Item 22

22. Southshore and South New Brighton Earthquake Legacy Project

Reference / Te Tohutoro: 20/930198

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1. Purpose of the Report / Te Pūtake Pūrongo

1.1 The purpose of this report is to seek Council approval of recommendations to address earthquake legacy issues in Southshore and South New Brighton; and to inform the Council of financial implications to be considered in the 2021-31 Long Term Plan.

1.2 This report responds to resolutions made by the Council on 29 August 2019 [CNCL/2019/00196] in which Council staff were directed to further investigate or design potential options and actions that would mitigate earthquake legacy issues on the Southshore and South New Brighton estuary edge.

1.3 The decisions in this report are of medium-high significance in relation to the Christchurch City Council's Significance and Engagement Policy. This was determined by the high level of interest from affected communities and the potential impact on Christchurch ratepayers.

2. Officer Recommendations / Ngā Tūtohu

That the Council approve, subject to funding being agreed in the 2021-2031 Long Term Plan, and subject to design and consenting, the construction of:

Southshore estuary edge erosion issues

1. The unit approach to replacement or encapsulation based on the physical characteristics of the edge.

Southshore estuary edge inundation issues

2. A new engineered bund to 11.4m RL near to the current 'LINZ bund' alignment.

South New Brighton estuary edge erosion issues

3. A cobble beach with existing reno mattress as core as the preferred method of implementing a restoration of the edge, as per the Council's previous resolution, subject also to a review of the South New Brighton Reserves Management Plan and Development Plan.

South New Brighton estuary edge inundation issues

4. A new engineered bund to 11.4m RL set 25-100m back from the estuary edge within South New Brighton Park between the Jetty near Beatty St and the southern end of the campground on Halsey St.

And that Council:

5. Note that the total estimated cost of the recommended options is $12.5 million and that currently $10.5 million is allocated in the draft 2021-31 Long Term Plan.

3. Executive Summary

3.1 In August 2019 the Council passed a number of resolutions that required either immediate implementation or further investigation and design. It allocated $900,000 capital expenditure for construction of a set-back bund in South New Brighton and improvement of the Estuary Walkway and $400,000 for further investigation and design.

3.2 All available capital funding has been spent or is committed in a construction contract and, as signalled in August 2019, any further work requires a Council decision to identify new funding from the 2021-31 Long Term Plan.

3.3 This report sets out the outcome of the investigation and design work and makes recommendations for the preferred options for addressing residual earthquake legacy issues.

3.4 It is important to acknowledge that the best way to address earthquake legacy issues has been the subject of lengthy and ongoing debate between the Council and the Southshore and South New Brighton communities. Despite significant investments in time and resources by the Council and many community members, some issues remain unresolved. As a result, the communities point to a sense of ongoing uncertainty about their future and Council staff acknowledge the impact that this has had on community wellbeing. There are no perfect options for this area that will resolve all historical issues, are compatible with addressing future hazards and risks, and which are affordable and acceptable to all in the community.

3.5 This report proposes solutions that largely meet the community's stated needs and, if approved, offers the possibility of drawing a line under the earthquake legacy issues to enable Council and the communities to move forwards.

3.6 In particular, community members have indicated that once earthquake legacy issues are addressed they are willing to participate in a future-focused conversation to identify adaption pathways to respond to the impacts of sea level rise.

3.7 Council staff recommend the following options:

- **Southshore Estuary Edge Erosion Mitigation** – implement the Unit Approach of designing replacement or encapsulation of the existing structures based on the physical characteristics of the edge. This provides the most comprehensive and robust approach to reducing erosion risk, has significant community support, it substantially improves the visual amenity of the estuary edge, and it contributes to saltmarsh restoration. Estimated cost $5.2m.
- **Southshore Bund Inundation Mitigation** - construct an engineered 11.4m bund immediately beside the existing LINZ bund alignment. In conjunction with the South New Brighton Inundation Mitigation proposed below, this would reduce flood risk to 450 homes and it has significant community support. Estimated cost $3.9m.
- **South New Brighton Estuary Edge Erosion Mitigation** – implement the Cobble Beach Approach of cobble beach construction with existing reno mattresses as core. This achieves pre earthquake levels of erosion management, impacts positively on other values, aligns with community support for a sloping beach and set-back bund, and contributes to saltmarsh restoration. Estimated cost $1.2m.
- **South New Brighton Inundation Mitigation** – construct a bund set-back from the estuary edge by 25-100m. In conjunction with the Southshore Bund Inundation Mitigation proposed above, this would reduce flood risk to 450 homes as well as the campground, and aligns with community support for a sloping beach and set-back bund. Estimated cost $2.2m.

3.8 The total estimated cost of the recommended work is $12.5m and the current draft 2021-31 Long Term Plan includes an allocation of $10.5 million (noting that the Council is in the process of prioritising projects and funding at present).

3.9 If the Council approves the proposed works the draft 2021-31 Long Term Plan will need to be re-prioritised and phased to allocate the shortfall of $2 million to ensure delivery of the works is possible.

4. Background: Southshore & South New Brighton Earthquake Legacy Project

4.1 On 9 May 2019 the Council requested staff report back to the Council by August 2019 on options to address earthquake legacy issues relating to the estuary edge in Southshore and South New Brighton. [CNCL/2019/00074]

4.2 This decision followed the transfer of the Southshore and South New Brighton Regeneration Strategy from Regenerate Christchurch to the Council and a Council decision to address earthquake legacy issues in advance of initiating coastal hazards adaptation planning with these communities.

4.3 Residents of Southshore and South New Brighton have sought responses from agencies to a range of issues resulting from the 2010-2011 Canterbury earthquakes. Community concerns have centred around the increased risk of inundation and erosion on the estuary edge between Evans Avenue and the Southshore Spit caused by areas of land subsidence. Due to a perceived lack of progress by agencies in resolving these issues, there is a legacy of distrust of the Council and a perception that other communities have experienced more timely and comprehensive responses to earthquake issues.

4.4 Between May-August 2019 Council staff undertook engagement to understand community needs relating to earthquake-legacy issues and identify actions to address these needs. A Community Assessment of options generated 373 survey responses that provided evidence of community preferences, which directly informed the recommendations to the Council in August 2019 and remain relevant for the decisions in this report.

4.5 On 29 August 2019 the Council passed a number of resolutions (see Attachment A).

4.6 This report summarises and makes recommendations for resolutions relating to the following geographic areas and issues:

- Southshore Estuary Edge – Erosion Mitigation
- Southshore Bund – Inundation Mitigation
- South New Brighton Estuary Edge - Erosion Mitigation
- South New Brighton – Inundation Mitigation

4.7 While work has consistently progressed on all August 2019 Council resolutions, the impact of Covid-19 lockdowns on fieldwork has created some unavoidable delays.

5. Work Undertaken to Date

5.1 The Council has addressed (or partially addressed) resolutions 1, 2, 2a, 3a, and 5 detailed in Attachment A.

5.2 Improvements have been made to the Estuary Walkway including repairs to the pathway near Kibblewhite Street to address ponding and surfacing issues.

5.3 Construction is underway on an engineered set-back bund between Bridge Street and South New Brighton School, with the southern section from the School to the Jetty completed.

Construction of the northern section to join with the completed bund near Bridge Street is due to start in 2021 to accommodate lizard and bird nesting seasons.

5.4 A condition assessment of the Pages Road to Bridge Street stopbank has occurred. Some minor issues were identified and addressed but overall it was assessed as meeting current standards. GHD are undertaking an updated life safety risk assessment of the stopbank and a separate report will come to the Council once this investigation is concluded.

6. Southshore Estuary Edge – Erosion Mitigation

6.1 In August 2019, the Council resolved:

6.a. Requests that a collaborative group be established which includes a technical expert nominated by the Southshore community, to investigate the immediate Earthquake Legacy edge issues for the Estuary Edge repair and protection including the development of a suitable erosion mitigation plan with costings (including options for the formerly, privately-owned edge structures), and the position of the 11.4m bund.

6.2 In December 2019 the Southshore Residents Association nominated Gary Tear (OCEL) as their technical expert and participant in the Collaborative Working Group alongside the lead contractor (Jacobs) and Council staff.

6.3 The scope of the *"Erosion Management Options Report; Southshore, Ihutai/Avon-Heathcote Estuary"* September 2020 (see Attachment B) was to investigate the immediate options to minimise further erosion and 'make safe' the structures from Godwit Street to Tern Street.

6.4 In line with the Council resolution, the scope did not seek longer-term protection against sea level rise. The design required a level of protection that could be maintained for 20 years to allow time for adaptation planning to be undertaken with the Southshore community.

6.5 It is important to note that the previous owners of red-zoned properties, using a wide range of materials, built the majority of the existing Southshore structures. While some structures continue to provide effective erosion protection, others are in a state of disrepair, collectively provide poor visual amenity, and pose health and safety risks.

6.6 The Collaborative Working Group identified two alternative strategies:

- 'Unit Approach' - A unit approach of replacement by designed protection options based on the physical characteristics of the edge (recommended)
- 'Prioritised Repair Approach' - A prioritised repair and maintenance approach (not recommended).

Recommended Option – Unit Approach

6.7 The Unit Approach of designed replacement or encapsulation options based on the physical characteristics of the edge is recommended subject to detailed design and resource consent.

6.8 The Unit Approach involved the identification of five spatial sub-units (Units 1, 2, 3a, 3b and 4) based on common physical characteristics such as the location, current level of protection, existing materials, land and foreshore elevation and the presence of saltmarsh (see Figure 1).

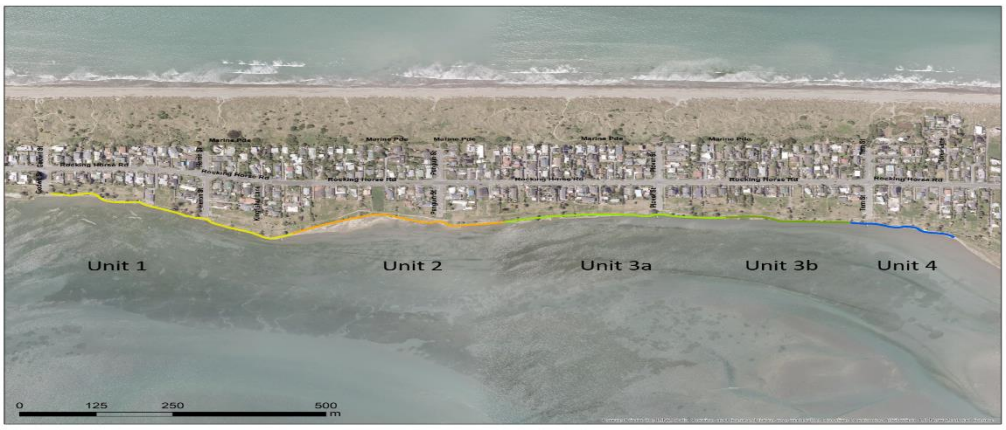

Figure 1: Spatial units in Southshore estuary edge

Unit 2 – Cobble Beach Renourishment and Offshore Breakwater

6.9 The Unit 2 component of the Unit Approach includes cobble beach renourishment incorporating (where possible) encapsulation of existing rubble revetment material in conjunction with an offshore breakwater that, with the cobble beach, will enhance the salt marsh and provide a natural form of erosion protection.

6.10 Beach renourishment involves adding volume and elevation to beaches by introducing cobbles to a designed slope and elevation. The principle is to use a larger grain size than that naturally found at the site to reduce erosion by wave action while still allowing the individual cobbles to move without de-stabilising the whole structure. If cobbles are displaced over time, they can simply be topped up. Beach renourishment can be effective over either low rubble or existing vertical seawalls.

6.11 The offshore breakwater component of Unit 2 is comprised of a row of large rock on the estuary bed (close to the foreshore) to break up wave energy and facilitate sediment build-up. Similar structures have been installed alongside the Jellicoe Marsh boardwalk in South New Brighton Park.

6.12 The breakwater will augment the protection offered by beach renourishment by raising the estuary bed and allowing for the enhancement of the existing saltmarsh, which provides natural erosion protection to the estuary edge.

Units 1, 3a, 3b and 4 – Armoured Rock Revetments

6.13 The Unit Approach for the remaining four Units (1, 3a, 3b and 4) includes armoured rock revetments incorporating (where possible) encapsulation of existing rubble revetment material with some removal of excess existing materials where required.

6.14 Armour rock revetments involve placing large rocks on a designed slope at the estuary edge with a crest height that minimises the amount of overtopping in large water level events to prevent back-scour. The rock size used is sufficient to prevent displacement of the rocks within the structure during significant storm events. Rock revetments can be an effective way to encapsulate existing low rubble structures or vertical seawalls, and can be adapted in the future to have higher crest elevations if there is space available in the backshore.

Figure 2: Example of a rock revetment

6.15 Landscaping and planting will support the durability of the erosion protection offered and improve visual amenity.

Advantages/Benefits of the Unit Approach

6.16 The Unit Approach is recommended because it ensures that the whole length of the estuary edge meets a consistent design standard that effectively addresses existing issues of loading, slope, suitability and durability of material. As a result, the residual risk of erosion is reduced to medium to low levels and ongoing maintenance and repair is minimised.

6.17 Because the Unit Approach best fits the physical characteristics of each unit, it considers the natural environment values (e.g. ecology, natural character) and social values (e.g. visual amenity, access, cultural) of each unit.

6.18 A multi-criteria assessment identified benefits of the Unit 2 cobble beach approach including its natural appearance and ease of access to the foreshore. The breakwater will protect and enhance the existing salt marsh which is consistent with the Council's Biodiversity Strategy and the New Zealand Coastal Policy Statement.

6.19 Importantly, the Unit Approach options are all able to be adapted for sea level rise beyond a 20-year time frame should that be the desired approach of Council and the community following an adaptive planning process. The designed revetments will be durable beyond the 20-year time frame.

6.20 The Unit Approach provides a greater improvement in visual amenity than the Prioritised Repair Approach; with provision made for planting, access to the foreshore, and a more uniform look to the estuary edge.

6.21 Perhaps of greatest significance, given the lengthy history of the earthquake legacy issues, is that the Southshore Residents Association support the Unit Approach (in combination with the recommended edge bund) stating that it: *"is an ecologically appropriate erosion and inundation solution to resolve the earthquake legacy issues of the estuary edge. The acceptance and funding of this work by CCC will create a platform for future coastal and SLR discussions. We*

believe it will increase the wellbeing of the Southshore community and enhance the amenity value of this ecologically and aesthetically valuable area for all the city to enjoy."[10]

6.22 In summary, the Unit Approach is recommended because it provides the most comprehensive and robust approach to reducing erosion risk, and has significant community support. In addition this approach provides for a substantial improvement in the visual amenity of the Southshore estuary edge, and contributes to saltmarsh restoration.

Disadvantages/Risks

6.23 The Unit Approach is comparatively more expensive, at $5,200,000 compared with the Prioritised Repair Approach at $3,733,000.

6.24 The breakwater structure would be visible, particularly during low tides, and rock structures are not naturally found in the estuary. However rocks are a natural product and could provide an inter-tidal roosting opportunity for estuary birds.

Not Recommended – Prioritised Repair Approach

6.25 The alternative option is the Prioritised Repair Approach which proposes a range of treatment options and can be summarised as follows:

- In Units 1 and the southern end of Unit 4 remedial repairs would occur on a 'by structure' priority basis to raise existing individual structures to an elevation of 11.2m RL or, where this was not possible, to replace individual structures as required.
- For all other units the Unit Approach would be required; however no breakwater is included for Unit 2.

6.26 The Prioritised Repair Approach is not recommended because it delivers a piecemeal approach with a variable design standard that does not consistently address existing issues of loading, slope, suitability or the durability of the existing material.

6.27 The residual risk of structure failure and further erosion would remain high in Units 1 and 4, and further repairs are likely to be required within the 20-year lifetime. Furthermore the exclusion of the breakwater would preclude the opportunity to enhance the saltmarsh.

6.28 The Southshore Residents Association do not support the Prioritised Repair Approach. Therefore if this approach was pursued there is likely to be ongoing re-litigation and an inability for the Council and the community to move forward towards adaptation planning.

7. Southshore Bund – Inundation Mitigation

7.1 The Council resolution requested that staff prepare advice on the position of an 11.4m RL bund. Council staff have also undertaken analysis to determine whether a bund is required in this location.

7.2 The current tidal statistics for a 50-year return period event are about 11.1m RL and a 2017 Council survey highlighted that sections of the existing bund are below this level.

7.3 Flood modelling of a 50-year return period event in combination with a 5-year rainfall event was undertaken (see Figure 3). This is referred to throughout the paper as 'flood modelling'. The flood modelling has shown that approximately 450 properties could be at risk of underfloor flooding in this event.[1]

[10] Email from Sue Carbines, SSRA Chairperson, Record of Minutes SSRA, record of event 21/9/20.

[1] Note also there is not sufficient confidence in existing building floor levels to estimate overfloor flooding risk. However, it is likely that there is some above floor flooding risk given the number of underfloor dwellings at risk.

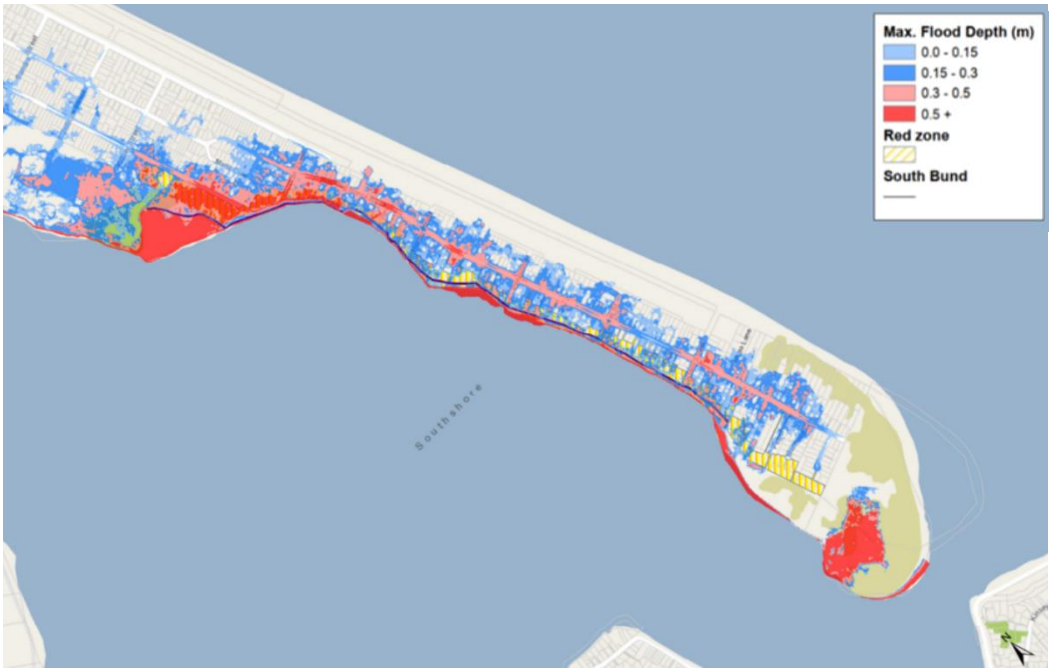

Figure 3: 50 year modelling (combination of 50 year tide and 5 year rainfall events)

7.4 While only minor overtopping was reported in the recent February 2018 event, the recorded level at Bridge Street was at 11.08m RL. This is below the 50 year flood level meaning we are at risk of overtopping if we don't increase the height of the bund.

7.5 The Council resolution explicitly described a crest height of 11.4m RL[11] for the Southshore bund. Staff note that this would provide for the freeboard levels (300mm) required to respond to the updated tidal data.

7.6 Three alternative strategies were considered:

- Construction of a new bund on the current alignment (recommended)
- Construction of a new set-back bund (not recommended)
- Raising the existing bund along most of its length (not recommended).

7.7 To be effective, any bund would be approximately 1500m in length and 0.8m high on average. A trail is proposed on top of the bund.

Recommended Option – Construction of a New Bund on the Current Alignment

7.8 The recommended approach is to construct the bund immediately behind the proposed estuary edge erosion planting (approximately 5m set-back from the edge) or behind the existing LINZ bund, whichever is further from the edge. This is to allow sufficient room for erosion management and safe construction of the bund. In some locations, deviations may be required to account for significant trees or infrastructure. Further design work is required to confirm the exact alignment.

7.9 The new bund would be engineered in compliance with the Avon River Temporary Stopbank Management specifications to achieve the desired permeability, earthquake resilience, and erosion resistance.

7.10 The cost for constructing a new bund is approximately $3.9 million.

Advantages/Benefits of the Construction of a New Bund on the Current Alignment

[11] The bund would be built 100mm higher than 11.4m RL to account for construction and survey tolerances.

7.11 In combination with the South New Brighton works a new bund would reduce flood risk for up to approximately 450 properties.

7.12 The risk of erosion of the bund is low over the proposed design life of 20 years due to the Unit Approach to erosion management proposed in this report. There is no additional risk in the construction of a bund near to the current alignment.

7.13 As the land generally falls away from the estuary edge towards Rocking Horse Road a set-back bund would be slightly higher above ground level than if built adjacent to the LINZ bund. Some savings can be made by re-using the top soil from the existing bund in the construction of the new bund.

7.14 Because there are no significant engineering or economic drivers for a decision regarding the alignment of the bund, community preferences are of added significance. The Southshore Residents Association strongly support an alignment near to the estuary edge stating that they *"support the Linz position and stated height of the bund 11.4."*

7.15 Construction of the bund with a 20-year time frame supports the resolution of earthquake legacy issues in advance of initiating coastal hazards adaptation planning with these communities.

7.16 In summary, the construction of a new bund at the current alignment is recommended because it reduces flood risk to approximately 450 properties and it has significant community support.

Disadvantages/Risks

7.17 Constructing a bund might inadvertently create a false sense of security for the community, as there is still a risk of flooding through a storm event that exceeds the crest of the bund, a rainfall event that exceeds temporary pump capacity, or groundwater that rises above ground level. Furthermore, the proposed works are likely to be severely damaged in a large earthquake.

7.18 Tree and vegetation removals are likely to be required to allow the works.

Not Recommended – Raising the Existing Bund

7.19 The existing LINZ bund is constructed from top soil. Raising the bund is not a viable option as it does not offer the required level of flood risk reduction due to the limitations of its composition and construction.

Not recommended – Construction of a New Set-Back Bund

7.20 While a new set-back bund would provide similar levels of flood protection as the recommended option it did not gain community support during the Community Assessment in 2019 because it would allow the intermediate land to be occasionally inundated and because it would allow passers-by to overlook neighbouring properties.

8. South New Brighton Estuary Edge – Erosion Mitigation

8.1 In 2014, a Council Hearings Panel approved a reserve management plan that promoted naturalisation of the estuary edge to enhance natural resilience to erosion. A development plan, prepared in parallel with the management plan and approved by the Burwood Pegasus Community Board in 2014, indicated restored salt marsh along the estuary edge.

8.2 In August 2019, following a Jacobs report on erosion management options, the Council resolved:

3.b. For the Estuary Edge, Yacht Club to the boardwalk, implement a restoration of the edge as per earthquake legacy edge repairs using reno mattresses and gabion baskets as previously existed pre earthquake.

8.3 Council engineers were engaged to develop a practical and deliverable concept-level design that best achieved the resolution. The resolution was interpreted by staff as restoration of the pre earthquake level of erosion protection whereby erosion of the estuary edge is reduced using new reno mattresses (where practical), as opposed to reinstating the actual position (and height) of structures as they existed pre earthquake.

8.4 The concept design report is available in Attachment C.

8.5 Two alternative strategies were identified:

- Cobble Beach Approach - Cobble beach with existing reno mattresses as core (recommended).
- Reno Repair Approach - Raising and repairing existing reno mattresses (not recommended).

Recommended Option – Cobble Beach with Reno Mattresses as Core

8.6 For the South New Brighton estuary edge, we recommend a cobble beach with existing reno mattress as core as the preferred method of implementing a restoration of the edge, subject to a review of the South New Brighton Reserves Management Plan and Development Plan and resource consents.

Figure 4: Example of a cobble beach

8.7 The Cobble Beach Approach is based on the concept of an unconfined cobble beach, potentially with an elevated cobble mound at the landward edge, to provide a suitable level of erosion protection without relying on the construction of new reno mattresses. Achieving the design objectives will be dependent on a suitable beach gradient and cobble size.

Figure 5: Typical area suitable for cobble beach

8.8 In areas with a relatively steep face where the existing reno is damaged, a rock armour over the existing structures is considered to be most appropriate.

Figure 6: Typical area suitable for rock armour over existing reno

8.9 In some areas with substantial shoreline regression, new sandy beaches and embayments have started to develop and the former reno mattresses are now located well offshore. These areas would be appropriate for encouraging saltmarsh recolonization in combination with a cobble beach, protected by a new breakwater created by enhancing the old reno mattress with suitable rock armour, similar to what is proposed in the Southshore salt marsh (Unit 2).

Figure 7: Typical area suitable for breakwater, saltmarsh and cobble beach

Figure 8: Example of breakwater and saltmarsh at boardwalk

8.10 The estimated cost of the Cobble Beach Approach is $1.2 million.

Advantages/Benefits of Cobble Beach with Existing Reno Mattress as Core

8.11 The Cobble Beach Approach repurposes the existing reno mattress, is easy to repair and maintain, and a shallower slope reduces the potential for scour at the base. It can also be adapted for sea level rise beyond a 20-year time frame should that be the desired approach of the Council and the community following an adaptive planning process.

8.12 In the 2019 Community Assessment, 63 per cent of respondents indicated a preference for a sloping beach and set-back bund (compared with 53 per cent who supported the repair of the reno mattresses and an edge bund).

8.13 Other advantages of the recommended Cobble Beach Approach when compared with the Reno Repair Approach include improved access to the shoreline, a more naturalised edge, and the ability to accommodate a greater range of shoreline environments and habitats in the intertidal area (e.g. salt marsh recolonization).

8.14 The Cobble Beach Approach is more likely to provide positive outcomes in terms of landscape, natural character, access to the coast, and ecology than the Reno Repair Approach. It is more likely to gain support of affected parties, align with District Plan policy requirements, meet the relevant Regional Plan Policy of being the best practical option, and be granted consent without notification.

8.15 In summary, the Cobble Beach Approach is recommended because it achieves pre earthquake levels of service with regard to erosion management, impacts more positively on other values than the Reno Repair Approach, is more likely to be consented, and contributes to restoring saltmarsh which is consistent with the Council's Biodiversity Strategy and the South New Brighton Reserves Development Plan.

Disadvantages/Risks

8.16 The Cobble Beach Approach (and the Reno Repair Approach) will require a formal review of the South New Brighton Reserves Management Plan and associated Development Plan (see s.12 Legal Implications).

8.17 The Cobble Beach Approach may incur higher maintenance requirements than the Reno Repair Approach particularly after major storm events, as there is potential for some movement of cobble material along the estuary edge, and some community members may perceive that it is not "engineered".

Not Recommended– Raising and Repairing Existing Reno Mattresses

8.18 The Reno Repair Approach primarily consists of constructing new reno mattresses to supplement the existing ones where they are not too badly damaged. In most cases, the existing damage is related to subsidence, so extending those structures to a suitable design height and filling in behind them where there has been low to moderate shoreline erosion is an effective approach. In areas of severe shoreline regression, the existing low-lying structures would be abandoned and new reno mattresses constructed at the new shoreline location.

8.19 The advantages of the Reno Repair Approach compared with the Cobble Beach Approach are that it achieves the "hard edge" desired by some community members, it is less likely to be damaged during moderate storm events, and it may have lower ongoing maintenance costs.

8.20 The disadvantages of the Reno Repair Approach compared with the Cobble Beach Approach are the slightly higher estimated construction and renewal costs, the reduced ease of access to the shoreline, the less-natural aesthetic, and reduced opportunity for ecological improvement.

8.21 The Reno Repair Approach may also produce more than minor effects on some of the key values assessed under the District Plan and Regional Coastal Environment Plan, in particular landscape and amenity values, natural character, cultural values, and indigenous habitats and ecosystems. It may be more difficult to gain support from key stakeholders as the reno mattress is unlikely to restore ecological and natural values and is less likely than a cobble beach to meet the Regional Coastal Environment Plan Policy of being the best practical option.

9. South New Brighton Bund – Inundation Mitigation

9.1 In August 2019, the Council resolved:

> *4. Requests staff to report separately on any flood protection measures that may be required for the* [South New Brighton – south of Bridge Street] *area, in the context of this report.*

9.2 In the February 2018 storm event a small, non-uniform emergency bund was built outside of the South New Brighton campground. This event highlighted the potential for coastal inundation in the area.

9.3 Flood modelling shows the potential for overland flows to flood properties via the campground and ponding to significant depths to affect properties in the Estuary Road/Caspian Street area. It shows that up to 450 properties are at risk of underfloor flooding across Southshore and South New Brighton[12].

9.4 Three alternative strategies were considered:

- Construction of a new set-back bund (recommended).
- Construction of a new bund on the estuary edge (not recommended).
- Do not construct a bund (not recommended).

Recommended Option – Construct a Set-Back Bund

9.5 A new set-back bund is recommended to reduce flood risk in South New Brighton Park and to nearby properties. The proposed alignment between the Jetty at Beatty St and the southern end of the campground on Halsey St is consistent with recommendations made by staff in August 2019, and would be set-back from the estuary edge by approximately 25-100m.

9.6 The bund would vary in height depending on the existing land levels in order to meet the 11.4m RL design height. It would be about 0.7m height on average and include a trail on top. It would be approximately 600m long with an additional 120m of trail to provide access across the sections of high land.

9.7 Figure 9 shows that the current South New Brighton Reserves Development Plan allows for a set-back bund/stopbank in the proposed location, meaning that it would be easier to consent. The alignment of the bund supports the development of a natural plant sequence from estuarine habitat to coastal forest. Unlike in Southshore where the land is relatively flat, there are areas of higher land in South New Brighton Park away from the edge. A set-back bund is preferable as it is cheaper to connect to and construct on higher ground. Building the bund at the estuary edge would be more expensive as it would require construction of the edge erosion works to a fixed level (similar to the 11.2 m RL level for Southshore).

[12] **This is the combined figure of Southshore and South New Brighton as overland flows from Southshore and South New Brighton overlap. Consequently, they have been reported as a combined figure.**

9.8 Significant land clearance, vegetation removal and tree removal would be required to support the works. Detailed design work will be required and will include replacement planting.

Figure 9: South New Brighton Park Development Plan Proposed Development

9.9 The cost for constructing a new bund is approximately $2.2 million.

Advantages/Benefits of a South New Brighton Bund

9.10 In conjunction with the Southshore works the construction of a bund would reduce flood risk for up to approximately 450 properties as well as the campground and recreational facilities in the South Brighton reserve.

9.11 As noted, the majority of respondents in the Community Assessment favoured the set back bund. It would offer future proofed recreational access via a new trail on higher ground.

9.12 Construction of the bund with a 20-year lifetime supports the resolution of earthquake legacy issues in advance of initiating adaptation planning.

Disadvantages/Risks

9.13 As with the proposed Southshore bund, constructing a bund might inadvertently create a false sense of security for the community, as there is still a risk of flooding through a storm or rainfall event, or rising groundwater, and the proposed works are likely to be severely damaged in a large earthquake.

Not Recommended– South New Brighton Edge Bund and No Bund Options

9.14 An estuary edge bund would be constructed directly behind the proposed erosion works at the estuary edge. A bund in this location would be larger as it would not be able to link to areas of high ground and this would increase the costs of this option.

9.15 This option is not recommended as an edge bund alignment would be inconsistent with the current South New Brighton Reserves Development Plan and community preferences expressed through the Community Assessment. A change to the development plan would be required to support the option. It would also prevent the establishment of a natural plant sequence from estuarine to coastal forest.

Not Recommended– No Bund

9.16 While a decision to not construct a bund would avoid the costs of construction, it is not recommended as it would leave properties, the park and campground at risk of flooding and would not meet community expectations.

10. Policy Framework Implications / Ngā Hīraunga ā- Kaupapa here

Strategic Alignment /Te Rautaki Tīaroaro

10.1 The recommendations in this report contribute to the community outcomes of active participation in civic life and safe and healthy communities. It reflects the strategic priority of enabling active and connected communities to own their future.

10.2 This report supports the Council's Long Term Plan (2018 - 2028):

10.2.1 Activity: Flood Protection & Control Works

- Level of Service: 14.1.6.2 Reduce risk of flooding to property and dwellings during extreme rain events. - Catchment models represent the current network (measured as a percentage of network): 95% of operational network greater than 300mm diameter or greater is included in model Annual reduction in the modelled number of properties predicted to be at risk of habitable floor level flooding of the primary dwelling in a 2% AEP Design Rainfall Event of duration greater than 1.5 hours excluding flooding that arises solely from private drainage.

10.2.2 Activity: Parks and Foreshore

- Level of Service: 6.8.2.7 Parks are provided managed and maintained in a clean, tidy, safe, functional and equitable manner (Asset Condition) - Recreational tracks and pathways - condition average or better: 75%.
- Level of Service: 10.8.1.4 Provision of a network of publicly available marine structures that facilitate recreational and commercial access to the marine environment for citizens and visitors. - Seawalls (condition average or better): 60 %.

Policy Consistency / Te Whai Kaupapa here

10.3 The decision has some inconsistencies with Council's Plans and Policies.

10.4 There is some inconsistency with the vision, goals and objectives of the Council's Biodiversity Strategy 2008-2035, particularly for the more hard-engineered aspects of the estuary edge recommendations. The first goal of the strategy is to conserve and restore Christchurch's and Banks Peninsula's indigenous biodiversity. The Estuary of the Heathcote and Avon Rivers/Ihutai is a Site of Ecological Significance and a hard edge prevents restoration of biodiversity.

10.5 The recommended cobble beach in South New Brighton Park is not consistent with the South New Brighton Reserves Management Plan or Development Plan 2014 (see s.12 Legal Implications) and both plans will need to be reviewed to enable this option to proceed.

Impact on Mana Whenua / Ngā Whai Take Mana Whenua

10.6 This report does involve significant decisions in relation to ancestral land or a body of water or other elements of intrinsic value, therefore does specifically impact Mana Whenua, their culture and traditions.

10.7 Te Ngāi Tuāhuriri Rūnanga are recognised as the manawhenua for the area and hold ancestral links and have interests in the area. The Estuary of the Heathcote and Avon Rivers/Ihutai and

its catchment has considerable cultural and historic importance to tangata whenua within Ōtautahi/Christchurch and the wider Canterbury area.

10.8 With regard to South New Brighton Park, the reserve management plan has an objective to recognise and restore the value of the reserve for tangata whenua, including for mahinga kai, and to recognise and provide for tangata whenua as kaitiaki (guardians) of the South New Brighton reserves. This includes the restoration of naturally occurring native vegetation along the shoreline, and a range of other steps to improve mahinga kai values wherever opportunities arise.

10.9 Further input will be sought from Ngāi Tahu through the consenting process for each of the projects.

10.10 As part of the investigation for Southshore erosion management options, a high level multi-criteria assessment of short listed options for each shoreline unit was undertaken to determine which options provided the greatest value against design, social and natural environment criteria. As described in the "Erosion Management Options Report; Southshore, Ihutai/Heathcote Estuary" (see Attachment Two), an assessment of the interaction of each option with identified cultural factors for the area has been undertaken with Mahaanui Kurataiao Ltd.

Climate Change Impact Considerations / Ngā Whai Whakaaro mā te Āhuarangi

10.11 The options recommended in this report have been designed to address earthquake legacy only and provide a similar level of service to pre-earthquake conditions for an estimated 20 years. The structures have not been designed for forecast impacts of climate change.

10.12 Addressing earthquake legacy issues will enable the community to move towards a discussion on climate change and adaptation.

Accessibility Considerations

10.13 The works proposed in this report will have implications for accessibility through the creation of bunds and erosion management structures. While access and egress will be considered in the design of these works through trails on top of bunds and access points to the foreshore, some accessibility impacts are unavoidable.

11. Resource Implications / Ngā Hīraunga Rauemi

Capex/Opex / Ngā Utu Whakahaere

11.1 As noted earlier in this report, no funding exists for these works with the $900,000 allocated from the regeneration initiatives capital funding exhausted on the construction of a bund from Bridge St to the Jetty and on improvements to the Estuary Walkway.

11.2 The estimated costs of the preferred options in this paper total $12.5 million as outlined in the table below.

Item	Cost (estimated)	Budget holder	Total cost	Funds allocated in the draft LTP	Phasing in draft LTP	Funding shortfall
Southshore Erosion	$5.2m	Parks	$6.4m	$5.5m	F22 $0.4m, F23 $2.3m F24 $2.8m	$0.9m
South Brighton Erosion	$1.2m					
Southshore Inundation	$3.9m	Three Waters	$6.1m	$5m	F22 $0.5m, F23 $0.8m,	$1.1m

South Brighton Inundation	$2.2m				F24 $2m, F25 $1m F26 $07m	
Totals			$12.5m	$10.5m		$2m

11.3 The current draft 2021-31 Long Term Plan includes an allocation of $10.5 million (noting that the Council is in the process of prioritising projects and funding at present).

11.4 If the Council approves the works proposed in this report the draft 2021-31 Long Term Plan will need to be re-prioritised to allocate the shortfall of $2 million to ensure delivery of the works is possible.

11.5 Estimated maintenance (opex) costs are:

- For the erosion works: Maintenance will be reactive as required with costs estimated to be in the range of $10,000 -$20,000 average per annum for Southshore and a similar amount for South New Brighton.
- For the inundation works: The need for temporary pumping has already arisen and is allowed for in existing budgets. The construction of a trail on top of the bund will lead to increased operational costs of approximately $2,000 per year. Inspections and other minor works are likely to cost an additional $5,000 per year.

12. Legal Implications / Ngā Hīraunga ā-Ture

Other Legal Implications / Ētahi atu Hīraunga-ā-Ture

12.1 The Legal Implications section of this report has been reviewed and approved by the Legal Services Unit.

South New Brighton Reserves Management Plan

12.2 The South New Brighton Reserves Management Plan 2010 was reviewed in consultation with the community in response to changes wrought by the Canterbury earthquakes. The new management plan was approved by a Council Hearings Panel in 2014.

12.3 Section 41(11) of the Reserves Act requires the Council "in the exercise of its functions [to] comply with the Management Plan for the reserve…"

12.4 The intention of the management plan with regard to the estuary edge is that natural processes be allowed to function without being significantly constrained by man-made structures, but that an allowance needs to be made for particular water based facilities, such as boat ramps, which may be treated differently.

12.5 The recommended cobble beach is in direct conflict with the following objectives and policies of the plan:

Ecology Objective: To protect and restore ecological values of the reserves and river and the estuary margin.

Policy 3.1.1 Manage the river and estuary margin to facilitate natural environmental processes where possible, subject to policies 3.2.3 and 3.3.1 (which allow for essential protection of water based facilities and flood protection infrastructure)

Policy 3.1.2 Conserve, restore, and manage the saltmarshes as conservation areas and as a cultural resource and allow for their inland migration in response to changing environmental conditions.

Policy 3.1.4: Ensure restoration, development, and maintenance of the river and estuary margin is done in accordance with an approved Development Plan and provides for cultural landscapes, cultural and ecological values, and strategic views across the estuary and beyond.

Climate Change Objective: To adapt to the effect of climate change in the reserves

Policy: 3.2.4 Facilitate the protection and restoration of natural defences to improve the resilience of the river and estuary margin to the effects of climate change and erosion.

Culture and Heritage Objective: To recognise and restore the value of the reserves for tangata whenua, including for mahinga kai, and to recognise and provide for tangata whenua as kaitiaki (guardians) of the South New Brighton reserves.

Policy 3.5.2: Ensure the appropriate restoration and planting of species that support mahinga kai.

12.6 Legal advice is that the recommended cobble beach, whilst appearing relatively natural, is nevertheless an unnatural man-made structure considered inconsistent with the tenor of the commentary in the Management Plan which appears to be focused on "natural" solutions. The legal view is that in order to mitigate against any legal challenge it would be advisable to first complete a change to both the Management Plan and the Development Plan to accommodate that option.

12.7 The process for reviewing management plans is set out in s41 of the Reserves Act 1977. Consultation, a potential hearing, and a report to the Community Board who has the delegation to approve reserve management plans will be required to make changes to the management plan. The process is expected to take a minimum of six months and will need to be prioritised within current work programmes and resources. The Council would be required to comply with the final approved management plan.

South New Brighton Reserves Development Plan

12.8 The South New Brighton Reserves Development Plan (Blighs Garden, Bridge Reserve, South New Brighton Park) April 2014, was prepared to present concept plans that support the objectives and policies of the South New Brighton Reserves Management Plan 2014.

12.9 The recommended cobble beach is in contrast to the existing Development Plan for the area which includes a concept plan that indicates restored salt marsh along the estuary edge. See Figure 9 above.

12.10 The Development Plan will need to be reviewed in parallel with the Management Plan. This process will require community consultation and a report to the Community Board who have the delegation to approve reserve landscape plans

Consenting Pathways

12.11 In August 2019, the Council resolved:

8. Notes that the implementation of some of these actions is subject to obtaining necessary resource consents from Environment Canterbury and/or the Christchurch City Council and request staff to ensure that options under the Greater Christchurch Regeneration Act are considered to expedite processes.

12.12 Recommended options for the estuary edge in Southshore and South New Brighton are likely to be assessed as a non-complying or restricted discretionary activity under the District Plan and Regional Coastal Environment Plan, particularly with regard to landscape and amenity values, natural character, cultural values, and indigenous habitats and ecosystems, and will require resource consent.

12.13 The sole mechanism available under the Greater Christchurch Regeneration Act to expedite the process is an opportunity for regeneration plans to be developed. However, the sections of the Act that provide for regeneration plans will be repealed on 30 June 2021.

12.14 Multiple resource consenting pathways exist for the different options outlined in this report. It is not appropriate to determine the suitability of using a regeneration plan pathway to expedite the works until Council approves specific options and these enter the detailed design phase. These steps are a necessary precursor to more accurately understanding the consenting requirements and optimal pathway whether it be under the GCRA or Resource Management Act 1991. In that context it is not practically possible to develop a regeneration plan to change the District Plan to remove those consenting requirements before the relevant sections of the Act are repealed.

13. Risk Management Implications / Ngā Hīraunga Tūraru

13.1 There is a risk of any of the options outlined in this Report suffering from occasional inundation and erosion and/or significant storm damage. Such damage may result in high maintenance requirements beyond current operational resources, reduced effectiveness of the proposed structures, reputational damage, and/or negative media coverage of the Council's actions.

Attachments / Ngā Tāpirihanga

No.	Title	Page
A ⇨	Council resolution 29 August 2019 *(Under Separate Cover)*	
B ⇨	Final Southshore Erosion Management Options Report 051020 *(Under Separate Cover)*	
C ⇨	South New Brighton Erosion Control Concepts, 18 September 2020 *(Under Separate Cover)*	

In addition to the attached documents, the following background information is available:

Document Name	Location / File Link
Not applicable	

Confirmation of Statutory Compliance / Te Whakatūturutanga ā-Ture

Compliance with Statutory Decision-making Requirements (ss 76 - 81 Local Government Act 2002).

(a) This report contains:
  (i) sufficient information about all reasonably practicable options identified and assessed in terms of their advantages and disadvantages; and
  (ii) adequate consideration of the views and preferences of affected and interested persons bearing in mind any proposed or previous community engagement.

(b) The information reflects the level of significance of the matters covered by the report, as determined in accordance with the Council's significance and engagement policy.

Signatories / Ngā Kaiwaitohu

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Approved By	Andrew Rutledge - Head of Parks Helen Beaumont - Head of Three Waters & Waste David Griffiths - Head of Planning & Strategic Transport Brendan Anstiss - General Manager Strategy and Transformation