal areas and dune revegetation to restore dune ecosystems and habitat, improve beach amenity and beach safety. The works remove the scarped profile of the fore dune and improve beach access and amenity and accelerate natural dune building processes.


IMMEDIATE IMPACT LINE
50 YEAR IMPACT LINE
100 YEAR IMPACT LINE
LIGHTHOUSE RD
KIPLING ST
MARVELL ST
SHORT ST
EVANS ST
LAWSON ST
RESERVE FOR PUBLIC RECREATION
LOCALITY PLAN
NORTH
SHEET 10 OF 17 SHEETS
R.R. 1:4,000
DRAWN C G J
DATE 15/8/86
CHECKED M.R.
APPROVED
COUNCIL FILE No.
ADOPTED BY COUNCIL
BYRON SHIRE COUNCIL
COASTAL EROSION DEVELOPMENT CONTROL PLAN


IMMEDIATE IMPACT LINE
COAST
SHIRLEY
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CROSWORTH
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FLETCHER
BAY
NORTH
DRAWN C G J
DATE 15/8/86
CHECKED M R
APPROVED
COUNCIL FILE No
ADOPTED BY COUNCIL
SHEETS
RR 1:4,000
BYRON SHIRE COUNCIL
COASTAL EROSION
DEVELOPMENT CONTROL PLAN

Section 5 APPROVALS, LICENCES and PERMITS

Item	Locations that may trigger an external approval, licence or permit	*Check one*	
3.1	Working in an area containing endangered, threatened, vulnerable or protected species, populations, ecological communities or critical habitat (flora and fauna) *6. Department of Planning and Environment—Environment, Energy and Science Group (DPE–EES Group)* *7. Department of Primary Industries—Fishing (DPI–Fishing)*	☒ Yes	☐ No
3.2	Working on land reserved under the National Parks and Wildlife Act (e.g. National Park, Nature Reserve, Aboriginal area, wilderness area, conservation area or wild river) *8. Department of Planning and Environment—Environment, Energy and Science Group (DPE–EES Group)*	☐ Yes	☒ No
3.3	Working in an area of national environmental significance (Ramsar wetlands, threatened species, migratory birds, World Heritage, National Heritage, nature reserve, etc) or on Commonwealth land or marine area *9. Department of Agriculture, Water and the Environment (Commonwealth)*	☐ Yes	☒ No
3.4	Working within an area that is subject to any conservation agreement entered into under the *National Parks and Wildlife Act 1974* *10. Department of Planning and Environment—Environment, Energy and Science Group (DPE–EES Group)* *11. Relevant LALC*	☐ Yes	☒ No
3.5	Working within an area that is subject to any plan of management under the *National Parks and Wildlife Act 1974* *12. Department of Planning and Environment—Environment, Energy and Science Group (DPE–EES Group)* *13. Relevant LALC*	☐ Yes	☒ No
3.6	Working within an area that is subject to any joint management agreement under the *National Parks and Wildlife Act 1974* *14. Department of Planning and Environment—Environment, Energy and Science Group (DPE–EES Group)* *15. Relevant LALC*	☐ Yes	☒ No
3.7	Working in an area subject to a joint management agreement entered into under the *Threatened Species Conservation Act 1995* *16. Department of Planning and Environment—Environment, Energy and Science Group (DPE–EES Group)*	☐ Yes	☒ No
3.8	Working in an area subject to a biobanking agreement entered into under Part 7A of the *Threatened Species Conservation Act 1995* that applies to the whole or part of the land to which the activity relates *17. Department of Planning and Environment—Environment, Energy and Science Group (DPE–EES Group)*	☐ Yes	☒ No

Item	Locations that may trigger an external approval, licence or permit	*Check one*	
3.9	Working in an aquatic reserve or in marine vegetation such as seagrass, mangroves, saltmarsh, etc 18. *Department of Primary Industries—Fishing (DPI-Fishing)* 19. *Department of Primary Industries—Marine Parks (DPI–Marine Parks)* 20. *Department of Planning and Environment—Environment, Energy and Science Group (DPE–EES Group)*	☐ Yes	☒ No
3.10	Working in a Marine Park declared under the Marine Parks Act 21. *Department of Primary Industries—Marine Parks (DPI–Marine Parks)*	☒ Yes	☐ No
3.11	Dredging or reclamation of water. (Note that councils do not need approval for a controlled activity under the *Water Management Act 2000*) 22. *Department of Primary Industries—Fishing (DPI–Fishing); and/or* 23. *NSW Water* 24. *Transport for NSW*	☒ Yes	☐ No
3.12	Enlarge, deepen or sink a new water bore 25. *NSW Water*	☐ Yes	☒ No
3.13	An activity that will pollute water (eg dewatering) 26. *Department of Planning and Environment—Environment, Energy and Science Group (DPE–EPA Group)*	☐ Yes	☒ No
3.14	Working within the curtilage of a ‘Heritage Place’ or ‘Heritage Item’ identified on the Byron LEP Heritage Schedule, the State Heritage Register or the National Heritage List 27. *Australian Heritage Council* 28. *Heritage NSW* 29. *Heritage Council of NSW* 30. *Byron Shire Council*	☐ Yes	☒ No
3.15	Working within a ‘heritage conservation area’ identified in Byron LEP Schedule 5 Environmental Heritage – Part 2 31. *Byron Shire Council*	☐ Yes	☒ No
3.16	Working where a ‘Relic’ is likely to be discovered (eg Archaeological Zoning Plans) 32. *Heritage Council of NSW; or* 33. *Heritage NSW*	☐ Yes	☒ No
3.17	Working near Aboriginal relics or places where an Aboriginal Heritage Impact Permit (AHIP) may be required; working on land or water successfully claimed by traditional owners 34. *BoBBAC (Arakwal), Jali LALC, Tweed Byron LALC, Ngulingah LALC* 35. *Heritage NSW*	☒ Yes	☐ No
3.18	An activity comprising a fixed or floating structure in or over a navigable waterway 36. *Transport for NSW*	☐ Yes	☒ No

Item	Locations that may trigger an external approval, licence or permit	*Check one*	
3.19	An activity comprising work on Crown land not subject to a plan of management *37. Department of Planning and Environment—Crown Lands (DPE–Crown Lands)*	☐ Yes	☒ No
3.20	Working at sites at which asbestos or asbestos-containing materials exist. (Determine if a licence or exemption will be required) *38. SafeWork NSW*	☐ Yes	☒ No

Are any permit(s) required? ☒ Yes ☐ No

If **Yes**, please indicate what permit(s) are required:

		Check box if required
A	Fisheries Permit	☒
B	Marine Park Permit	☒
C	Other:	☐

If **Yes**, but no permits are required, please indicate why not:

Crown Land advice provided Council as a Land Manager of the project area does not require a CL Licence.

NOTE: If you have checked any ☒ **Yes** in the table above then you must do one of the following:

3. Attach a copy of the approval, licence or permit to the final REF, OR
4. Detail who is responsible for obtaining the approval, licence or permit, OR
5. Explain why the project is exempt.

NOTE: If you have checked ☒ **Yes** at any item in the table above, a referral to the relevant authority may still be required under the Transport and Infrastructure SEPP, even if a permit or approval is not required. A period of 21 days is allowed for response. All responses are to be considered and included in this assessment.

Section 6 ENVIRONMENTAL IMPACT ASSESSMENT

If an impact is predicted, place a **1**, **2** *or* **3** *in columns 7, 8 and 9. Multiply these three scores to obtain the environmental score in column 10.*

For each of columns 7, 8 and 9: 1 = *Minor* 2 = *Moderate* 3 = *Major*

Projects with any HIGH environmental score (greater than or equal to 10) will require specialist advice to assess environmental issues or re-evaluation of the project options or mitigation measures. It is recommended that there is consultation with your supervisor to determine the most appropriate course of action. Where the project is modified, a revised REF will be required.

		Columns:	4	5	6	7	8	9	10
			Multiply the three scores:			*1–3*	*1–3*	*1–3*	=
Item	Issue	Examples of impacts	Description of impacts AND causes *NOTE: Either check 'No impact' OR provide details*		Project-specific control measures	Likelihood	Extent	Sensitivity	Environmental score
6.1	AIR	**Construction:** Dust generation (excavating, disturbing soil, stockpiling, trenching, erosion-prone sites, clearing of vegetation, transporting soil, etc). Fumes, odours and other air pollution from vehicles, equipment, machinery or other activities.	☐ **No impact** *If checked, go to next issue*	The plant and equipment will generate local exhaust as part of the works. Soil has the potential to become windborne and create a dust issue (i.e sand stockpiles, exposed earth). [Noting that sand is wet and unlikely to be a problem]. The activity involves short term use of machinery including driving the machine onto the beach. There will be standard emissions of diesel fumes during the activity. Risks:. Excessive generation of exhaust during the works Windblown sand (dust) may be generated from the site compound and blow beyond the construction footprint	Construction equipment will be turned off when not in use. Site compound will be as small as possible to reduce ground disturbance. Stop work if wind blown sand is a problem.	3	1	1	3
6.2		**Operation:** Fumes, odours and other air pollution from vehicles, equipment, machinery or other activities.	☒ **No impact** *If checked, go to next issue*			Enter score	Enter score	Enter score	Multiply scores in columns 7,8,9

	Columns:		4	5	6	7	8	9	10
			Multiply the three scores:			*1–3*	*1–3*	*1–3*	=
Item	Issue	Examples of impacts	Description of impacts AND causes *NOTE: Either check 'No impact' OR provide details*		Project-specific control measures	Likelihood	Extent	Sensitivity	Environmental score
6.3	WATER	**Construction:** Polluting waterways, wetlands, stormwater drains or groundwater (eg storing, transporting, handling or disposing of oils, fuels, pesticides, chemicals, pit/trench water or other liquids). Machinery related spills (eg fuel, oil, hydraulic fluid). Sedimentation of waterways, wetlands, stormwater drains or groundwater (eg excavating, disturbing soil, stockpiling, trenching, concrete cutting, access tracks, erosion-prone sites, etc).	☐ **No impact** *If checked, go to next issue*	The machinery to be used is most likely the use diesel fuel and have hydraulic fluid and oils on board (i.e. minimal handling of oils etc necessary). Risks: Pollution may occur from mishandling of fuels or leaks of the machine. Pollution may occur to the beach if these bags are exposed by an erosion event.	All machines will be refuelled at the site compound (off the beach). Spill kits to be onsite (beach and within site compound) if any leaks occur. All plant will be washed down at the site compound to ensure no contaminants enter the Marine Park.	1	1	3	3
6.4		**Operation:** Polluting waterways, wetlands, stormwater drains or groundwater (eg storing, transporting, handling or disposing of oils, fuels, pesticides, chemicals, pit/trench water or other liquids).	☒ **No impact** *If checked, go to next issue*			Enter score	Enter score	Enter score	Multiply scores in columns 7,8,9

	Columns:		4	5	6	7	8	9	10
			Multiply the three scores:			*1–3*	*1–3*	*1–3*	=
Item	Issue	Examples of impacts	Description of impacts AND causes *NOTE: Either check 'No impact' OR provide details*		Project-specific control measures	Likelihood	Extent	Sensitivity	Environmental score
6.5	NOISE & VIBRATION	**Construction**: Noise/vibration (eg rock breakers, concrete cutters, jackhammers, chainsaws, compressors, excavators, backhoes, trucks, vehicles, cranes, steel plate movements, generators, etc).	☐ **No impact** *If checked, go to next issue*	The operation of the earthmoving machines will generate noise and likely vibration. However, this is expected to be relatively minor and similar in nature to the traffic on Lawson's road. Risks: Construction equipment and trucks cause excessive noise Working may occur outside of normal construction hours (7am-5pm Mon-Fri)	Turn off machines when not in use. Notification to nearby stakeholders about the possibility of vibration & noise impacts. Review work and noise mitigation if impacts are beyond reasonable / complaints are received.	3	1	2	6
6.6		**Operation:** Noise/vibration (eg pumps, generators).	☒ **No impact** *If checked, go to next issue*	Click here to enter text.	Click here to enter text.	Enter score	Enter score	Enter score	Multiply scores in columns 7,8,9

	Columns:		4	5	6	7	8	9	10
			Multiply the three scores:			*1–3*	*1–3*	*1–3*	=
Item	Issue	Examples of impacts	Description of impacts AND causes *NOTE: Either check 'No impact' OR provide details*		Project-specific control measures	Likelihood	Extent	Sensitivity	Environmental score
6.7	CONTAMINATION & WASTE	**Construction:** Disturbing contaminated soil (eg known contamination, ASS, old industrial site, previous landfill, etc). Disturbing old sand mining area or stockpile (radioactivity). Contaminating or polluting land (eg storing, handling or disposing of oils, fuels, pesticides, chemicals, pit/trench water or other liquids). Excavating public road material for reuse in the road reserve. Environmental problems caused by generating, storing, handling, transporting or disposing of waste (eg soils, building materials, oils, solvents, toilets, etc). Restricting current and potential activities associated with the land (eg amenity, buildings, parking).	☐ **No impact** *If checked, go to next issue*	The work involves shallow excavation of the beach of uncontaminated soil. The work involves shallow excavation around the Cowper Street stormwater drain. There may be discoloured (sludgy sand) uncovered. Minor amounts of buried general waste may be uncovered (fencing or geobags etc). The machinery to be used is most likely the use diesel fuel and have hydraulic fluid and oils on board (i.e. minimal handling of oils etc necessary). Risks: Pollution may occur from mishandling of fuels/hydraulic oil leaks etc on the machines	All machines will be refuelled at the site compound (off the beach). No re-fuelling to occur on the beach. Spill kits to be onsite if any leaks occur. Only the minimum amount of fuel will be onsite each day to run the machines. Plant operators to document the plant is clean upon arrival prior to works commencing. Prestart daily checks of plant to check for fuel and hydraulic leaks prior to commencing work each day. All waste will be removed from site. Implement Stop Work procedure and further investigation if any contaminated soil is thought to be encountered (i.e. different smell or looks different colour).	1	1	3	3

	Columns:		4	5	6	7	8	9	10
			Multiply the three scores:			*1–3*	*1–3*	*1–3*	=
Item	Issue	Examples of impacts	Description of impacts AND causes *NOTE: Either check 'No impact' OR provide details*		Project-specific control measures	Likelihood	Extent	Sensitivity	Environmental score
6.8		**Operation:** Contaminating or polluting land (eg storing, handling or disposing of oils, fuels, pesticides, chemicals, pit/trench water or other liquids). Environmental problems caused by generating, storing, handling, transporting or disposing of waste (eg soils, building materials, oils, solvents, etc). Restricting current and potential activities associated with the land (eg amenity, buildings, parking).	☒ **No impact** *If checked, go to next issue*	As outlined above.	Click here to enter text.	Enter score	Enter score	Enter score	Multiply scores in columns 7,8,9

	Columns:		4	5	6	7	8	9	10
			Multiply the three scores:			*1–3*	*1–3*	*1–3*	=
Item	Issue	Examples of impacts	Description of impacts AND causes *NOTE: Either check 'No impact' OR provide details*		Project-specific control measures	Likelihood	Extent	Sensitivity	Environmental score
6.9	TRANSPORT	**Construction:** Restricting or affecting transport (eg pedestrian, car, bus, train, airports, boats, river crossings, bus stops, public transport corridors and infrastructure, construction-related disturbances, property access, parking restrictions, etc).	☐ **No impact** *If checked, go to next issue*	The proposed works involve scraping sand and reprofiling the dune and access way works. Works will be undertaken between the lower and upper beach and will restrict pedestrian access alongshore through the project footprint. The project area will be sectioned off from the public via closing of the beach accessways. Machines will be floated to the site and a small site compound set up in the reserve. Impacts are considered manageable and low due to the short project duration. Risks: Interactions of construction plant / activities and community pedestrians Community members ignoring signs/fencing and using the beach access point anyway.	Pedestrians will be managed by an on-site Spotter/Safety person. The project area will be restricted to the general public – i.e. there will be no alongshore access during works. Pedestrians will have a number of open access ways they can use as an alternative. Signs on star pickets will be installed at the closed access points. Delivery of machines on floats will be managed through traffic control staff.	3	2	1	6

	Columns:		4	5	6	7	8	9	10
			Multiply the three scores:			*1–3*	*1–3*	*1–3*	=
Item	Issue	Examples of impacts	Description of impacts AND causes *NOTE: Either check 'No impact' OR provide details*		Project-specific control measures	Likelihood	Extent	Sensitivity	Environmental score
6.10		**Operation:** Restricting or affecting transport (eg pedestrian, car, bus, train, airports, boats, river crossings, bus stops, public transport corridors and infrastructure, construction-related disturbances, property access, parking restrictions, etc).	☒ **No impact** *If checked, go to next issue*	As outlined above.	Click here to enter text.	Enter score	Enter score	Enter score	Multiply scores in columns 7,8,9

6.11	FLORA & FAUNA	**Construction:** Clearing or modifying native vegetation (including trees, shrubs, grasses, roots, herbs or aquatic species). Clearing or modifying critical habitat. Clearing in a Biodiversity Value mapped area. In the case of threatened species, populations and ecological communities and their habitats, whether there is likely to be a significant effect on those species, populations or ecological communities, or those habitats. Introducing or spreading weeds (including noxious) or vermin. Introducing bushfire risk factors. Endangering any species of animal, plant or other form of life, whether living on land, in water or in the air (eg any danger to birds in the locality). Displacing, disturbing or damaging terrestrial or aquatic fauna (eg creating a barrier to fauna movement, clearing remnant vegetation or wildlife corridors, collisions, etc). Any other environmental impact on the ecosystems of the locality.	☐ **No impact** *If checked, go to next issue*	There are no planned impacts to dune flora and fauna as a result of the project including the critically endangered rainforest. Any impacts to dune flora and some fauna are expected to be positive as the project is a rehabilitation project and aims to restore the dunal habitat and vegetation. The project will impact on the park grass land in the reserve, but this is considered negligible as any grass that will be removed is being removed for replacement by native dune vegetation. No tree clearing or pruning is expected as a part of the works apart from moving around any trees that have fallen onto the beach from the eroding sand dune. These trees will remain in situ and placed at the toe of the dune. Shorebirds may be impacted by disturbance of food sources (intertidal benthic macrofauna), disturbance to foraging, nesting and breeding. Turtles may be impacted by disturbance to nesting area.	Operators are proficient in this work and operation of machinery within the beach/dune area. A declaration will be completed by the plant operators prior to floating to document the plant was clean upon arrival Implement a stop work policy when fauna enter the immediate work site where injury is possible. All plant to be washed down daily to ensure no weeds enter the Marine Park. A pre-project inspection of the dune and completion of daily pre-site checks. Any nest sites will be marked and works will avoid the nest. Completion of daily site checks and timing of the works to avoid key shorebird activity and turtle nesting periods. Undertake preliminary survey for biological species composition and distribution at this location and to highlight any concerns related to biological assemblages at this location.	3	1	2	6

	Columns:		4	5	6	7	8	9	10
			Multiply the three scores:			*1–3*	*1–3*	*1–3*	=
Item	Issue	Examples of impacts	Description of impacts AND causes *NOTE: Either check 'No impact' OR provide details*		Project-specific control measures	Likelihood	Extent	Sensitivity	Environmental score
				Benthic infauna will be directly impacted through direct mortality via removal of intertidal sand and the deposition of sand on the foredune face which will bury the infauna of this zone, e.g. ghost crabs, pipis, invertebrates. Risks: Impacting native vegetation on the site by machines accidently or as part of the construction methodology Importing weeds and vermin when floating plant and gear to site. Native fauna may be impacted by the works (i.e struck by moving plant) or through disturbance (nesting, feeding). Direct impacts to benthic infauna at borrow and placement area. Impact to benthic infauna through movement of equipment on the sand (crushing).	Limit beach scrape depth to 20cm. Ensure live pipis are collected periodically from scraped sand and taken back to below the tide line. Long-term impacts to biodiversity are **expected to be positive** as the project will restore dunal habitat and increase vegetation. .				

	Columns:	4	5	6	7	8	9	10
		Multiply the three scores:			*1–3*	*1–3*	*1–3*	=

Item	Issue	Examples of impacts	Description of impacts AND causes *NOTE: Either check 'No impact' OR provide details*		Project-specific control measures	Likelihood	Extent	Sensitivity	Environmental score
6.12		**Operation:** Introducing or spreading weeds (including noxious) or vermin. Introducing bushfire risk factors. In the case of threatened species, populations and ecological communities and their habitats, whether there is likely to be a significant effect on those species, populations or ecological communities, or those habitats. Endangering any species of animal, plant or other form of life, whether living on land, in water or in the air (eg any danger to birds in the locality). Displacing, disturbing or damaging terrestrial or aquatic fauna (eg creating a barrier to fauna movement, clearing remnant vegetation or wildlife corridors, collisions, etc). Any other environmental impact on the ecosystems of the locality.	☒ **No impact** *If checked, go to next issue*	Any impacts to dune flora and some fauna are **expected to be positive** as the project is a rehabilitation project and aims to restore the dunal habitat and vegetation.	Click here to enter text.	Enter score	Enter score	Enter score	Multiply scores in columns 7,8,9

6.13	SOCIAL	**Construction:** Creating a nuisance to the community (eg impact on amenity through noise, perceived risk of fires, explosions, property value devaluation, etc). Creating financial loss to members of the community (eg restricting access to commercial premises, changing land use, etc).	☐ **No impact** *If checked, go to next issue*	A number of beach accessways will be closed permanently within the reserve. The ones that are already closed have been closed for 18 months and no complaints have been received, hence impact to users is considered low. Permanent closing of some access ways is not considered an impact on the use of the reserve, as a number of beach access ways will be retained and restored. Affected landowners and Café users have a number of other accessways to use. The proposed works involve scraping sand and reprofiling the dune and access way works. Works will be undertaken between the lower and upper beach and will restrict pedestrian access alongshore within the project footprint. Primary footprint is to the west of the key businesses, however, the works interrupt or restrict commercial operations at times (e.g kayak operators and/or surf lessons). However any impacts are considered manageable and low due to the short project duration.	Timing of works not to coincide with school holidays and (where possible) not on Sundays or public holidays. Timing of works will best try to avoid key events and large activities. Event proponents will be alerted to the project works and timing. Use two machines/dozers to be more efficient and shorten the duration of the project and lessen the impact to users of the area. Community and stakeholder engagement plan developed and implemented. One-on-one contact with directly affected businesses. Education and information provided to the broader community on the project. Pedestrians will have a number of open access ways they can use as an alternative. Delivery of machines on floats will be managed through traffic control staff. Beach users will be managed by an on-site Spotter/Safety person. The project area will	3	1	2	6

	Columns:		4	5	6	7	8	9	10
			Multiply the three scores:			*1–3*	*1–3*	*1–3*	=
Item	Issue	Examples of impacts	Description of impacts AND causes *NOTE: Either check 'No impact' OR provide details*		Project-specific control measures	Likelihood	Extent	Sensitivity	Environmental score
					be restricted to the general public – i.e. there will be no alongshore access during works.				
6.14		**Operation:** Creating a nuisance to the community (eg impact on amenity through noise, perceived risk of fires, explosions, property value devaluation, etc). Creating quantifiable financial loss to members of the community (eg restricting access to commercial premises, changing land use, etc).	☐ **No impact** *If checked, go to next issue*	Any long-term impacts to the environment and community are **expected to be positive** as the project is a rehabilitation project and aims to restore the dunal habitat and beach amenity and access.	Click here to enter text.	Enter score	Enter score	Enter score	Multiply scores in columns 7,8,9

	Columns:		4	5	6	7	8	9	10
			Multiply the three scores:			*1–3*	*1–3*	*1–3*	=
Item	Issue	Examples of impacts	Description of impacts AND causes *NOTE: Either check 'No impact' OR provide details*		Project-specific control measures	Likelihood	Extent	Sensitivity	Environmental score
6.15	HERITAGE	**Construction:** Affecting a locality, item, place or building having aesthetic, anthropological, archaeological, architectural, historical, scientific, cultural or social significance or other special value (eg visual effect on adjoining heritage buildings or items; disturb, move, excavate Aboriginal object) or working where heritage items could be found. Affecting any Aboriginal heritage (eg engravings, middens, carved trees, grinding grooves, paintings, burial sites, etc).	☐ **No impact** *If checked, go to next issue*	The project activities involve shallow excavation of highly mobilsed sand within the beach system, i.e. sand that has been transported recently by waves in the swash zone. It is considered unlikely (low likelihood) that cultural heritage may be impacted by this project and an AHIP is not necessary. The code advises that project may proceed with caution, and that if any Aboriginal objects are found, enact the stop work procedure.	Staff/contractors to undertake a Cultural Heritage Awareness Induction. Stop Work procedure should shell middens or Aboriginal artefacts be identified onsite. Impact to the cultural heritage is **expected to be positive** as the project will rehabilitate and restore the dunes, thereby protecting any objects within the dune system	1	1	3	3
6.16		**Operation:** Affecting a locality, item, place or building having aesthetic, anthropological, archaeological, architectural, historical, scientific, cultural or social significance or other special value (eg visual effect on adjoining heritage buildings or items; disturb, move, excavate Aboriginal object) or working where heritage items could be found. Affecting any Aboriginal heritage (eg engravings, middens, carved trees, grinding grooves, paintings, burial sites, etc). Affecting land claimed by traditional owners.	☐ **No impact** *If checked, go to next issue*	Any long-term impacts to the environment and/or cultural heritage are **expected to be positive** as the project is a rehabilitation project and aims to restore the dunal habitat thereby protecting any underlying heritage items.	Click here to enter text.	Enter score	Enter score	Enter score	Multiply scores in columns 7,8,9

	Columns:	4	5	6	7	8	9	10
		Multiply the three scores:			*1–3*	*1–3*	*1–3*	=

Item	Issue	Examples of impacts	Description of impacts AND causes *NOTE: Either check 'No impact' OR provide details*		Project-specific control measures	Likelihood	Extent	Sensitivity	Environmental score
6.17	VISUAL & OTHER ENVIRONMENTAL ISSUES	**Construction:** The effect of an activity on any wilderness area (within the meaning of the *Wilderness Act 1987*) in the locality in which the activity is intended to be carried on. Changing the visual or scenic landscape (eg impacting or restricting views). Transforming a locality (eg significant earthworks).	☒ **No impact** *If checked, go to next issue*	Click here to enter text.	Click here to enter text.	Enter score	Enter score	Enter score	Multiply scores in columns 7,8,9
6.18		**Operation:** Any other risk to the safety of the environment (eg long-term effects on the environment as a result of waste emissions). Increasing demands on resources (natural or otherwise) that are or are likely to become in short supply (eg demand on water use). Changing the visual or scenic landscape (eg impacting or restricting views). Transforming a locality (eg significant earthworks). Any cumulative environmental effect with other existing or likely future activities. Reducing the range of beneficial uses of the environment (eg effect on surrounding land uses and considering response of affected land owners).	☐ **No impact** *If checked, go to next issue*	Any long-term impacts to the environment and community are **expected to be positive** as the project is a rehabilitation project and aims to restore the dunal habitat and beach amenity and access.	Implement Community and Stakeholder Engagement Plan. Provide education and information on the project – scope and benefits.	3	1	1	3
6.19	OTHER	Click here to enter text.	☒ **No impact** *If checked, go to next issue*	Click here to enter text.	Click here to enter text.	Enter score	Enter score	Enter score	Multiply scores in columns 7,8,9
					TOTAL ENVIRONMENTAL SCORE:				**39**

NOTE 1: For the purpose of attaining the objects of this Act relating to the protection and enhancement of the environment, a determining authority in its consideration of an activity shall, notwithstanding any other provisions of this Act or the provisions of any other Act or of any instrument made under this or any other Act, examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity.

NOTE 2: In assessing the impacts on flora and fauna, Council must show that it has taken into account:

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

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity:

- is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
- is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

(c) in relation to the habitat of a threatened species or ecological community:

- the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and
- whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and
- the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality,

(d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

Section 7 ENVIRONMENTAL PLANNING AND ASSESSMENT REGULATION 2021, SECTION 171(2) CHECKLIST

In addition to the requirements of the "Is an EIS required?" guideline, the following factors listed in section 171(2) of the Environmental Planning and Assessment Regulation 2021 *must be considered to assess the likely impacts of the proposal on the environment.*

Compliance with section 171(2) of the EPA Regulation 2021

Environmental factor	IMPACTS:		Minor	Medium	Major
• Any environmental impact on a community? There will be short-term impacts to the community through limitation of access to and along the beach at times. However any impacts are considered manageable and low due to the short project duration. Any long-term impacts to the community are **expected to be positive** as the project is a rehabilitation project and aims to restore the dunal habitat and beach amenity and access.	☐ Nil *If checked, go to next factor*	☒ Positive	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☒ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
		☒ Negative	☒ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
• Any transformation of a locality? Click here to enter text.	☒ Nil *If checked, go to next factor*	☐ Positive	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
		☐ Negative	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term

Environmental factor	IMPACTS:		Minor	Medium	Major
• Any environmental impact on the ecosystems of a locality? There are no planned impacts to dune flora and fauna as a result of the project including the critically endangered rainforest. Any impacts to dune flora and some fauna are expected to be positive as the project is a rehabilitation project and aims to restore the dunal habitat and vegetation. The project will impact on the park grass land in the reserve, but this is considered negligible as any grass that will be removed is being removed for replacement by native dune vegetation. Shorebirds may be impacted by disturbance of food sources (intertidal benthic macrofauna), disturbance to foraging, nesting and breeding. Turtles may be impacted by disturbance to nesting area. Benthic infauna will be directly impacted through direct mortality via removal of intertidal sand and the deposition of sand on the foredune face which will bury the infauna of this zone, e.g. ghost crabs, pipis, invertebrates.	☐ Nil *If checked, go to next factor*	☒ Positive	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☒ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
		☒ Negative	☒ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
• Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality? Any long-term impacts to the community and environment are **expected to be positive** as the project is a rehabilitation project and aims to restore the dunal habitat and beach amenity and access.	☐ Nil *If checked, go to next factor*	☒ Positive	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☒ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
		☐ Negative	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term

Environmental factor	IMPACTS:		Minor	Medium	Major
• Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present generations? Click here to enter text.	☒ Nil *If checked, go to next factor*	☐ Positive	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
		☐ Negative	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
• Any impact on habitat or any protected fauna (within the meaning of the *Biodiversity Conservation Act 2016*)? Shorebirds may be impacted by disturbance of food sources (intertidal benthic macrofauna), disturbance to foraging, nesting and breeding. Turtles may be impacted by disturbance to nesting area. Benthic infauna will be directly impacted through direct mortality via removal of intertidal sand and the deposition of sand on the foredune face which will bury the infauna of this zone, e.g. ghost crabs, pipis, invertebrates.	☐ Nil *If checked, go to next factor*	☐ Positive	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
		☒ Negative	☒ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
• Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air? Shorebirds may be impacted by disturbance of food sources (intertidal benthic macrofauna), disturbance to foraging, nesting and breeding. Turtles may be impacted by disturbance to nesting area. Benthic infauna will be directly impacted through direct mortality via removal of intertidal sand and the deposition of sand on the foredune face which will bury the infauna of this zone, e.g. ghost crabs, pipis, invertebrates	☐ Nil *If checked, go to next factor*	☐ Positive	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
		☒ Negative	☒ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term

Environmental factor	IMPACTS:		Minor	Medium	Major
• Any long-term effect on the environment? Any long-term impacts to the community and environment are **expected to be positive** as the project is a rehabilitation project and aims to restore the dunal habitat and beach amenity and access.	☐ Nil *If checked, go to next factor*	☒ Positive	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☒ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
		☐ Negative	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
• Any degradation of the quality of the environment? Click here to enter text.	☒ Nil *If checked, go to next factor*	☐ Positive	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
		☐ Negative	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
• Any risk to the safety of the environment? Any long-term impacts to the community and environment are **expected to be positive** as the project is a rehabilitation project and aims to restore the dunal habitat and beach amenity and access.	☐ Nil *If checked, go to next factor*	☒ Positive	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☒ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
		☐ Negative	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term

Environmental factor	IMPACTS:		Minor	Medium	Major
• Any reduction in the range of beneficial uses of the environment? There will be short-term impacts to the community through limitation of access to and along the beach at times. However any impacts are considered manageable and low due to the short project duration. Any long-term impacts to the community and environment are **expected to be positive** as the project is a rehabilitation project and aims to restore the dunal habitat and beach amenity and access.	☐ Nil *If checked, go to next factor*	☒ Positive	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☒ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
		☒ Negative	☒ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
• Any pollution of the environment? Click here to enter text.	☒ Nil *If checked, go to next factor*	☐ Positive	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
		☐ Negative	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
• Any environmental problem associated with the disposal of waste? Click here to enter text.	☒ Nil *If checked, go to next factor*	☐ Positive	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
		☐ Negative	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term

Environmental factor	IMPACTS:		Minor	Medium	Major
• Any increased demand on resources, natural or otherwise which are, or are likely to become, in short supply? Click here to enter text.	☒ Nil *If checked, go to next factor*	☐ Positive	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
		☐ Negative	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
• Any cumulative environmental effect with other existing or likely future activities? Click here to enter text.	☒ Nil *If checked, go to next factor*	☐ Positive	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
		☐ Negative	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
• Any impact on coastal processes and coastal hazards, including those under projected climate change conditions? Click here to enter text.	☒ Nil *If checked, go to next factor*	☐ Positive	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
		☐ Negative	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term

Environmental factor	IMPACTS:		Minor	Medium	Major
• Any applicable local strategic planning statements or regional strategic plans or district strategic plans? Click here to enter text.	☒ Nil *If checked, go to next factor*	☐ Positive	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
		☐ Negative	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term

Section 8 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

Under the environmental assessment provisions of the Environment Protection and Biodiversity Conservation Act 1999*, the following Matters of National Environmental Significance are required to be considered to assist in determining whether the proposal should be referred to the Australian Government Department of Agriculture, Water and the Environment.*

Factor	IMPACTS:		Minor	Medium	Major
• Any impact on a World Heritage property? *State whether the proposal would impact on a World Heritage property. If yes, describe the extent of the impact. If impacts are likely, describe the nature and extent of the impacts.* Click here to enter text.	☒ Nil *If checked, go to next factor*	☐ Positive	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
		☐ Negative	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
• Any impact on a National Heritage place? *State whether or not the proposal would impact on a National Heritage place. If impacts are likely, describe the nature and extent of the impacts.* Click here to enter text.	☒ Nil *If checked, go to next factor*	☐ Positive	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
		☐ Negative	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term

Factor	IMPACTS:		Minor	Medium	Major
• Any impact on a wetland of international importance? *State whether the proposal would impact on a Commonwealth-listed wetland of international importance. If impacts are likely, describe the nature and extent of the impacts.* Click here to enter text.	☒ Nil *If checked, go to next factor*	☐ Positive	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
		☐ Negative	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
• Any impact on a listed threatened species or community? *State whether the proposal would impact on a Commonwealth-listed threatened species or community. If impacts are likely, describe the nature and extent of the impacts.* Click here to enter text.	☒ Nil *If checked, go to next factor*	☐ Positive	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
		☐ Negative	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
• Any impact on listed migratory species? *State whether the proposal would impact on a Commonwealth-listed migratory species. If impacts are likely, describe the nature and extent of the impacts.* Click here to enter text.	☒ Nil *If checked, go to next factor*	☐ Positive	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
		☐ Negative	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term

Factor	IMPACTS:		Minor	Medium	Major
• Any impact on a Commonwealth marine area? *State whether the proposal would impact on a Commonwealth marine area. If impacts are likely, describe the nature and extent of the impacts.* Click here to enter text.	☒ Nil *If checked, go to next factor*	☐ Positive	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
		☐ Negative	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
• Does the proposal involve a nuclear action (including uranium mining)? *State whether the proposal would involve a nuclear action. If impacts are likely, describe the nature and extent of the impacts.* Click here to enter text.	☒ Nil *If checked, go to next factor*	☐ Positive	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
		☐ Negative	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
• Additionally, any impact (direct or indirect) on Commonwealth land? *State whether the proposal would impact (either directly or indirectly) on Commonwealth land. If impacts are likely, describe the nature and extent of the impacts.* Click here to enter text.	☒ Nil *If checked, go to next factor*	☐ Positive	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term
		☐ Negative	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term	☐ Short-term ☐ Medium-term ☐ Long-term

Section 9 CONCLUSION

9.1 Publishing the REF on the NSW Planning Portal

	Check one	
Does the activity have a capital investment value of more than $5 million?	☐ Yes	☒ No
Does the activity require an approval or permit in relation to:		
• Fisheries Management Act 1994 (sections 144, 200, 205, 219)?	☒ Yes	☐ No
• Heritage Act 1977 (section 57)?	☐ Yes	☒ No
• National Parks and Wildlife Act 1974 (section 90)?	☐ Yes	☒ No
• Protection of the Environment Operations Act 1997 (sections 47–49 or 122)?	☐ Yes	☒ No
Is it in the public interest to publish the REF?	☒ Yes	☐ No

If the answer to any of the above questions is **Yes** then the REF must be published on the Council website OR the NSW Planning Portal.

9.2 Person who prepares this REF

I certify to the best of my knowledge that:

- I have completed this REF, and
- The assessment meets the requirements of sections 1.7, 5.5 and 5.7 of the EPA Act, section 171(2) of the EPA Regulation and other relevant legislation and guidelines, and
- The information contained in this REF is not materially misleading, and
- My assessment has been adequately completed, and
- My conclusion as to the likely environmental and community impact of the project is reasonable, and is likely to be ☒ **LOW** ☐ **MODERATE** ☐ **HIGH** *(check one)*, and
- I am satisfied that, subject to the inclusion of the mitigation measures included in this REF, the project will not have a significant impact on the environment during both the construction and operation phases, and
- An Environmental Impact Statement is not required, and
- A Species Impact Statement is not required, and
- The REF is required to be published on the Council website or NSW Planning Portal.

Signature:		Date:	19/09/2022
Name *(print)*:	Chloe Dowsett		
Position:	Coast and Biodiversity Coordinator - Byron Shire Council		

Section 10 QUALITY ASSURANCE

10.1 Person who reviews this REF

I have reviewed this REF and agree with the conclusion in section 9.			
Signature:		Date:	Click here to enter date. 19/9/22
Name *(print)*:	Mike Svikis		
Position:	Mike Svikis Planning - Consultant		

Section 11 DETERMINATION

11.1 Determining officer – person who determines this REF

I certify that on behalf of Byron Shire Council I have reviewed the completed REF.

I conclude that the assessment has been adequately completed, the project has minor and predictable impacts, and the conclusion as to the likely environmental impact of the project is reasonable. I consider that an Environmental Impact Statement is not required and that a Species Impact Statement is not required.

The project can proceed subject to the mitigation measures in this REF, as well as any approval, licence or permit. I agree with the conclusion in section 9.

I determine that the REF is required to be published on the Council website or NSW Planning Portal.

Signature:		Date:	21/9/22
Name *(print)*:	Phil Holloway		
Position:	Director of Infrastructure Services		

APPENDIX A – Maps and Images

Topography of the Beach - Near Maps image from 16 July 2022

Map showing threatened flora search and Council's vegetation mapping (2021)

APPENDIX B

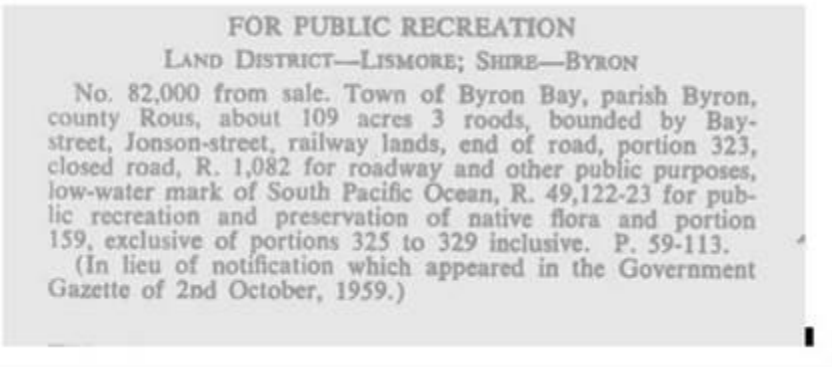
Community/Agency Consultation Responses

Dear Chloe,

Thank you for your email relating to seeking a licence from Crown Lands for the Main and Clarkes Beach Dune Recovery Project.

Thanks to the Crown Lands North Coast team for providing this advice.

As Council is the Crown Land Manager for Lot 10 DP1049827, Reserve 82000, Council can undertake the works to protect the reserve without a Crown Lands Licence. As long as the works are above the low water mark as per the gazettal (described below). Council will need to clearly articulate its Native Title pathway and document how this project is consistent with the reserve purpose, which is Public Recreation.



FOR PUBLIC RECREATION

LAND DISTRICT—LISMORE; SHIRE—BYRON

No. 82,000 from sale. Town of Byron Bay, parish Byron, county Rous, about 109 acres 3 roods, bounded by Bay-street, Jonson-street, railway lands, end of road, portion 323, closed road, R. 1,082 for roadway and other public purposes, low-water mark of South Pacific Ocean, R. 49,122-23 for public recreation and preservation of native flora and portion 159, exclusive of portions 325 to 329 inclusive. P. 59-113.
(In lieu of notification which appeared in the Government Gazette of 2nd October, 1959.)

It would be great to discuss this project at the next Clarkes Beach Working Group meeting. Reach out if you would like to discuss this further.

Kind regards
Malcolm

Malcolm Robertson
Senior Project Officer – Coastal Unit
Land & Asset Management

Crown Lands | Department of Planning and Environment
M 0409 310 449 | **E** malcolm.robertson@crownland.nsw.gov.au
30 Park Avenue, Coffs Harbour 2450
www.dpie.nsw.gov.au

The Department of Planning and Environment acknowledges that it stands on Aboriginal land. We acknowledge the traditional custodians of the land and we show our respect for elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.

Chloe Dowsett
Byron Shire Council

29th August 2022

To whom it may concern,

RE: Letter of support for Byron Bay – Main and Clarks Beach Dune Recovery Project

Brunswick Valley Landcare (BVL) is happy to support Byron Shire Council's project "Byron Bay – Main and Clarks Beach Dune Recovery Project".

The project to stabilise and regenerate a section of Main Beach in Byron Bay would be welcomed by the Green and Clean Awareness Team, the Landcare Locality group that works in this area.

BVL formed in 2003 and acts as an umbrella group for 23 locality groups and 2 special interest groups in Byron Shire. The Green and Clean Awareness Team are one of the longest running and most active locality groups. They hold regular working bees along the dunes at Main Beach and Clarkes Beach undertaking weeding and planting.

Brunswick Valley Landcare and Byron Shire Council have a Memorandum of Understanding and work collaboratively on many projects.

The Dune Recovery project will see significant outcomes to an important and much loved area of our coastal environment.

Brunswick Valley Landcare are happy to support the Green and Clean Awareness Team to work with Byron Shire Council on this project. The Green and Clean Awareness Team will support the project by

- Providing feedback on the Vegetation Management Plan (species, plantings etc),
- Attending a Dune Care Day which will be run by Bushland Restoration Services– morning tea and planting of some plants after the works,
- Assisting with maintenance of the area post works.

Should you require any more confirmation of support, please do not hesitate to contact me.

Yours sincerely

A Ratcliffe

Alison Ratcliffe
Landcare Coordinator for Byron Shire
Brunswick Valley Landcare Inc.
02 6626 7028

APPENDIX C

Aboriginal Heritage Information Management System Search and any Response from Traditional Owners

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : Search

Client Service ID : 711215

Byron Shire Council

Date: 24 August 2022

Station Street Mullumbimby
NSW New South Wales 2482

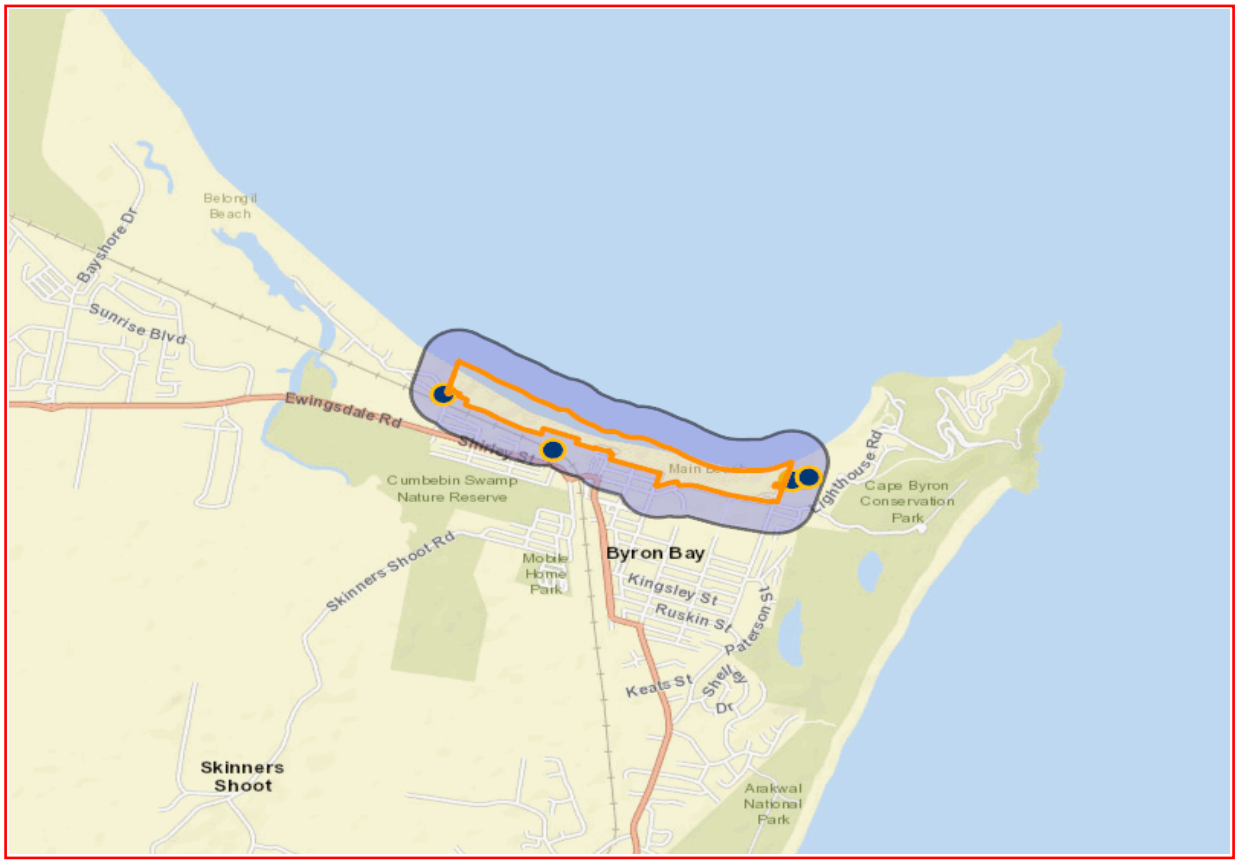
Attention: Chloe Dowsett

Email: chloe.dowsett@byron.nsw.gov.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 18, DP:DP1269368, Section : - with a Buffer of 200 meters, conducted by Chloe Dowsett on 24 August 2022.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

5	**Aboriginal sites are recorded in or near the above location.**
0	**Aboriginal places have been declared in or near the above location. ***

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (https://www.legislation.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Heritage NSW upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Heritage NSW and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date. Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

Level 6, 10 Valentine Ave, Parramatta 2150
Locked Bag 5020 Parramatta NSW 2124
Tel: (02) 9585 6345

ABN 34 945 244 274
Email: ahims@environment.nsw.gov.au
Web: www.heritage.nsw.gov.au

PO Box 6967, Tweed Heads South 2486
21/25 Ourimbah Rd, Tweed Heads 2485
Ph: 0755361763
Em: sites@tblalc.com

Tweed Byron Local Aboriginal Land Council

CULTURAL HERITAGE SITE INSPECTION REPORT

Main Beach and Clarkes Beach Dune Recovery Project

7 September 2022

REPORT PREPARED BY:

TBLALC CULTURAL HERITAGE UNIT

Conservation Planning Officer Maurice Gannon and

Senior Cultural Heritage Sites Officer Warren Phillips

Aboriginal people have deep spiritual and cultural connections with the land and have inherent responsibilities to ensure that those connections are maintained for future generations.

PURPOSE

There are numerous Federal, State and Local Government statutes, regulations, policies and guidelines that are applicable to the assessment of, and protection of, Aboriginal Cultural Heritage (ACH). The National Parks and Wildlife Act 1974 (NPW Act) is the primary legislation for the protection of ACH in New South Wales.

Part 6 of the NPW Act provides specific protection for Aboriginal Objects and declared Aboriginal Places by establishing offences of harm, for which significant penalties apply. Harm includes desecrating, destroying, defacing or damaging an Aboriginal Object or Aboriginal Place and, in relation to an Object, moving it from the land on which it has been situated.

The Tweed and Byron regions are abundantly rich in ACH. Extreme and extensive damage to the ACH of the region has occurred over many years, including very recently. The regions are also areas of rapid population growth and development. Therefore, the potential for ongoing harm to ACH is real and ever-present.

This report was prepared by the Cultural Heritage Unit (CHU) of the Tweed Byron Local Aboriginal Land Council (TBLALC), It summarises the findings resulting from an on-site inspection supported by desktop analysis, review of the TBLALC CHU databases and records, access to and consultation with Aboriginal community and knowledge-holders and informed awareness of Aboriginal history, traditions and lore.

LALCs have constitutional rights in relation to Aboriginal culture and heritage as set out in current NSW Government laws and associated regulations and policies. The TBLALC CHU provides independent, objective and professional advice to project proponents and participants and strives to work cooperatively with all other interested Aboriginal parties.

The site inspection considers both the tangible and intangible ACH of the site. TBLALC assesses the potential for harm and provides advice on avoidance, mitigation, and compliance with relevant legislation and codes of practice.

This report does not confer approval to harm ACH. The authority for such an approval rests solely with the NSW Government authorities and the process of applying for and obtaining such an approval is very detailed and substantive.

TBLALC's objectives are:

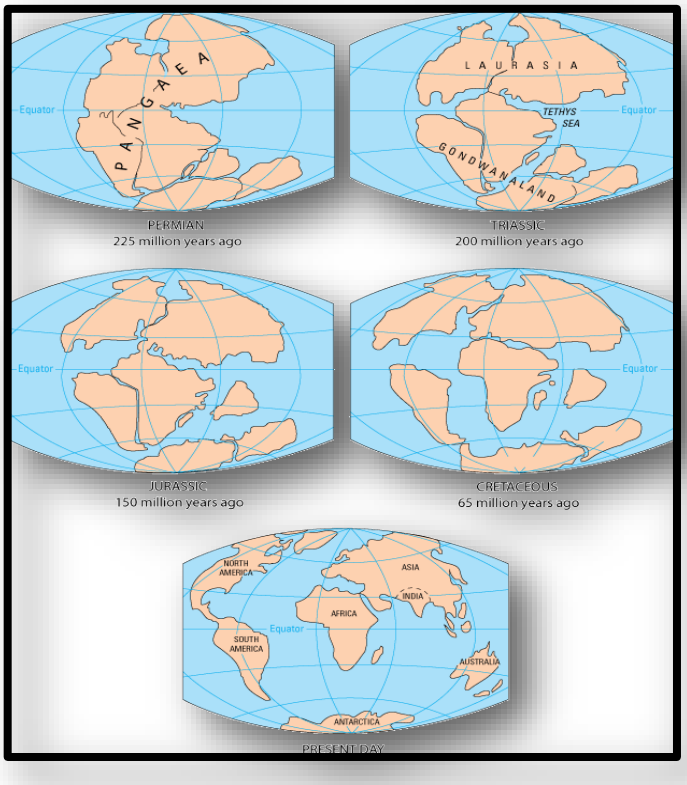
1. to ensure ACH is appreciated, respected, protected and preserved;

2. to inform you of ACH in the region and the actual and potential ACH on the site;

3. to inform you of the applicable law and potential risks involved in any proposed project; and

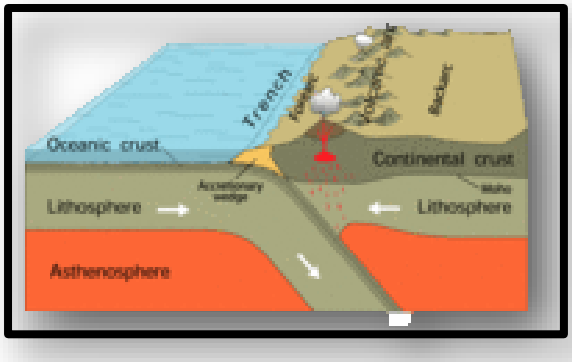
4. to provide advice and recommendations as to how you should go about minimizing your risks of legal breaches.

LANDSCAPE



The Australian continent has been tectonically stable for an exceptionally long time. About 370 to 290 million years ago a volcanic mountain chain extended along the Gondwana coast. The eroded sediments from the volcanic chain were deposited and settled differentially into coarse sands and finer silts and muds on the seafloor off the Gondwana coast.

Over the next 50 million years the oceanic plate was being subducted beneath the continental plate. The pressure and heat of the tectonic plate movements compressed and cooked the sediments and folded and thrust them upwards to form mountain ranges. The sediments were also penetrated by lavas that erupted onto the deep ocean floor. In some places innumerable siliceous skeletons of microscopic animals called radiolaria formed sediments of marine origins.



This process also caused metamorphism (cooking as squeezing) to form new minerals and rock types such as greywacke, argillite, greenstone and quartzite. These massive tectonic, volcanic and erosion and deposition processes continued during the next 140 million years as Australia rifted away from Antarctica.

Source: NASA Jet Propulsion Laboratory. California Institute of Technology. Shuttle Radar Topography Mission (SRTM) from the space shuttle Endeavour.

Australia is the only continent without any current volcanic activity but it hosts one of the world's largest extinct volcanoes, the Tweed Volcano. Rock dating methods indicate that the Tweed Volcano eruptions lasted about 3 million years, ending about 20 million years ago. Twenty million years of erosion has left this landform deeply eroded yet very recognizable, appearing as a caldera with a central peak. The central peak is the erosional stub of the volcanic neck; the central pipe that carried the magma upward. It is surrounded by ring dikes, which are circular sheets of magma that solidified and now form erosion-resistant ridges. The central peak is named Wollumbin (Mt. Warning). The topography of the northern rivers region is a record of this enormous shield volcano and the landscape evolution that has occurred since its creation. Low relief uplands interspersed between deeply eroded canyons form a radial pattern that clearly defines the shape and extent of the original volcanic dome.

LANDSCAPE (Cont.)

Erosion is most extensive on the eastern side because the eroding streams drained directly to the ocean and therefore had the steepest gradients. This asymmetry of erosion has been extreme enough that the volcano has been hollowed out by the east-flowing drainage, forming an erosional caldera. Calderas usually form as the result of collapse where magmas retreat within an active volcano. If collapse occurred here erosion may have removed the evidence but it produced a similar landform. This combination of volcanic activity and erosion and deposition processes over a vast area and enormous time span has resulted in the landforms and environmental features that define the area today.

The metamorphism and folding and uplifting of the marine sediments formed the Neranleigh–Fernvale basement rocks. The tectonic plate movements gave rise to the Burringbar and Condong Ranges. The erosion and deposition and folding of sediments generated the Clarence Moreton Basin. The more recent volcanism of the Tweed Shield Volcano created the Lamington Volcanics and lava flows the remnants of which remain at Kingscliff, Cudgen, Fingal, Banora, Cook Island and throughout the Tweed Valley.

The underlying country rock of much of the Tweed region is therefore made up of the Neranleigh-Fernvale beds, a somewhat unusual rock type of partially metamorphosed sediments - meta-sediments - and the volcanics of the Wollumbin shield volcano. These source rocks have been altered over millions of years by the combined effects of erosion, deposition and climatic and sea-level changes that produced ancient stream channels and geological remnants of earlier coastlines (paleo shorelines).

The in-situ chemical weathering of the of Pleistocene (Ice Age) country rock (up to 1.8 million years in age) results in the development (pedogenesis) of the volcanic soils and the poorly sorted, rocky, sandy and silty soils that make up the land surface today. More recent sedimentary deposits which, of course, dominate the coastal erosional and depositional environments, are Holocene in age (Present to 10,000 years). The Pleistocene and Holocene epochs, together make-up the Quaternary Period, which is the Period that includes human habitation.

Many of the rock types created by these tectonic, volcanic and geomorphic processes, such as quartzite, chert, silcrete, flint, quartz, obsidian and garnet, are the specific types that were used by Aboriginal people for stone tool making. For example, chert is formed by the silicification of beds of the deep sea sediments made up of the microscopic skeletons of marine organisms, mentioned earlier. Obsidian, at the other extreme, is formed by very rapid cooling of felsic volcanic lava.

All land has an ancient history. In the northern rivers regions of NSW we are extremely fortunate to be able to also relate the geological, geomorphological and environmental history with the human cultural history of the area. Aboriginal cultural heritage is a current, living and unbroken human relationship with country.

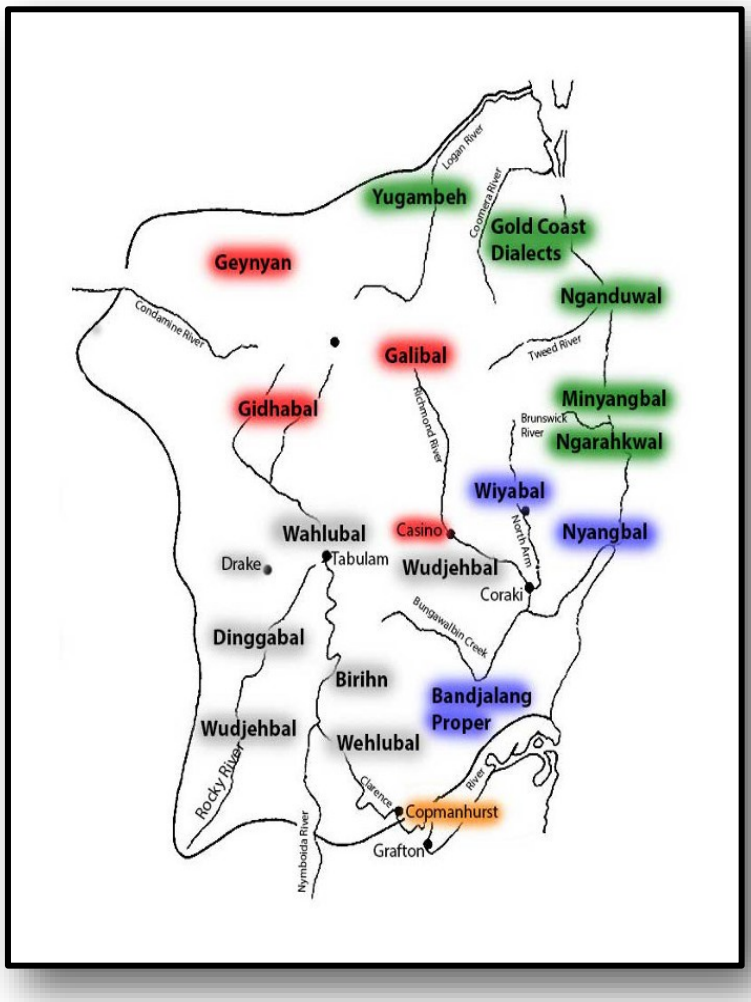
This is the landscape in which we live.

BRIEF ETHNOHISTORY OF THE ABORIGINAL PEOPLES OF THE TWEED AND BYRON

Aboriginal 'territories' were defined and maintained by languages and dialects. Ngandowal was spoken by people around the Tweed, Minyungbal south to Byron and Nyungbal around Ballina.

Within these language groups there were also clan groups occupying certain areas:

- The Goodjinburra were a clan group that lived along the coast between the Tweed and Brunswick Rivers. 'Goodgen' means 'red' and the territory of the Goodjinburra clan was, amongst other things, a source of ceremonial ochre.
- The Tul-gi-gin people lived around the North Arm; and
- The Moorang-Moobar people lived around the Southern and Central Arms around Wollumbin (Mt Warning).



References to Minyungbal, Ngnadowal, Goodjingburra, Tulgigin, Moorang-Moobar and Githabal (variously called Minjangbal, Minjyung, Minywoa, Gendo, Gando Minjang, Gandowal, Ngandowul, Cudgingberr, Coodjingburra, Gidhabal and many alternatives) are all references to the Bundjaung people.

Wollumbin is the central landmark in Bundjalung territory. It has mythical, spiritual and cultural significance to the Bundjalung and other Aboriginal people.

A very large number of sites containing physical evidence of past Aboriginal land use remain in the Tweed and Byron regions: middens, bora grounds/ceremonial grounds, fish traps, burials, innumerable artefact scatters, stone tools, caves, scarred trees, cultural places, story places and campsites. Aboriginal people currently living in the region have unbroken lineages, with Elders and knowledge holders who are the custodians of ancient knowledge and teachings and the carriers of oral histories and stories of Aboriginal cultural practices prior to non-Aboriginal settlement.

BRIEF ETHNOHISTORY OF THE ABORIGINAL PEOPLES OF THE TWEED AND BYRON

The earliest historical report of European observation of the Aboriginal population of northern coastal NSW was made by Captain James Cook on May 15, 1770, who, 25 kilometres south of the Tweed River "discovered smoke in many places and saw a group of natives". The first direct contact with was made by the explorer Lieutenant John Oxley on October 31, 1823: "200 Aboriginal men approximately five kilometres from the mouth of the Tweed River".

There is conjecture about the total populations of Aboriginal people prior to the arrival of Europeans. Allison Smith, daughter of the first pilot at Tweed Heads, stated: "At that time [early 1870s] hundreds of natives camped within the present town site". Of course there was no census and it is a known fact that Aboriginal populations were decimated by introduced diseases both before and after contact. N. C. Hewitt in the Tweed Daily 1923 Supplement quoted Henry Barnes of Dryaaba Station saying, "Some disease came amongst the blacks about 1858 and nearly one third of them on the coast died." In October 1923, a writer, 'Old Hand', in the Northern Star stated, "Dysentery occurred among the blacks in 1865 and carried off hundreds of victims." It is also a fact that massacres took place and historical records of such events were understated, to say the least.

The earliest reports record groups of hundreds of Aboriginals camped in the area. Records dating from the 1860's describe gatherings of the Tul-Gi-Gin and Moorung-Moobar people of up to 600 people in semi-permanent camps on the banks of the Tweed River.

Aboriginal people did not 'trespass' on each other's country but the coastal people moved more 'freely' across common territory. These limited historical records tempt the conclusion that territorial boundaries were more significant where resources were less abundant. The region is resource rich and resource zones were guarded. Seasonal events, such as the bunya-nut feasts, would result in large gatherings, sometimes drawing people from distant territories. Complex and strict rules governed trespass. Territory and interactions were likely linked to ceremony and ceremonial sites.

There was regular trade and interaction between both local and broader territories and so there was travel and gatherings for trade and seasonal and ceremonial events. Travel across territorial boundaries established pathways, campsites, tool-making sites, meeting and gathering places and ceremonial locations across the landscape.

The Bundjalung territory was replete with cultural sites. From the earliest days of interaction with white settlers corroboree sites, bora rings and ceremonial sites were well documented.. Many have been destroyed but the region, fortunately, is still rich in cultural material and other sites. Aboriginal people frequently used the coastal dunes as burial sites and cemeteries. There are numerous recorded Aboriginal burial sites around the Tweed and Byron region. The known sites and physical evidence represent a fraction of what would once have been present.

Rights of passage and 'directions' were established by levels of initiation, stories, traditional knowledge, songs and dances. The stories relate to 'country'; not just descriptive landscapes but also the animals and plants, the rocks, soils and waters and ancient histories and ancestral experiences. These pathways formed a network of 'songlines' and 'story places' that connected and traversed the entire continent and, in some cases, beyond. This is why the knowledge holders of Aboriginal communities are so profoundly respected. They are the repositories of ancient lore.

BRIEF OUTLINE OF ABORIGINAL LAND USE IN THE TWEED AND BYRON REGIONS

Aboriginal land use is classically described as 'subsistence'. A more current perspective would describe it as 'sustainable'. Resource use and people movements were determined in large part by seasonal resource availability and social customs. Living along the banks and in the catchments, estuarine outlets and wetlands of the Tweed, Brunswick, Richmond and Clarence Rivers, 'subsistence' involved the gathering of fresh and saltwater fish, shellfish and crustaceans. The roots of the Bungwahl fern was gathered from wetlands as a staple food item. Other animals were also hunted, particularly further inland, including wallabies, bandicoots, possums, flying foxes, echidnas, snakes, goannas and lizards, freshwater fish, ducks, pigeons and other birds. Edible and fruit and berry bearing plants were also harvested, as was wild honey.

The temperate and timbered environments also provided abundant resources for habitation structures and stone tool making. Sophisticated techniques, including nets, weirs, fish traps and spears were used in fishing. Nets were also used for hunting kangaroo. Bangalow palm leaves were used to make containers and the bark and trunks of various trees were used to make canoes.

Prior to the establishment of large-scale timber getting in the mid-1840s, the Bundjalung people had relatively little contact with the European settlers. Change was sudden and rapid: extensive dispossession and decimation of the Aboriginal population began with the establishment of large-scale timber getting industry in 1844. Although there are several records of violent and bloody conflicts Aboriginal people, with their unique skills and knowledge of the country assisted the timber getters and were rewarded with steel axes, flour, sugar, rum, tobacco and tea. As cedar resources diminished freehold land was opened to white settlers in the 1860s. Sugar cane, banana growing, dairying and commercial fishing industries started to develop and rail links were established by the late 1800's. Of course Aboriginal people were also used as labourers in timber getting and land clearing.

Land clearing, devastation of habitats and resources, destruction of sacred and ceremonial sites, disease, dispossession and seizure of Aboriginal women gave rise to violent conflict and Aboriginal people were forced into reserves and missions. Fortunately for the Bundjalung people coastal estuaries, dunes, beaches, swamps and lakes (in addition to mountains) weren't good farmlands and therefore there was some degree of relative 'refuge' on the coast .

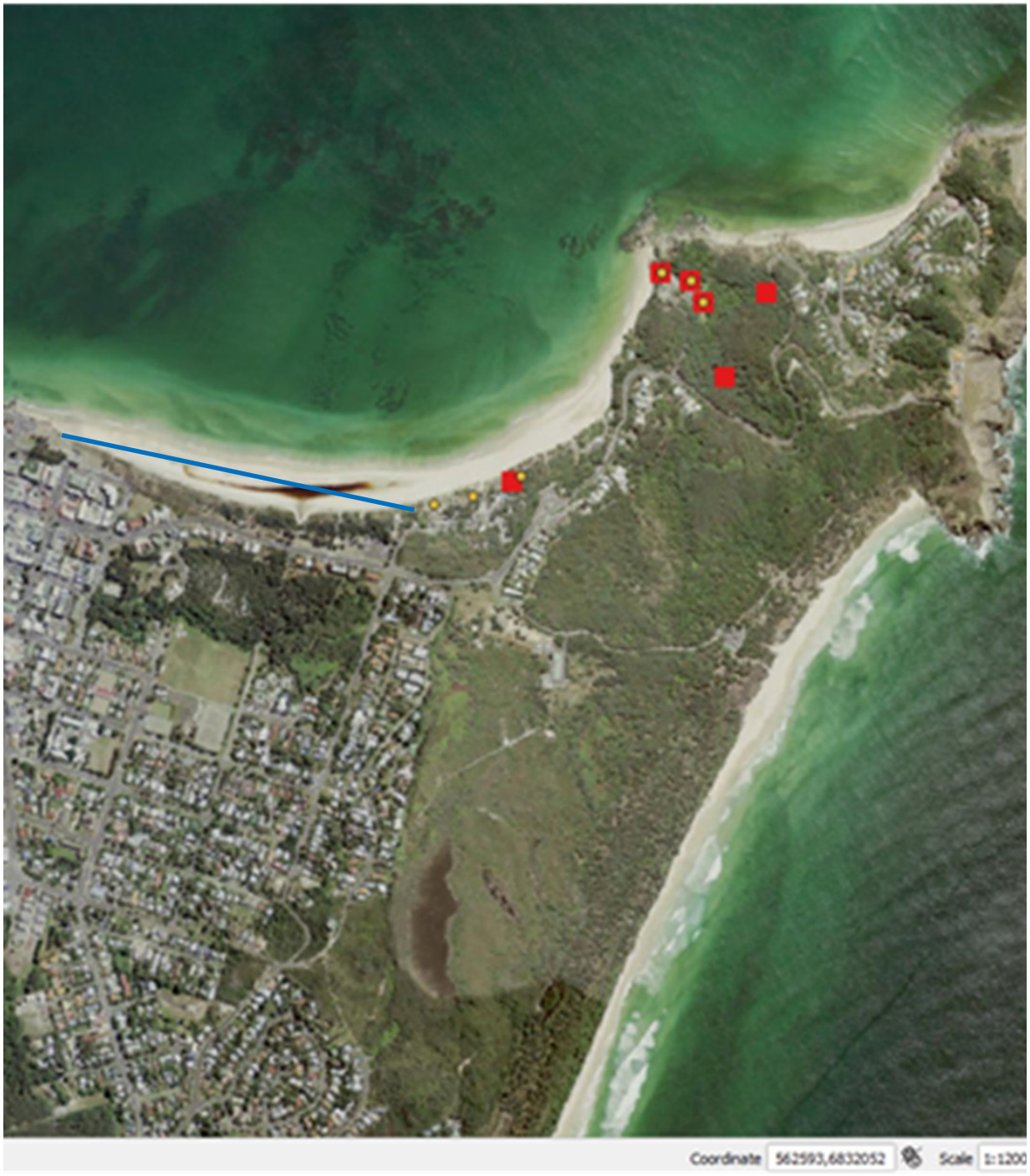
Adrian Piper (1983) noted, between 1865 and 1875 the solid social fabric and economic [Aboriginal] structure collapsed as the basis of a viable society. The last recorded Booral ceremony took place on the Upper Tweed in about the mid eighteen seventies. This is significant for it emphasises how devastating the impact of farming into the Tweed Valley really was. The ritual life is perhaps the strongest and most enduring element of any society, yet in the Tweed Valley it barely survived fifteen years of contact with farmers. With the loss of both traditional land and the ritual essential to Aboriginal society the Tweed Aborigines became refugees in their own land.

Fingal was established as an Aboriginal camp, 'the blacks camp', in the 1880s. Aboriginal life became more sedentary and was influenced by Christianity and Pacific Islander culture. The Aboriginal community of the Tweed Region is still strong and vibrant today with living descendants of the original people of the country. This is a strong, proud, sophisticated culture that literally comes from and belongs to this place and reaches back into prehistory,

LOCATION AND CULTURAL MAPPING

Main Beach and Clarkes Beach are relatively narrow beaches which are backed by quite steep dunes. The sand beaches are extremely dynamic sand erosion and deposition environments with virtually permanent tidal and runoff lagoon. In recent years the coastal erosion and the long-shore drift sand replenishment has been extreme and slumping of the dune system has occurred.

The blue line in the figure below indicates *approximately* the area of the proposed works. The yellow dots and the red squares indicate the locations of AHIMS registered sites. Notably, the registered sites are outside the area of the proposed works. This does not preclude the possibility that midden material may also be present in the dune system in the area of the proposed works. The recent erosion of the dune system has exposed in-situ midden deposits in the Clarkes Beach National Park area and, over the past five years, TBLALC has been engaged in several salvage projects.



AHIMS SEARCH

The Aboriginal Heritage Information Management System (AHIMS) database, compiled and maintained over many years by the NSW Government, currently records twelve Aboriginal sites in the area. Caution is required when using AHIMS records because often the data is incomplete and sometimes inaccurate. The number of registered AHIMS sites is also not the conclusive record of actual sites in any given area because the database is a function of the extent of research in the area. Local Aboriginal cultural knowledge of the area and the CHU's current database confirm that there are at least eight known sites in the area of, or in close proximity to, the proposed works . The AHIMS record, at least, confirms that Aboriginal cultural material is present in the area that is the subject of this report.

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : Main Beach
Client Service ID : 718416

TBLALC CHU
PO BOX 6967
TWEED HEADS SOUTH New South Wales 2486
Attention: Maurice Gannon
Email: sites@tblalc.com

Date: 16 September 2022

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 18, DP:DP1269368, Section : - with a Buffer of 1000 meters, conducted by Maurice Gannon on 16 September 2022.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.

A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

12	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

ABORIGINAL CULTURAL HERITAGE SITE INSPECTION OUTCOMES

A walkover of the are of the proposed works was undertaken on 7 September 2022. I attendance were:

- Chloe Dowsett, Coast, Biodiversity & Sustainability Coordinator, Byron Shire Council,
- Zoe Immisch, NSW Department of Planning and Environment,
- Warren Phillips, Senior Cultural Heritage Sites Officer, Cultural Heritage Unit, Tweed Byron Local Aboriginal Land Council,
- Maurice Gannon, Conservation Planning Officer, Cultural Heritage Unit, Tweed Byron Local Aboriginal Land Council.

Whilst the dune erosion has been observed over the recent past (4 to 5 years), the extent of the relatively beach sand replenishment was particularly noticeable. Obviously, there is virtually zero likelihood that the recently deposited beach sand will contain any Aboriginal cultural heritage (ACH) Objects or materials.

It has been our consistent opinion and advice over past years that batter stabilisation, reestablishment of the angle of repose, and revegetation of the dune system is the most appropriate and in fact the only practical long-term method for rectifying the erosion problem. Rectification of the dune erosion is also intrinsically the best way to protect and preserve the midden deposits and any other ACH that may be present in the dune system. Only now is there an abundance of fresh sand to enable this work to be undertaken.

In the opinion of the CHU there is no potential to cause harm to ACH by scraping fresh beach sand onto the dune system. Due care needs to be applied when working directly on the dune system. The objective should be to deliver the sand onto the dunes with as little 'impact' as possible. Any ACH that is encountered, which we consider to be unlikely, should be left in - situ. Only in situations in which ACH is encountered and will be 'harmed' (i.e.; moved or destroyed) by the proposed works should works be stopped until further advice and authorisation is obtained.

RECOMMENDATIONS

- TBLALC has reviewed the proposal against its Aboriginal cultural heritage mapping database and cultural knowledge, undertaken a site visit and, based on this, considers that there is only a low likelihood of Aboriginal heritage Objects or materials being encountered in the course of the proposed works.
- TBLALC does not consider it necessary to engage an archaeologist for further assessment.
- TBLALC recommends:
    1. that an on-site cultural heritage induction be provided for the work crew immediately prior to the commencement of the works; and
    2. that the work crew be advised of their stop work responsibilities should any cultural material be encountered during the works.

Procedure to be applied in the case of unexpected finds

⇒ In the event that any material is encountered that is even *suspected* to be of Aboriginal cultural origin or to *potentially* be human skeletal material, it must be left undisturbed, a wide buffer zone must be established and cordoned off and all work in the area must cease immediately.

⇒ The proponent is bound under State legislation *(National Parks and Wildlife Act, 1974)* to inform the DPE immediately of any cultural heritage objects found.

⇒ In the event that human skeletal material is encountered the NSW Police must be contacted immediately.

⇒ TBLALC appreciates that the assessments of whether material is of Aboriginal cultural origin or whether bone material is human skeletal material require specialist skills. Therefore, we suggest that we be contacted and consulted in the first instance. If any material that has been encountered is, in fact, Aboriginal cultural material or human skeletal material, DPE and / or the NSW Police Department will establish the conditions under which any further works may be undertaken.

Please contact the TBLALC Cultural Heritage Unit (CHU) if we can be of further assistance.

APPENDIX D

Specialist Reports

Proposal for a preliminary survey of beach infauna at Clarkes Beach, Main Beach and Belongil Beach, Byron Bay

Stephen D. A. Smith, Aquamarine Australia

Beach scraping is proposed for the western half of Clarkes Beach to replenish the dunal system following recent and progressive erosion. While previous studies of the impacts of beach scraping, where sand is borrowed from the lower sections of the same beach, have indicated that impacts on animals living within the sand matrix are minimal (Smith et al., 2011a,b; 2019), there is recognition that preliminary surveys are warranted to document species composition and distribution and highlight any concerns related to unusual or significant biological assemblages. This is particularly pertinent as the works will occur within the Cape Byron Marine Park. Given the aspect of the beach (northward facing), and the consequent lower wave energy compared to east-facing beaches that have been the focus of previous assessments of biological impacts of beach-scraping in the region (New Brighton, Wooli), there is a possibility that the beach may support more diverse or different suites of fauna (Hacking, 1998).

This proposal is for a preliminary survey to provide details of infaunal assemblages across transects identified by Department of Planning and Environment (DP&E) and Byron Shire Council (BSC), both in the area of the proposed beach scraping, and in other areas of interest between The Pass to the just west of Main Beach (Figure 1).

Figure 1: Identified transects between The Pass to the just west of Main Beach.

Previous studies have suggested the most suitable approach is to extract sand cores using a box corer (0.33 x 0.33m) to a depth of 0.25m, from 5 different levels of the beach (Smith et al., 2011a,b), to sample across the recognised fauna l gradients occurring from the upper to lower intertidal beach face (e.g. Hacking, 1998; Schoeman et al., 2003). Cores of sand are sieved through a 1-mm sieve to retain the macrofauna. Assessment of the fauna in the upper beach (above the strandline) and foredune has also been recommended to assess impacts of sand deposition from beach scraping on larger, motile fauna such as ghost crabs (Family Ocypodidae) (Smith et al., 2019).

The scope of this work is to provide a preliminary examination of the beach fauna to identify: the components of the infauna inhabiting the beach face, the lagoonal area on Clarkes Beach, and the upper beach/foredune (to species-level where possible); any rare, unusual or regionally significant species; any concerns related to likely impacts of the proposed works.

<u>Design and method</u>

While best-practice for studies of ecological impact involves replication of sampling at every level of the investigation (e.g. Smith et al., 2011a,b), the study outlined here has the primary intent of providing initial evaluation of the beach fauna - species, abundance and distribution across the beach face in the nominated area of interest. If further investigations of impact are indicated, a more comprehensive design will be required incorporating replicated samples taken before and after the beach scraping event at impacted and control (unaffected) sites (e.g. Smith et al., 2011a,b).

For this study, we propose to establish 5 beach levels along each of the transect locations identified by DP&E (Appendix 1) and take one core sample from each level on each transect. Samples will be sieved through a 1-mm mesh in the field with fauna retained on the sieve transferred to individually-labelled containers and preserved in either ethanol or 4% formalin pending sorting and identification. In the laboratory, animals will be identified to the highest possible level of taxonomic resolution (species targeted) and counted. A collection of representative species will be established for reference purposes. The fauna I assemblage will be compared to those documented in other regional studies, primarily focusing on the list of species found.

The upper beach and foredune area of each transect will be surveyed for larger mobile fauna by assessing the density of crab burrows (e.g. Smith et al., 2019) and making visual observations of species present. No cores will be taken at this level of the beach.

The lagoonal area in the mid-upper beach in the middle of Clarkes Beach represents a different habitat type that is likely to support a different suite of fauna that may be affected by the proposed work. As such, additional sampling, using a smaller core sampler (15cm internal diameter) is recommended with sampling spread across the lagoonal area (20 samples).

References

Hacking, N., 1998. Macrofaunal community structure of beaches in northern New South Wales, Australia. Marine and Freshwater Research 49, 47-53.

Schoeman, D.S., Wheeler, M., Wait, M., 2003. The relative accuracy of standard estimators for macrofaunal abundance and species richness derived from selected intertidal transect designs used to sample exposed sandy beaches. Estuarine Coastal and Shelf Science 58, 5-16.

Smith, S.D.A., Harrison, M.A., Rowland, J., 2011a. The effects of beach scraping on the infauna of New Brighton Beach northern NSW. Report to Byron Shire Council. National Marine Science Centre, Southern Cross University, Coffs Harbour, pp. 33.

Smith, S.D.A., Harrison, M.A., Rowland, J., Fitzgibbon, B.E., 2011b. Assessing the impacts of beach scraping on the macroinvertebrates of New Brighton beach, northern NSW. Proceedings of the 20th Coastal Conference, Tweed Heads, 2011

Smith, S.D.A., Tucker, J., Nimbs, M.J., 2019. An assessment of biological impacts of beach scraping at Wooli Beach, northern NSW. Report to Clarence Valley Council and NSW DPI. National Marine Science Centre, Southern Cross University, Coffs Harbour, pp. 12.

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C.
 Search criteria : Public Report of all Valid Records of Threatened (listed on BC Act 2016) or Commonwealth listed Entities in selected area [North: -28.59 West: 153.57 East: 153.67 South: -28.69] returned a total of 3,668 records of 98 species.
Report generated on 5/08/2022 1:15 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Amphibia	Myobatrachidae	3137	*Crinia tinnula*		Wallum Froglet	V,P		101	
Animalia	Amphibia	Hylidae	3166	*Litoria aurea*		Green and Golden Bell Frog	E1,P	V	3	
Animalia	Amphibia	Hylidae	3202	*Litoria olongburensis*		Olongburra Frog	V,P	V	33	
Animalia	Reptilia	Cheloniidae	2004	*Caretta caretta*		Loggerhead Turtle	E1,P	E	104	
Animalia	Reptilia	Cheloniidae	2007	*Chelonia mydas*		Green Turtle	V,P	V	112	
Animalia	Reptilia	Cheloniidae	2008	*Eretmochelys imbricata*		Hawksbill Turtle	P	V	30	
Animalia	Aves	Phaethontidae	0107	*Phaethon rubricauda*		Red-tailed Tropicbird	V,P	C,J	1	
Animalia	Aves	Columbidae	0025	*Ptilinopus magnificus*		Wompoo Fruit-Dove	V,P		8	
Animalia	Aves	Columbidae	0021	*Ptilinopus regina*		Rose-crowned Fruit-Dove	V,P		10	
Animalia	Aves	Columbidae	0023	*Ptilinopus superbus*		Superb Fruit-Dove	V,P		2	
Animalia	Aves	Podargidae	0314	*Podargus ocellatus*		Marbled Frogmouth	V,P		3	
Animalia	Aves	Apodidae	0334	*Hirundapus caudacutus*		White-throated Needletail	P	V,C,J,K	10	
Animalia	Aves	Diomedeidae	0931	*Thalassarche bulleri*		Buller's Albatross	P	V	1	
Animalia	Aves	Procellariidae	0929	*Macronectes giganteus*		Southern Giant Petrel	E1,P	E	39	
Animalia	Aves	Procellariidae	0937	*Macronectes halli*		Northern Giant-Petrel	V,P	V	6	
Animalia	Aves	Procellariidae	8684	*Pterodroma leucoptera leucoptera*		Gould's Petrel	V,P	E	1	
Animalia	Aves	Procellariidae	8993	*Pterodroma neglecta neglecta*		Kermadec Petrel (west Pacific subspecies)	V,P	V	1	
Animalia	Aves	Procellariidae	0955	*Pterodroma nigripennis*		Black-winged Petrel	V,P		1	
Animalia	Aves	Ciconiidae	0183	*Ephippiorhynchus asiaticus*		Black-necked Stork	E1,P		33	
Animalia	Aves	Ardeidae	0197	*Botaurus poiciloptilus*		Australasian Bittern	E1,P	E	3	
Animalia	Aves	Ardeidae	0196	*Ixobrychus flavicollis*		Black Bittern	V,P		14	
Animalia	Aves	Accipitridae	0226	*Haliaeetus leucogaster*		White-bellied Sea-Eagle	V,P		8	
Animalia	Aves	Accipitridae	0225	*Hieraaetus morphnoides*		Little Eagle	V,P		1	
Animalia	Aves	Accipitridae	0230	*^^Lophoictinia isura*		Square-tailed Kite	V,P,3		2	
Animalia	Aves	Accipitridae	8739	*^^Pandion cristatus*		Eastern Osprey	V,P,3		22	
Animalia	Aves	Gruidae	0177	*Grus rubicunda*		Brolga	V,P		1	
Animalia	Aves	Rallidae	0053	*Amaurornis moluccana*		Pale-vented Bush-hen	V,P		20	
Animalia	Aves	Burhinidae	0174	*Burhinus grallarius*		Bush Stone-curlew	E1,P		7	
Animalia	Aves	Burhinidae	0175	*Esacus magnirostris*		Beach Stone-curlew	E4A,P		15	
Animalia	Aves	Haematopodidae	0131	*Haematopus fuliginosus*		Sooty Oystercatcher	V,P		3	
Animalia	Aves	Haematopodidae	0130	*Haematopus longirostris*		Pied Oystercatcher	E1,P		36	
Animalia	Aves	Jacanidae	0171	*Irediparra gallinacea*		Comb-crested Jacana	V,P		14	
Animalia	Aves	Scolopacidae	0164	*Calidris canutus*		Red Knot	P	E,C,J,K	1	
Animalia	Aves	Scolopacidae	0161	*Calidris ferruginea*		Curlew Sandpiper	E1,P	CE,C,J,K	1	
Animalia	Aves	Scolopacidae	0165	*Calidris tenuirostris*		Great Knot	V,P	CE,C,J,K	3	
Animalia	Aves	Scolopacidae	0149	*Numenius madagascariensis*		Eastern Curlew	P	CE,C,J,K	5	
Animalia	Aves	Laridae	0972	*Gygis alba*		White Tern	V,P		1	
Animalia	Aves	Laridae	0120	*Onychoprion fuscata*		Sooty Tern	V,P		2	
Animalia	Aves	Laridae	9926	*Procelsterna cerulea*		Grey Ternlet	V,P		1	
Animalia	Aves	Laridae	0117	*Sternula albifrons*		Little Tern	E1,P	C,J,K	12	
Animalia	Aves	Cacatuidae	0265	*^Calyptorhynchus lathami*		Glossy Black-Cockatoo	V,P,2		5	
Animalia	Aves	Psittacidae	8028	*^Cyclopsitta diophthalma*		Coxen's Fig-Parrot	E4A,P,2	E	1	

				coxeni				
Animalia	Aves	Psittacidae	0260	*Glossopsitta pusilla*	Little Lorikeet	V,P		2
Animalia	Aves	Tytonidae	0252	*^^Tyto longimembris*	Eastern Grass Owl	V,P,3		13
Animalia	Aves	Tytonidae	0250	*^^Tyto novaehollandiae*	Masked Owl	V,P,3		3
Animalia	Aves	Tytonidae	9924	*^^Tyto tenebricosa*	Sooty Owl	V,P,3		1
Animalia	Aves	Monarchidae	0376	*Carterornis leucotis*	White-eared Monarch	V,P		7
Animalia	Mammalia	Dasyuridae	1008	*Dasyurus maculatus*	Spotted-tailed Quoll	V,P	E	3
Animalia	Mammalia	Dasyuridae	1045	*Planigale maculata*	Common Planigale	V,P		15
Animalia	Mammalia	Phascolarctidae	1162	*Phascolarctos cinereus*	Koala	E1,P	E	616
Animalia	Mammalia	Potoroidae	1175	*Potorous tridactylus*	Long-nosed Potoroo	V,P	V	6
Animalia	Mammalia	Pteropodidae	1280	*Pteropus poliocephalus*	Grey-headed Flying-fox	V,P	V	45
Animalia	Mammalia	Pteropodidae	1294	*Syconycteris australis*	Common Blossom-bat	V,P		7
Animalia	Mammalia	Emballonuridae	1321	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V,P		1
Animalia	Mammalia	Vespertilionidae	1357	*Myotis macropus*	Southern Myotis	V,P		32
Animalia	Mammalia	Vespertilionidae	1336	*Nyctophilus bifax*	Eastern Long-eared Bat	V,P		21
Animalia	Mammalia	Vespertilionidae	1361	*Scoteanax rueppellii*	Greater Broad-nosed Bat	V,P		5
Animalia	Mammalia	Miniopteridae	1346	*Miniopterus australis*	Little Bent-winged Bat	V,P		34
Animalia	Mammalia	Miniopteridae	3330	*Miniopterus orianae oceanensis*	Large Bent-winged Bat	V,P		5
Animalia	Mammalia	Muridae	1466	*Pseudomys gracilicaudatus*	Eastern Chestnut Mouse	V,P		2
Animalia	Mammalia	Dugongidae	1558	*Dugong dugon*	Dugong	E1,P		3
Animalia	Mammalia	Otariidae	1882	*Arctocephalus pusillus doriferus*	Australian Fur-seal	V,P		1
Animalia	Mammalia	Balaenopteridae	1575	*Megaptera novaeangliae*	Humpback Whale	V,P	V	21
Animalia	Insecta	Noctuidae	I021	*Phyllodes imperialis southern subspecies*	Southern Pink Underwing Moth	E1	E	8
Animalia	Insecta	Nymphalidae	I024	*Argynnis hyperbius*	Laced Fritillary	E1	CE	1
Animalia	Gastropoda	Camaenidae	I002	*Thersites mitchellae*	Mitchell's Rainforest Snail	E1	CE	215
Plantae	Flora	Apocynaceae	1233	*Marsdenia longiloba*	Slender Marsdenia	E1	V	2
Plantae	Flora	Casuarinaceae	8980	*Allocasuarina defungens*	Dwarf Heath Casuarina	E1	E	1135
Plantae	Flora	Casuarinaceae	14655	*Allocasuarina thalassoscopica*			E	12
Plantae	Flora	Cunoniaceae	10943	*^Davidsonia jerseyana*	Davidson's Plum	E1,2	E	36
Plantae	Flora	Euphorbiaceae	9851	*Chamaesyce psammogeton*	Sand Spurge	E1		1
Plantae	Flora	Fabaceae (Caesalpinioideae)	1877	*Caesalpinia bonduc*	Knicker Nut	E1		1
Plantae	Flora	Fabaceae (Faboideae)	2833	*Desmodium acanthocladum*	Thorny Pea	V	V	1
Plantae	Flora	Fabaceae (Mimosoideae)	7757	*Archidendron hendersonii*	White Lace Flower	V		45
Plantae	Flora	Flacourtiaceae	3114	*Xylosma terrae-reginae*	Queensland Xylosma	E1		21
Plantae	Flora	Lauraceae	3477	*Cryptocarya foetida*	Stinking Cryptocarya	V	V	236
Plantae	Flora	Lauraceae	8948	*Endiandra floydii*	Crystal Creek Walnut	E1	E	35
Plantae	Flora	Lauraceae	3491	*Endiandra hayesii*	Rusty Rose Walnut	V	V	9
Plantae	Flora	Lauraceae	8480	*Endiandra muelleri subsp. bracteata*	Green-leaved Rose Walnut	E1		19
Plantae	Flora	Meliaceae	3682	*Owenia cepiodora*	Onion Cedar	V	V	5
Plantae	Flora	Menispermaceae	3691	*Tinospora tinosporoides*	Arrow-head Vine	V		15
Plantae	Flora	Myrtaceae	4283	*Rhodamnia rubescens*	Scrub Turpentine	E4A	CE	25
Plantae	Flora	Myrtaceae	4284	*Rhodomyrtus psidioides*	Native Guava	E4A	CE	12
Plantae	Flora	Myrtaceae	4290	*Syzygium hodgkinsoniae*	Red Lilly Pilly	V	V	9

Plantae	Flora	Myrtaceae	4292	*Syzygium moorei*	Durobby	V	V	38
Plantae	Flora	Orchidaceae	14732	*^Diuris byronensis*	Byron Bay Diuris	E1,P,2		61
Plantae	Flora	Orchidaceae	6672	*^Geodorum densiflorum*	Pink Nodding Orchid	E1,P,2		124
Plantae	Flora	Orchidaceae	6990	*^Oberonia complanata*	Yellow-flowered King of the Fairies	E1,P,2		1
Plantae	Flora	Orchidaceae	4480	*^Phaius australis*	Southern Swamp Orchid	E1,P,2	E	9
Plantae	Flora	Orchidaceae	7324	*^Pterostylis nigricans*	Dark Greenhood	V,P,2		26
Plantae	Flora	Polypodiaceae	8156	*^^Drynaria rigidula*	Basket Fern	E1,3		2
Plantae	Flora	Proteaceae	5354	*Floydia praealta*	Ball Nut	V	V	3
Plantae	Flora	Proteaceae	5372	*Grevillea hilliana*	White Yiel Yiel	E1		1
Plantae	Flora	Proteaceae	9680	*Macadamia integrifolia*	Macadamia Nut		V	6
Plantae	Flora	Proteaceae	5446	*Macadamia tetraphylla*	Rough-shelled Bush Nut	V	V	16
Plantae	Flora	Psilotaceae	8164	*^^Psilotum complanatum*	Flat Fork Fern	E1,3		1
Plantae	Flora	Rutaceae	6457	*Acronychia littoralis*	Scented Acronychia	E1	E	15
Plantae	Flora	Rutaceae	8658	*Melicope vitiflora*	Coast Euodia	E1		2

SpeciesList (1)

APPENDIX E

Reference Documents

Acid Sulfate Soils Assessment Guidelines 1998, published by the Acid Sulfate Soils Management Advisory Committee

https://www.environment.nsw.gov.au/resources/soils/ASS-Manual-2-Assessment-Guidelines.pdf

Beach scraping as a coastal management option, Carley et al (2009)

Microsoft Word - James Carley full paper (burleighphysio.com.au)

Erosion and Sediment Control info and Blue Book

https://www.environment.nsw.gov.au/research-and-publications/publications-search/resource-guide-for-local-councils-erosion-and-sediment-control

RMS Code of Practice – Minor Works in NSW Waterways

https://www.rms.nsw.gov.au/documents/about/environment/code-practice-minor-work-nsw-waterways.pdf

Office of Water – Controlled Activities on Waterfront Land

https://www.industry.nsw.gov.au/water/licensing-trade/approvals/controlled-activities

Legislation website

https://www.legislation.nsw.gov.au

LEP/DCP

https://www.byron.nsw.gov.au/Services/Building-development/Plans-maps-and-guidelines

Development Design and Construction Manual

https://www.byron.nsw.gov.au/Services/Building-development/Plans-maps-and-guidelines/Development-Design-Manuals

Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW

https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Aboriginal-cultural-heritage/due-diligence-code-of-practice-aboriginal-objects-protection-100798.pdf

Byron Biodiversity Conservation Strategy

https://www.byron.nsw.gov.au/Services/Environment/Natural-environment

Guidelines for Ecological Assessment in Byron Shire
E201819547-FINAL-Guidelines-for-Ecological-Assessment.pdf

https://www.byron.nsw.gov.au/System-pages/Search-Results?dlv_OC%20CL%20Public%20Site%20Search=(keyword=e201819547)

Vegetation and tree removal in Byron Shire

https://www.byron.nsw.gov.au/Services/Building-development/Do-I-need-approval/Vegetation-and-tree-removal?BestBetMatch=tree%20removal|d13b95b2-5146-4b00-9e3e-a80c73739a64|4f05f368-ecaa-4a93-b749-7ad6c4867c1f|en-AU

Biodiversity Assessment and Solutions Pty Ltd (2021) Biodiversity Impact Assessment Temporary coastal protection works & infrastructure repair - Clarkes Beach, Byron Bay.

Byron Shire Coastline Hazard Assessment Update (BMT, 2013).

Fitzgerald, Mark (2010) Ecological Assessment and Review of Environmental Factors for the Trail Beach Scraping at New Brighton. Prepared for Byron Shire Council.

Patterson Britton & Partners [PBP] (2006). Cape Byron Sand Lobe Scoping Study. Report prepared for Byron Shire Council.

Public Works Department [PWD] (1978). The Byron Bay Hastings Point Erosion Study. Coastal Engineering Branch Report No. PWD 78026.

Schoeman et al. (2000) Lessons from a Disturbance Experiment in the Intertidal Zone of an Exposed Sandy Beach.

Smith et al (2010) Assessing the impacts of beach scraping on the macroinvertebrates of New Brighton Beach, Norther NSW. Study prepared for Byron Shire Council for the New Brighton trial beach scraping project.

Speybroek et al 2006 Beach nourishment: An ecologically sound coastal defence alternative? A review.