

**Before Hawkes Bay Regional Council and Hastings District Council**

In the matter of                   the Resource Management Act 1991

And

In the matter of                   Applications by Hastings District Council and Napier City Council  
**(Applicants)** for approvals relating to Area B at Ōmarunui Landfill  
**(Landfill)**

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**Summary of evidence by Jamie Yule  
(Geotechnical Engineering)**

Dated 28 October 2021

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1. I prepared evidence dated 2 September 2021 and have assisted Mr Bryce with his supplementary evidence of 14 October 2020 with respect to spoil disposal and stockpiling.
2. The Project comprises the construction of an extension to the Ōmarunui Landfill (known as 'Area B') including initial development earthworks of approximately 650,000m<sup>3</sup> to establish the initial development footprint. Cut earthworks are necessary to modify the existing valley landform to form the gently sloping landfill basegrade. This will include battered cuts along the valley edges at grades of between 1V:2H to 1V:3H up to 60 m in height that will be buttressed as the landfill is progressively developed. Generally, the slopes within the landfill cell will be at a maximum grade of 1V:3H, with cut slopes above this to a maximum angle of 1V:2H.
3. A starter toe bund, as part of the initial Stage 1 landfill development and construction of a permanent final toe bund at the northern end of the Area B Valley will provide support to the landfill behind. The toe bunds will be 'keyed' into the underlying rock to provide sufficient toe support to the landfill cell. The landfill liner system will include a combination of a fine-grained soil liner, Geosynthetic liner (**GCL**) and high-density polyethylene (**HDPE**) lining system along the base of the landfill. This is expected to require importing of suitable clay material from local sources to site to form the compacted liner or use of selective materials borrowed from site won materials.

4. The steeply sloping side slopes of the Area B site comprise shallow soil cover overlying sandstone, siltstone and sandy limestone bedrock. These slopes grade down towards a series of small drainage gullies, which are generally narrow running towards the northwest. The drainage gullies comprise a thin cover of alluvial soil over the sandstone rock. No signs of Karstic topography such as caves, tomos or sinkholes have been identified within the project area and the limestone beds are generally thin and discontinuous.
5. Extensive geotechnical investigations (including several deep machine boreholes) have been carried out within the Area B site and wider Omarunui Landfill complex since the 1980s. All existing investigations were reviewed in preparing the geotechnical aspects for the Project. These geotechnical investigations did not disclose any potential issues or 'fatal flaws' pertaining to the Site from a geological and geotechnical perspective for landfill development and associated activities.
6. The site is over 6km from the nearest active fault, located southeast of the Project. Accordingly, fault ground rupture is not considered a significant risk for the Project. Liquefaction and lateral spread hazards are not considered to be of significance as the gully alluvium will be removed below the landfill footprint.
7. Slope stability assessments have been undertaken on the major cut slopes and through the final toe bund, post closure. Acceptable conditions were modelled for the cut slopes. The theoretical factor of safety requirement was not met for the toe bund post closure case under seismic loading only. However, the modelled slope displacements were relatively minor for a low probability earthquake event and the design is considered acceptable.
8. I have provided a review of and comments on the Geotechnical and Design Conditions (Conditions 2 to 4). These conditions in the condition set are attached to the evidence of Ms Brabant, which I support.
9. In conclusion, I consider that sufficient information has been obtained for feasibility level design to indicate the specific project geotechnical hazards can be addressed and resource consents are able to be supported.

**Jamie Yule**  
**28 October 2021**