

9 December 2016

Paulette Birchfield
West Coast Regional Council
Greymouth

Dear Paulette,

Following the 22-Nov-2016 site inspection of the beach front and subsequent community meeting at Granity, Ngakawau and Hector, I consider it prudent to refine some of the advice in the recent report (NIWA, 2016).

Site inspection notes

The erosion sequence has continued with winter storms eroding the beach, overwashing into private property and damaging structures – with at least one garage destroyed and another property now deserted (Figure 1). Several new landowners have begun to protect their boundary with rocks and other ad-hoc defences (Figure 2). The existing hard protection structures have withstood the storms well (Figure 2), but the predicted slumping or gabions within rock revetments and lowering of the beach has occurred.

At Granity (154-165 Torea St) the erosion has become critical to several properties, overwhelming the Buller District Council (BDC) managed Bradleys Stream drain and berm (Figure 3). The nearby landowners have begun to protect their properties with rock revetments or vegetation (Figure 3).



Figure 1 Recently deserted property (Left, 23 Main Rd Hector) and overwash evidence into private property (Right, 151 Torea St, Granity). [Source: M Allis 22-11-2016]



Figure 2 New ad-hoc defence along the beachfront (Left, 7 Main Road, Hector) and existing hard defences in reasonable condition (Right, Granity School). [Source: M Allis 22-11-2016].



Figure 3 Overwhelming of Bradley Stream drain (left, at 154-160 Torea St) and ad-hoc coastal protection (right, 155-156 Torea St). [Source: M Allis 22-11-2016].

Management advice update (Sept 2015-Nov 2016)

Overall, the advice from NIWA (2016) stands true. The various coastal compartments are each facing a different level of risk from coastal erosion, and each have several options to reduce this risk to people and property. Gaps in hard defences should be infilled (Sections H3, G1, G2), and all properties should consider their individual long-term strategy should erosion continue at its present rate. The safest long-term strategy remains to relocate offsite.

However the advice for one coastal sections needs updating: the northern section of G4 (north of Bradley Stream) is rapidly approaching a critical risk level. The community have had waves and sand wash into their property in the last year and have been galvanised into action. This activity has been most notable around the northern half of frontage section G4 because of the failure and infilling of the Bradley Stream drain diversion (Figure 3). This is a positive move, but action should be taken to ensure the defences are well-constructed, form a consistent line of defence, tie-into existing defences and avoid end effects (i.e. avoiding the historic ad-hoc nature of defences).



Figure 4 Recent hard defences under construction north of Bradley Stream (G4) where the drain diversion bund failed. Left, 158-160 Torea St; Right, 154 Torea St. [Source: M Allis 22-11-2016].

My recommendation should be updated (from backstop defences) because several G4 owners have responded to the erosion by constructing rock revetments (Figure 4), and the drain clearance berm is unable to prevent waves to regularly wash into private property. **The most appropriate action now would be to unify the G4 owners to join and strengthen a single line of defence (both hard revetment and backstop) along this frontage section. However, BDC must reform the Bradley Stream drain and berm ASAP while the community and WCRC prepare (finance, consent, materials) to construct defences and link the under-construction walls.**

A singular rock revetment defence should include all G4 properties north of Bradley Stream (154-165 Torea Street), linking the under-construction revetments, extending along the stream-banks up to the roadway, and include the property immediately south of Bradley Stream (153 Torea Street). The toe of the new rock revetment would be well placed if it were keyed into the drainbed (north of Bradleys Stream) and placed front of the clay/peat outcrops on southern bank of Bradleys Stream. The G4 owners south of 153 Torea Street should also prepare to construct their backstop defence berm in the short-term, this should tie into the southern extent of the rock revetment works, but setback from the present beach face (edge of clay/peat outcrops) by 5 m and aggressively planted. These works would still only be a short to medium term defence for the G4 section.

This refinement means the exit to Bradley's Stream will predominantly be straight out to sea, but the stream banks will need protection to prevent outflanking and exacerbating erosion of the adjacent properties. Occasional clearance of the stream mouth may be required if beach gravels build up and block the outlet. A culvert onto the beach face is not recommended.

Note about BDC drain clearance: Re-forming and maintaining the Bradley Stream drain will be more expensive in the short term (0-2 years) while allowing the community to design and construct the hard defence. However, the drain itself will act as the base level or key-in for the wall which is essential to the longer-term performance of the revetment. It is anticipated that the drain clearance and diversion could cease after the wall is completed, therefore a saving for BDC over the longer term. However it is absolutely necessary in the immediate period to continue clearance, and even increase the frequency of drain clearances.

A detailed survey (say, aerial drone photos with surveyed elevations) would be useful for more detailed information to aid design.

All works suggested should still only be considered as short to medium term defence options.

Groynes

The community requested further investigation of whether groynes are a viable option. I reiterate that this is unlikely to be cost-effective, may not receive resource consent (anticipated DoC submissions) and is unlikely to be successful.

Groynes are unlikely to be successful for individual properties (updrift and downdrift effects), and groyne fields work best on a 5 km scale and this would require buy-in from all property owners in all sections - some of which are not at critical threat and less likely to want to pay. A trial groyne programme requires timeframes of years to establish its suitability- something many frontage sections (G4, N2) do not have.

At Granity, Ngakawau and Hector a seawall would be a more effective defence than groynes as they are more easily adaptable when/if each frontage section need to defend their line. In contrast, groynes are an all-or-nothing defence strategy, and have a different risk profile relying on natural processes to maintain the barrier (the gravel fillet) rather than a singular line of a seawall (the rocks).

Please contact me if you have any queries about the above.

Yours sincerely



Dr Michael Allis
Coastal Engineer