RESC19-07-2 RUBY BAY SEAWALL AT BROADSEA AVENUE - DRAINAGE/MAINTENANCE ISSUES

Information Only - No Decision Required

Report To:	Engineering Services Committee
Meeting Date:	4 July 2019
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Report Number:	RESC19-07-2

1 Summary

1.1 During the ex-cyclone Fehi event in February 2018, properties behind the Broadsea Avenue seawall in Ruby Bay experienced significant flooding due to the very high storm surge and associated overtopping of the structure.

1.2 Residents have expressed concerns about whether the seawall is within the terms of its resource consent and suggested that the Council should look at drainage issues in this area.

1.3 Staff consider that the seawall complies with its resource consent. It has required ongoing maintenance due to the nature of the structure, but this was expected.

1.4 Issues relating to coastal processes and risks to properties in this area have been thoroughly investigated in the past and the seawall in its current state is a product of past decisions made by the community and the Council. There are no simple or straightforward changes that can be made to the seawall that would not trigger a resource consent process, and that would reduce the impacts of seawater inundation during storm events like ex-cyclone Fehi.

1.5 The Council will be investigating the stormwater system in the Ruby Bay area to determine what improvements (if any) can be made.

2 Draft Resolution

That the Engineering Services Committee receives the Ruby Bay Seawall at Broadsea Avenue - Drainage/Maintenance Issues report, RESC19-07-02.

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3 Purpose of the Report

3.1 This report provides background information regarding the history of the Broadsea Avenue seawall in Ruby Bay and discusses the concerns raised by some residents following the significant flooding during ex-cyclone Fehi in February 2018.

4 Background and Discussion

4.1 During the ex-cyclone Fehi event in February 2018, properties behind the seawall experience significant flooding due to the very high storm surge and associated overtopping of the structure.

4.2 The main issue raised by the community after that event, including in the public forum at the Engineering Services Committee meeting on 25 October 2018, is the effect of the seawall on drainage, particularly during storm events where seawater overtops the structure and inundates the land behind.

4.3 There were also general questions raised about whether the structure complies with its resource consent.

Figure 1. Broadsea Ave Seawall Location, and existing stormwater infrastructure

History of the Current Structure

4.4 Some form of tide exclusion bank has existed on the foreshore reserve fronting the residential properties of Broadsea Avenue almost since the development of the subdivision in the late 1960s/early 1970s. This bank initially served primarily to minimise seawater

inundation of the properties behind. The structure performed relatively successfully in this regard. However, as this section of coastline is subject to a persistent long-term erosion trend, the bank needed to be repaired from time to time and generally translated landward as a result.

4.5 A more robust clay bank structure began to appear in the 1980s. Significant reconstruction of the clay bank occurred in 1988 and again in 1997 after Cyclone Drena, with the latter works being regarded by the residents as an interim measure while a more substantial and permanent solution to seawater inundation and erosion protection was pursued. Residents lodged an application for resource consent to construct a rock revetment over some 400m of foreshore in this location. Resource consent (NN990397) was granted in 1999 authorising 80m of rock revetment to protect a section of the clay bank which was close to failing at the time.

4.6 In June 2000, residents applied for land use consent to install a rock revetment facing to protect the entire length of a reconstructed clay bank. That application was initially declined by the Council. The decision was appealed, and resource consent was subsequently granted by consent order RMW 1096/00, for a period of 10 years.

4.7 In February 2002, the Council resolved (CN02/02/13):

"THAT a Council Subcommittee meet Broadsea Avenue residents to outline the basis on which Council is prepared to take the Ruby Bay rock protection project over (including the expected lump sums and annual charges), and assuming a satisfactory meeting with Broadsea Avenue residents, that this project goes ahead forthwith as outlined above, subject to legally binding agreements, signed by the majority of residents."

4.8 The basis for the Council taking over the project was that the Council were able to strike a targeted rate to ensure all directly benefitting landowners were legally required to contribute. The Council also contributed 20% share of the cost as it was a landowner for two of the protected properties (Chaytor Reserve and Tait Street).

4.9 The rock revetment was subsequently constructed by the Council to the standard required by RMA 1096/00, with a targeted rate applied to Broadsea Avenue properties for their share of construction costs. It extended for approximately 427 metres from the northern end of Tait Street to just north of the ramp at the southern end of Chaytor Reserve. The revetment had a crest height (clay bank height) of between RL 4.5 and 4.8m above mean sea level (amsl) (NVD55).

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Figure 2 – Seawall in 2004

4.10 The consent for the rock revetment lapsed on 22 August 2011. The Council applied for, and on 28 November 2012 was granted, resource consents (RM110096 and RM110150) to provide for the ongoing occupation of the coastal marine area and to retain and undertake ongoing maintenance of the existing rock revetment for a period expiring on 23 March 2044. It is noted that this consent was for the existing seawall at its current crest height, and did not contemplate construction of a new structure or upgrade of the existing one.

4.11 Overall, considerable investigations have been conducted as part of previous consent processes including the Broadsea Avenue seawall and other protection structures. This includes the Old Mill Walkway seawall to the east.

Crest Height and Revetment Slope

4.12 Maintenance has occurred on the seawall regularly. The original rock revetment work used some smaller rock that has a greater tendency to move during storms. This has meant new larger rock has been used to repair the wall.

4.13 The as-built of the original seawall shows crest height varies from RL 4.50m to 4.81m (NVD55), which is a little higher than levels noted in RMA 1096/00.

4.14 Erosion of the crest of the clay bank has resulted in rock protection being placed on the crest, adding to its design height. The 2018 survey data shows the top of the rock now

varies from RL 4.81m to 5.26m. The effect of this extra rock layer would be to slightly reduce the effects of seawater run-up and inundation on adjacent properties during storm events.

4.15 The surveyed average front face slope of the rock protection is 1.94H:1V, which is very close to the typical slope shown on the drawings for RM110096 of 2H:1V.

Stormwater and Seawater Management

4.16 An issue considered in RM110096 was stormwater and seawater management. It was acknowledged that the ongoing presence of the seawall would continue to have a potential influence on the management of stormwater from the catchment, and on flooding risk arising from seawater overtopping the structure during storm events.

4.17 When seawater overtopping occurs, seawater can generally only return to the coast via the stormwater pipe network. This network has purpose-built inlet structures in Tait Street and Chaytor Reserve for surface water entry. Ground levels on the esplanade reserve behind the seawall are generally contoured to drain water towards the stormwater inlet in Chaytor Reserve.

4.18 The stormwater inlet is maintained by Council's utilities contractor, but if the inlets are blocked by water-borne debris then seawater inundation of the land in the immediate vicinity of Broadsea Avenue increases. This occurred in 1997 during Cyclone Drena (when only a clay bank existed), and in 2018 during ex-Cyclone Fehi. In these circumstances, the presence of the seawall can become adverse due to the impounding effect preventing the return of seawater to the coast.

4.19 During storm surge events such as ex-Cyclone Fehi, the sea level can be higher than the stormwater outfall (and occasionally the inlet) meaning that no water will drain out of the pipe network.

4.20 RM110096 considered that the adverse effect of the seawall needs to be compared to the potential for seawater inundation effects on the land in the absence of the seawall. On balance, it was considered that limited seawater inundation and potential impoundment of this water behind the seawall would have lesser adverse effect on the land and property in the vicinity than would occur if the seawall was removed.

4.21 An access ramp at the southern end of the seawall in Chaytor Reserve acts to some degree as a secondary flow-path. Condition 28 of RM110096 required the crest height of the ramp to be reduced to RL 3.6m to better facilitate this function. This work was completed in 2013. By comparison the level of the stormwater inlet in Chaytor Reserve is RL 3.03m and this is the primary low point that surface water in the vicinity of the seawall will flow to.

4.22 Figure 3 below shows Chaytor Reserve looking towards the ramp during ex-Cyclone Fehi. It is evident that the sea level was so high that there was little opportunity for seawater behind the wall to flow out to sea via the ramp.

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Figure 3 – Chaytor Reserve during ex-Cyclone Fehi February 2018, looking towards boat ramp.

4.23 Council will be delivering improvements to the stormwater system in the coming year. New pipes and an improved stormwater channel will be constructed between Stafford Drive and Broadsea Avenue, in conjunction with the water and wastewater work in the area. There is also scope for minor improvements for stormwater intakes as part of this work. A second outlet to the coast was initially considered for this area, but was likely to deliver minor stormwater benefits and insufficient budget was available so has not been progressed.

Compliance with Resource Consent Conditions

4.24 The Council's Engineering Services Department requested a check of compliance with resource consent conditions from the Council's regulatory compliance team in 2013, following the lowering of the ramp at Chaytor Reserve. No non-compliances were noted.

4.25 No other non-compliances associated with the seawall have been noted.

Further Stormwater Investigations

4.26 Residents have raised questions about whether removing the clay bank within the seawall would reduce the effects of seawater inundation. Making the seawall permeable in this way would have both benefits and dis-benefits. As described previously, seawater inundation and drainage was a matter considered during resource consent process RM110096.

4.27 Dis-benefits include more regular inundation to properties behind the wall, as much smaller and more regular events would involve waves surging into the wall and forcing seawater through it. During the event, the regular wave period would mean that seawater run-up and inundation from each wave would not have time to run back out to sea through the wall before the next wave arrives, and inundation would continue. Benefits would be that when the event ends, any seawater inundation could more readily drain away.

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4.28 The Council's stormwater team plan to further investigate drainage in the Ruby Bay area in the coming year. Stormwater modelling will determine if there is an opportunity to improve stormwater system performance (including the discharge from a coastal inundation event).

Ongoing Maintenance of Wall

4.29 Between 2013 and 2016 there was minor maintenance to the rock facing of the seawall. During this period apart from some minor repairs to the face of the wall, the repairs related to the replacement of larger rock along the top of the wall to resist being pushed off from waves over topping the wall. Other repairs during this period related to several repairs of the Tait Street beach access steps.

4.30 Following the storms of 2017, an additional 400 tonne of rock was placed along the front face of the wall and some minor repairs were made to the top, between Tait Street and the Chaytor Reserve.

4.31 The ex-Cyclone Fehi storm of February in 2018 resulted in further over topping of the sea wall but no actual breaches of the structure. There was some damage to the face of the wall where rock had been displaced and some sections eroded. A further 600 tonnes of rock were used to top up the existing wall to reinstate it to the original service level.

4.32 The Old Mill Walkway revetment also sustained some damage in February 2018 that was mainly confined to the very top of the wall where existing rock had been displaced.

5 Options

5.1 This is an information report only and does not consider or recommend options for making improvements to the Broadsea Avenue seawall. The coastline in this area, and the seawall itself, have been the subject of considerable investigations previously.

6 Strategy and Risks

6.1 This report does not propose any changes to the existing seawall. The Council's Coastal Assets Activity Management Plan describes general risks that affect assets such as the Broadsea Avenue seawall.

6.2 Consideration of wider climate change and sea level rise, and associated adaptive planning processes that this Council may consider, is beyond the scope of this report.

7 Policy / Legal Requirements / Plan

7.1 The Council's Coastal Assets Activity Management Plan specifies that Council-owned coastal protection structures will be maintained to their original constructed standard. We consider that the Council is meeting this level of service in the case of the Broadsea Avenue Seawall.

7.2 This report does not propose any changes to the existing seawall. Any changes would be subject to a new resource consent process and would require consideration of the Tasman Resource Management Plan and the New Zealand Coastal Policy Statement 2010.

8 Consideration of Financial or Budgetary Implications

8.1 There are no financial or budgetary implications associated with this information report.

9 Significance and Engagement

9.1 This information report is not seeking any decision which may trigger the need for engagement or consultation relating to the Broadsea Avenue seawall.

9.2 Coastal resilience in the face of climate change and sea level rise is a significant issue for the Tasman region.

10 Conclusion

10.1 The Broadsea Avenue seawall appears to be compliant with its resource consent.

10.2 There are no straightforward opportunities to improve the performance of the existing seawall in terms of drainage performance and seawater inundation. Any such improvements would be substantial in nature and require not only a new resource consent process but significant funding.

10.3 Further investigations will be completed by the Council regarding the stormwater system in the vicinity of Broadsea Avenue and the wider residential area.

11 Next Steps / Timeline

11.1 Stormwater modelling of the Ruby Bay area will commence in the coming financial year. Options identified for stormwater improvements will be considered in the development of the Long Term Plan. These improvements will include improved outlet or overland flow capacity from behind the seawall.

12 Attachments

Nil