

BEFORE A PANEL OF INDEPENDENT HEARING COMMISSIONERS
APPOINTED BY ENVIRONMENT CANTERBURY AND CHRISTCHURCH
CITY COUNCIL

IN THE MATTER of the Resource Management Act 1991(the **Act**)

AND

IN THE MATTER of Resource Consent applications CRC242267,
CRC242268, CRC242269, CRC242269 and
RMA/2023/3243 by Christchurch City Council (**the
Applicant**) for Southshore and South New Brighton Park
Estuary Edge Project

**STATEMENT OF EVIDENCE OF TOMMASO ALESTRA
ON BEHALF OF CHRISTCHURCH CITY COUNCIL
(ESTUARINE SPECIES AND HABITATS)
Dated: 21 November 2025**

Andrew Green / Lisa Wansbrough
Partner / Partner
green@brookfields.co.nz /
wansbrough@brookfields.co.nz
Telephone No. 09 979 2172
P O Box 240
DX CP24134
AUCKLAND

BROOKFIELDS
LAWYERS

1. SUMMARY OF EVIDENCE

- 1.1 My evidence addresses ecological effects arising from the Southshore and South New Brighton Park Estuary Edge Project on estuarine species and habitats. My evidence is based on the updated Ecological Impact Assessment (updated EcIA) dated 29 May 2025, which supersedes the original report lodged with the applications. The updated assessment reflects changes to the project design and construction methodology, stakeholder engagement, and engineering advice received since lodgement.
- 1.2 My evidence provides a revised assessment of ecological effects accounting for additional changes to the project proposal following discussions with technical specialists from the Canterbury Regional Council subsequent to lodging the applications. These additional changes to the project design and construction methodology include:
- (a) The removal of all proposed areas of reclamation (resulting in the loss of mudflat habitat) at Southshore, the only exception being one area of reclamation at 44A Rocking Horse Road.
 - (b) The reduction in the number of stepped access points to the Estuary bed.
 - (c) The establishment of a “soft edge” natural beach at South New Brighton Park in place of the previously proposed cobble beach structure.
 - (d) The revision of the width of the trench required to accommodate the toe of the new structures (from 3 m, to up to 5 m wide).
 - (e) The need to operate machinery on the Estuary bed in the area identified for the “soft edge” natural beach at South New Brighton Park.
 - (f) The inclusion of temporary stockpiling of excavated mudflat material on the Estuary bed in areas where the Estuary bed is about to be excavated.
- 1.3 My revised impact assessment concludes that, with the implementation of the proposed impact management measures, the project will have Very Low, Low or Net Gain levels of effect on estuarine species and habitats. The balance of Estuary bed reclamation and land declamation will result in a net

gain of 2,473 m² of new mudflat habitat across the project site. Temporary disturbance to the mudflat habitat through excavation and use of machinery onto the Estuary bed (where this cannot be avoided) will not affect the most sensitive estuarine vegetation, i.e., seagrass (very high ecological value) and saltmarsh (high ecological value). Temporary stockpiling of excavated mudflat material on the Estuary bed will be only in areas where the Estuary bed is about to be excavated, with prompt reinstatement of the mudflat material (within the same low-tide window) to minimise the mortality of the organisms living within the Estuary bed. The reinstated mudflat material will be compacted and left level with the surrounding Estuary bed, and it is expected to return to pre-disturbance conditions.

- 1.4 Once construction is completed, trampling impacts on benthic habitats due to pedestrian traffic will be minimised through the reduced number of access points. At South New Brighton Park, occasional top-ups of sand may be needed to maintain the “soft edge” natural beach. Any movement of sand is anticipated to replicate the existing sediment transport processes. The sand originating from the natural beach will be thinly dispersed on the Estuary bed and is not expected to result in smothering of benthic organisms nor in significant changes to the benthic habitat. Sand movements and patterns of accumulation will be monitored as a part of the Soft Edge Monitoring Plan associated with the implementation of the “soft edge” natural beach.
- 1.5 Considering that the current baseline condition includes the existing erosion protection structures (i.e., the Estuary edge is already armoured / modified), my conclusions in relation to coastal squeeze and cumulative effects have not changed from those stated in the updated EcIA (i.e., Very Low – Low and Net gain levels of effect, respectively). I consider the “soft edge” natural beach at South New Brighton Park to be an ecological improvement compared to the cobble beach which was originally proposed both in relation to coastal squeeze and cumulative effects.
- 1.6 Concerns raised in the submissions in relation to coastal squeeze and cumulative effects caused by the Estuary edge modification have been addressed based on the results of the coastal squeeze assessment included in the updated EcIA. Because of the presence of the existing erosion protection structures, ecological effects associated with the armouring of the shoreline already exist and will continue even in the absence of the project. I also note that by implementing a Long-Term Monitoring and Adaptive

Management Plan, the project will monitor physical and biotic changes, which may be associated with the presence of the proposed Estuary edge modification and will inform future adaptation planning. By seeking a short consent duration, the project allows for the possibility that different solutions from those proposed in this application may be required beyond the 20-year timeframe.

- 1.7 There are no outstanding matters of disagreement with the peer reviewers from Canterbury Regional Council and Christchurch City Council within my area of expertise. I note that the peer-reviewers would not have been aware of the additional changes to the project design and construction methodology discussed in my evidence at the time of preparing their reports.

2. INTRODUCTION

- 2.1 My full name is Tommaso Alestra.
- 2.2 My evidence is given on behalf of the Applicant.
- 2.3 My evidence relates to the potential construction and operational effects of the proposal on estuarine species and habitats at the Avon-Heathcote Estuary Ihutai.
- 2.4 I was one of the four co-authors of the marine ecology sections of the *Southshore and South New Brighton Park Flood Protection Works – Ecological Impact Assessment* report, dated 1 December 2023 (**original EcIA**), which was included as Appendix M to the Applicant's Assessment of Environment Effects (**AEE**) that accompanied the applications to Canterbury Regional Council (**CRC**) and the Christchurch City Council (**CCC**). Following lodgement of the application, I was also involved in providing advice to the Applicant in response to the Requests for Further Information (**RFIs**) issued under s92 of the RMA by CRC and CCC.
- 2.5 Following the RFI process, I was involved in updating the original EcIA in order to assess and address design changes made in response to the RFI requests, ongoing engagement with stakeholders, and updated engineering advice and any changes to impacts on marine ecology. The **updated EcIA**, dated 29 May 2025, fully supersedes the original EcIA and forms the basis of my evidence and any subsequent amendments to my Marine Ecology Assessment, as described below, and should be relied upon as the Applicant's assessment of ecological impacts arising from the proposal.

3. QUALIFICATIONS AND EXPERIENCE

- 3.1 I am currently employed as a Senior Ecologist / Associate Principal with Boffa Miskell Limited (Boffa Miskell), a national multi-disciplinary environmental planning and design consultancy. I have held this position for 5 years.
- 3.2 I hold the qualifications of Doctor of Philosophy in Ecology from the University of Canterbury (2014) and Master of Science in Marine Biology from the University of Pisa (2009).
- 3.3 I have approximately 10 years of professional experience in ecological surveying, monitoring, applied scientific research and advising on ecological matters. Prior to joining Boffa Miskell, I worked as a Research Associate at the University of Canterbury (**UC**). My work at UC included assessing the recovery of rocky reef communities impacted by the Kaikōura earthquake for the Ministry for Primary Industries, monitoring patterns of benthic biodiversity in Whakaraupō / Lyttelton Harbour for CRC, and assessing effects of marine protected areas for the Department of Conservation (**DOC**).
- 3.4 In my role at Boffa Miskell I have assessed the effects on the marine environment of a wide range of coastal developments across the country. Relevant project experience in Christchurch city / Ōtautahi and in the wider Canterbury region / Waitaha includes:
- (a) Amberley Beach bund renewal (ecological impact assessment for Hurunui District Council, 2022).
 - (b) Christchurch Coastal Pathway - Yacht Club to Rapanui / Shag Rock (ecological impact assessment for CCC, 2021).
 - (c) Rapanui – Shag Rock Cycleway - Tidal View (ecological impact assessment for CCC, 2021).
 - (d) Marine natural character study of the Canterbury coastal environment (desktop assessment for CRC, 2021).
 - (e) Estuary and coastal stormwater management area: freshwater, estuarine and coastal ecology values (desktop assessment for CCC, 2021).
- 3.5 I am a full member and regional representative of the New Zealand Coastal Society, of the Environment Institute of Australia and New Zealand (**EIANZ**), and a Certified Environmental Practitioner (**CEnvP**) with the EIANZ.

4. CODE OF CONDUCT

- 4.1 Although this matter is not before the Environment Court, I confirm that I have read the Code of Conduct for Expert Witnesses outlined in the Environment Court's Practice Note (2023) (**Code**) and have complied with it in preparing this evidence. I also agree to follow the Code when presenting evidence to the Panel. I confirm that the issues addressed in this brief of evidence are within my area of expertise, except where I state that I rely upon the evidence of other expert witnesses. I also confirm that I have not omitted to consider material facts known to me that might alter or detract from my opinions.
- 4.2 As a CEnvP with the EIANZ, I am also bound by the Institute's code of ethics.
- 4.3 In respect of the Code, I am a resident and property owner at Southshore, having resided there since 2016. I have not had any discussions regarding this project with the Southshore Residents Association or any member of the Southshore/South New Brighton community.

5. SCOPE OF EVIDENCE

- 5.1 This statement of evidence covers the following:
- (a) A summary of my evidence (see **Section 1** above);
 - (b) **Section 6:** An update to my Marine Ecology Assessment;
 - (c) **Section 7:** My comments on the issues raised in submissions that fall within my area of expertise;
 - (d) **Section 8:** My comments on the issues raised in the Section 42A Report that fall within my area of expertise;
 - (e) **Section 9:** My recommendations for additional conditions of consent;
 - (f) **Section 10:** Conclusions.

6. UPDATE TO MY MARINE ECOLOGY ASSESSMENT

- 6.1 Since providing the updated EclA to the CCC and CRC, additional changes to the project design and construction methodology have been made in response to discussions with CRC technical specialists¹.

¹ Bould, J. (2025). Summary of Changes to Application: RMA2023/3243 and CRC242267, CRC242268, CRC242269 and CRC251999. Memo prepared by Town Planning Group on behalf of Christchurch City Council, dated 5 November 2025.

6.2 Design changes include:

- (a) The removal of all proposed areas of reclamation (resulting in the loss of mudflat habitat) at Southshore, the only exception being one area of reclamation at 44A Rocking Horse Road. At this location, reclamation is unavoidable due to the presence of residential properties within the Residential Red Zone precluding the landward shift of the proposed erosion protection structures. There are further areas of reclamation proposed at South New Brighton Park (**SNBP**) to protect midden sites (see Section 6.1.1 of the updated EclA) and to establish the newly proposed “soft edge” natural beach (see paragraph 6.3(c) below). The reclamation area at 44A Rocking Horse Road, Southshore, and the midden sites at SNBP were assessed in the updated EclA. The newly proposed “soft edge” is an amendment to the design since my assessment in the updated EclA.
- (b) The reduction in the number of stepped access points to the Estuary bed. Only two stepped, formal access points are now proposed (one located at the road end of Godwit Street and the other approx. 90 m to the south of Tern Street).
- (c) The establishment of a “soft edge” natural beach at SNBP in place of the previously proposed cobble beach structure. The “soft edge” natural beach approach is described below (paragraphs 6.5 and 6.6) based on the report² prepared by Tonkin + Taylor (**T+T report**) and on the expert evidence of Mr Reinen-Hamill which together outline the design concept, construction methodology and likely maintenance requirements of the proposed approach.

6.3 Changes to the construction methodology include:

- (a) The revision of the width of the trench required to accommodate the toe of the new structures (from 3 m to up to 5 m wide).
- (b) The need to operate machinery on the Estuary bed in the area identified for the “soft edge” natural beach at SNBP. Machinery will be operated from land in all other locations.

² Tonkin & Taylor letter to Christchurch City Council titled ‘Southshore Edge Protection – South New Brighton Park Soft Edge Concept Design’, dated 30 October.

- (c) Allowing stockpiling of excavated material on the Estuary bed before reinstatement during the same low-tide window. Stockpiling will be limited to areas located alongside the excavation trench that are scheduled to be excavated next (i.e., stockpiling onto areas of seabed about to be excavated). No stockpiling will occur on areas of seabed that will not otherwise be disturbed.

6.4 The implications of these changes to the project design and construction methodology for my assessment and conclusions in relation to estuarine species and habitats as set out in the updated EcIA are outlined in the revised assessment of construction, operational and cumulative effects provided in the following subsections (paragraphs 6.7 to 6.57).

“SOFT EDGE” NATURAL BEACH AT SNBP

- 6.5 The “soft edge” natural beach approach will involve the establishment of sandy beach in the area where a stretch of unarmoured Estuary edge and a new area of Estuary bed have been created by ongoing erosion following earthquake damage to the existing erosion protection structures (Figure 1).
- 6.6 As outlined in Figure 2, in the T+T report, and in the expert evidence of Mr Reinen-Hamill, the existing, damaged erosion protection structures (gabion baskets) will be removed (allowing the reinstatement of approx. 357 m² of Estuary bed). The proposed beach design involves a landward shift of the coastal edge enabling the creation of additional soft sediment habitat both above (2,500 m²) and below (582 m²) Mean High Water Springs (**MHWS**). Four rock groynes (occupying approx. 369 m² of Estuary bed) will be installed to minimise further erosion and stabilise the coastal edge. A layer of imported sand up to 0.5 m thick will be deployed to complete the design. The imported sand will likely be Waimakariri River sand sourced from local quarries. It will be washed and free from fine sediment, contaminants, and pests. The imported sand will be similar to or slightly coarser than the Estuary bed material naturally found in the SNBP area (which is mostly fine and medium sand with 125-420 µm grain size; see Section 3.2.3 of the updated EcIA). The imported sand will cover approx. 400 m² of the existing Estuary bed, as well as the entire portion of the beach above MHWS. The beach design is expected to limit further erosion, but there is the potential for storms to move sand offshore and then alongshore to the north during significant events. Sand losses could be managed by either ongoing top-ups of sand and/or allowing more landward adjustments of the beach crest.

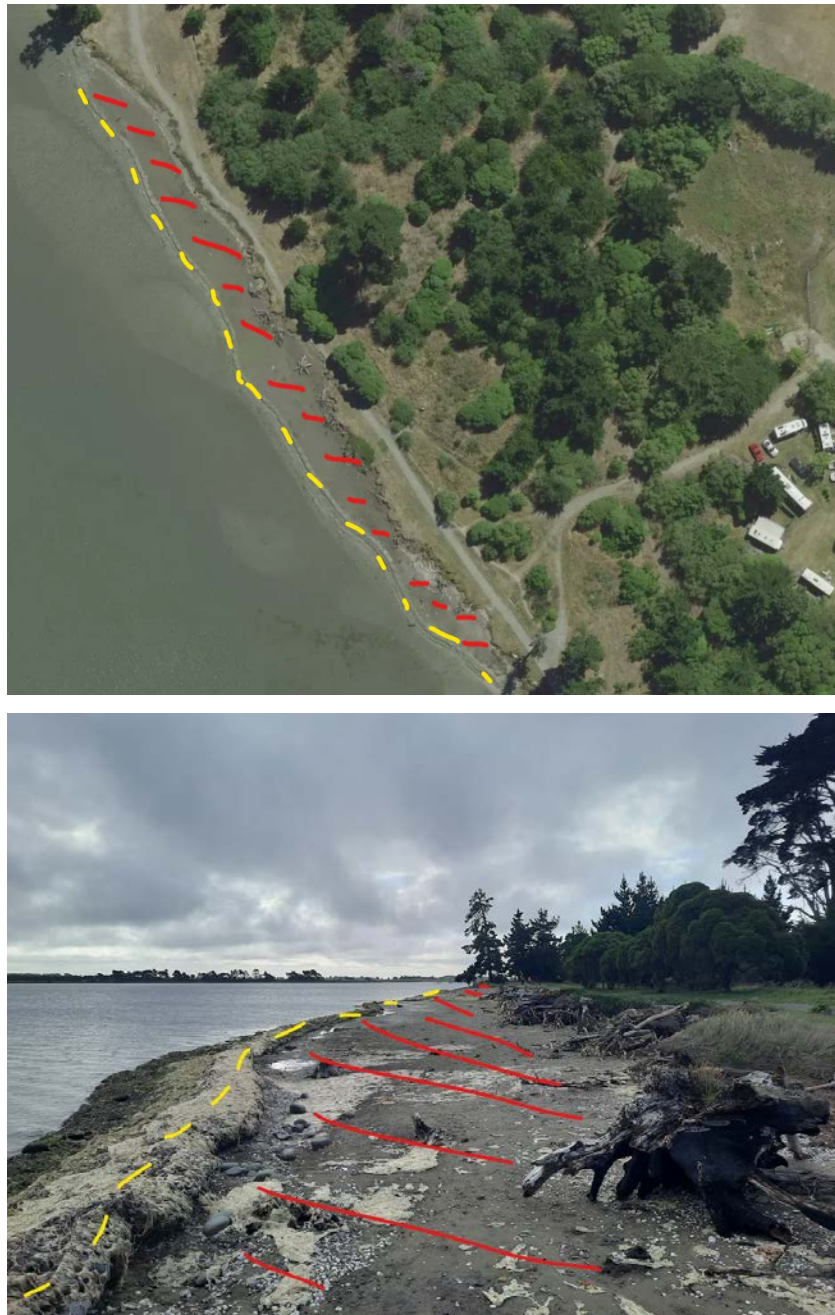


Figure 1. Aerial (top) and ground view (bottom) of the area of Estuary bed to be disturbed for the establishment of the "soft edge" natural beach (highlighted with red marks) at SNBP. The gabion baskets delimiting the western side of the area (highlighted with yellow marks) will be removed.

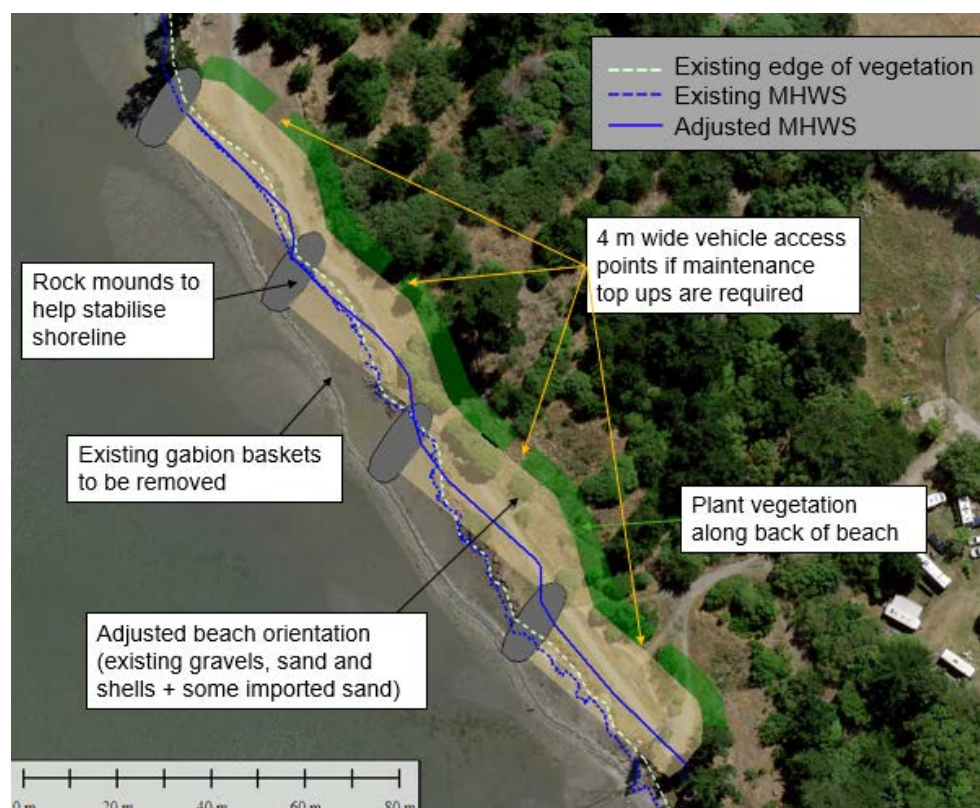


Figure 2. Concept sketch (not to scale) of the “soft edge” natural beach at SNBP included in the T+T report. The area which will be covered with imported sand is highlighted in light brown.

REVISED ASSESSMENT OF CONSTRUCTION EFFECTS

Loss and creation of mudflat habitat

6.7 Updated figures showing the extent (m²) of mudflat habitat that will be lost (reclamation) and created (declamation) based on the updated project design are provided in Table 1 below.

Table 1. Updated amounts of mudflat habitat loss and creation following the additional design changes. These are compared to the amounts of mudflat habitat loss and creation assessed in the updated EclA (given in parentheses).

	SNBP	Southshore	Total across the project site
Mudflat habitat lost	791 m ² (422 m ²)	109 m ² (476 m ²)	900 m² (898 m²)
Mudflat habitat created	1,233 m ² (966 m ²)	2,140 m ² (2,139 m ²)	3,373 m² (3,135 m²)
Permanent change	+ 442 m ² (+ 574 m ²)	+ 2,031 m ² (+ 1,663 m ²)	+ 2,473 m² (+ 2,237 m²)

6.8 As a result of the additional design changes, the overall increase in the extent of mudflat habitat across the project site will amount to 2,473 m², with an

additional 236 m² of mudflat habitat gained compared to my assessment in the updated EcIA.

- 6.9 At Southshore there is a larger net gain of mudflat habitat, while at SNBP the permanent gain of mudflat habitat is reduced from 574 m² to 442 m² because of the footprint of the four groyne structures required for the “soft edge” natural beach (see paragraph 6.6).
- 6.10 I note that implementing the “soft edge” natural beach without the groyne structures would be preferable from an ecological point of view to avoid loss of mudflat habitat, and this was discussed within the project team. However, the groynes are required because, in the absence of these control structures, the ongoing erosion of the Estuary edge is expected to continue (see the T+T report and the evidence of Mr Reinen-Hamill).
- 6.11 Since the newly created mudflat habitat is expected to be analogous to the existing mudflat and to be colonised by the same suite of benthic organisms that is currently present, I consider that an increase of approx. 2,473 m² in the extent of mudflat habitat across the project site is a Positive magnitude effect. A positive magnitude of effect on the moderate ecological value of the mudflat habitat equates to a **Net Gain** level of effect. Therefore, my assessment of the overall level of effect associated with the loss and creation of mudflat habitat is unchanged.

Loss and creation of hard bottom habitat

- 6.12 The inclusion of the groyne structures for the “soft edge” natural beach at SNBP will increase the amount of artificial hard bottom habitat created as part of the project from 248 m² to 428 m².
- 6.13 Overall, since the new erosion protection structures are unlikely to support communities of higher ecological value than those found on the existing structures (which support limited abundance and diversity of estuarine organisms; see Section 3.2 of the updated EcIA), I consider that an increase of approx. 180 m² in the extent of hard bottom habitat across the project site will have a Negligible magnitude of effect, with no change or only a very slight change from the existing baseline conditions. A negligible magnitude of effect on the low ecological value of the hard bottom habitat equates to a **Very Low** level of effect. Therefore, my assessment of the overall level of effect associated with the loss and creation of hard bottom habitat is unchanged.

Mudflat habitat disturbance and modification

- 6.14 The additional design changes and updated construction methodology will require the disturbance of approx. 7,736 m² of mudflat habitat, as opposed to 4,435 m² assessed in the updated EcIA report.
- 6.15 Both at SNBP and at Southshore, the increased amount of mudflat habitat disturbance will be caused by the need to excavate a larger trench than originally anticipated (up to 5 m wide instead of approx. 3 m wide) to install the toe of the new revetment structures.
- (a) In the areas where the new revetment structures will be located within the same footprint of the existing ones or further out into the Estuary (reclamation), the trench will be located entirely onto the Estuary bed. As a result, an area of Estuary bed up to 5 m wide will be excavated and subsequently reinstated.
 - (b) In the areas where the new revetment structures will be located landward of the existing ones (declamation), the trench will be at least in part on declaimed land. As a result, the area of Estuary bed excavated will be less than 5 m wide.
- 6.16 At SNBP, additional excavation of the Estuary bed will be required to construct the groynes and remove the damaged gabion baskets in the area identified for the “soft edge” natural beach. These activities cannot be completed working only from the land and therefore will require the use of machinery on the Estuary bed in the area between the Estuary edge and the damaged gabion baskets (see Figures 1 and 2 at paragraphs 6.5-6.6). Because of this additional excavation and use of machinery in the Coastal Marine Area (**CMA**), mudflat habitat disturbance will be more widespread than assessed in the updated EcIA. The entire portion of Estuary bed between the Estuary edge and the damaged gabion baskets (approx. 1,260 m², see Figure 1 at paragraph 6.5) will be disturbed. In addition, excavation up to 1 m wide along the western (seaward) side of the gabion baskets will also be needed to remove these damaged existing structures.
- 6.17 To establish the “soft edge” natural beach, some modification of the existing mudflat habitat will also be required, as approx. 400 m² of the area between the Estuary edge and the damaged gabion baskets will be covered with a layer of imported sand up to 0.5 m thick (see Figure 2 at paragraph 6.6). The imported sand will be similar to or slightly coarser than the Estuary bed

material at SNBP (which comprises a mix of fine and medium sand). Therefore, where the Estuary bed will be covered with the imported sand, the mudflat habitat will have slightly different physical characteristics.

6.18 To minimise the impact of excavation and use of machinery on the mudflat habitat, the following impact management measures originally proposed remain valid:

- Working from the land with no use of machinery on the Estuary bed (the only exception being the area of the “soft edge” natural beach at SNBP);
- Only carrying out construction activities on the Estuary bed within low-tide windows, to ensure working in dry conditions;
- Reinstating the excavated material so that it is compacted and level with the surrounding Estuary bed.

6.19 With the proposed mitigation measures in place, the mudflat habitat post excavation/disturbance will be analogous to the existing mudflat and will be colonised by the same suite of benthic organisms which is currently present.

6.20 I consider that the existing suite of epibenthic and infaunal species will also be able to recolonise the small area covered with imported sand at SNBP. A potential slight increase in the sediment grain size in this area is unlikely to cause significant changes in the composition of the epibenthic/infaunal community compared to the surrounding mudflat habitat.

6.21 Overall, I consider the disturbance of mudflat habitat as having a Negligible magnitude of effect, with no change or only a very slight change from the existing baseline conditions. A negligible magnitude of effect on the moderate ecological value of the mudflat habitat equates to a **Very Low** level of effect. Therefore, my assessment of the overall level of effect associated with the disturbance of the mudflat habitat is unchanged.

Mortality of estuarine organisms

6.22 Disturbance and modification of the mudflat habitat will cause mortality among the estuarine organisms associated with the mudflat (common estuarine species with no Threatened or At Risk species present).

6.23 I note that the mudflat habitat in the area between the Estuary edge and the damaged gabion baskets at SNBP (approx. 1,260 m², see Figure 1 at

paragraph 6.5) supports low abundance and diversity of infaunal and epibenthic organisms compared to the rest of the mudflat habitat across the project site (see Section 3.2.5 of the updated EclA) because of the higher elevation of the seabed compared to the surrounding mudflat habitat (see Section 3.2.1 of the updated EclA). Therefore, construction impacts on estuarine organisms will be lower in this area compared to the other areas of mudflat habitat across the project site.

6.24 To minimise the mortality of the estuarine organisms living on or within the Estuary bed, the following impact management measures originally proposed remain valid:

- (a) Working from the land with no use of machinery on the Estuary bed (the only exception being the area of the “soft edge” natural beach at SNBP);
- (b) Reinstating the excavated material so that it is compacted and level with the surrounding Estuary bed, and
- (c) Reinstating the excavated material within the same low-tide window.

6.25 In addition, the following impact management measures are proposed:

- (a) Where practicable, separating the superficial layer of the excavated material (indicatively the top 10-20 cm of the Estuary bed) from the mudflat material located deeper down. Most of the estuarine organisms inhabiting the Estuary bed will be in the mudflat material of the superficial layer, which will be prioritised for reinstatement to reduce their mortality. When complete reinstatement of all excavated material cannot be achieved (because some space under the surface of the Estuary bed will be occupied by the toe of the new structures) only mudflat material from the deeper layer will be removed and disposed offsite.
- (b) Stockpiling the excavated material onto the Estuary bed to expedite its reinstatement and prevent the loss of mudflat material and benthic organisms that would occur if stockpiling on land. The material stockpiled onto the Estuary bed will be reinstated within the same low-tide window, leaving the stockpiling area compacted and level with the surrounding Estuary bed. Stockpiling of excavated mudflat material onto the Estuary bed will only occur in the following areas:

- i. In the area between the Estuary edge and the damaged gabion baskets at SNBP (see Figure 1 at paragraph 6.5), which supports low biodiversity of estuarine organisms, and which will be disturbed/modified through excavation, use of machinery and sand nourishment (see paragraphs 6.16 to 6.17).
- ii. In areas along the Estuary edge about to be excavated to install the toe of the new revetment structures. In these areas, construction will follow a stage-by-stage approach, with short linear stretches of Estuary bed excavated at a time. Stockpiling of excavated material will only occur in the area alongside the excavation trench which is next to be excavated as the trench advances (Figure 3). Stockpiling will not take place in areas which will not be excavated. As noted at paragraph 6.15, the width of the excavation trench will vary depending on the alignment of the structures. It will be less than 5 m in the areas of declamation where some of the excavation will occur on declaimed land instead of on the Estuary bed.

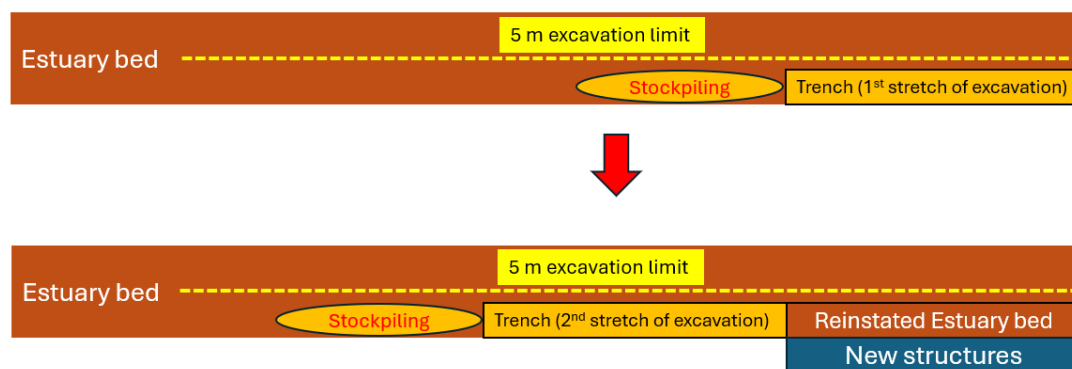


Figure 3. Schematic outline of the proposed stockpiling of mudflat material onto the area of Estuary bed alongside the trench (set to be excavated as the trench advances). As explained at paragraph 6.15, the excavation limit may be located less than 5 m away from the Estuary edge.

- 6.26 The exact excavation footprint along the Estuary edge across the project site will be accurately detailed during detailed design so that excavation and stockpiling can be planned accordingly. On site, the active excavation and stockpiling areas will be marked with a silt curtain on the seaward side (i.e., the silt curtain will mark the maximum extent of the excavation/stockpiling

footprint). The silt curtain will also ensure that there are no spills of excavated material beyond the excavation footprint. The silt curtain will be kept in place until the excavated material is reinstated and any stockpiling removed.

- 6.27 With these additional proposed mitigation measures in place, I consider the mortality of estuarine organisms to have a Negligible magnitude of effect. Although there will be a temporary shift away from existing baseline conditions, I do not consider that there will be permanent effects, with estuarine organisms returning to pre-disturbance levels of abundance in the long term. A negligible magnitude of effect on the moderate ecological value of the mudflat habitat equates to a **Very Low** level of effect. Therefore, my assessment of the overall level of effect associated with the mortality of estuarine organisms within the mudflat habitat is unchanged.

Resuspension of benthic sediment and contaminants

- 6.28 Increased disturbance of the mudflat habitat has the potential to increase the resuspension of benthic sediment and associated contaminants. This risk will be minimised by:
- (a) Working from the land with no use of machinery on the Estuary bed (the only exception being the area of the “soft edge” natural beach at SNBP);
 - (b) Only carrying out construction activities on the Estuary bed within low-tide windows, to ensure working in dry conditions;
 - (c) Installing a silt curtain while carrying out excavation and stockpiling along the Estuary edge;
 - (d) Reinstating the excavated material so that it is compacted and level with the surrounding Estuary bed;
 - (e) Removing any material stockpiled onto the Estuary bed so that the stockpiling area is compacted and level with the surrounding Estuary bed;
 - (f) Reinstating the excavated/stockpiled material within the same low-tide window.
- 6.29 With these measures in place, I consider the resuspension of benthic sediment and contaminants to have a Negligible effect, resulting in a minor shift away from existing baseline conditions for a limited period of time. A

negligible magnitude of effect on the moderate to very high ecological values of the different estuarine habitats that would be affected equates to a **Very Low - Low** level of effect. Therefore, my assessment of the overall level of effect associated with the resuspension of benthic sediment and contaminants is unchanged.

Seagrass and saltmarsh habitat disturbance

- 6.30 Disturbance of the mudflat habitat will not affect the seagrass habitat (very high ecological value) and the saltmarsh habitat (high ecological value). These two habitat types are not present within the project site at SNBP. At Southshore, any overlap between the mudflat excavation footprint and the seagrass / saltmarsh habitat generated by the use of a larger trench will be avoided through design changes and/or onsite management of the width of the trench.
- 6.31 To avoid impacts on the seagrass habitat, the following impact management measures originally proposed remain valid:
- (a) Re-mapping the eastern boundary (closest to the Estuary edge) of the seagrass habitat at Southshore, as well as small, isolated seagrass patches before construction begins.
 - (b) If needed, revising the project design to avoid any overlap between seagrass and the new structures and/or the excavation footprint. In the presence of severe design constraints, the applicant may discuss alternative measures with the consent authority.
 - (c) Requiring the presence of a suitably qualified ecologist on site to ensure that the presence of seagrass is correctly identified. The ecologist will also be responsible for marking (with flags / stakes or similar) the eastern boundary (closest to the Estuary edge) of the Southshore seagrass habitat, as well as the location of small, isolated seagrass patches to ensure that the areas to be avoided are clearly visible.
 - (d) Leaving the footing component of the existing erosion protection structures in place where seagrass grows in close proximity to their toe to avoid the need to excavate the seabed.
 - i. In regard to this measure, I also note that the updated EcIA erroneously stated that the remaining footing component may

emerge up to 10 mm above the Estuary bed. This is incorrect. The remaining footing will be 10 mm below the Estuary bed, as indicated by the applicant's [Response to final ECan matters \(19 December 2024\)](https://letstalk.ccc.govt.nz/southshore-and-south-new-brighton-coastal-protection-works), which forms part of the application documents (<https://letstalk.ccc.govt.nz/southshore-and-south-new-brighton-coastal-protection-works>).

- 6.32 With these measures in place, the project will have no effect on seagrass (i.e., no net loss of seagrass habitat). Therefore, my assessment of the overall level of effect associated with seagrass habitat disturbance is unchanged.
- 6.33 The impact of the proposed activities on the saltmarsh habitat (a 6 m² overlap between the saltmarsh habitat and the erosion protection structures at Southshore based on the updated EclA report) is discussed in the expert evidence of Dr Jaz Morris.
- 6.34 To confirm that the overlap between saltmarsh and the new structures and/or the excavation footprint is no larger than that which was assessed in the updated EclA report, and to appropriately manage construction activities in proximity of saltmarsh, I recommend that the impact management measures proposed for seagrass are also applied to saltmarsh.
- 6.35 Impact management measures for seagrass and saltmarsh will be detailed in a management plan before construction begins.

REVISED ASSESSMENT OF POST-CONSTRUCTION EFFECTS

Movement of rock / cobble material onto the Estuary bed

- 6.36 Movement of cobble material will no longer occur at SNBP because of the replacement of the proposed cobble beach with the “soft edge” natural beach. Based on the T+T report (see paragraphs 6.5 and 6.6), the groynes which will be installed as part of the “soft edge” natural beach are expected to be stable, but dislodgment of some of the rock units may happen in the event of significant storms.
- 6.37 Monitoring of the dislodgment of rock units from the groynes and their subsequent reinstatement will form part of the Soft Edge Monitoring Plan associated with the “soft edge” natural beach (see the T+T report and the expert evidence of Mr Reinen-Hamill).

- 6.38 As indicated in the impact management measures included in Section 8.1.2.2 of the updated EclA, removal of rock units from the Estuary bed and their subsequent reinstatement will be done by hand, with no use of machinery in the CMA.
- 6.39 Based on this, I consider that the movement of rock material from the groynes (at SNBP) and of cobble material at Southshore (where a cobble beach is still part of the proposal) will have a Negligible magnitude of effect, with no or only a very slight change from the existing baseline conditions. A negligible magnitude of effect on the moderate to high ecological values of the different estuarine habitats that would be affected (i.e., mudflat habitat both at SNBP and at Southshore, as well as saltmarsh habitat at Southshore), equates to a **Very Low** level of effect. Therefore, my assessment of the overall level of effect associated with the movement of rock/cobble material is unchanged.

Increased access to the Estuary bed

- 6.40 The additional design changes include a further reduction in the number of “formal” pedestrian access points (i.e. access points providing stepped access to the Estuary bed) from four to two (while the applicant has indicated that 29 access points are currently present).
- 6.41 One of the access points will be located at the road end of Godwit Street, and the other approx. 90 m to the south of Tern Street. Both access points will be located at least 30 m away from sensitive estuarine habitats (seagrass and saltmarsh habitat).
- 6.42 As already recommended in Section 8.1.3 of the updated EclA, signs will be erected alerting the public about water quality issues (likely to discourage the harvesting of estuarine organisms) and about the ecological values of the habitat and species found in the Estuary.
- 6.43 Based on the further reduction in the number of access points, I consider that increased access to the Estuary bed will have a Negligible magnitude of effect, with no change or only a very slight change from the existing baseline conditions. A Negligible magnitude of effect on the moderate to very high ecological values of the different estuarine habitats that would be affected equates to a **Very Low - Low** level of effect. Therefore, my assessment of the overall level of effect associated with the increased access to the Estuary bed is unchanged.

- 6.44 As described by Dr Leigh Bull in her evidence, I also note that the recently introduced dog ban in the Estuary (which is part of the new Dog Control Policy adopted by CCC as of November 2025) will further mitigate this effect, as it should discourage dog owners from accessing the Estuary bed.

Sand nourishment and redistribution

- 6.45 As outlined in the T+T report (see paragraphs 6.5 and 6.6) and in the expert evidence of Mr Reinen-Hamill, some of the sand imported to establish the “soft edge” natural beach at SNBP may be lost in large storm events and occasional top-ups may be required (possibly every 5 years). The top-ups will be carried out by placing the sand above MHWS and allowing natural processes to redistribute the sand down the beach profile (see T+T report). Movement and accumulation of the top-up sand below MHWS has the potential to smother and cause the mortality of estuarine organisms occupying the Estuary bed within the “cells” of the natural beach (i.e., within the areas of seabed comprised between the groynes).
- 6.46 The magnitude of this effect will depend on the volume and frequency of the top-ups and on the patterns of redistribution of the top-up sand, which will be monitored as part of the Soft Edge Monitoring Plan associated with the “soft edge” natural beach (see the T+T report and the expert evidence of Mr Reinen-Hamill).
- 6.47 Based on the information on coastal processes provided by the T+T report and on the diversity and distribution of estuarine organisms at SNBP, the most likely scenario is that the largest accumulations of top-up sand will occur in the high-intertidal area, close to MHWS. This area will likely be colonised by common, stress-tolerant infaunal species. If these species were to suffer mortality, they will be able to naturally recolonise the area in the multi-year interval between consecutive top-ups. No Threatened or At Risk species or sensitive habitats will be affected.
- 6.48 As outlined in the T+T report (see paragraphs 6.5 and 6.6) and in the expert evidence of Mr Reinen-Hamill, some of the sand mobilised in large storm events may also be transported in northward direction along the Estuary edge and be thinly dispersed on the seabed (Figure 4). Areas of thick accumulation are not expected. This process will be limited to the area in proximity of the Estuary edge and will not extend beyond the area surrounding the South New Brighton jetty (located approx. 500 m to the north

of the “soft edge” natural beach; Figure 4). A small patch of saltmarsh habitat (high ecological value) is present within the expected deposition footprint, on the northern side of the jetty.



Figure 4. Indicative sediment transport pathways (from the T+T report).

- 6.49 As indicated in the T+T report (see paragraphs 6.5 and 6.6) and in the expert evidence of Mr Reinen-Hamill, sediment dispersal and northward transport are already happening under the present conditions because of the rapid erosion of the Estuary edge in the area identified for the establishment of the “soft edge” natural beach. The establishment of the natural beach is anticipated to replicate the existing sediment transport processes. Since sand originating from the natural beach will be thinly dispersed on the Estuary bed, this material is not expected to result in smothering of benthic organisms or in significant changes to the benthic habitat.
- 6.50 Based on the above and on the short duration of the consent (20 years), I consider that sand nourishment and redistribution will have a Negligible or Low magnitude of effect, with a slight or minor shift away from baseline conditions. A negligible/low magnitude of effect on the moderate to high

ecological value of the estuarine habitats that would be affected (mudflat and a small patch of saltmarsh) equates to a **Very Low - Low** level of effect.

- 6.51 The short duration of the consent (20 years) and the implementation of a Soft Edge Monitoring Plan (monitoring estuarine habitats, sand movements and patterns of accumulation both within the area of the natural beach and to the north) will provide further safeguards and the opportunity for adaptive management.

Coastal squeeze

- 6.52 Coastal squeeze is the loss of coastal habitats occurring when their landward migration in response to sea level rise is constrained by the presence of hard structures.
- 6.53 The “soft edge” natural beach at SNBP will create additional soft sediment habitat above MHWS (2,500 m², see paragraph 6.6) available for colonisation by estuarine organisms as sea water levels rise. In addition, the presence of a soft edge makes the natural beach a dynamic structure which has the potential to move and retreat in response to sea level rise (thereby mitigating coastal squeeze effects). Based on this (and on the Positive to Low level of effect of the construction and operational impacts associated with the “soft edge” natural beach), I consider the “soft edge” natural beach an ecological improvement compared to the cobble beach which was originally proposed at SNBP.
- 6.54 Since only minimal loss of intertidal habitat (hosting the estuarine organisms most susceptible to coastal squeeze) is expected within the 20-year consent duration (see the coastal squeeze assessment at Section 7.3.2.4 of the updated EcIA report), I consider that the “soft edge” natural beach will only have a minimal effect in mitigating coastal squeeze over this timeframe. As a result, I consider the magnitude of effect of coastal squeeze on the benthic organisms occupying the mudflat habitat at SNBP to be Negligible, resulting in a very slight change from the existing baseline conditions. A negligible magnitude of effect on the moderate ecological values of the mudflat habitat equates to a **Very Low** level of effect. Therefore, my assessment of the overall level of effect associated with coastal squeeze is unchanged.
- 6.55 However, as discussed above, the “soft edge” natural beach approach has the potential to accommodate the landward migration of estuarine organisms and a further retreat of the Estuary edge in response to accelerating sea level

rise in the second half of the century and beyond. Therefore, the ecological benefits of this approach are likely to become evident over longer timeframes (beyond the 20-year consent duration).

REVISED ASSESSMENT OF CUMULATIVE EFFECTS

- 6.56 The additional design changes discussed throughout the evidence will result in a higher net gain of mudflat habitat than originally anticipated (2,473 m² instead of 2,237 m²), in a reduction in the number of pedestrian access points to the Estuary bed, and in the preservation of an unarmoured section of shoreline at SNBP (which will mitigate coastal squeeze at this location). None of the additional design changes will affect key elements and features of the existing baseline condition which contribute to the ecological value of the Estuary.
- 6.57 Based on this, and considering that the current baseline condition includes the existing erosion protection structures (i.e., the Estuary edge is already armoured / modified), I consider the cumulative effects of the project in the context of the Avon-Heathcote Estuary / Ihutai as having Positive magnitude. A positive magnitude of effect on the low to very high ecological values of the different estuarine habitats that would be affected equates to a Net Gain level of effect. Therefore, my assessment of the overall level of effect associated with cumulative effects is unchanged.

7. ISSUES RAISED IN THE SUBMISSIONS

- 7.1 In the following sections, I address submissions on the CRC and CCC applications raising matters of relevance to the ecology of estuarine habitats and species.

Avon-Heathcote Estuary Ihutai Trust

Estuary edge modification

- 7.2 In the CRC submission, the Avon-Heathcote Estuary Ihutai Trust (AHEIT) comment on the impact of the Estuary edge modification caused by the project on the ecological function of the intertidal mudflats, as well as on coastal squeeze and cumulative effects.
- 7.3 When assessing the ecological impacts of the Estuary edge modification caused by the project, it is important to consider that the Estuary edge along the project site is already modified because of the presence of the existing

erosion protection structures which armour the edge throughout the project site. By “locking” the Estuary edge in its current position, the existing structures are already precluding the formation of new mudflat habitat and the landward migration of estuarine species and habitats. Therefore, I consider that the ecological impacts of the Estuary edge modification mentioned by the AHEIT already exist and will continue even in the absence of this project (since no agency is going to require the removal of the existing structures³).

- 7.4 I am aware of the multiple stressors affecting the Estuary which were mentioned in the AHEIT submission (excess nutrients, sedimentation, modified edges, contaminants from the rivers and direct stormwater discharges, anthropogenic disturbance, rising sea level and increasing water and air temperature), but I do not consider that the change from the existing to the proposed erosion protection structures will compound these impacts and increase the level of cumulative effects.
- 7.5 In light of the existing baseline, I do not consider that the project will worsen the existing effects on the ecological function of the intertidal mudflats, coastal squeeze and cumulative effects associated with the modification of the Estuary edge. My conclusions in respect to these effects have not changed following my reading and consideration of the AHEIT submission.

I also note that:

- (a) A “soft” approach (no longer requiring armouring of the Estuary edge) was discussed at the outset of the project (see Section 5.1 of the updated EcIA), but it was considered incompatible with the main objective of the project (i.e., reinstating pre-earthquake conditions over a nominal 20-year period while longer-term adaptive planning responses to climate change and sea level rise are developed as part of the Coastal Hazards Adaptation Planning Programme; see Section 1.1 of the updated EcIA and the evidence of Mr Little).
- (b) Coastal squeeze effects during the consent duration have been assessed in more detail in the updated EcIA (which was not available to the AHEIT at the time of their CRC submission).

³ Legal advice on this matter is included in Ms Carter 42A Report at paragraph 34.

- (c) 2,473 m² of additional mudflat habitat will be created through land declamation across the project site.
- (d) By implementing the “soft edge” natural beach at SNBP, the project will preserve a short stretch of unarmoured edge created by ongoing erosion following earthquake damage to the existing armouring structures.
- (e) By implementing a Long-Term Monitoring and Adaptive Management Plan (LTMAMP; the plan and associated consent conditions will be addressed in counsel's opening) the project will monitor physical and biotic changes which may be associated with the presence of the proposed Estuary edge modification and will inform future adaptation planning.
- (f) By seeking a short consent duration, the project allows for the possibility that different solutions from those proposed in this application may be required beyond the 20-year timeframe.

Cobble beaches

- 7.6 In their submission to CRC, the AHEIT express concern about the establishment of cobble beaches because they represent a non-natural habitat and because of the risks posed by the movement of cobbles onto the Estuary bed.
- 7.7 The use of cobble beaches is driven by design rather than ecology. Cobble beaches were proposed to soften the project design with structures characterised by a gentler slope and a more natural appearance. Cobble beaches were not intended as a form of ecological enhancement or as a means of mimicking natural habitats (and were not assessed as such in the updated EclA report).
- 7.8 I agree with the view expressed by the AHEIT that the cobble beaches are non-natural and do not benefit the ecological functioning of the Estuary. I expressed this view when I was asked to score the effects of both rock revetment and cobble beach structures on ecological values as part of [multi-criteria analysis \(MCA\)](#) during the RFI process (see “Ecological Value” at row 39 of Sheet1 of the Excel file, which forms part of the application documents: <https://letstalk.ccc.govt.nz/southshore-and-south-new-brighton-coastal-protection-works>).

- 7.9 Following the replacement of the cobble beach proposed at SNBP with the “soft edge” natural beach, the only remaining area of cobble beach is at Southshore, at the Penguin Street road end. Due to the close proximity of the Estuary edge to residential properties in this area, the applicant considered that alternative solutions not requiring armouring of the Estuary edge could not be explored.
- 7.10 The Penguin Street cobble beach will be located almost entirely above MHWS and the Coastal Processes and Natural Hazards Assessment Report prepared in support of the application considers the movement of cobble material as a rare occurrence given the infrequent nature of large storms and the low energy environment of the Estuary. Based on this, and on the remediation measures recommended in Section 8.1.2.2 of the updated EcIA, I maintain the view that the movement of cobble material onto the Estuary bed will be unlikely and will have a **Very Low** level of effect during the consent duration.
- 7.11 As indicated in the coastal squeeze assessment included in the updated EcIA report, coastal squeeze at Southshore will have a Very Low – Low level of effect during the consent duration. Being located mostly above MHWS, the Penguin Street cobble beach will contribute less to coastal squeeze effects than all other structures at Southshore.
- 7.12 As noted above:
- (a) By implementing a Long-Term Monitoring and Adaptive Management Plan (LTMAMP; the plan and associated consent conditions will be addressed in counsel’s opening) the project will monitor physical and biotic changes which may be associated with the presence of the proposed Estuary edge modification (including the cobble beach at Penguin Street) and will inform future adaptation planning.
 - (b) By seeking a short consent duration, the project allows for the possibility that different solutions from those proposed in this application (including the cobble beach at Penguin Street) may be required beyond the 20-year timeframe.
- 7.13 Overall, although I understand the AHEIT position in relation to cobble beaches, my conclusions in respect to the ecological effects associated with the Penguin Street cobble beach for the duration of the consent are unchanged.

Access to the Estuary bed

- 7.14 Both in their CRC and in the CCC submission, the AHEIT raise the issue of improved pedestrian access to the Estuary bed posing the risk of increased trampling disturbance to estuarine habitats.
- 7.15 As discussed at paragraphs 6.40 to 6.44 of my evidence, I consider that the reduction of the number of “formal” (i.e., stepped) access points to two (both located at least 30 m away from sensitive estuarine habitats), adequately addresses these concerns. I also note that the areas identified for establishing the natural beach at SNBP and the cobble beach at Southshore already provide easy access to the Estuary bed. Therefore, there will not be a significant change from baseline conditions. My conclusions in respect to the effects associated with access to the Estuary bed have not changed following my reading and consideration of the AHEIT submission.

Mudflat reclamation at Southshore

- 7.16 In their CCC submission, the AHEIT query why loss of mudflat habitat (reclamation) cannot be further reduced at Southshore.
- 7.17 As discussed at paragraph 6.2(a), all areas of reclamation at Southshore were removed as part of the latest design changes, the only exception being one area of reclamation at 44A Rocking Horse Road, where reclamation (109 m²) is unavoidable due to the presence of residential properties within the Residential Red Zone precluding the landward shift of the proposed erosion protection structures (see the evidence of Mr Little).

Recommended consent conditions

- 7.18 In response to the CRC application, the AHEIT recommended the addition of or amendments to conditions. I have responded only to the AHEIT recommendations where matters relate to my area of expertise, marine ecology.

- (a) A tighter version of condition 25 (on page 153 of the AEE) in relation to cobble beaches (further details to be provided at the hearing).**

I believe the AHEIT is referring to the provisions below, which have been included in the updated draft consent conditions. I consider

these provisions appropriate to manage the operational effects of the remaining cobble beach at Southshore.

The consent holder shall monitor the migration of cobble beach material onto the mudflat and saltmarsh habitat below MHWS at Penguin Street (Southshore) by undertaking the following: a) Monitor and map the position of the toe of the cobble beach structures yearly, commencing at the completion of construction and annually thereafter, to assess whether the structures are encroaching or moving closer to the mudflat and saltmarsh habitats: b) Promptly inspect the cobble beach structures following large storm events: c) Assess damage to the saltmarsh vegetation in case of cobble encroachment/inundation in the saltmarsh habitat.
If needed, based on the results of the yearly mapping and of any post-storm inspection: a. Reinstall the original position of the toe of the cobble beach structures. b. Remove any material washed onto the mudflat and saltmarsh habitats. c. Re-establish saltmarsh plants in areas where cobbles have caused damage to the saltmarsh vegetation. d. Results of the yearly mapping and post-storm inspections and any activities associated with clauses a. – c. shall be documented and provided on request to Canterbury Regional Council.

(b) A condition requiring the remediation of the declamation areas to functional intertidal soft sediment habitat.

I do not consider that active remediation is necessary. Since the declamation areas will be level with the surrounding Estuary bed, they will become immediately inundated and will receive propagules from the adjacent mudflat. This will allow the natural colonisation of the declaimed mudflat by estuarine organisms.

(c) A condition requiring a qualified marine ecologist to liaise with the construction company, undertake qualitative monitoring and report monthly on construction activities that occur below MHWS during the construction phase.

The proposed conditions require a suitably qualified marine ecologist to mark the location of sensitive habitats (saltmarsh and seagrass) and to be present on site when work takes place in areas where sensitive habitats are adjacent to the Estuary edge. I consider these provisions, along with the impact management measures recommended in the updated EclA report and in my evidence, sufficient to effectively manage construction effects.

Department of Conservation (DOC)

- 7.19 After reviewing the updated EclA report, DOC submitted a letter to CCC (dated 17 September 2025) stating that the updated EclA satisfied the Director-General's concerns raised in her previous submission to CRC.
- 7.20 The letter sent by DOC to CCC expressed support for consent conditions ensuring that construction works are not undertaken during peak spawning times for inanga (e.g., February and March), and that key inanga spawning habitat are protected and considered for inclusion in the design of structures. Inanga spawn in tidally-influenced freshwater habitats, upstream of the saline wedge. The project is wholly within the Estuary and the habitats do not provide suitable environmental conditions for inanga spawning⁴. As such, I do not consider these conditions are necessary.
- 7.21 The DOC submission to CCC also recommended consent conditions requiring monitoring of damage caused to structures, property, and ecosystems during large coastal storm events, as well as monitoring of the recovery of any affected saltmarsh, saltmeadow and other indigenous vegetation in order to inform future decision making.
- 7.22 Measures to manage effects on saltmeadow, saltmarsh and other indigenous vegetation are discussed in the evidence of Dr Jaz Morris. A condition requiring monitoring of any displaced rock/cobble material and remediation of any impact of the cobbles on the saltmarsh habitat is included among the proposed consent conditions, as recommended in the updated EclA. Further monitoring of the structural integrity and performance of the erosion protection structures will be outlined in the proposed Long-Term Monitoring and Adaptive Management Plan (LTMAMP; the plan and associated consent conditions will be addressed in counsel's opening).

⁴<https://gis.ccc.govt.nz/portal/apps/webappviewer/index.html?id=a3486dbd58d7426b85bfd4b63d481c32>

Other submitters

- 7.23 In their submissions to CCC, Ms Jan Walker, Ms Leane Dempsey and Mr Scott Butcher commented on the detrimental ecological effects of the armouring of the Estuary edge. I consider that the information provided on this matter in reply to the AHEIT submission (paragraphs 7.2 to 7.5) adequately responds to the issues raised by these submitters. Further comments on coastal squeeze effects on saltmarsh (relevant to the submissions of Ms Walker and Mr Butcher) are provided in the evidence of Dr Jaz Morris.
- 7.24 Mr Butcher also commented on the loss of mudflat habitat (reclamation) at 44A Rocking Horse Road (Southshore) causing impacts on seagrass and not being adequately offset. The solution proposed by Mr Butcher to avoid reclamation in this area (i.e., purchasing and removing the remaining property on the Residential Red Zone) was explored by CCC at the outset of the project, but it could not be pursued. The reasons for this are discussed in the evidence of Mr Little. While reclamation in this area (109 m²) is unavoidable, seagrass disturbance will be avoided as outlined at paragraphs 6.30 to 6.35 of my evidence (and in Sections 7.3.1.4 and 8.1.1 of the updated EcIA). Given that across Southshore there will be significantly more declamation than reclamation (resulting in the creation of 2,031 m² of additional mudflat habitat; see paragraphs 6.7-6.11), I disagree with Mr Butcher's view that the reclamation of mudflat at 44A Rocking Horse Road is not remediated.
- 7.25 Mr Butcher also objected to the establishment of a cobble beach at SNBP. As noted at paragraphs 6.52 to 6.55, the "soft edge" natural beach replacing the cobble beach at SNBP is an ecological improvement which will preserve the existing unarmoured edge created by ongoing erosion and will provide increased resilience to sea level rise. The "soft edge" natural beach approach is not as extensive as the realignment proposed by Mr Butcher, but it provides the flexibility to allow for further erosion and land inundation in the future (as suggested by Mr Butcher). I appreciate the merit of Mr Butcher's proposed realignment, but I do not consider it necessary for effect management as part of the current proposal.
- 7.26 No other submitters in opposition to the proposal raise matters within my expertise.

8. ISSUES RAISED IN THE SECTION 42A REPORTS

- 8.1 In the following sections, I address matters of relevance to the ecology of estuarine habitats and species which were raised in the Section 42A Reports prepared by Ms Murray and Ms Carter (s42A officers for CRC and CCC, respectively).

CRC s42A report

- 8.2 In the CRC s42A report, matters relevant to the ecology of estuarine habitats and species are addressed in the technical report of Ms Burns (Appendix 5 of the CRC Section s42A report).
- 8.3 Following the RFI process and the preparation of the updated EcIA report, Ms Burns and I are in general agreement on the level of effect of the proposed activities and on the associated mitigation measures. Ms Murray's s42A Officer's report confirms that the concerns raised by Ms Burns have been resolved.
- 8.4 In the following sections (paragraphs 8.5-8.15) I expand on some points raised in Ms Burns' report to provide confirmation or clarification.

Recommended consent conditions

- 8.5 Ms Burns notes that some of the impact management measures originally recommended in the updated EcIA need to be included as consent conditions for her to consider the adverse effects to be low. The mitigation measures to be included as consent conditions relate to working only during low-tide windows, reinstating excavated mudflat within the same low-tide window, ensuring that the reinstated mudflat is compacted and level with the surrounding seabed, and removing cobble material from the Estuary bed by hand. I agree with these recommendations and note that these impact management measures are already included in the proposed consent conditions.
- 8.6 Ms Burns also recommends that cobble and rock material needs to be free from contaminated material, soil, and pest species. I agree with this recommendation and its inclusion in the consent conditions. I also recommend that these same provisions apply to the Waimakariri River sand to be used for the "soft edge" natural beach at SNBP, although I note that it may not be possible for the sand to be completely free of fine particles (a content of fines up to 5% may be present).

Mortality of estuarine organisms

- 8.7 Ms Burns states that she considers the mortality of estuarine organisms caused by disturbance of the mudflat habitat to have a Low level of effect (instead of Very Low as assessed in the updated EcIA report) provided that the recommendation of the updated EcIA to reinstate the excavated material within the same tidal window is included in the proposed consent conditions.
- 8.8 As stated above (paragraph 8.5), I agree that reinstatement of the excavated material within the same low-tide window should be included in the consent conditions. As outlined at paragraphs 6.25 and 6.26 of my evidence, additional impact management measures are proposed to minimise mortality of estuarine organisms and should be included in the consent conditions:
- (a) Where practicable, separating the superficial layer of the excavated material (indicatively the top 10-20 cm of the Estuary bed) from the mudflat material located deeper down. Most of the estuarine organisms inhabiting the Estuary bed will be in the mudflat material of the superficial layer, which will be prioritised for reinstatement.
 - (b) Stockpiling the excavated material prioritised for reinstatement (i.e., superficial layers) onto the Estuary bed to expedite its reinstatement and prevent the loss of mudflat material and benthic organisms that would occur if stockpiling on land (noting the restrictions to where stockpiling onto the Estuary bed can take place outlined at paragraphs 6.25(b)(i) and 6.25(b)(ii) of my evidence).
- 8.9 With these measures in place, I consider that the mortality of estuarine organisms will have a Very Low level of effect, because there will be a temporary shift away from existing baseline conditions but no permanent effects, with estuarine organisms returning to pre-disturbance levels of abundance in the long term.
- 8.10 This small level of disagreement with Ms Burns on the exact level of effect (Very Low vs. Low) is uninfluential for the overall outcome of the effect assessment in relation to the mortality of estuarine organisms, because both Very Low and Low effects are minor.

Coastal squeeze

- 8.11 Ms Burns states that there is still uncertainty around the potential adverse effects from coastal squeeze (and higher water levels) on seagrass beds and

loss of intertidal soft sediment habitat on macroinvertebrate community composition over the duration of the consent, and that she recommends a 'softer engineered' solution along Southshore alongside a monitoring plan to collect data to inform future coastal adaptation strategies.

- 8.12 In the updated EcIA, the potential adverse effects of coastal squeeze were estimated accounting for the best information on sea level rise, Estuary bed subsidence and water clarity which is currently available. This complex interplay of multiple variables is subject to change because the intensity of local stressors (e.g., sedimentation and turbidity) can vary (as noted by Ms Burns), and also because sea level rise and land subsidence can change pace. Therefore, I consider that some uncertainty is unavoidable, but that it does not affect the conclusions of the coastal squeeze assessment presented in the updated EcIA. My opinion is based on the short timeframe of the assessment, on the small contraction in the extent of the intertidal area predicted for 2045 under the most likely sea level rise scenarios, and on the fact that there are large areas of Estuary bed available for accommodating shifts in the distribution of seagrass and macroinvertebrates (with 2,473 m² of additional mudflat habitat to be created as part of this project).
- 8.13 I also note that the proposed Long-Term Monitoring and Adaptive Management Plan (LTMAMP; the plan and associated consent conditions will be addressed in counsel's opening) will monitor physical and biotic changes which may be associated with the presence of erosion protection structures along the Estuary edge. This will enable ground-truthing of the current coastal squeeze predictions and will inform future adaptation planning.
- 8.14 I am not convinced that a 'softer engineered' cobble beach solution is a suitable approach to address coastal squeeze, because my understanding is that an armouring of cobbles will have a similar effect as rock revetments, i.e., it will constrain any movement of the Estuary edge, precluding the formation of new mudflat habitat and the landward migration of estuarine species and habitats. Compared to revetments, the gently sloping profile and smaller rock size of a cobble beach may facilitate the retention of sediment among the cobbles and the colonisation of these structures by certain species of benthic organisms. This may provide some mitigation of coastal squeeze effects for certain species, but not for others. For seagrass, for

example, cobbles are likely to represent an insurmountable barrier just like rock revetments.

- 8.15 Finally, as previously discussed (paragraphs 7.2-7.5), since the Estuary edge is already armoured by the existing structures, it is important to consider that coastal squeeze effects (and any uncertainty associated with them) already exist and will continue even in the absence of the project (since no agency is going to require the removal of the existing structures⁵). Therefore, while it is important to assess and understand the likely coastal squeeze effects of estuarine species and habitats, given the existing baseline I do not believe that these effects should be considered entirely as new effects introduced by this proposal.

CCC Section s42A report

- 8.16 In the CCC s42A report, matters relevant to the ecology of estuarine habitats and species are addressed in the technical report of Dr Orchard (Appendix 5 of the CCC Section s42A report).
- 8.17 Based on Ms Carter's s42A Officer's report I understand that the concerns raised by Dr Orchard in relation to the assessment of effects on estuarine habitats and species have been resolved. There are no outstanding matters requiring further clarification.

9. CONDITIONS OF CONSENT

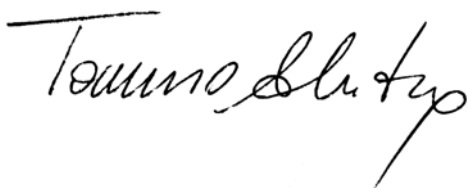
- 9.1 I recommend that a consent condition is included requiring the Waimakariri River sand to be used for the "soft edge" natural beach at SNBP to be free from contaminated material, pest species, and with very low fines (no more than 5%; see paragraph 8.6).
- 9.2 I recommend that a suitably qualified marine ecologist contributes to the preparation of the Construction Environment Management Plan (CEMP), and that the CEMP incorporates the following impact management measures discussed in my evidence:
- (a) Separating the superficial and deeper layers of the excavated mudflat material where possible.
 - (b) Prioritising the superficial layer for reinstatement where possible.

⁵ Legal advice on this matter is included in Ms Carter 42A Report at paragraph 34.

- (c) Limiting stockpiling of the excavated material onto the Estuary bed to areas which are set to be excavated or disturbed through the use of machinery. No stockpiling should occur in areas that will not otherwise be disturbed.
- (d) Using a silt curtain to mark the active excavation and stockpiling areas.

10. CONCLUSIONS

- 10.1 I have assessed construction, post-construction and cumulative effects of the project accounting for additional changes to the project design and construction methodology made following the completion of the updated EcIA. I confirm that the key conclusions and recommendations of the updated EcIA remain unchanged with respect to estuarine species and habitats. Additional impact management measures have been proposed to account for the ecological implications of the additional changes to the project design and construction methodology.
- 10.2 I have considered and responded to submitter feedback within my area of expertise and there are no important areas of disagreement arising from the CRC and CCC s42A officers' reports (although I note that the peer-reviewers would not have been aware of the additional changes to the project design and construction methodology discussed in my evidence at the time of preparing their reports).



Tommaso Alestra

Dated 21 November 2025