

20 November 2024

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Environment Canterbury
Resource Consents team
Via email: Olivia.Murray@ecan.govt.nz

Attention: Olivia Murray
Resource Consents Team, ECan

Dear Olivia,

Please see below for a further response to the Request for Further Information (RFI), issued on 24 May 2024 for the resource consent applications CRC242267, CRC242268 and CRC242269, made by Christchurch City Council (CCC) relating to the Southshore and South New Brighton Inundation Protection Project.

Below is the remaining outstanding response to Question 2 and 4(a). Questions 1, 3 and 4(b) of the RFI were previously responded to on 23 October 2024.

We would welcome further discussion if required to clarify the answers below. We trust this final response now completed the RFI response and processing of the application can recommence.

2. Ecological Values

CRC Principal Scientist – Land Ecology has reviewed the assessment and has stated that they disagree with the use of the EIANZ ecological impact assessment guidelines determinations of ‘ecological value’ in the AEE and Appendix M Ecology Assessment report descriptions of the ‘existing environment’. The EIANZ ecological impact assessment guidelines are non-statutory and have not been approved for use by MfE, DOC, Councils or the New Zealand Ecological Society.

The provided ecological assessment did not include an assessment of ecological significance of the affected area (considering both direct/construction effects and wider operational effects) following the criteria and associated guidance appended to the Canterbury Regional Policy Statement.

CRC Coastal Surface Water Quality & Ecology Scientist has reviewed the assessment and noted the Ecological Impact Assessment Report by Boffa Miskell (2023) refers to the EIANZ EcIA guidelines to assess the ecological values of the different habitat types within the project footprint and level of impact on estuarine ecology. These guidelines only apply to terrestrial and freshwater environments and haven’t been developed for coastal-marine areas. CRC expert disagrees they should be used.

The proposed works are within Land of National Significance (DOC), Regional Coastal Environmental Plan Area of Significance Natural Value.

In order to understand the specific ecological values at the site, further assessment is required.

Our CRC expert disagrees with the assessment that the seagrass (*Zostera muelleri*) beds only have a high ecological value. In Canterbury, seagrass beds are only present at a small number of locations, and the beds in Southshore are some of the largest that are present in Canterbury. The NZCPS Policy 11 states that indigenous biodiversity in the coastal environment should be protected by avoiding adverse effects of activities on indigenous taxa that are listed as threatened or at risk in the NZTCS. Therefore, the CRC expert considers that these beds should be considered to have very high ecological values and that they are protected from adverse effects.

- a. *Please provide an assessment justifying the conclusion of effects as high ecological values on Seagrass beds in Southshore and any necessary mitigation measures to address any potential detrimental effects. The application does not address the long-term climate change adaptation and projected sea level rise.*

Our assessment of the seagrass (*Zostera muelleri*) habitat at Southshore having High ecological value is based on the Environment Institute of Australia and New Zealand (EIANZ) EcIA criteria for assigning ecological value to species. These criteria (outlined in Section 2.8, Table 6 of the EcIA report) provide a framework for assigning ecological value to species, where species listed as At Risk – Declining are assigned a High ecological value, and Threatened species a Very High ecological value. *Zostera muelleri* is as an At Risk – Declining species so is considered as having High ecological value.

However, we agree that in the context of the Canterbury region, where seagrass beds are only present at a small number of locations, it is appropriate to assign the Southshore seagrass meadows a Very High Ecological value. Following the EIANZ EcIA framework, a change in ecological value from High to Very High would increase the level of all effects on seagrass to Low (cf. Very Low; see Section 7.3.1.5 and Table 27 of the EcIA).

However, it is important to note that this change would not affect the conclusions of our assessment; our assessment followed the provisions of NZCPS Policy 11 to avoid adverse effects on seagrass. Design changes, with a landward shift in the position of the erosion protection structures to avoid seagrass along Southshore are described in Section 5 of the EcIA. Further avoidance measures are detailed in Section 8.1.1 of the EcIA.

- b. *Please provide an assessment of the application on long-term climate adaptation and the effects of projected sea level rise.*

This question is a repeat of Question 3(d) which has previously been answered. The answer previously accepted on 8 October 2024. For completeness, the response is reattached as Attachment A.

The CRC expert disagrees with the assessment of proposed reclamation at SNBP and Southshore. They consider the effects of reclamation at SNBP will be moderate and at Southshore will very high.

Along Southshore there is a large area between the existing properties and the estuary edge that are part of this project area which could be considered for further landward movement of the erosion protection structures. This would avoid having to reclaim a significant area of estuarine habitat and potential damage to seagrass beds. Furthermore, Policy 10 of the NZCPS states that reclamation of land in the coastal marine area should be avoided unless the land outside the area is not available.

- c. *Please provide a further assessment on the effects of the reclamation and how the proposed reclamation areas can be justified with area of land available landward of the Coastal Marine Area*

The bund design and location has sought to balance a range of planning constraints and costs within the project area. Reclamation has been minimised and avoided as far as possible within the design process. There are some small areas where reclamation is unable to be avoided as there is no additional land area available and there is a need to encapsulate contaminated materials to prevent these entering the coastal waters. Removal of contaminated material (both of the retaining structures and the ex-residential soils landward of these) to naturalise the edge and grade the bank back as suggested would add significant costs as well as increasing the carbon emissions associated with the disposal of this material. In our experience elsewhere in the red zone, disturbing ex-residential soils gets expensive quickly, both from a testing perspective and a removal one. Regardless of the extent of testing, it is likely that once works commenced, additional contaminated material would be found, increasing costs, time and scope of the project. Disturbing this material in the manner suggested would be a completely different project, and would require a return to Council to rescope and re-budget the project, at which point there would undoubtedly be discussions around who is the owner of these coastal structures.

If the bund were set back in Southshore then it would like lead to the negative impact of overlooking of adjoining properties by pedestrians walking along the bund. The alignment of the bund was designed to respond to community needs whilst balancing the impacts on the existing environment. If the bund were set back and new erosion control structures avoided then two outcomes could result:

1. Ongoing degradation of existing structures along the estuary edge and stranding of these structures in the estuary bed

2. Release of contaminants from the structures and land not owned by Council into the Estuary

The question indicates 'significant' reclamation is occurring – the reclamation for this project is comparable or less than other similar coastal edge projects around the estuary edge such as the Coastal Pathway and associated work to build a sea wall along the opposite edge of the estuary.

As explained in Section 5 of the EclA report, we have:

1. Explored the feasibility of reinstating a naturalised estuary edge (which would have not involved any reclamation) at least in some areas of the project site. However, this was not possible to achieve in relation to the bund structure and footprint and incompatible with the scope of the project, which aimed to reinstate pre-earthquake conditions without changes in the position of the land / coastal marine area (CMA) interface (see Sections 1 and 10.3.4 of the AEE).
2. Contributed to a design shaping process which led to a landward shift in the position of the erosion protection structures in many areas of the project site to avoid impacts on seagrass and minimise the loss of mudflat habitat. See Section 5 of the EclA.

Constraints preventing a further landward shift in the position of the erosion protection structures and the need for reclamation are discussed in Sections 4.3, 4.4 (Design Methodology) and 10.3.4 (NZCPS Assessment) of the AEE and addressed further by others.

The project is assessed to be considered with the NZCPS overall and avoids significant effects on the coastal marine area. As discussed in the AEE, the threshold for significant effects is much higher and is one that is likely to have a serious adverse impact on the environment. The methodology, design and management approaches to this project have avoided effects to the greatest extent possible and where design changes have not been possible, mitigation to reduce identified effects to the lowest possible extent have been adopted.

The report by Boffa Miskell has stated that the seagrass habitat disturbance will require careful management which may involve small design changes as well as the temporary removal and reinstatement of small patches. The report has assessed the effects as very low as it will only affect very small patches or isolated plants, which is contrary to their statement that any loss of seagrass habitat should be avoided.

The CRC expert disagrees with this assessment and considers that any removal or disturbance to the seagrass beds is considered to have very high adverse effects.

- d. *Please provide further justification of the proposed disturbances of seagrass habitat and have regard to Policy 11 of the NZCPS which states that adverse effects of activities on Threatened or At-Risk taxa should be avoided.*

We agree that Policy 11 of the NZCPS requires that adverse effects of activities on Threatened or At Risk species should be avoided. The avoidance measures included in our EclA have been proposed to avoid the loss of seagrass.

The temporary removal (during construction) and reinstatement of small patches or isolated plants of seagrass is proposed to avoid the loss of seagrass in areas where it will not be possible to complete the proposed works without disturbing the seagrass habitat. The areas in which disturbance to the seagrass habitat is unavoidable are where seagrass is present right beside the existing structures (Figure 1). There are several of these areas south of Penguin Street (see Figure 46 in the EclA report). In these areas, the existing structures need to be removed so that the new estuary edged can be shifted landward (further away from the seagrass). However, this cannot be done without disturbing the seagrass because the estuary bed will need to be disturbed / excavated to extract the toe of the existing structures.

Temporarily removing the seagrass ahead of the removal of the existing structures and then rapidly reinstating the seagrass (i.e., as soon as the structures are removed) is the only available option to avoid the loss of the seagrass growing adjacent to the existing edge protections.



Figure 1. Examples of seagrass growing adjacent to the existing erosion protection structures at Southshore.

While proposed to avoid the loss of seagrass, the temporary removal and reinstatement of small patches or isolated plants of seagrass will disturb the seagrass habitat. The temporary removal and reinstatement of small patches of seagrass or isolated plants, which cannot be avoided when removing existing structures, would occur within a single tide cycle and be carefully managed and overseen by a marine ecologist. To ensure that this effect is minimised and appropriately managed, we have made the following recommendations in Section 8.1.2.1 of the EclA report:

- Development of a Seagrass Management Plan outlining when and how to carry out the excavation and reinstatement of small patches or isolated plants of seagrass, with avoidance of seagrass disturbance always being the first principle. The Seagrass Management Plan should be informed by review of relevant information on seagrass restoration and consultation with local seagrass experts.
- Implementation of the Seagrass Management Plan by a suitably qualified marine ecologist who should be present on site when work is undertaken in areas where disturbance to the seagrass habitat may occur.

In summary, we maintain the view that the proposed approach will have a Very Low¹ level of effect on the seagrass habitat because:

- There will be no loss of seagrass.
- Any disturbance to the seagrass habitat (i.e., temporary removal and reinstatement of small patches or isolated plants) will be temporary and very small in scale relative to the size of the Southshore seagrass beds.

It is also important to consider that the removal of the existing structures will be beneficial for the seagrass habitat because:

- It will generate 1659 m² of additional mudflat area, which could be colonised by seagrass (see Section 7.3.1.1 and Figure 46 in the EclA report).
- It will stop the ongoing release of debris from the estuary edge, which has a smothering effect on seagrass (Figure 2).

¹ Taking into consideration our response to Question 2a, the level of effect on seagrass from temporary disturbance and reinstatement is Low (where a Negligible magnitude of effect on a Very High ecological value equates to a Low level of ecological effect, in accordance with the EIANZ EclA framework).



Figure 2. Seagrass smothered by debris released from derelict erosion protection structures along the estuary edge.

The Tern Street Jetty will shade approximately 55m² of mudflat habitat and has been assessed as having a very low (hard bottom substrates) to low level (mudflats) of effects. There are large seagrass beds on the mudflats near Tern Street which are growing and expanding.

- e. *Please provide an assessment of the potential effects of shading of mudflat habitat on the growing and expanding Seagrass beds at Tern Street, by effectively reclaiming 55m² of habitat.*

The applicant has agreed to remove this structure from the application. In addition to removing the shading effect, this will also avoid the occupation of approx. 1 m² of estuary bed by the piles and toe of the jetty ramp (see Section 6.2 of the EclA report).

The report by Boffa Miskell has assessed the effects of cobble beach substrates as being very low (negligible) with recommended actions to remove any material washed onto the mudflat because of storm events. The CRC expert is concerned about the potential damage to mudflat habitats from the deposition and subsequent removal of cobble material. They also state that cobbles are not a part of the natural estuary habitat and there is also the potential for long-term changes in the composition of substrate with the constant replenishment of cobble material. The CRC expert considers the effects on the mudflats to be low.

- f. *Please provide an assessment of the potential damage to mudflats from the deposition and subsequent removal of cobble material*

The effects of cobble deposition on the mudflat habitat can already be observed at South New Brighton Park, where cobbles no longer retained by damaged reno mattresses dot the seabed adjacent to the estuary edge (see Figure 3 below and Section 3.2.1 of the EclA report). At South New Brighton Park, the cobbles have scattered around and have occupied only a very small fraction of the mudflat habitat, which appear otherwise unmodified and characterised by epibenthic communities typical of this environment (dominated by green algae, red algae and snails).



Figure 3. Cobble material from the damaged reno mattresses scattered across the mudflat habitat at South New Brighton Park.

At South New Brighton Park, the cobbles have attracted very little marine life and are for the most part uncolonised. Therefore, their removal would not result in large mortality of marine organisms. We don't anticipate any other adverse effects that could be associated with the removal of the cobble material from the mudflat habitat. The prompt removal of the cobble material (which should be done by hand, without the use of machinery in the CMA) will prevent long-term changes in the composition of the substrate and any long-lasting effects on the mudflat habitat. The cobble material removed from the mudflat habitat will be repositioned onto the cobble beach structures. Therefore, the replenishment of the cobble beach would occur through the reinstatement of dislodged material and not through the introduction of new material.

It is also important to note that cobble material may be washed onto the mudflat habitat only following large storm events. This would be a rare occurrence given the infrequent nature of large storms and the low energy environment of the estuary (see Coastal Processes and Natural Hazards Assessment Report).

Therefore, with the proposed mitigation measures in place and considering the infrequent nature of large storm events, as well as the low energy environment of the estuary, the movement of cobble material onto the mudflat and its subsequent removal will not leave long-lasting effects relative to the existing baseline conditions, and we consider that the overall level of effect will be Very Low.

The new erosion protection structures will include four new stepped facilities to facilitate access to the estuary, which may result in an increased number of people (and dogs) accessing the estuary bed. The report by Boffa Miskell have stated the effects associated with increased access will be very low. CRC expert disagrees with this assessment and considers that the effects will be moderate to high as this will cause increased trampling of seagrass beds, harvesting of mahinga kai species, dogs chasing native birds, and faeces in the estuarine area could have considerable adverse effects on the estuarine ecology and water quality.

- g. Please provide an assessment of alternatives to building the four new stepped facilities as there is already a walkway on the landward side of the estuary edge as well as grassed areas either side of the walkway which provide suitable areas for walking and dog exercising without providing access to the estuary bed.*

We do not see the stepped facilities as a significant point of difference for the effects mentioned in the question. The estuary bed is currently easily accessible throughout the project area, and it is used by dogs, people and motorised vehicles (Figure 4).



Figure 4. Motorbike driven through the mudflat and seagrass habitat along Southshore in August 2024.

The proposed new structures will continue to allow easy access to the estuary bed even in the absence of the stepped facilities (since the vast majority of the public will be able to walk down the new revetments and cobble beaches).

Since the effects mentioned in the question are already occurring and will not be significantly altered by the presence of the stepped facilities, we maintain the view that the overall level of ecological effect will be Very Low if our recommendations made in the EclA (see Section 8.1.3) are followed. That is, the stepped access points should not be located in proximity to the most sensitive estuarine habitats (i.e., seagrass and saltmarsh); signage about water quality (likely to discourage the harvesting of estuarine organisms) and ecological values of the estuarine habitats and organisms should be included. The signage, in combination with the requalification of the area through the removal of derelict structures and the implementation of the proposed landscape plan should contribute to promote greater public appreciation and respect towards the estuarine ecosystem and the surrounding area.

We also understand that the stepped access relates to measures to address aspirations and recommendations by others. We refer to the Q3(f) of this RFI for an assessment of alternatives.

The CRC experts state that they disagree with the assessment that the effects of coastal squeeze along Southshore will be very low and consider that it will be moderate to high. They consider that the hard-walled structures will not only act as a barrier and prevent the inland migration of habitats and organisms but are likely to result in increased water depths throughout the intertidal area from sea level rise. These increased water depths may limit light availability and intensify wave action which are both unfavorable for seagrass (Keyser et al., 2020). This may result in loss of seagrass habitats and the ecosystem services they provide.

There are wide margins between the current houses and the estuary edge which could be used to allow a natural edge and for the seagrass habitats to survive and expand. Seagrass beds not only sequester and store organic carbon in the sediment acting as natural carbon sinks (Serrano et al., 2021) reducing the effects of climate change, but they also encourage sediment stabilisation and surface elevation making them a natural coastal defence (Potouroglou et al., 2017).

- h. Please provide an assessment on coastal squeeze which gives consideration to the inclusion of a natural edge at areas along Southshore to allow for the natural migration of seagrass beds.*

We are well aware of the important ecological role of seagrass and of the threats to its persistence in New Zealand and worldwide. As outlined in the EclA report, we had a strong focus on avoiding effects on seagrass while working

within the scope of the project, which aimed to reinstate pre-earthquake conditions without changes in the position of the land / coastal marine area (CMA) interface (see Sections 1 and 10.3.4 of the AEE). As already explained in the EclA report (see Section 5) and in this memo (see answer to question 2c), the inclusion of a natural edge was an option that was explored but could not be pursued.

Our assessment of coastal squeeze (refer to the EclA) was limited to two small areas of the project site in which a “soft” edge (i.e., not armoured with engineered structures) is present. Neither of these areas are in proximity of the seagrass habitat. The Very Low level of effect mentioned in the question refers to the mudflat habitat at South New Brighton Park, not to the seagrass habitat (see Sections 7.3.2.4 and 7.6 of the EclA report). Our assessment of coastal squeeze did not consider other areas along the project site where the estuary edge is already armoured with erosion protection structures and, therefore, we considered that coastal squeeze effects are already present and would not be altered significantly by the project.

In response to this RFI, we have assessed coastal squeeze effects on seagrass. We have combined information on seagrass distribution, vertical land movement of the estuary bed and sea level rise projections as outlined in the memo prepared by NIWA and included in Appendix 1. This assessment is based on six seabed cross sections along Southshore (Figure 5) and assumes the presence of a hard estuary edge along Southshore.

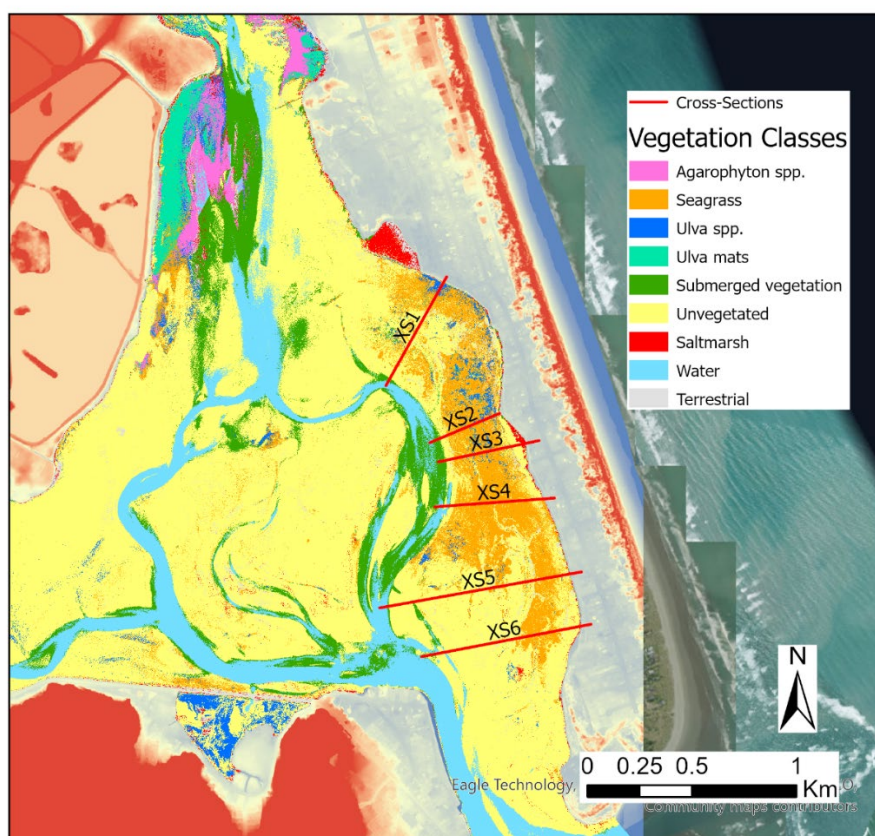


Figure 5. The six seabed cross sections along Southshore that were used for the coastal squeeze assessment. The mapping of seagrass and other features was carried out by NIWA in 2024².

We assessed the likely changes in the extent of intertidal habitat between 2020 and the end of the consent duration (year 2045), under three sea-level rise (SLR) scenarios³ (Table 1).

This assessment shows that there will be only minimal losses in the extent of the intertidal habitat (emerged at low tide) under SLR scenarios SSP2-4.5 p17 and SSP5-8.5 p50; Table 1, Figure 6⁴. Under these two SLR scenarios, losses of intertidal habitat will be confined to the areas of sloping seabed flanking tidal channels. Seagrass is not currently present in these areas. The large areas of flat seabed occupied by seagrass will remain intertidal. Only under the extreme (but low confidence), SLR scenario (SSP5-8.5 p83), might we expect a larger contraction in

² <https://ecan.maps.arcgis.com/home/webmap/viewer.html?useExisting=1&layers=c1fa51dbab6a492f852abf59c365b670>

³ The SLR scenarios assessed differ in the likelihood / confidence of being realised within the 45-year period of assessment.

⁴ The graphs displayed in Figure 6 are included in larger format in Appendix 2.

the extent of the intertidal area, particularly at the northern end of Southshore (see cross sections XS1 and XS2 in Table 1, Figure 6).

Table 1. Changes in the linear length (m) of the intertidal area (comprised between mean high water springs (MHWS) and mean low water springs (MLWS)) expected by 2045 (relative to 2020) under three different SLR scenarios across six seabed cross sections.

	XS1	XS2	XS3	XS4	XS5	XS6
2020	526.2	284.4	382.3	505.1	695.4	713.5
SSP2-4.5 p17 medium confidence	524.4	280.9	380.2	503.3	692.8	709.5
SSP5-8.5 p50 medium confidence	519.6	268.2	377.2	501.5	690.6	701.4
SSP5-8.5 p83 low confidence	222.7	220	354.7	494.4	687.4	678.2

With limited changes in the extent of the intertidal area under the two most likely SLR scenarios (SSP2-4.5 and SSP5-8.5), the Southshore seagrass meadows will continue to experience an alternation of emersion/immersion periods depending on the state of the tide, while under the most extreme scenario (SSP5-8.5 p83) some of the seagrass will become permanently submerged (Table 2, Figure 6).

Table 2. Proportional changes in the linear extent (m) of seagrass located in the intertidal area expected by 2045 (relative to 2020) under three different SLR scenarios across six seabed cross sections (100% = no change).

	XS1	XS2	XS3	XS4	XS5	XS6
2020	100%	100%	100%	100%	100%	100%
SSP2-4.5 p17 medium confidence	100%	100%	100%	100%	100%	100%
SSP5-8.5 p50 medium confidence	100%	99%	100%	100%	100%	100%
SSP5-8.5 p83 low confidence	53%	80%	96%	100%	100%	100%

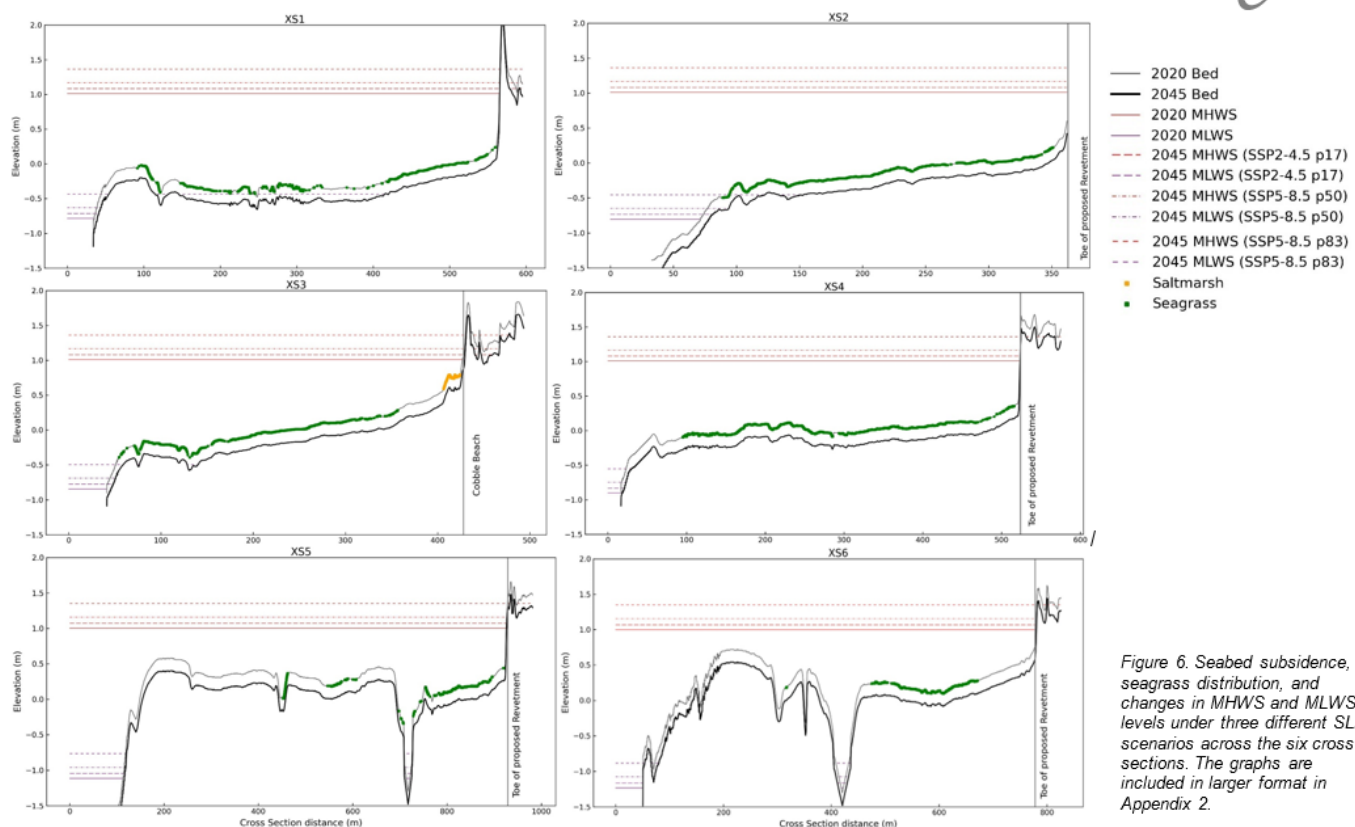


Figure 6. Seabed subsidence, seagrass distribution, and changes in MHWs and MLWS levels under three different SL scenarios across the six cross sections. The graphs are included in larger format in Appendix 2.

Under all the three SLR scenarios assessed, with the combination of sea level rise and land subsidence, the periods of immersion will become progressively longer during the duration of the consent, and water depths at high tide will also increase. Longer periods of immersion in deeper water at high tide (or continuous immersion in areas no longer emerged at low tide under the most extreme scenario (see Table 2 and Figure 6) could reduce the photosynthetic capacity of seagrass, with the severity of this effect being dependent on water clarity^{5,6}.

Under the first two SLR scenarios, we consider that any reduction in the photosynthetic capacity of seagrass due to changes in the periods and depths immersion by 2045 will be of small magnitude and insufficient to force seagrass to move towards the estuary edge (in which case coastal squeeze would occur). This is because:

- Measures of photosynthetically active radiation (PAR) collected at Southshore (43.5508 S 172.7378 E), show limited changes in PAR levels during periods of high tide immersion as opposed to periods of low tide emersion⁷. This indicates that light is not heavily influenced by the tidal state and, therefore, good water clarity should mitigate the effects of increased immersion times/depths.
- Zostera muelleri* has been shown to have considerable physiological plasticity and is able to up-regulate photosynthesis during periods of emersion at low tide to compensate for decreased productivity in low lights conditions at high tide⁸. Therefore, the fact that the seagrass will continue to be located in the intertidal area and to experience an alternation of emersion/immersion periods will provide resilience in the face of the conditions expected by 2045 under the most likely SLR scenarios.

Based on these considerations and given that there are still large areas of seabed available for seagrass colonisation along the Southshore estuary edge and across the surrounding mudflats, with 1,659 additional m² of mudflat to be created under this proposal (see Figure 20 in the EclA report and the Avon Heathcote / Ihutai estuary 2024 habitat classification map⁹), we consider the magnitude of effect of coastal squeeze on seagrass under the two SLR scenarios with moderate confidence by 2045 is Negligible. A negligible magnitude of effect on a High

⁵ Flowers GJ, Needham HR, Bulmer RH, Lohrer AM, Pilditch CA. Going under: The implications of sea-level rise and reduced light availability on intertidal primary production. *Limnology and Oceanography*. 2023 Jun;68(6):1301-15.

⁶ Shao Z, Bryan KR, Lehmann MK, Flowers GJ, Pilditch CA. Scaling up benthic primary productivity estimates in a large intertidal estuary using remote sensing. *Science of the Total Environment*. 2024 Jan 1;906:167389.

⁷ Mangan S, Bryan KR, Thrush SF, Gladstone-Gallagher RV, Lohrer AM, Pilditch CA. Shady business: the darkening of estuaries constrains benthic ecosystem function. *Marine Ecology Progress Series*. 2020 Aug 13;647:33-48.

⁸ Drylie TP, Lohrer AM, Needham HR, Bulmer RH, Pilditch CA. Benthic primary production in emerged intertidal habitats provides resilience to high water column turbidity. *Journal of sea research*. 2018 Dec 1;142:101-12.

⁹ <https://ecan.maps.arcgis.com/home/webmap/viewer.html?useExisting=1&layers=c1fa51dbab6a492f852abf59c365b670>

ecological value equates to Very Low level of effect¹⁰.

Under the most extreme SLR scenario (SSP5-8.5 p83) even in the areas in which the seagrass may no longer be emerged at low tide by 2045 (see Table 2 and Figure 6), on average seagrass will not be located more than a few centimetres below MLWS (Table 3) and, given the good water clarity, should still have access to a suitable light environment at low tide.

- However, a more comprehensive mapping across the Southshore area would be needed to assess the likely changes to intertidal area, patterns to depth in the new permanently submerged areas, and whether some of the areas currently not colonised by seagrass could become more suitable / available for seagrass colonisation. We note that this most extreme SLR scenario has the lowest confidence in being realised by 2024.

Table 3. Changes in maximum, minimum and average depth (m) of seagrass relative to MHWS and MLWS expected by 2045 (relative to 2020) under three different SLR scenarios across six seabed cross sections.

	2020		SSP2-4.5 p17 medium confidence		SSP5-8.5 p50 medium confidence		SSP5-8.5 p83 low confidence	
	MHWS	MLWS	MHWS	MLWS	MHWS	MLWS	MHWS	MLWS
XS1								
Min (m)	0.77	0	1.02	0	1.11	0	1.30	0.0008
Max (m)	1.45	0	1.70	0	1.78	0	1.98	0.18
Average (m)	1.22	0	1.47	0	1.55	0	1.75	0.09
XS2								
Min (m)	0.79	0	1.04	0	1.12	0.0002	1.32	0.0002
Max (m)	1.51	0	1.76	0	1.84	0.03	2.04	0.22
Average (m)	1.15	0	1.40	0	1.49	0.02	1.68	0.05
XS3								
Min (m)	0.73	0	0.98	0	1.06	0	1.26	0.0002
Max (m)	1.40	0	1.65	0	1.74	0	1.93	0.08
Average (m)	1.07	0	1.32	0	1.41	0	1.60	0.02
XS4								
Min (m)	0.65	0	0.90	0	0.99	0	1.18	0
Max (m)	1.11	0	1.36	0	1.44	0	1.64	0
Average (m)	0.97	0	1.22	0	1.31	0	1.50	0
XS5								
Min (m)	0.56	0	0.81	0	0.90	0	1.09	0
Max (m)	1.34	0	1.59	0	1.68	0	1.87	0
Average (m)	0.85	0	1.10	0	1.19	0	1.38	0
XS6								
Min (m)	0.72	0	0.97	0	1.05	0	1.25	0
Max (m)	0.90	0	1.15	0	1.24	0	1.43	0
Average (m)	0.80	0	1.05	0	1.14	0	1.33	0

The proposed works construction and operation will disturb and displace sizeable populations of protected native birds, including threatened and at-risk species, and will result in inferior feeding and roosting habitats.

- Please provide further assessment of the effects of the proposed works on construction and operation on native birds and their feeding and roosting habitats, and any mitigation measures to address any potential detrimental effects.*

¹⁰ Taking into consideration our response to Question 2a, the level of effect of coastal squeeze on seagrass is Low (where a Negligible magnitude of effect on a Very High ecological value equates to a Low level of ecological effect, in accordance with the EIANZ EclA framework).

The assessment of effects on avifauna (Section 7.5 of the EclA report) considered the following potential effects:

- Direct loss of habitat (Section 7.5.1)
- Disturbance and displacement (Section 7.5.2)
- Mortality or injury (Section 7.5.3)
- Food supply and foraging (Section 7.5.4)
- Artificial lighting (Section 7.5.5).

We consider these potential effects relevant for the proposal, including in relation to foraging and roosting habitats, and they were assessed for all the native species (including Threatened and At Risk) that were recorded within and adjacent to the project footprint, or which could have occurred there. As such, we consider that the current assessment has done what is requested. The overall effects of the project on avifauna show that these will be Low to Very Low based on the implementation of the impact management measures for avifauna (see Table 27 and Section 8.0 of the EclA).

With regard to the comment that “the proposed works construction and operation will disturb and displace sizeable populations of protected native birds”, Section 3.4 of the EclA identified the avifauna assemblage (including Threatened and At Risk species) associated with the Avon-Heathcote Estuary eastern shoreline, including the project site. The habitat associations and utilisation of these species with the project site and surrounding areas were identified, including spatial maps (Figures 33-40 of the EclA) showing the distributions of thousands of individual birds that were recorded. The number of birds for species recorded within the project footprint was calculated (refer to Tables 19 and 20 of the EclA), and these were shown to be very small proportions of the recorded populations.

With regards to indirect disturbance or displacement, we applied the relevant species mean flight initiation distances (FIDs) to determine the proportion of birds which may be exposed to disturbance. Those species for which >10% of the populations would be exposed to construction disturbance were all Not Threatened species (refer to Table 23 of the EclA) and for which the overall level of this effect is considered to be Low (refer to Table 24 of the EclA). This effect will be temporary and for a short term.

Furthermore, it is unclear on what basis it has been determined that the project will result in inferior feeding and roosting habitats, particularly when the project will result in an overall net gain of 879 m² of mudflat area and the establishment of approx. 1,230 m of rock revetment.

Proposed Condition 11 of the CCC Condition set (Section 8.9 of the AEE, page 156) provides a condition limiting when construction can occur. This condition may be adopted for the ECan consents, if needed.

4. Reclamation Assessment

The applicant claims that ‘new estuary habitat’ will be created (i.e. declamation) by the landward movement of structures and removal of the existing earthquake- damaged structures in the intertidal area.

We do not consider that the area of declamation should be used to offset the areas of reclamation giving an overall net gain. Further, that these areas of declamation should not be included in the assessment of the overall area to be reclaimed.

a. *Please provide an assessment on the above review comment of the proposal; and*

We understand from seeking further clarification on the wording of this question that the technical specialists do not support reclamation as an approach due to the effects of reclamation on the environment. As demonstrated in the answers contained within this RFI, a balancing approach has been taken regarding the position of the bund, recognizing the ecological and cultural values associated with this area, inappropriate historical materials that forms part of the edge areas and that further community engagement to understand where the estuary edge should be located forms part of the decision in terms of the bund location.

Appropriate technical specialists have been engaged with the design process from the commencement of the design process seeking to achieve an acceptable solution for the community while having the most minimal effect possible on the environment in which these works are proposed. As previously summarised, the effects are assessed as less than minor subject to the mitigation proposed.

The clarification sought also indicated:

“The reclamation needs to be justified why it is needed when there is plenty of redzone land available and you are able to go landward. Reclamation should be used as a last resort and should be justified why it is required as per Policy 10 of the New Zealand Coastal Policy Statement *“Avoid reclamation of land in the coastal marine area”*.”

As mentioned, there is a bigger conversation to be had in relation to where the edge of the estuary should be located. CCC aim to engage and consult meaningfully with the community about this important matter and just because Red Zone land is plentiful does not mean it should be used without community engagement. The overall design approach has been to have the smallest impact possible on the environment while achieving an acceptable outcome for the community.

Written Approvals: Are you able to provide any written approvals for this proposal? I note that there are private landowners, South New Brighton Holiday Park, DOC, Runanga, Te Ihutai Ahu Whenua Trust amongst further potential parties to be consulted.

Runanga have delegated mana whenua decision to Te Ihutai Whenua Trust.

Te Ihutai Ahu Whenua Trust	Provided.
Department of Conservation	Provided.
Pleasant Point Yacht Club	Provided.
South New Brighton Holiday Park	Provided.
Landowners; specifically: 44A Rocking Horse Road 78 Rocking Horse Road 168A Rocking Horse Road 172D Rocking Horse Road 184B Rocking Horse Road	44A Rocking Horse Road – Provided. 78 Rocking Horse Road – owner unable to be located. 168A, 172D or 184B Rocking Horse Road are currently engaged with CCC to negotiate sale of these properties and will be in CCC ownership by the time the project commences, noting the 172D Rocking Horse Road has recently progressed and is ready for settlement of sale. 168A and 184B Rocking Horse Road are also subject to registered easements.

We look forward to confirmation this letter and associated attachments have been received at your earliest convenience.

Kind regards,
Jess Bould
Senior Consultant, Environment and Planning

Copy to:

Dave Little
Residential Red Zone Manager
Christchurch City Council

Attachments

- A Southshore Climate Change Assessment
- B NIWA Report