

**Annexure 3: Council Beach Erosion Report**

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**Waikawa Bay Plan Change**  
**Beach processes and erosion assessment**

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*Prepared for*

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## **1. Introduction**

This report presents a review of Marlborough District Council Private Plan Change 21 with regard to beach processes in the wider Waikawa Bay area. It also presents a review of specific submissions that raise issues of beach erosion.

The plan change proposes an extension to the Marina Zone and the creation of four mooring management areas. The plan change documentation does not assess possible effects on beach processes. However it is unlikely that there will be direct effects on beach processes from the plan change, and the potential increase in mooring management areas in Waikawa Bay, and potential extension to the existing Marina Zone.

### **Scope of Assessment**

The Plan Change seeks to provide for the long-term management of the water space in Waikawa Bay. In terms of effects on beach processes and erosion, the plan change application has two key aspects: an extension to the northwest end of the marina zone, and establishment of defined Mooring Management Areas.

While the Plan Change itself will not create effects, subsequent development within the proposed marina zone and mooring management areas will likely result in an increase in boat passages within and in/out of Waikawa Bay. This assessment considers the potential effects with particular regard to submissions received by council.

The assessment of effects on beach processes is based on theoretical beach process dynamics and the author's familiarity with boat wake issues in the greater Marlborough Sounds, the types of beaches in Waikawa Bay, and studies of similar issues in Otago Harbour and Tairua Harbour.

## **2. The existing beach environment**

Waikawa Bay is located in Queen Charlotte Sound, northeast of Picton Harbour. The bay is relatively narrow and long, reflecting its formation as a flooded river valley. The bay is oriented in a northeast to southwest direction, with the opening to the northeast. The entrance of the bay is approximately 1.4km wide, and is bounded to the west by the Snout headland, and to the east by Karaka Point.

The Snout is the distal end of a peninsula separating Waikawa Bay and Picton Harbour. The Wellington – Picton ferries pass close by en-route to and from Picton, and cross the mouth of Waikawa Bay at an angle along the axis of Queen Charlotte Sound. Karaka Point separates Waikawa Bay from Whatamango Bay.

Waikawa Bay has an irregular shaped shoreline in plan view, with a series of smaller bays, and embayments backed by steep vegetated slopes. The head of the bay narrows to about 400 m in width, but is almost completely encapsulated by the existing marina structures. Waikawa Stream enters the bay at the eastern end of the existing marina development.

The western shore, north of the existing marina, is mainly near vertical rock below dense vegetation, and slopes steeply to the water. At low tide, a narrow coarse sediment beach is exposed. The shore at the Snout comprises coarse gravel on a narrow steep beach. This beach is very dynamic and is exposed to large wind waves and swell coming down Queen Charlotte Sound (from the north) and boat wake from numerous pleasure craft, commercial shipping and inter-island ferries passing off the headland. The western shore of Waikawa Bay is sparsely populated by homes, with access from the water via jetties or small wharves. There is one small, un-named bay just north of the existing marina that has a shallow nearshore, but is unlikely to have more than a narrow low tide beach.

The eastern shore of Waikawa Bay is more densely populated, with numerous houses on the slopes below and above Waikawa Road and Port Underwood Road. This shore is exposed to wind waves, swell and vessel wake penetrating from Queen Charlotte Sound, plus locally generated wind waves and vessel wake from boats travelling within Waikawa Bay and accessing the beaches and jetties. There is a short stretch of shore (about 250 m) fronting private property that does not appear to be faced with any structures at the southern end of this shore. The shore directly below Waikawa Road along to where the road becomes Port Underwood Road is faced by structures of various types. The Moikarurangi Bay shore, south of Wharetukura Bay, contains a large number of boatsheds. The shore behind the boatsheds is a mixture of structures and rocky shore with large cobbles and coarse gravel slopes in some areas. The boatsheds and the shore behind them are exposed to large waves coming into Waikawa Bay from Queen Charlotte Sound, and were subject to effects of boat wake and storm waves during the late 1990s. These effects included areas of erosion and longshore transport of coarse sediments along short stretches of shore. Progressing along the shore towards Karaka Point, there are two small beaches (less than 100 m long) within Wharetukura Bay, while further north there is a larger bay with a narrow beach about 200 m long. All of these beaches have houses and private properties along the backshore. A narrow coarse sediment beach is exposed along most of the shore at low tide. There are also a number of jetties along the shore.

### **3. Potential effects of the Plan Change**

The proposed Marina Zone extension on the western shore of Waikawa Bay will effectively remove a section of the shore from the influence of shore processes, and will change the accessibility to the shore from the water.

The nature of the rocky shore, and the contemporary development of the hinterland of the few soft shores and beaches minimise the potential effect of increased boat use of Waikawa Bay that may occur in response to the Plan Change. There is an existing speed limit for vessels travelling close to the shore (must not exceed 5 knots within 200 m of the shore or structures or within 50 m of another vessel, raft or person in the water). One aim of the speed limit is to reduce wake from recreational craft.

With the boating regulations in place in the Marlborough Sounds, it is likely that the indirect effects of the Plan Change, from increases in the number of boats using Waikawa Bay, on beach processes and beach erosion will be less than minor.

### **4. Issues raised in submissions**

I am aware of 4 submissions to council that refer to physical coastal processes and beach erosion as a potential adverse effect of the Plan Change. Table 1 notes the submitter's comments. There are two main themes. These are that:

- Additional boat traffic using the marina and moorings will increase erosion of beaches, and
- Changes to Waikawa Stream may change tidal processes and sedimentation in the upper eastern section of the bay.

The Marlborough District Council has boating speed limits in place in order to ensure safety and to minimise wake disturbance at the shore. Implementation of the speed limits within Waikawa Bay should limit the effects of boat wake at the shore. Where there is an existing problem, or perception of beach erosion due to boat wake, then the matter should be raised with the council so that the causes can be assessed, and the adverse beach change mitigated.



**Table 1** Extracted comments from submissions relating to beach erosion and physical coastal processes

Submitters	Comment
Geoffrey and Maria (Beech) MacDonald	“Erosion of the beaches due to the extra boat traffic.”
Guardians of the Sounds, Peter Beech	<p>Diversion of Waikawa Stream – “This diversion would radically change the dynamics of the delta system which has the most significant effect on the shellfish beds, as it would also change the intertidal zone along the Eastern Shore. It could scour out the frontages, or it could cause accretion a build up of sand and silt along beach frontages, it will almost certainly result in siltation of the inshore zone to the point where the cockle beds are scoured out or smothered. Those moorings would become that shallow as to become unusable (which is erosion also of the rights of those mooring owners. And beach front property owners.)”</p> <p>“Our beach front is directly exposed to the Nor West and over the summer months our beach is seriously eroded by the effects of passing boat traffic to and from the Marina. Double the number of boats double the adverse effects on our beach.”</p>
Leanne Claire Roberts	“...effects from wakes of boats on smaller bays all contribute to degradation of the natural environment...”
Michael and Vanessa Ede	“The changes to river and tidal flow, and to boat wake within Waikawa Bay.”

The proposed Plan Change 21 does not refer to any changes to Waikawa Stream or the configuration of the stream mouth. The extension to the Marina Zone, and the Mooring Management Areas are unlikely to change patterns of sedimentation within Waikawa Bay, nor change the sediment load entering the bay from the stream.

## 5. Conclusions and recommendations

The proposed Plan Change 21 seeks to provide for long-term management of vessel mooring in Waikawa Bay. While the Plan Change itself will not create effects, subsequent development within the proposed marina zone extension and mooring management areas will potentially lead to an increase in vessel traffic within the bay.

The shores of Waikawa Bay are robust, and generally at equilibrium with the existing process environment. Much of the shoreline is hard rock, with narrow low tide coarse sediment linear beaches, or comprises artificial structures. The sediments on the few sandy beaches within the bay are freely mobile in response to natural waves and vessel wake, whether generated within the bay or travelling from Queen Charlotte Sound. Submitters note instances or periods of beach erosion related to wakes from vessel traffic, but the erosion does not appear to be systemic or to result in long-term landward retreat or loss of the beach.

If constructed, the proposed Marina Zone extension on the western shore of Waikawa Bay will remove a section of the shore from the influence of wave processes, and that part of the shore will not be able to be accessed from the water, but will be accessible from land.

The robust and resilient nature of the shore, and the contemporary development of the hinterland of the few soft shores and beaches, along with existing vessel speed regulations minimise the potential effect of increased boat use of Waikawa Bay.

It is likely that the indirect effects of the Plan Change, from increases in the number of boats using Waikawa Bay, on beach processes and beach erosion will be less than minor.

It is recommended that the boating regulations be visibly enforced, so as to deter breaches of the speed limits within Waikawa Bay. It is also recommended that the state of the beaches and soft shores of Waikawa Bay be identified to provide a baseline against which the shore can be assessed in the future, with regard to changes in vessel use of the bay, natural process events (storm waves and floods) and to changes in hinterland use.