

To: Brittany Watson

From: Tim Baker

Company: Otago Regional Council

SLR Consulting New Zealand

cc:

Date: 15 July 2025

Project No. 875.V13600.00002

**RE: RM24.098 – WM New Zealand, Fairfield Closed Landfill
Natural Hazards & Climate Change Technical Peer Review**

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1.0 Introduction

SLR Consulting NZ (SLR) has been engaged by Otago Regional Council (ORC) to conduct a technical review of the resource consent application (including subsequent attachments and request for information (RFI) responses submitted by WM New Zealand (WM, the applicant) for discharge and take activities associated with the Fairfield Closed Landfill aftercare.

SLR completed an initial review of the application in April 2024 and identified a number of items requiring further clarification (Section 92). A response to the request for further information was provided by the applicant in June 2025.

2.0 Scope of Review

The scope of this review includes **natural hazards and climate change** aspects of the application and responses to questions asked by ORC. The key documents included in this review are:

- Planz Consultants, 2025. Waste Management NZ Limited – Fairfield Closed Landfill Application (RM24.098) Response to the section 92 Request for Further Information.
- Proposed Consent Conditions (Appendix 8) (Updated 13 June 2025).
- Fairfield Closed Landfill – Natural Hazard and Climate Risk Assessment and Management Plan (Appendix 6) (PDP, 2024). Hereinafter referred to as the Natural Hazard Report.
- Fairfield Aftercare Management Plan (Draft).

3.0 Assessment

Q55: In your opinion, has the Natural Hazard & Climate Assessment addressed all potential natural hazards that may be relevant to the application?

The Natural Hazard Report has adequately identified the primary risks associated with natural hazards and climate change. These are listed in Table 1 of the Natural Hazards Assessment.

However, these risks are proposed to be addressed via additional assessment and reporting that are requirements of proposed consent conditions.

Q56: Are the proposed mitigation measures to reduce adverse effects due to the effects of natural hazards reasonable/ appropriate? Why/ why not?

The proposed mitigation measures provided in the Natural Hazard Report are high level, and the Applicant proposes to push the detail around these measures into a future consent condition.

The following summarises the main hazards and the proposed mitigations:

- Change in climatic variables (temperature/drought/wind). To be addressed through periodic surveillance (Section 3.1 of Hazards report).
- Increased annual rainfall/change in flood flows/sea level rise/storm surges/king tides. Proposed to be managed through Conditions 20 and 21 (Water permit), which requires the Consent Holder to complete an assessment and/or modelling, and a design, for proposed climate change mitigation works within 2 years.
- Seismic risk. Proposed to be assessed via the completion of a slope stability assessment of the Eastern Landfill (only) within 2 years of the consent being granted; and every five years thereafter (Condition 5 Discharge Permit).

From technical perspective, I do not have any concerns about requiring these assessments to be completed within the proposed timeframes of the resource consent conditions. However:

- Please refer to my response to Q67; in that Council should be provided with the opportunity to review and approve the reporting.
- The proposed mitigation measures may require their own resource consents to implement.

With regards to the response to climate induced changes to rainfall, sea level rise and flooding – an adaptive management response could provide clear trigger and/or thresholds at which certain mitigations are required to be implemented. It would be helpful to see approach adopted as part of the required reports.

Q57: In your opinion, has the potential landslide risk been addressed adequately?

The risk of landslide relates directly to slope stability. This risk of slope instability will be assessed via the completion of a slope stability assessment of the Eastern Landfill (only) within 2 years of the consent being granted; and every five years thereafter (Condition 5 Discharge Permit).

Condition 5 of the Discharge Permit requires that a seismic reassessment report is prepared. The report is proposed to include:

- Update peak ground accelerations in line with the most recent guidance and New Zealand standard documents.
- The static stability of the slopes assuming elevated leachate levels within the landfill mass and the associated risks from increased or upward seepage; and
- The static performance of the slope from inundation of the toe of the landfill slope by a range of flood inundation levels and residence times.



We recommend that the slope stability assessment is completed for the entire landfill, not just the Eastern Landfill.

We note that the completion of the slope stability assessment requires an accurate understanding of leachate head within the landfill. Additional groundwater monitoring wells should be installed within the centre of the landfill mass to assist with this understanding.

I further note that during a site visit to the Green Island landfill in 2024, I observed a land slip on the eastern face of the Eastern Landfill. The slope of this face looked visually steeper than a typical landfill design.

Q58: Have the cumulative effects associated with natural hazards been adequately addressed?

The Natural Hazard Report groups natural hazards that have the potential to cause similar effects and require similar, or the same, management. I consider this to be a cumulative assessment, even though it is not referred to as a cumulative assessment.

Similarly to the response to Q56 above, the mitigations for the cumulative risks have not been addressed in the application but are proposed to be addressed as part of a consent condition requirement.

Q59: Is the technical information provided in support of the application robust, including being clear about uncertainties and any assumptions? Yes, or no. If not, what are the flaws?

Yes, the identification of hazards is robust, but as described above the report does not contain any detail on how these will be mitigated, other than pushing the detail into future reports.

Q60: Are there any other matters that appear relevant to you that have not been included? Please specify what additional info you require and why? Please explain why.

I note that Section 3.0 of the Natural Hazard Report provides a long list of recommended actions related to landfill surveillance inspections that have not been included in the Aftercare Management Plan (AMP). These should be included in the AMP.

Q61: Are the proposed consent conditions appropriate (updated Appendix 8)? If not, please state why.

I suggest the addition of a Council review and acceptance of the reports required by Conditions 20 and 21 (Water permit). Currently, the consent holder is just required to prepare the report but there is no process for ORC to review and make the decision of whether to accept it.

Q62: If granted, are there any specific conditions that you recommend should be included in the consent beyond what the applicant has proposed?

Please refer to the response to Q61.

Defence against water and water diversion assessment- s92 Response



Note: The Applicant has amended the application to include resource consent to divert water, and to construct a defence against water. The Applicant has proposed a mitigation measure of increasing the level of the site's perimeter access road, plus associated protection and armouring of the road. The Applicant has stated that this mitigation measure may be implemented in the future to address the potential risks to the land fill arising from climate change effects.

Q63: The Applicant has proposed a condition of consent which requires the design, including a description of the construction methodology and timeframes, and an assessment and / or modelling of the effects of the associated surface water diversion, to be provided to the ORC, for certification, prior to any construction works commencing. In your opinion, is this an appropriate approach to manage potential adverse effects?

The approach, including describing the methodology and modelling the effects on flooding is appropriate. However, without knowing what the effects are, it is unclear how this could be consented. At the very least, and upper bounds or envelop of effects would need to be provided.

Q64: Do you agree with the Applicant assessment of adverse effects as result of the water diversion and construction of a defence against water associated with the increase in the height of the road perimeter? (See AEE in s91 Deferral Letter). Has the applicant identified what the potential adverse effects are and who might be affected by these?

No. The assessment of effects presented in the s91 Deferral letter AEE is only high level and is not based on any design. It even notes that an alternative option may be adopted, so as per the answer in Q63, it is not clear how the effects of a yet undetermined design could be robustly addressed. The applicant's assessment addresses the following key points:

- It is feasible that another solution (other than increasing the height of the perimeter road and adding scour protection) may be identified as the best option.
- Carrying out the height increase, and armouring does not result in the loss of any channel or bed of the stream/wetland/estuary. I generally agree with this statement but have not seen a map of the full extent of the proposed work which I require to be certain.
- The 'diversion' of water associated with the potential establishment of the 'defence against water' will not result in any loss of water from the Kaikorai Stream or Kaikorai Lagoon Swamp. I generally agree, but it is unclear how the proposed works would interact with Christies Creek and Coals Creek and their flood plains.
- The intent of the proposed 'defence against water' is to provide for site-specific protection against natural hazard and climate change risks, and therefore given that the proposal does not entail an increase in the footprint of the landfill, but aims to ensure that high water levels and flows are retained within the stream and wetland, it is anticipated that there will be no increase to flooding risk in the broader area. This will be subject to confirmation by way of the modelling / assessment required by the process outlined in the 'Mitigation – Effects of Climate Change' conditions. Raising the height of the perimeter road must decrease the cross-sectional area of the flood plain. The reduction in flood storage (in floods higher than the current perimeter road



level) needs to be quantified, which has not been done. I do not consider 'Anticipating' the effect is sufficient for assessing the effects.

Q65: Is the technical information provided in support of the application robust, including being clear about uncertainties and any assumptions? Yes, or no. If not, what are the flaws?

No. The technical information, particularly in relation to the assessment of effects of the proposed defence against water, is not technically robust, and needs to be based on an actual design. This is described in more detail in Q64 above.

Q66: Are there any other matters that appear relevant to you that have not been included? Please specify what additional info you require and why? Please explain why.

There are no other matters not already addressed above.

Q67: If granted, are there any specific conditions that you recommend should be included in the consent beyond what the applicant has proposed

My main recommendation is that if it were to be granted that assessments and reports issued as part of the resource consent are required to be signed off or certified by ORC before being accepted. As it stands, they just must be provided to ORC and it does not appear that there is a process for ORC to provide any comment or review.

Regards,

SLR Consulting New Zealand



Tim Baker
Principal Consultant



Emma Trembath
Technical Director – Waste Management

Partial responses to Question 57 was provided by Emma Trembath.

