

IN THE MATTER of the Resource Management
Act 1991

AND

IN THE MATTER of the hearing (Stage 1) by the
Waikato District Council on the
Proposed Waikato District Plan

SUMMARY OF REBUTTAL EVIDENCE BY LINCOLN SMITH

Terra Firma Resources Limited

16 June 2021

- 1.1. My name is Lincoln Smith. I provided evidence in reply (**EIR**) dated 3 June 2021 in relation to the geotechnical peer review of Terra Firma Resources Ltd's geotechnical evidence in chief (**EIC**), undertaken by Mr John Warrington of WSP. In my EIR, I outlined my qualifications, experience and commitment to comply with the Environment Court Expert Witness Code of Conduct. A summary of my evidence follows.
- 1.2. The subject site was constructed by the placement of mine overburden behind an engineered earth bund wall. The wall was constructed on a designed foundation keyed into basement material and included vertical sand drains ('chimney drains') to manage pore water pressures. The toe of the completed bund extends approximately 150m into the southern edge of the lake.
- 1.3. The fill material of the bund and spoil is the same as the general overburden sequence typical at Huntly. There is strong anecdotal evidence post-rehabilitation to indicate there has been no settlement, subsidence or mass ground movements.
- 1.4. The Strata Control Technologies (SCT) report refers to the high level of engineering professionalism of the mine owners, and notes a very high standard of work in the work conducted for the Weavers open cast mine. The design and construction of the final retaining bund provide confidence that the structure has been designed and built to be fit for purpose.
- 1.5. I consider that the combination of Mr Carter's preliminary findings and the background knowledge provided by the SCT report, gives sufficient confidence for rezoning, with the ongoing gathering of more geotechnical information providing confidence that there is no residual settlement and data for the ultimate foundation design.
- 1.6. I disagree with Mr Warrington's classification of the fill material as "non-engineered fill". In my opinion, the material is likely to have a high proportion of materials suitable for engineering fill. Pockets of soft material will have been enclosed by the competent material and these pockets will have likely drained and been consolidated by the loading of the overlying fill material.

- 1.7. I acknowledge that results show some variability between the two areas. TFR will undertake further testing which may show variability or may show a pattern. Regardless of the outcome, as Mr Warrington has noted in his report, the potential for differential settling that might result can be mitigated by specific engineering design.
- 1.8. While, as Mr Warrington notes, it has not been established whether groundwater is contributing to flows within the surface water drainage zones, engineered 'chimneys drains' were installed as part of the backfill and rehabilitation process.
- 1.9. I agree that further groundwater investigation is required and this will be carried out as part of the next phase of geotechnical investigation.
- 1.10. I agree that further geotechnical investigation is required. TFR is committed to undertaking additional work as necessary to address the outstanding areas of uncertainty. This includes on-going monitoring of a series of points with their locations fixed with GPS coordinates to determine whether there is any on-going movement or subsidence.
- 1.11. However, I disagree that all the investigations must be completed prior to rezoning. As Mr Warrington has himself stated, there are engineering solutions that may be used to address variable ground and reduce the risk of subsidence, as is the case on any building site.
- 1.12. I do not disagree with Mr Warrington's observation that a contaminated site assessment would be required to address the possibility that coal clasts, heavy metal minerals and other contaminants may be present in the fill and may be released into the environment during earthworks. However, this matter does not have any bearing on whether or not the land should be rezoned. In any case, TFR's intention is to minimise significant earthworks and to broadly retain the existing topography.

- 1.13. TFR takes the geotechnical matters very seriously, and would not be pursuing the proposed rezoning without confidence in the investigations and knowledge so far, and the understanding that more work must be undertaken over an extended timeframe. Preparation for development, including securing consents, will also take time. Rezoning the land to Residential/Commercial will allow some of the geotechnical investigations to occur in parallel to preparing for development, and expedite supply to the housing market.
- 1.14. TFR has confidence in the design and execution of the rehabilitation works and that the land is stable. The critical aspects are the final engineered bund and drainage and we know these were properly designed and constructed.
- 1.15. Mr Warrington and I share the opinion that engineering solutions exist, and can be implemented to mitigate any residual risk (which will be determined from further investigations).
- 1.16. We have a high level of confidence that our assumptions are being borne out by the results of investigations to date and that the planned further investigations will support this development.