Minor Coastal Structures: Consent Compliance, Asset Integrity and Hazard Management

A report prepared for the South Taranaki District Council

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1 INTRODUCTION

1.1 Monitoring background

Territorial Authorities carry out coastal monitoring for a range of objectives such as:

- Acquiring baseline (or control) data for use in asset design, hazard assessment or environmental management (proactive environmental monitoring);
- Helping to understand and mitigate an unexpected problem situation that has arisen (reactive environmental monitoring). However, for best results baseline data is also required;
- Resource consent compliance, in particular to identify/define coastal structure/activity effects on the environment (adjacent shorelines in particular), or
- Asset management – to identify maintenance requirements.

Coastal monitoring methods typically involve visual inspection or measurement-based surveying (2D profiling, 3D topographic survey or bathymetric survey).

In the past, South Taranaki District Council's (STDC) coastal structures have been subject to varying levels of baseline, reactive and asset management monitoring, usually when the need arose. The exception being the Patea sand dunes which have a long history of instability and regular measurement-based monitoring has occurred since the early 2000s. Coastal consent compliance was undertaken by TRC officers who carried out annual inspections and have produced monitoring reports since 2012.

1.2 Revised consent compliance monitoring

More recently, the Taranaki Regional Council (TRC) has revised the monitoring requirements on the coastal resource consents it administers (see Table 1). In particular, consent holders are required to carry out annual visual inspections of all structures, and also measurement-based monitoring on structures the TRC deemed more likely to affect the environment (see **emboldened** structures listed in Table 1.1) . The STDC's measurement-based monitoring program was based on a 2021 review by Coastal Systems Ltd. Measurement-based monitoring (MDM) is typically carried out at 2 to 10 year intervals depending on the nature of a structure and its environmental setting, and a guide for STDC structures is summarized in Table 1.2.

1.3 Structural integrity monitoring

To ensure the integrity is maintained, officers include in their annual inspection/report any change in a coastal structure's physical condition, in the adjacent environment or associated potential hazards. In addition, a consultant is commissioned to carry out on-site inspection of the structures from time to time, or to further investigate/comment on change noted by officers.

Beca recently inspected and reported on the major structures; these included the MBM structures listed in Table 1 as well as those in Ōpunakē Bay). The remaining (so-called

minor) structures have been inspected by Coastal Systems Ltd and their condition and recommended interventions are reported below. Hazard noted during the CSL inspections were immediately reported to officers and copies are in Appendix A.

Note, in years when consultants inspect and report on the coastal structures, this will take the place of the annual inspection carried out by STDC officers. However, TRC officers plan to continue inspecting all structures annually.

Table 1.1 Summary of TRC coastal permits for STDC coastal structures

Location	Description	Consent number
Bayly Road	Boulder seawall	5512
Middleton Bay	**Boulder seawall**	**5504**
Opunake headland	**Breakwater and boat ramp**	**6791**
Opunake Beach[4]	Retaining wall and accessway	4578
Kaupokonui	Boulder riverbank protection	5983
Denby Road	Accessway protection	6763
Patea	**Rivermouth structures[1]**	**4573**
Patea	**South Mole reinstatement[2]**	**6839**
Patea	**Boat ramp and jetty[3]**	**4566**
Patea	Wharf maintenance	4575
Waverly	Accessways	4579

1 Moles, Mana Bay seawall, wave guidewall, Carlyle Bay rock bank protection.
2 160 m of the existing half tide training wall adjoining the South Mole raised to the level of the mole.
3 Rock protection has been added to the adjacent riverbank.
4 Measurement-based monitoring is also carried out at Ōpunakē Bay for STDC baseline and environmental monitoring purposes - rather than for compliance monitoring.

1.4 Report Layout

Sections 2 to 6 document each of the 5 minor structure inspections. Within each section, firstly the consent objective and relevant special conditions are described, secondly the structure's history and environment are described, thirdly the structure's condition at the time of inspection is described, and finally recommend remedial actions required to ensure ongoing integrity/functionality/hazard management or consent compliance are listed. Priority ranking used for remedial interventions consists of the following:

- Urgent : as soon as possible;
- Shorter term: +/- 1 year;
- Long-term intervention: up to 5 years.

STDC officer comment on remedial work underway, immanently underway or bring planned are provided in Appendix B.

Table 1.2 Summary of key monitoring attributes at each measurement-monitoring location for STDC consents issued by the TRC

Location	Profiling N** freq (y)	Topographic* frequency (y)	Bathymetric frequency (y)	Further detail
Middleton	5 1(0.5)# Spring 2020	5 Spring 2019	10 2021-2022	Section 3.1 and Figure 1
Ōpunakē	5 1 (0.5) Spring 2020	5 Spring 2019	10 2021-2022	Section 3.2 and Figure 2
Patea north: Dune- greenwaste	4 (6) 2 (1) Spring 2021	5 Spring 2021	-	Section 3.3.1 and Figure 5
Patea north: Structures	4 2 (1) Spring 2021	5 2020-21 Sum	-	Section 3.3.1 and Figure 5
Patea south	2(3) 2(1) Spring 2021	-	-	Section 3.3.2 and Figure 5
Patea inlet	6 (8) 2 (1) Spring 2021	5 2020-21 Sum	10 (5) 2020-21 sum	Section 3.3.3 and Figure 5

* from drone photography or LIDAR ** N = number of transects to be profile surveyed

1 (0.5) First number is default (eg yearly sampling), Bracketed number if practicable or necessitated such as by an erosion episode (eg ½ yearly sampling)

Time/date is for commencement of monitoring regime. Bi-annual sampling in Spring and Autumn, annual and longer sampling intervals to be in the Spring to incorporate the effect of winter storms (wind and waves). Bathymetric sampling more suited to summer (Sum).

2 Bayly Road Seawall

This inspection was carried out on 3 March, 2022 by Dr Roger Shand between 1500 and 1600 hrs. Environmental conditions included light variable winds, low tide and 1.2 m waves.

2.1. Resource Consent

Permit 5512 was issued by the Taranaki Regional Council on 5 August 1999 and expired on 1 June 2013. The permit was subsequently issued in February 2016 and will expire on 1 June 2031.

The consent was granted to occupy the Coastal Marine Area with a boulder rip rap seawall on the foreshore at Bayly Road Beach for coastal erosion protection.

Of note, Special Condition 2 requires the STDC to maintain the structure in a safe and sound condition so that it functions effectively and any misplaced material reaching the foreshore be removed.

2.2. Setting

The existing structure extends from the boat ramp/training wall structure at its northern end to a small car park and stream at the southern end of the embayment (Figure 2.1).

The STDC's 1999 AEE report states that there was an existing 40 m long seawall located at the southern end of the bay, and a 250 m extension along to the boat ramp was being applied for. The AEE included a layout plan reproduced here as Figure 2.2.

A design cross-section was also included with the AEE (reproduced here as Figure 2.3) and this was included in the 1999 and 2016 TRC officers reports. The TCR officers report states that the cobble beach at the base of the scarp will be pulled back so boulders are placed on the wave cut platform. This did not appear in the AEE and if it occurred during construction this cannot be verified. I also note that photographs in the 2001 T&T report to the TRC (p77), show that while the proposed design may have been followed closer to the boat ramp, loose concrete rubble is evident further south – in the centre of the embayment. Structural failure could be expected and consent conditions require ongoing maintenance.

The design does not meet coastal engineering standards (e.g. PRIF, 2017), lacking the following: a filter (geotextile) layer, consideration of the strength shape and grading of materials in keeping with environmental conditions, and the relevant batter slope.

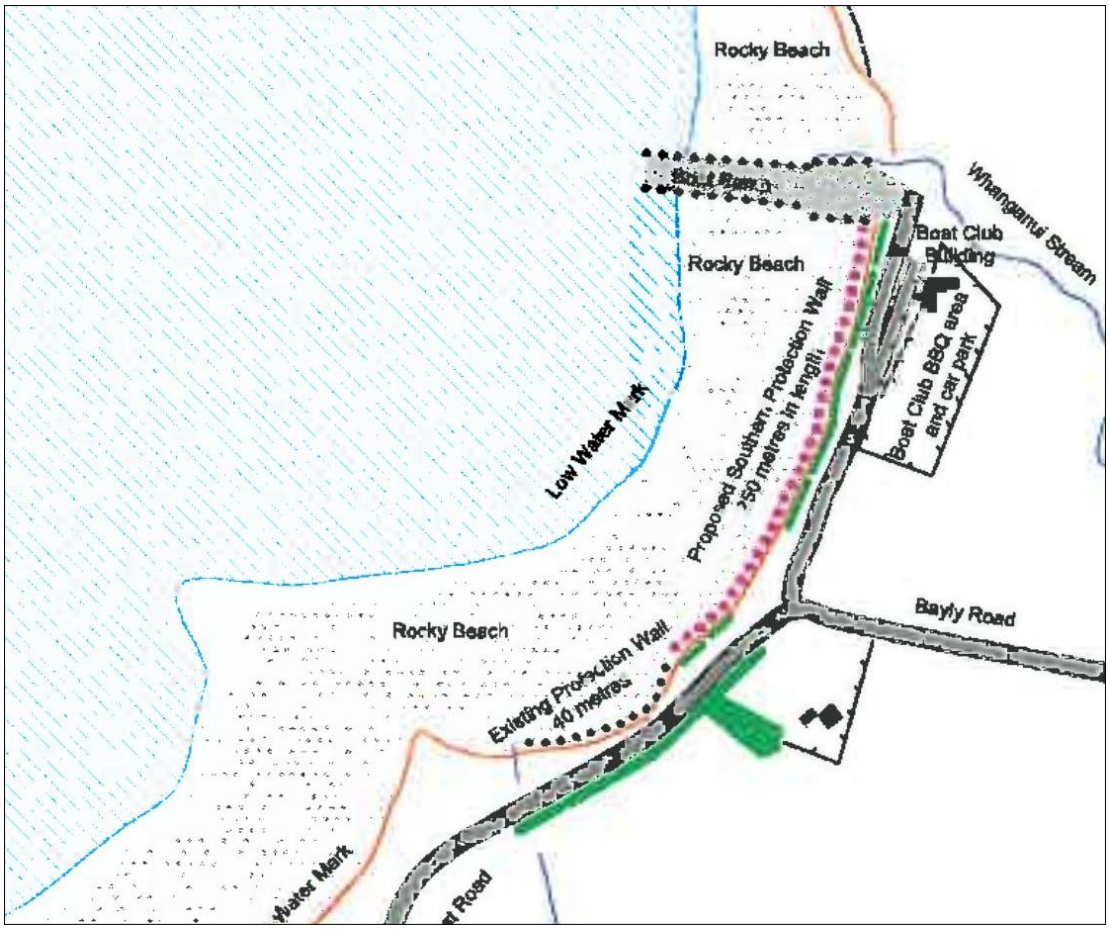

Figure 2.1 Location map from the STDC 1999 AEE report.

Figure 2.2 Bayly Road seawall location with chainage marked from the boat launching structure.

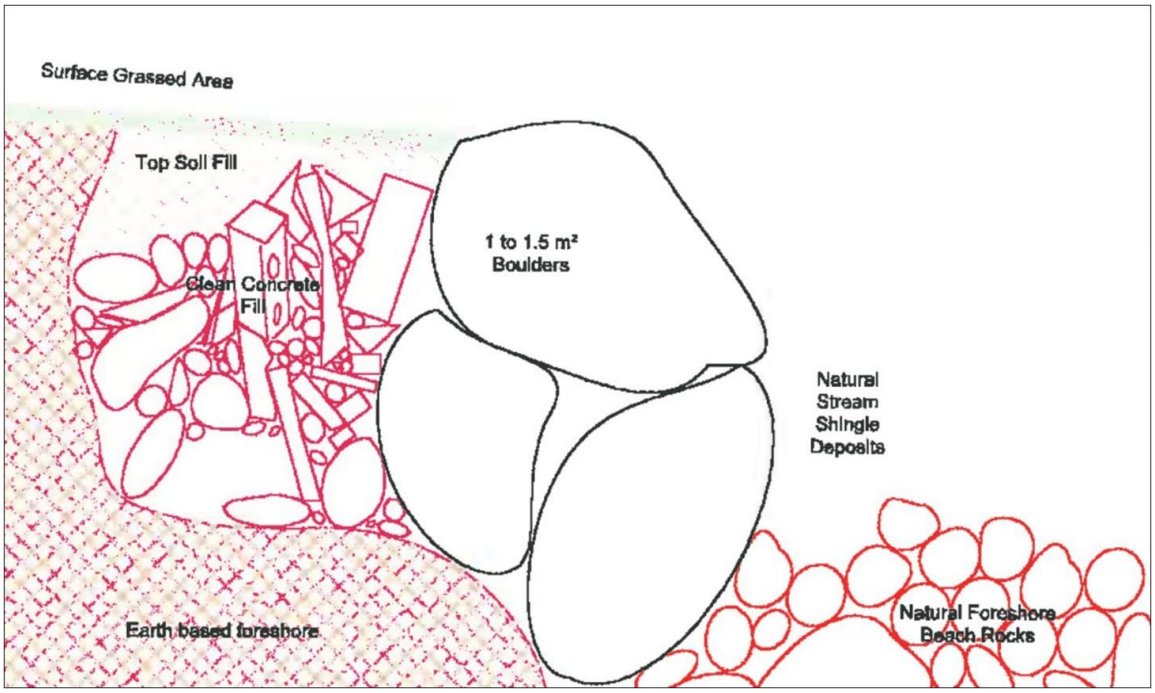

Figure 2.3 Cross section design from 1999 AEE and 2016 consent reapplication.

The aerial photo/satellite record shows a dredged channel has been in place since at least the 1970s and extends a further 200 m beyond the 200 m long boat ramp, the latter being constructed prior to 2001. Dredged rock was placed along the sides to form and intertidal groyne-like structures and by 2001 at least 100 m of the southern groyne was above high tide level. Erosion control at the back of the bay began just prior to this and a cause-effect relationship cannot be ruled out. About 2013, a channel was excavated parallel to the boat ramp and again displaced rock was used to construct a jetty (evident in Figure 2.2). Given that the initial structure appeared to have had some impact on the adjacent shoreline, the more recent additions may also.

Indeed, a sand and gravel upper beach now lies adjacent to, and in the lee of, the boat launching structure with the remainder of the bay being fronted by a narrow pebble and cobble upper beach. The lower intertidal comprises a boulder platform up to 200 m wide. An offshore reef extends seaward a further 500 m, possibly in combination with the boat launching structure, may well focus storm wave action against the seawall.

The seawall structure rises 1.5 to 3 m above current beach level and gaps from back-scour and slumpage show the foundation material is of lahar origin with potential for alongshore variation in erosive resistance. Topographic variation across the intertidal/surfzone coupled with the boat launching structure likely result in wave process variation, which would also cause alongshore variation in erosion potential.

2.3. Seawall condition during site inspection

The first 30 to 40 m of the structure (chainage as marked in Figure 2.2) is buried or partially buried and stable.

The next 80 m (60 to 140 m, i.e. to the Bayly Road intersection) consists of rock protection of varying height and steepness. Overall this section is functional and stable, albeit overly step in places. However, between 60 to 80 m the structure is not adequately protecting the bank with some of the very large Norfolk pine trees being undermined (Figure 2.4) and this unique recreation area (emphasised in the consent applications) behind the wall and the trees themselves are threatened.

From 150 to 180 m (fronting the Bayly Road-Coast Road intersection) new rock has recently been placed. While coverage is adequate, it is not graded and the slope is overly steep (Figure 2.5). In addition, at each end of this placement, erodible material is exposed, possibly enhanced by structural "end-effects" (Figure 2.6 and 2.7).

Along the next 80 m (180 to 260 m chainage) protection and functionality are satisfactory. However, the final 15 m to the stream/car park (260 to 275 m chainage) has erosion occurring along the upper bank (Figure 2.8). It is possible there is an element of end-effect erosion occurring here. This area appears to be important for iwi access/values.

2.4. Remedial work

Intervention priority ranking used below is set out in Section 1.4.

Between 40 to 60 m: exposed upper bank and large trees being undermined creates an urgent intervention scenario. Rock and fill are needed to restore the structure, stabilise the large trees, and give long-term protection to the significant recreation area. Existing material should be removed down to a stable foundation level and a geotextile layer installed. Suitably graded armour rock placed with the appropriate stable slope, and backfilled with material of lesser size.

Between 60 and 140 m there are some sections that are overly step and the upper slope must be reduced by extending the lower structure seaward with armour rock after removing insitu smaller sized rock.

The recent placement between 150 and 180 m should also have its upper slope reduced by extending the lower structure seaward after removing insitu smaller size rock.

The 150 to 180 m section section also requires extending alongshore at each end to join with the existing sections of the existing wall. Excavation, a geotextile and suitably graded armour rock at the appropriate slope should also be used along the extensions. The above recommended remedial works (between 60 and say 190 m) are shorter-term interventions as the overly steep face is potentially hazardous.

Between 260 to 275: the existing structure needs extending 10 to 15 m southward to reach to the stream/small car park. Again excavation, a geotextile and graded rock should be used with the appropriate frontal slope. This is a longer term intervention.

Figure 2.4 Typical upper bank exposure and undermined Norfolk pine trees at 60 to 80 m chainage.

Figure 2.5 Overly steep recent rock placement at 150 to 180 m chainage

Figure 2.6 Unconsolidated and erodible material at the northern end of recent rock placement at 140 to 150 m chainage.

Figure 2.7 Exposed upper bank (circled) at southern end of the recent rock placement on the left side of photo (180 to 200 m chainage).

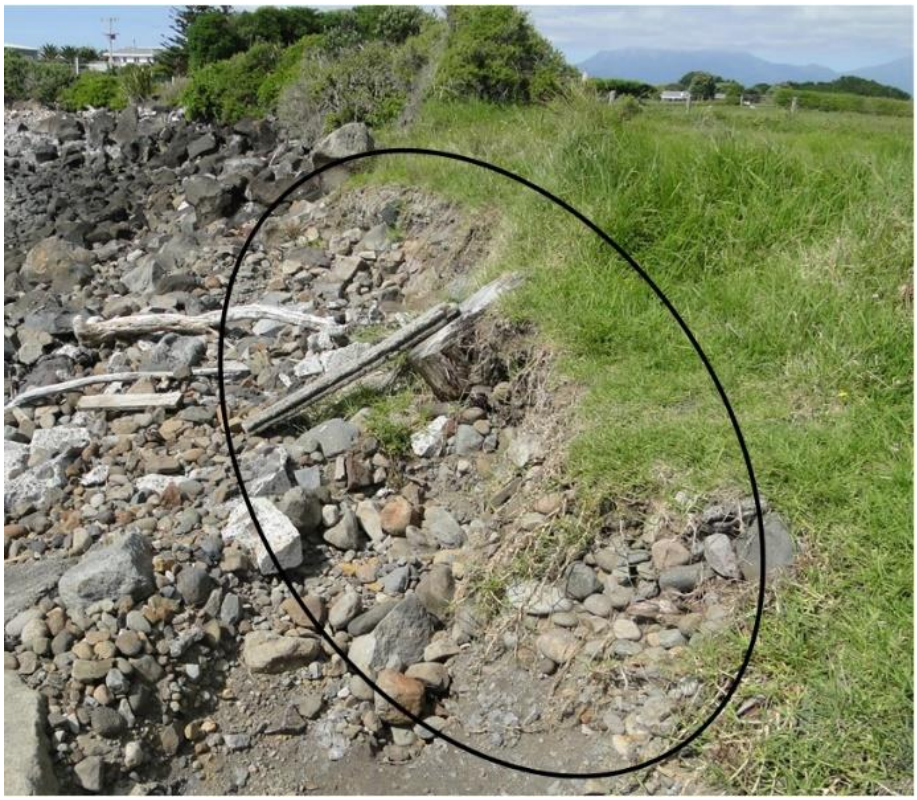

Figure 2.8 Exposed upper bank at southern end of seawall (260 to 275 m).

3 Kaupokonui boulder riverbank protection wall

This inspection was carried out on 4 March, 2022 by Dr Roger Shand between 800 and 900 hours. Environmental conditions included light variable winds, low to mid tide and no waves at the site.

3.1. Resource Consent

Permit 5983 was granted to erect, place and maintain a boulder rock rip-rap on the left bank of the Kaupokonui Stream for erosion control purposes (see Figure 3.1). This permit was issued to the South Taranaki District Council retrospectively by the Taranaki Regional Council on 13 May 2002 following discovery of a boulder wall. The permit 5983 was reissued on 30 January 2018 and covers those works within CMA which has its upstream boundary 5 m downstream of the footbridge. A landuse consent covers the works upstream of the CMA

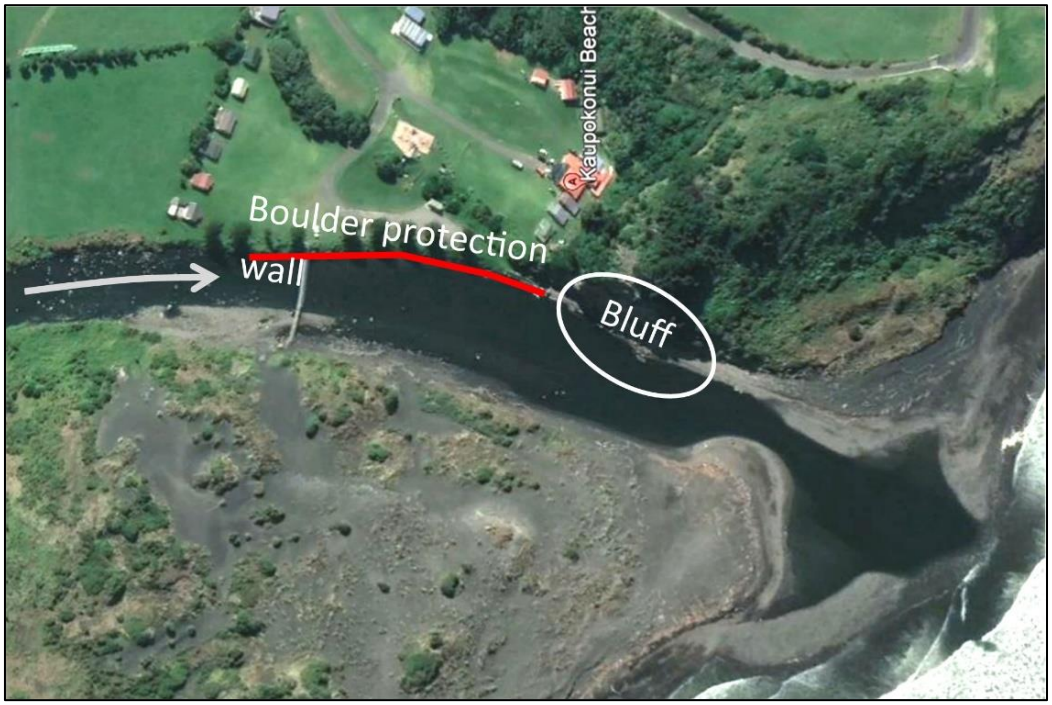

Figure 3.1 Location of the 170 m long boulder protection wall, the eastern bluff (Kaupokonui South Head), and footbridge (evident but not marked). The arrow indicates river flow and the beach is on the right.

3.2 Setting

The Kaupokonui Stream enters the sea approximately 5 km west of Manaia. A bluff on the south eastern side and short sand spit on the northwestern side separate the beach from a sheltered grassed reserve and camping ground to landward. A modern foot bridge provides access to the northern beach. An unformed track along the bluff section allows for pedestrian access to the southeastern beach (Figure 3.1).

The boulder protection wall is some 170 m long and fronts the reserve. Approximately 50 m of wall is upstream of the foot bridge and 120 m downstream. The structure terminates at the bluff access track.

3.3. Protection wall condition during site inspection

The boulder protection wall is composed of large boulders. While the face is overly steep, it is well vegetated and there was no evidence of localised failure (Figure 3.2). The stability of the structure is further demonstrated by its resistance to high flow during the extreme rainfall event some week prior when both the natural bank upstream of the structure, and the bluff immediately downstream were both subject to significant failures (Figure 3.3). Slumping and rock slides at the bluff resulted in pedestrian access to the coast becoming hazardous and a report was made to STDC officers (Appendix A).

Figure 3.2 Kaupokonui boulder protection wall post flood with bluff in background.

3.4. Remedial work

Intervention priority ranking used below is set out in Section 1.4.

The wall is overly steep and toe support may be inadequate. For both consent compliance, asset management and hazard avoidance, a more detailed engineering inspection is recommended in the shorter term.

The bluff accessway condition requires urgent STDC attention to ensure public safety. The south beach access should be closed until the rock fall is stabilised - possibly by water sluicing, and then a long-term solution is required.

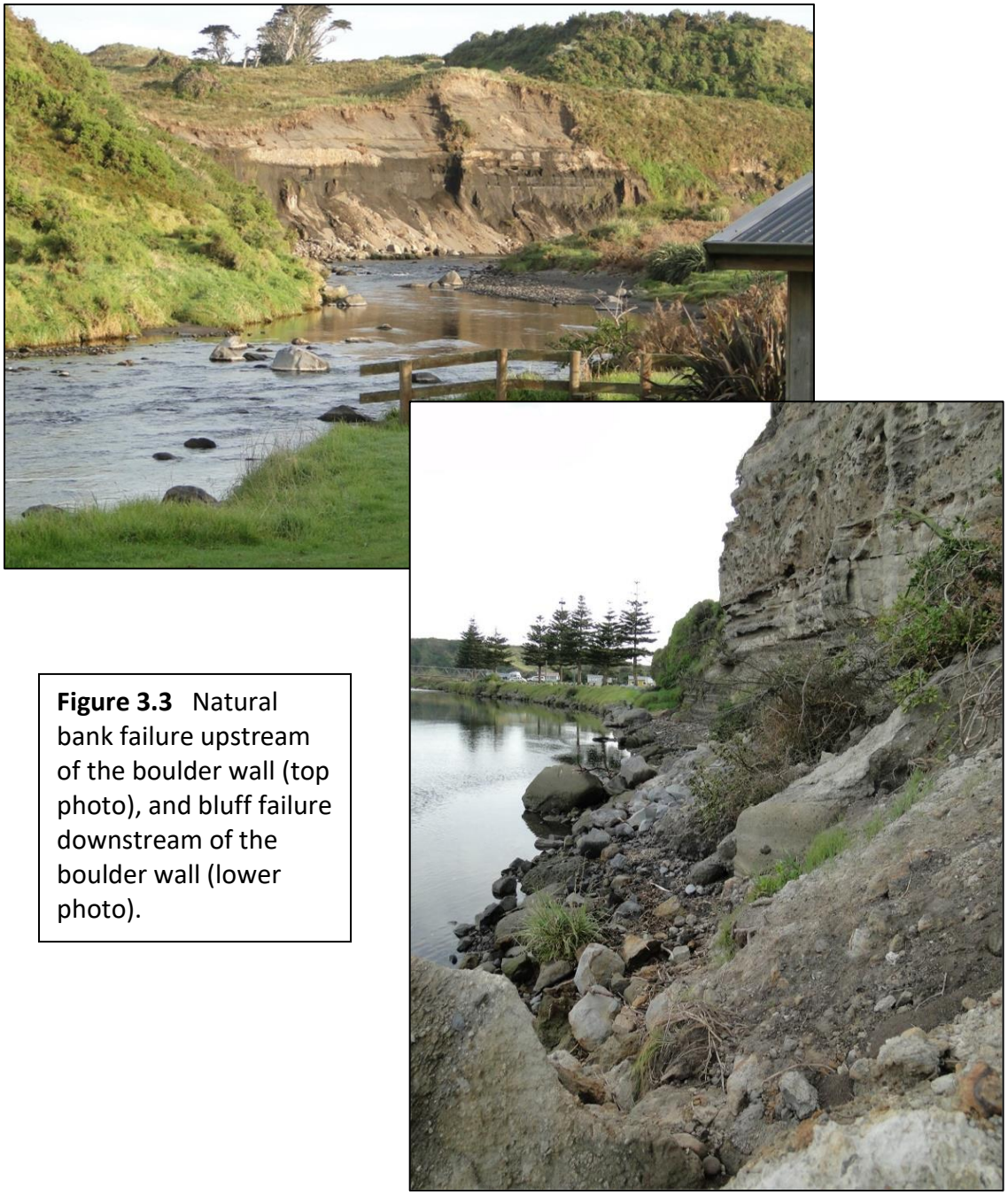

Figure 3.3 Natural bank failure upstream of the boulder wall (top photo), and bluff failure downstream of the boulder wall (lower photo).

4 Denby Road (Waihi) Beach access structure

This inspection was carried out on 4 March, 2022 by Dr Roger Shand between 9.30 and 1000 hrs. Environmental conditions included light variable winds, mid tide and 0.7 m waves.

4.1. Resource Consent

Permit 6736 was issued by the Taranaki Regional Council on 5 December 2005 to erect, place and maintain a gabion mattress for erosion control and public access. The consent was modified on 12 March, 2008 to enable emergency access. Following ongoing storm damage, by 2018 the structure had become noncompliant (TRC Monitoring Report 2018-19) and was removed in December 2019. A barrier fence was erected fronting the original gabion-based accessway. In 2018 a lower accessway was excavated on the northwestern side of the original access track and structure to facilitate access onto the beach. No consent was required.

4.2. Setting

Waihi Beach lies opposite Hawēra, at the end of Denby Road and at the mouth of the Waihi Stream. The 195 m access track begins at a well-appointed car park and is the start of a coastal walkway between Waihi Beach and Ohawe Beach 10 km to the northwest. Signage warns the public of unstable cliffs, falling debris and tidal hazards.

The track down to the beach is wide enough for a 4WD vehicle, but it is steep and sure footing is necessary.

The track is truncated at the beach with access onto the sand is via large siltstone boulders and is difficult. Note that streams enter the beach on each side of the access point making this a particularly difficult site for council management.

At high tide the waves can intersect the cliff base with safe walking only at mid to low tide.

The cliffs are approximately 40 m high and composed of fine marine sediments (siltstone) topped with sand and volcanic clay and are prone to failure. This coast is undergoing long-term retreat in excess of 0.5 m/year.

The original gabion mattress was presumably erected soon after the consent was issued in December 2005. The mattress measured 6 m x 2 m x 0.23 m and was placed on existing rocks. Once completed, the structure was covered in concrete and steps constructed to further aid pedestrian access. The TRC monitoring reports 2015 to 2019 show repeat photos of the structure which illustrate its systematic destruction. Removal of the remains occurred in December 2019.

4.3 Site condition during site inspection

Runoff from the hillsides had caused considerable slippage with vegetation accumulating in the stream courses and reaching the beach. Post-storm photographs appear in Figures 3.1 to 3.3. Slips had also blocked the drainage channel along parts of the upper access track and the unconfined storm water was eroding the track surface, forming rills and covering the path with loose stone.

The beach access was scarped and obstructed by boulders. Access was further compounded by recent storm debris.

The coastal cliffs were particularly unstable with the heavy rainfall resulting in very large slips which obstructed the Ohawe beach walk.

4.4 Remedial work

Intervention priority ranking used below is set out in Section 1.4.

With the TRC consent no longer active there are no compliance issues.

STDC officers are presently working on a new design and consent. However, the nature of the physical environment will make finding a sustainable solution challenging.

The council's ongoing maintenance programme needs to keep the track clear of storm debris (urgent responses) if the track surface is to remain safe and intact.

Figure 4.1 Waihi Beach access track showing slumpage (circled) and blocked drainage channel (dashed line) with resulting rills (focused erosion) developing on the track

Figure 4.2 The barrier marks the location of the original consented gabion-based access structure. The alternative lower accessway (from 2018) is evident as is the escarpment at its base caused by stream flow and waves. Boulder-hopping is now required to access the beach.

Figure4.3 Recent coastal cliff erosion and debris spilling across the beach between Waihi and Ohawe Beaches.

5 Patea Wharf and bank rip rap

This inspection was carried out on 4 March, 2022 by Dr Roger Shand between 1500 and 1600 hrs. Environmental conditions included light variable winds, low to mid tide, no waves at the site and mid to low river flow.

5.1. Resource Consents

Permit 4575 was first issued by the Taranaki Regional Council on 20 October, 1995 for the purpose of maintaining the existing wharf. On 1 June 2010 the consent was modified to occupy the CMA with a derelict wharf and 200 m of rock rip-rap (Figure 5.1). Special Conditions require the rip-rap wall be maintained in a safe, sound and functioning condition, and the derelict wharf be maintained in an intact state to the extent that no part of the wharf becomes a navigational hazard.

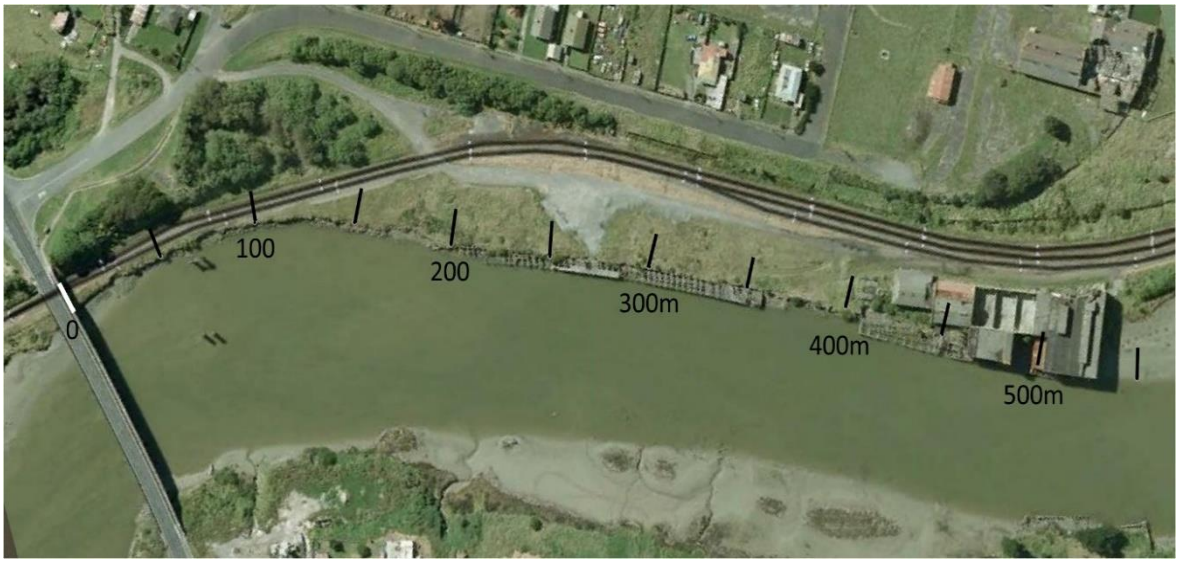

Figure 5.1 Patea river relating to consent 4575: rip-rap bank protection from chainage 0 to 200 m and the derelict wharf from 200 m to 530 m.

5.2. Setting

The 200 m long rubble and boulder rip rap is located between between the SH3 bridge and the upstream end of the wharf. The wharf was constructed during the early years of the harbour endowment and stretched between 200 and 530 m chainage (based on the 1968 aerial photo 24882). It seems that there was always a 50 m gap between 360 and 410 m chainage. There were also wharfs on the opposite (right bank) with the river width constrained between the wharves to some 60 m. These structures (revetment and wharves) are noted in officer reports to have stablised the channel and that council consider this stability will remain as long as the left back flow alignment is maintained.

Figure 5.2 Upper photo: Rip-rap near the bridge comprising variety of materials with no coverage in places. Middle photo: more complete rip-rap protection but hazardous iron rails in distance. Lower photo: variable riprap at the rip-rap/wharf juncture.

Figure 5.3 Upper photo: upstream section of dilapidated wharf 250 to 200 m. Middle photo: superstructure 290 to 350m, inset for comparison is TRCs 2013 photo. Lower photo: collapsing structure at 360 m with no wharf having been constructed along the next 50 meters.

Figure 5.4 Upper photo: piles in the vicinity of the wharf buildings - between 420 to 465 m. Middle photo: superstructure fronting the wharf buildings at about 500 m chainage. Lower photo: downstream end of wharf (530 m).

5.3 Wharf and rip-rap condition during site inspection

Between chainage 0 to 30 m, the rip-rap protection varies in condition from nothing to minimal coverage (Figure 5.1 upper photo), moderate coverage occurs between 30 m to 170 m with isolated sections having full coverage (Figure 5.2 middle photo). Minimal coverage occurs around the small embayment 170 to 200 m (Fig 5.2 lower photo). The shape of this embayment is characteristic of end-effect erosion from the 170 m revetment termination. Protruding railway iron is evident in the middle and lower (Figure 5.2) photos.

The wharf may have once extended to about 170 m chainage as evident by the pile stubs in Figure 5.2 lower photo. The wharf structure begins at about 200 m (Fig 5.2 lower photo) and extends more or less intact to chainage 360 m (Figure 5.3 photos). However, there are gaps in the super structure which in some places is highly dilapidated and is hazardous to the public, and in particular to fishers who appear to use this area.

Piles with remnant or non-existent superstructure extend from 410 m to the end of the wharf buildings at about 530m (Figure 3.4). Judging by the graffiti and rubbish in the buildings and adjacent wharf remnants, they are well used by some members of the public.

4. Remedial work

Intervention priority ranking used below is set out in Section 1.4.

The upstream rip rap protection fails to meet consent, asset and hazard management requirements regarding safe, sound and functioning condition. A shorter-term intervention is required for both consent compliance and asset/hazard management purposes that upgrades the revetment using correct design, materials and placement.

Gaps within the wharf structure together with the unknown state of the lower piles or what lies beneath the superstructure could affect navigability. It was not possible to satisfactorily inspect these areas visually from safe access and a thorough inspection from a boat and involving a diver and port engineer is recommended as a short-term intervention.

This highly dilapidated wharf presents a considerable hazard risk to the public who clearly use it and the buildings for fishing and other forms of recreation. From a hazard mitigation perspective, the STDC needs to give urgent consideration to warning signage and physical barriers.

6 Caves Beach (Waverly) access ramp

This inspection was carried out on 4 March, 2022 by Dr Roger Shand between 1700 and 1800 hrs. Environmental conditions included light variable winds, low tide, and 0.5 m waves.

5.1. Resource Consent

Permit 4479 was issued on 23 June 2010 to construct and maintain a concrete access ramp. Special conditions require the consent holder to maintain the structure in a safe and sound condition.

53.2 Setting

Caves Beach is a small embayment in an otherwise cliffed coastline. The embayment is some 50 m wide at the entrance, 75 m wide within the embayment and stretches some 70 m back to a stream mouth. Repeat photos in TRC monitoring reports dating back to 2012 show the bay can be choked with driftwood at times, and the sand level can fluctuate by about 1 metre.

The access ramp is located some 20 m west of the stream mouth. The ramp is cut into a mudstone-siltstone cliff some 15 m high. The structure is 20 m in length and 3 m wide, having been laid in 3 strips which are broken, or have settled unevenly, in places. The ramp is wider toward the base on its eastern side, suggesting a proclivity to erode there. In addition, a 2 m wide by 16 m long concrete pedestrian step-way is located next to the ramp with a hand rail along its western edge. The accessway leading down to the top of ramp is formed of shell rock. See Figure 6.1.

Figure 6.1 Caves beach access structure, showing pedestrian steps and handrail, vehicle ramp and broadened lower section.

6.3. Condition of the structure during site inspection

The sand level in the bay appears to be considerably lower this year than last year with 11 steps showing below the handrail compared with three in last years TRC monitoring report. Logs were also clogging the stream mouth (Figure 6.2) and some were reaching the base of the ramp.

As noted in previous TRC monitoring reports, the vehicle ramp is in a degraded state with sections having differing elevations and compromising functionality (Figure 6.3). The steps are also in an increasingly degraded state with sections of concrete broken and sand and vegetation making the handrail unusable (Figure 6.4). These situations are worsened by shell rock from the access road above washing down the ramp and steps with the finer particles making the ramp particular slippery and hazardous (Figure 6.4). The shell rock coating may well have been exacerbated by the preceding rain storms as rill and incipient gullying were evident on the access road (Figure 6.5).

A hazard report was made to STDC officers following the inspection (see Appendix A).

6.4. Remedial work

Intervention priority ranking is set out in Section 1.4.

The structure may be contributing to erosion on the adjacent shoreline toward the stream. However, the low sand level and logs may also be having an effect. At this stage no intervention is required as natural recovery is expected; however, in the meantime the situation should be inspected more regularly.

The structure is not in a safe and sound condition with the following interventions relevant to both consent compliance and asset and hazard management.

Both the ramp and steps are in need of maintenance and given the hazard potential this should be treated as a shorter term intervention.

Given the compromised functionality and potential hazard caused by fine shell rock originating above the structure, surface drainage should be improved immediately. In the longer term, permanent paving above the ramp could be considered.

Figure 6.2 Log accumulation fronting the stream and extending to the ramp. Fresh shoreline erosion is evident just beyond the ramp.

Figure 6.3
Degraded condition of the beach access ramp.

Figure 6.4
Dysfunctional access steps and handrail, with fine shell rock coating the ramp and steps.

Figure 6.5
Stormwater drainage issues above the structure.

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APPENDIX A Post-Storm Hazards Reporting

The annual inspection for consented coastal (minor) structures was carried out on 3 and 4 March 2022. This followed an extreme rain event on the weekend of and 13 February, which was preceded by a somewhat lesser event on 4-5 of February and a following event on 25-26 February 2022. This report brings to your attention storm impacts which have potential to be hazardous to the public. The full inspection report will be provided in due course and will form part of the (new) reporting procedure being developed for/by the TRC on consent monitoring.

Kaupokonui

Issues Access from the reserve/campground to the southern beach has been blocked by rockfalls which extend into the river. The camp custodian says some dropped down as recently as a week ago. Adjustment to the instability may continue for some time. To access the beach it is necessary to climb over unstable rock with the threat of further falls from above. The northern beach cliff has also been substantial subject to significant erosion.

Recommendations. Close the southern accessway with hazard fencing and erect warning signs. As this is a popular accessway, restoration may well be required. The council/officers should obtain advice of an experienced coastal engineer (for the South Taranaki coast). Erect signage warning of unstable cliffs as the public cross the bridge.

Waihi Beach (Denby Road)

Issue Runoff from the rainfall events have caused stream scour and surface erosion such that getting onto the beach difficult and somewhat hazardous. Closer to the carpark, hillside slips have blocked the drainage channel along the access path and the uncontained storm water is eroding the accessway forming rills and covering the path with loose stones. Along the coast (the advertised walkway to Ohawe Beach) the cliffs have been subject to severe erosion and walkers need to use this area when tides are higher.

Recommendations Ideally, beach access should be closed until safer access can be implemented. Again, a lasting design will need input by an experienced coastal engineer. However, given the site's popularity, an interim solution may be needed which could include (temporary) handrails, (strongly worded) signage, and clearing the drainage channels on the upper accessway. Unstable sea cliff warning signs are also recommended.

Caves Beach Access (Waverly)

Issue Surface runoff on the unsealed approach to the beach access steps and ramp has resulted in surface, rill and gully erosion. This impedes vehicle operation. However, of greater concern is the loosened shell rock which as been washed across the concrete ramp and steps creating a hazard for vehicles and pedestrians. Indeed, I slipped heavily on the ramp and without warning and was most fortunate to come away bruising.

Recommendations Infill the existing erosion depressions on the unsealed access road approach and reform to safely channel/exit drainage at the margins.. Remove shell rock debris from the ramp and steps (repeating as necessary) and excavate sand and vegetation around the hand rail, i.e. make it usable). A longer-term solution would be to seal the approach. Erect warning signs.

Roger Shand 7-3-2022

Senior Coastal Scientist

Coastal Systems Ltd

APPENDIX B Officer comment on remedial works

Bayly Rd seawall

This seawall is largely located in road reserve and land parcels owned by LINZ. The immediate properties protected include the road and fishing club building.

Reactive and preventative maintenance is planned for the Bayly Rd rockwall. We are awaiting deployment of penguin nesting investigations prior to being able to commence works.

STDC plans to remove the large Norfolk pipes in financial year F24/25, this is based on condition and risk. If further erosion occurs this work may need to be done earlier.

LINZ land is red, council land is purple, roading reserve is shaded grey, coastal protection zone is shown as blue line.

Kaupokonui boulder riverbank protection wall

This river rockwall protects the nearby public reserve.

STDC has placed signage warning of users about the dangerous bluff. STDC is aware that if physical barriers were erected to barricade the pathway, this has the potential to result in a situation where people scale the pathway anyway and unable to escape in event of a rockslide.

The STDC Recreation and Facilities team is responsible for this track. Further condition-based assessment can be considered for future monitoring programmes.

Council land is purple, roading reserve is shaded grey.

Denby Rd Waihi Beach accessway

The Denby Rd coastal structure is located on council land.

The pre-existing was demolished by the ocean and has since been removed. STDC is in the process of reconsenting for a replacement structure.

The STDC Recreation and Facilities team is responsible for access track to the coastal structure. Signage has been placed at the top of the accessway warning users of crumbling cliffs.

This is a significant historical area.

Council land is purple, roading reserve is shaded grey.


CAUTION
THESE CLIFFS HAVE
CRUMBLING EDGES
PLEASE KEEP CLEAR


CAUTION!
These Cliffs Have
Crumbling Edges
Please Keep Clear
Freedom
Camping

Patea wharf and bank rip rap

The Patea wharf is generally on property owned by the Department of Conservation (DoC) and Pataka Processors Ltd. The Patea riverbank rip rap protects rail reserve and some aspects are located on DoC land. None of these are located on council property or protect council property.

Warning signage exists at the derelict wharf and also at the derelict building. a significant amount of trespass is required to access the southern sections of the wharf.

Further condition-based assessment can be considered for future monitoring programmes. Discussions may be required between STDC and Kiwirail and Department of Conservation as to the funding of any treatments to the rockwall. Stabilization of the wharf is planned for F24/25.

Department of conservation land is red, Council land is purple, roading reserve is shaded grey, coastal protection zone is denoted by blue line.


DANGER
KEEP OFF


DANGER
KEEP OFF


KEEP OUT
FTP

Waverley Caves Beach access

The Caves Beach access structure is located on council land. It provides access from the pathway to the beach. It offers no protection to structures.

The ramp shows cracking from basecourse subsidence but is generally in stable condition. The pedestrian steps have been repaired and weeds removed between the steps and hand rails, to facilitate safe pedestrian access to the beach.

The STDC Recreation and Facilities team is responsible for this track. Further condition-based assessment can be considered for future monitoring programmes. Signage can be placed warning of slippery slope and gravel.

Crown land is red, Council land is purple, roading reserve is shaded grey, coastal protection zone is denoted by blue line, significant outstanding natural feature is shown as green shading.