BEFORE THE FAST-TRACK EXPERT PANEL

IN THE MATTER	An application for approvals under section 42 of the Fast-track Approvals Act 2024 ("FTAA")
AND	
IN THE MATTER	Te Ākau Bream Bay sand extraction, a project listed in Schedule 2 to the FTAA

STATEMENT OF EXPERT EVIDENCE OF RICHARD BULMER FOR NGĀTIWAI TRUST BOARD AND TE PATUHARAKEKE TE IWI TRUST BOARD

(BENTHIC ECOLOGY)

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1. INTRODUCTION

1.1 My name is Dr Richard Bulmer

1.2 I am a marine ecologist and director of Tidal Research Ltd.

1.3 I hold an MSc (First Class Honours) and a PhD in marine science from the University of Auckland, and have worked as a marine ecologist for over 15 years, including 9 years at the National Institute of Water and Atmospheric Research (NIWA) and four years running Tidal Research Ltd. My area of expertise is marine ecology, with a focus on benthic ecology and ecosystem functioning. I have authored over 45 publications and dozens of reports on estuarine and coastal ecology. As part of this I have previously led benthic assessments throughout Whangarei harbour and Te Ākau Bream Bay area.

1.4 I have been asked by Te Patuharakeke Te Iwi Trust Board and Ngātiwai Trust Board to provide expert evidence to inform their comments on the application lodged by McCallum Bros Ltd for approvals for sand mining in Te Ākau Bream Bay.

1.5 In this brief of evidence, I address the benthic ecological implications of the proposed sand extraction activity, with particular focus on the scale of direct seabed disturbance, the survivorship assumptions relied on in the applicant's ecology assessment, the extent to which the conclusion of low effects within the sand mining area and negligible in the wider Te Ākau Bream Bay is supported, and whether the proposed Environmental Monitoring and Management Plan provides a sufficiently robust framework for detecting and responding to adverse ecological change.

1.6 In preparing this brief I have:

a. Reviewed:

- Te Ākau Bream Bay Sand Extraction Project, Assessment of Ecological Effects for: McCallum Bros Limited as included in the application lodged with the EPA.
- Bioresearches (2025). Assessment of Ecological Effects (Bioreseaches). Report for McCallum Bros Limited as included in the application lodged with the EPA. I refer to this as the “updated Bioresearches assessment”.

  Please note that this has had two versions, one submitted to Te Patuharakeke Te Iwi Trust Board for initial review, and then a second revised version that was submitted as part of the application.
- Environmental Monitoring Management Plan for the Te Ākau Bream Bay Sand Extraction Site pp 231 as included in the application lodged with the EPA (“proposed EMMP”).

b. Read and complied with the Environment Court’s code of conduct for expert witnesses in Part 9 of the Environment Court Practice Note and agree to abide by that code.

1.7 Because of its late introduction I have not had time to consider the further benthic information provided by the applicant in response to further information requests from the Panel.

2. EXECUTIVE SUMMARY

2.1 The original Bioresearches assessment understated the spatial footprint of dredging, and although the per-trip figure has now been corrected to approximately 0.135-0.145% of the 15.4 km2 extraction area per trip, the updated Bioresearches assessment still presents this primarily on a per-trip basis and does not clearly communicate that at 161 trips per year this equates to approximately 21-23% of the extraction area being directly dredged annually in the early years, increasing thereafter.

2.2 The 86% survivorship estimate for benthic organisms passing through the dredge relied on in the updated Bioresearches assessment cannot reasonably be generalised to the full benthic community. In my opinion, survivorship is likely to be very low or zero for many sensitive and habitat-forming taxa such as larger bivalves, including scallops, horse mussels and corals if they encounter the dredge.

2.3 When the annual footprint and survivorship uncertainties are considered together, the potential for repeated disturbance, high mortality and longer-term changes in benthic community structure is likely to be greater than implied in the updated Bioresearches report. In my opinion, the conclusion that effects on benthic biota will be low within the sand mining area and negligible in the wider Te Ākau Bream Bay is not sufficiently supported by the information currently available.

2.4 The proposed EMMP does not yet set clear, quantitative ecological thresholds or adaptive triggers linked to defined management responses. In my view, this creates a real risk that ecologically meaningful adverse changes in benthic communities could progress before they are detected and acted upon.

2.5 Overall, in my view the material currently available does not provide a sufficiently robust basis to conclude that adverse benthic ecological effects will be low within the sand mining area and negligible in the wider Te Ākau Bream Bay or that they can be reliably identified and managed over the term of the consent through the proposed EMMP as presently framed.

3. TE ĀKAU BREAM BAY BENTHIC ENVIRONMENT

3.1 Moderate to high benthic biodiversity was identified in the proposed dredge area during sampling by Bioresearches in March 2024. While in small numbers, sensitive and ecologically important species (e.g., horse mussels *Atrina zelandica* and Brachiopods) and soft corals, including two species of stony cup corals (*Kionotrochus suteri*, *Sphenotrochus* sp) that are protected under the Wildlife Act 1953, were found.

3.2 Scallops (which are important for recreational, commercial, traditional or cultural purposes) were also observed in low numbers in the proposed dredge area. Scallops within the proposed dredge area and the wider Te Ākau Bream Bay and are being managed for recovery through fisheries closures since April 2022.

4. DREDGE FOOTPRINT AND COMMUNICATION OF SCALE

4.1 In the original Bioresearches assessment, the spatial extent of seabed disturbance was understated, with the effects described as affecting less than 0.2% of the consent area per year and approximately 0.001% per extraction track. Subsequent clarification with the authors confirmed that the proposed activity would in fact disturb approximately 0.135–0.145% of the 15.4 km² extraction area per trip, and that 161 trips are anticipated per year in the early stages of the consent.

4.2 When expressed on an annual basis, this equates to approximately 21-23% of the total extraction area being directly dredged each year during the initial 3 year consent period, with the footprint increasing further if the extraction rate is increased in later years.

4.3 The updated Bioresearches assessment correctly updates the per trip footprint, but still presents this on a per trip basis without clearly communicating the annual footprint, which may lead readers to infer that impacts are confined to approximately 0.135% of the area rather than recognising the annual scale of repeated disturbance.

4.4 From a benthic ecological perspective, the distinction between a 0.001–0.135% and a 22% annual footprint is substantial, because it determines how many organisms and habitats are exposed to direct physical disturbance and how frequently any given patch of seabed is likely to be re impacted over the life of the consent. This is particularly important for larger and more vulnerable species such as horse mussels, Brachiopods, soft corals and scallops, which are likely to have lower survivorship to the dredge and recover more slowly than more opportunistic shorter-lived species.

5. SURVIVORSHIP ASSUMPTIONS

5.1 The updated Bioresearches assessment relies on an 86% "survivorship" figure for benthic organisms passing through the dredge (the report states "*Approximately 86% of the larger biota are expected to survive passage through the dredge").* This figure appears to be derived from another report undertaken by Bioresearches that sampled organisms greater than 9 mm in size at the sediment discharge point of a similar operation (the report was sourced here although no longer available: https://www.aucklandcouncil.govt.nz/ResourceConsentDocuments/BUN60369079%20Ecological%20Effects.pdf).

5.1.1 In my opinion, this estimate does not provide a robust peer reviewed basis for inferring survivorship across the Te Ākau Bream Bay benthic community, for several reasons.

5.1.2 First, the method sampled only those organisms retained on a 9 mm mesh in the discharge stream and did not compare this subset to the full assemblage present on the seabed over the same area, so it is unclear what proportion of individuals or species groups were actually represented. Therefore, it is possible that it missed key sensitive species and only enumerated a small subset of the total population. I note, moderate to high biodiversity was identified in the proposed Te Ākau Bream Bay dredge area. While in small numbers, sensitive

and ecologically important species (e.g., horse mussels *Atrina zelandica* and Brachiopods) and soft corals, including two species of stony cup corals (*Kionotrochus sutrei*, *Sphenotrochus* sp) that are protected under the Wildlife Act 1953, were found. If these species are dislodged from the seafloor and passed through the dredge it appears unlikely they will survive.

5.1.3 Second, the study did not enumerate organisms smaller than 9 mm, nor did it account for mortality and predation risk following discharge back into the water column, before organisms could reestablish on the seabed. Even if these smaller individuals were to survive being dredged up and passed through the dredge system, they are then discharged into the water column and therefore are vulnerable to being preyed upon by fish and other organisms before they can reestablish themselves on the seabed.

5.1.4 Third, scallops were also observed in low numbers throughout the proposed dredge area. While scallop survivability was not directly assessed in the 86% survivability estimate, the survivorship of different sizes of individuals for Dosinia sp. and Myadora striata (clam species) was assessed. Most clams over 15mm in length did not survive or had damage which may be fatal. Nothing over 40mm or less than 6mm was sampled. This indicates any scallops (or other bivalves and surf clams larger than 15mm individual) and other sensitive species (e.g. corals, horse mussels, corals) are unlikely to survive the dredge.

5.2 Taken together, these factors mean that the 86% figure appears to apply only to a limited and unknown subset of organisms and cannot reasonably be generalised to all benthic taxa within the footprint. In my opinion, overall mortality associated with dredging is likely to be higher than implied in the Bioresearches assessment, particularly for key habitat forming and taonga species which are unlikely to survive passing through the dredge and are expected to take longer to recover than smaller more rapidly reproducing species. This uncertainty is material when considering both the scale of direct ecological effects and the potential for long term changes in benthic community structure.

5.3 I note that despite the Pakiri sand mining operation (which uses comparable methods) ongoing for many years, there appears to be a lack of published, independently peer reviewed studies from Pakiri cited in the updated Bioresearchers report to inform the survivability assumptions for organisms passing through the dredge. This appears to be an oversight given the importance of the conclusions regarding survivorship and the value this would provide for informing future activities.

6. "LOW/NEGLIGIBLE" EFFECTS CONCLUSION

6.1 The updated Bioresearches assessment concludes that the effects of the proposed sand extraction on benthic biota will be low within the sand mining area and negligible in the wider Te Ākau Bream Bay. Having regard to the corrected annual footprint (approximately 22% of the extraction area per year initially) and the uncertainties and limitations associated with the survivorship estimates described

above, I do not consider that this conclusion is sufficiently supported by the information currently available.

6.2 In my opinion, the combination of a large footprint, repeated disturbance over time, and very low survivorship for some ecologically important taxa makes it unlikely that the effects on benthic communities can be robustly classified as low/negligible on the evidence presented to date. Based on the evidence presented, there remains a real possibility of sustained loss or degradation of sensitive and habitat forming taxa, associated biodiversity changes, and interference with recovery of key benthic species within the extraction area, which could be characterised as a Moderate level of effect under the EIANZ 2018 definitions *"Loss or alteration to one or more key elements/features of the existing baseline conditions, such that the post-development character, composition and/or attributes will be partially changed"*

7. CONDITIONS: PROPOSED EMMP – ADAPTIVE TRIGGERS, MONITORING AND ECOLOGICAL SIGNIFICANCE

7.1 While the proposed EEMP provides a general framework for ongoing monitoring and describes certain operational practices (such as rotation of extraction tracks), key elements required to reliably detect and respond to ecologically significant change are, in my view, under specified at this stage.

7.2 The proposed EMMP does not set out clear, quantitative ecological thresholds or adaptive triggers that would require specific management responses if exceeded. For example, there appears to be no explicit criteria relating to the magnitude, spatial extent, or persistence of changes in benthic community composition or abundance that would trigger a pause, reduction, or termination of extraction, nor are there defined processes for independent review of results in such circumstances. Although the proposed EMMP proposes the use of multivariate statistical methods such as PERMANOVA and SIMPER, it remains unclear how statistically detectable changes will be translated into judgements about "ecological significance", and what specific operational actions would follow an ecologically significant result.

7.3 For example, the proposed EMMP states that if statistically significant differences are observed then a discussion will be added as to the ecological significance of the data. The current wording appears to allow for statistically significant differences to be discounted as not ecologically significant on expert judgement, without predefined criteria or clear consequences for the extraction activity. In addition, the proposed EMMP states that after the first three years: "If it is determined that sand extraction cannot increase to 250,000 m3/year then this is to be reassessed in the following SEMR until such time that it is confirmed that sand extraction can increase to 250,000 m3/year." This implies that every year the assessment may be repeated for the length of the consent. It is also unclear whether the ecologically significant change would be compared to the baseline or the last rolling three-year period. Does the same apply if an ecologically significant impact is detected in year four or five (or later) after the volume of the dredge has been increased? E.g. would it then have to drop back to 150,000 m3?

7.4 In addition, scallops within the proposed dredge area and the wider Te Ākau Bream Bay are being actively managed for recovery through fisheries closures since April

2022. Given the fisheries closure and that sampling was undertaken in over 2 years ago; it is possible that the abundance and presence of scallops (and other sensitive organisms) has improved throughout the proposed dredge footprint post sampling. More up to date sampling would provide greater baseline data to inform the initial assessment as well as ongoing monitoring should the proposal go ahead.

7.5 Overall, my assessment is that the proposed EMMP, as currently described, does not yet provide a sufficiently clear or robust framework to ensure that ecologically meaningful adverse changes in benthic communities will be detected and appropriately managed over the life of the consent.

8. CONCLUSION

8.1 In my opinion, the assessment of the benthic ecological effects of the proposed sand extraction activity are not adequately supported by the current applicant material.

8.2 The corrected dredge footprint indicates disturbance at a larger annual scale than originally presented, the survivorship assumptions relied upon are not robust for the full benthic assemblage, and the conclusion of low/negligible effects is not sufficiently supported on the evidence presently available.

8.3 In addition, the proposed EMMP does not yet provide the clear thresholds, adaptive triggers and response pathways necessary to give confidence that ecologically meaningful adverse change will be reliably detected and managed over the term of the consent.

8.4 For those reasons, I consider that caution is warranted in relying on the current benthic ecology assessment and associated monitoring framework as a basis for concluding that adverse effects will be low/negligible or manageable.

DR RICHARD BULMER