BEFORE INDEPENDENT HEARING COMMISSIONERS APPOINTED BY THE KAIKOURA DISTRICT COUNCIL

IN THE MATTER OF	The Resource Management Act 1991 (**RMA** or **the Act**)
AND	
IN THE MATTER OF	Proposed Plan Change 4 (**PC4)** to the Kaikoura District Plan (**KDP** or **the Plan**) brought by Kaikoura Business Park Limited (**KBP**)
AND	
IN THE MATTER OF	The Hearing of Submissions and Further Submissions on PC4

EVIDENCE OF MICHAEL PATRICK NUGENT FOR THE APPLICANT KAIKOURA BUSINESS PARK LIMITED

Dated: 13 March 2024

Presented for filing by:
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INTRODUCTION

1 My name is Michael Patrick Nugent

2 I am currently a Senior Engineering Geologist working for LandTech Consulting, Ltd (LTC) in Christchurch.

3 I hold the qualifications of bachelor's degree in Geology.

4 I am registered as a Professional Geologist in the United States.

5 My relevant work experience includes 27 years employed in the earth sciences field, including overseas as a geologist, hydrogeologist and geophysicist. Since 2013 I have worked in New Zealand as a geologist, land damage specialist and engineering geologist, conducting testing, analysing data and providing detailed reports relating to repair solutions for damaged land/structures and the suitability of land for residential and commercial development. Within the past year I have focused primarily on providing geotechnical advice related to proposed/new residential and commercial developments.

6 Following the 2016 earthquake I worked on the NCTIR project as a geologist and conducted land damage surveys (including deep soil testing) for residential properties in the Kaikoura District.

7 I have read the Environment Court's Code of Conduct and agree to comply with it. My qualifications as an expert are set out above. The matters addressed in my evidence are within my area of expertise, however where I make statements on issues that are not in my area of expertise, I will state whose evidence I have relied upon. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed in my evidence.

SCOPE OF EVIDENCE

8 In my evidence I address the following issues:

(a) The suitability from a geotechnical/natural hazards perspective of the zoning for the site at 69 Inland Kaikoura Road to be changed from rural to light industrial as discussed in the 2022 LTC report for the site (attached and discussed below).

CONTEXT

9 LTC provided a report (attached) to Kaikoura Business Park 2021 Limited (KBP) titled, *Geotechnical Investigation Report for Proposed Land Use Change, 69 Inland Kaikoura Road*, dated 29 June 2022. The report detailed LTC's investigation of (including desk study and shallow and deep soil testing conducted by LTC) and geotechnical recommendations for the site.

10 The approximately 21.5ha site is located at 69 Inland Kaikoura Road, Kaikoura (Lot 2 Deposited Plan 501321 and part of Lot 2 Deposited Plan 527436).

11 I understand that the rural site is currently used for pastoral farming and is proposed to be changed to light industrial, allowing development of KBP. The 2022 LTC report was completed to support KBP's formal submission to change the site's current zoning under KDP (currently rural) to a proposed new zoning (light industrial) under PC4.

12 The site is located on a river plain near the west bank of the braided Kowhai River. Soils under the site are mapped (sourced from GNS web viewer) as Holocene River deposits comprising river gravel (typically found at shallow depths of approximately 0.0m to 1.5m below ground surface near the existing river channel based on LTC testing) and sand.

13 I am providing evidence based on my reading of the attached LTC to affirm and, where required, clarify the report's findings and recommendations. This evidence is restricted to my understanding of the report, including the desk study and testing completed to support the findings within.

14 In preparing this evidence I have referenced the following documents that are contained within and attached as appendices to the Kaikoura Business Park Plan Change Application (Notification version):

- The 2022 LTC report, including the testing data and publicly available information (desk study) referenced within.

- Site plan (*8153 – Outline Development Plan – Inland Kaikoura Road, Peketa, Kaikoura*) prepared by Baseline Group, dated 5 October 2022.

- Application for Plan Change, pages 54-79, written by Baseline Group, dated 25 August 2023

I have also referred to online databases, including the New Zealand Geotechnical Database, Canterbury Maps and the Kaikoura District Plan.

15 I affirm the contents of the following attached report:

(a) *Geotechnical Investigation Report for Proposed Land Use Change, 69 Inland Kaikoura Road*, dated 29 June 2022 (**Appendix A**). Clarifying that:

- The third sentence in section 10.0 *Geotechnical Hazard Evaluation* (page 13) should be corrected to read "…we consider this site suitable for land use change to **light industrial** [not "residential" as written] zoning from a geotechnical perspective."

- Section 11.3 *Future Geotechnical Involvement*, second paragraph refers to the potential for ground conditions to vary locally from those found in LTC's area-wide testing. While I consider this to be a low probability based on the LTC testing results (thin topsoil/river deposits overlying gravel with >300kPa Ultimate Bearing Capacity), depositional environment of the site soils (modern braided river system) and historical land use (pastoral farming), it is possible that greater thicknesses of potentially unsuitable topsoil/fill materials or liquefiable soils than those encountered by LTC may be present in discrete locations on the site/away from LTC test locations. The LTC report requires additional testing within proposed building footprint(s) to determine the suitability of soils for construction, to the testing density of the established MBIE guidelines at both the Subdivision Consent and Building Consent stages. If unsuitable or deep soils are encountered, these would either require removal (topsoil/fill) and replacement with suitably compacted engineered hardfill or further deep testing (significant thickness of sand) to assess liquefaction potential. If found to be liquefiable, then foundations constructed over these materials would need to be designed by a qualified engineer to resist the effects of liquefaction and/or lateral spreading in accordance with established MBIE guidelines. Ground improvements, if suitable to the location(s) and depending on deep testing results, may potentially be completed during building construction to allow for less robust and possibly more cost-efficient

foundations. Weaker near-surface soils may potentially be compacted where possible to attain suitable bearing.

THE RECEIVING ENVIRONMENT

16 Based on the LTC report and the documents referenced above, I consider the receiving environment to be the site itself, as set out in Section 2.0 to 11.2 of the 2022 LTC report. With reference to the report and KDP, development of the site in accordance with the report's findings (subject to further testing at the subdivision consent stage) will not impact the surrounding rural environs from a geotechnical perspective, in my opinion.

THE PROPOSAL FOR REZONING

17 I have read pages 54 to 79 of Baseline Group's application for plan change, which does not contain any items that would be impacted/affected/triggered by the proposed development from a geotechnical perspective.

18 Note: the size and height of new buildings (15m maximum according to LIZ-S1, page 70 of the plan change application) is primarily a structural/design issue. Foundation design for each building would be based on geotechnical conditions, which I (in consultation with LTC director, Dwayne Wilson, CPEng and my reading the 2022 LTC Report) consider to be suitable for appropriately designed buildings up to 15m height, assuming further geotechnical investigations are conducted at both the Subdivision Consent and Building Consent stages to confirm suitable ground conditions across the wider site and within future building footprints.

RELEVANT PLANNING PROVISIONS

19 The site is located within the Kaikoura District Plan liquefaction overlay within an area that "is underlain by younger stream/coastal gravels and sands with a higher water table. Liquefaction is possible during a strong earthquake. The MBIE guidelines recommend an assessment involving analysis of soils from the site to determine liquefaction susceptibility and foundation type be undertaken before building in this area" (sourced from Canterbury Maps layer – Natural Hazards in the Kaikoura District).

20 Based on the testing results provided in the 2022 LTC report, it is my opinion that generally there is a low potential for liquefaction across the proposed KBP area, which should be confirmed through additional geotechnical investigations to the testing density requirements of the MBIE guidelines at the design/subdivision consent stage(s) of development.

ASSESSMENT OF THE PROPOSAL

21 Sections 11.0 through 11.3 (pages 14 & 15) of the 2022 LTC report set out the findings of LTC's assessment of the site and proposed development/plan change, specifically that the site should generally be classified TC1 (subject to further geotechnical investigations and liquefaction analysis at the Subdivision Consent and Building Consent stages) and is suitable from a geotechnical perspective to be re-zoned from rural to light industrial.

RESPONSE TO MATTERS RAISED BY SUBMITTERS

22 To my knowledge, no submissions relating to the 2022 LTC report or to geotechnical matters generally were raised by Submitters.

KEY ISSUES AND SUMMARY OF CONCLUSIONS

23 **Subsurface conditions** – per Sections 9.0 to 9.7 of the 2022 LTC report, the site is underlain by thin (~0.3m thick) topsoil and, locally, minor fill. Natural soil underlying the site comprises 0.2m to 1.2m of alluvial sand/gravel over dense gravel with ~1.0m thick layers of less dense material recorded above effective refusal depths between 1.5m and 7.4m. Liquefaction of the site is considered "possible" by the local council, but a low probability of liquefaction is assumed for the site based on the results of LTC's testing and desk assessment (to be confirmed by further geotechnical investigations to the testing density of the MBIE guidelines at the Subdivision Consent and Building Consent stages).

24 **Geotechnical hazards** - per Sections 5.0 and 10.0 to 10.5 of the 2022 LTC report, the site is located ~7.8km away from the Hope Fault and is considered to be at minimal to low risk of geotechnical hazards listed in Section 106 of the Resource Management Act 1991.

25 **Site suitability** – per Sections 11.0 to 11.2 of the 2022 LTC report, the site is considered to be TC1 (subject to confirmation via further geotechnical

investigations at the Subdivision and Building Consent stages) and suitable for light industrial development. Based on LTC's preliminary, area-wide testing and desk study, River Deposits underlying topsoil/fill on the site generally meet the criteria for "good ground" according to the New Zealand Building Code and so are suitable for standard foundations. Variability of upper natural soils (below topsoil/fill) should be assessed by further geotechnical investigations during the Subdivision Consent and Building Consent stages to confirm sufficient ground bearing and/or the depth of any weaker materials and inform either in-situ compaction of the materials to suitable bearing or engineered foundation design if/where required should localised liquefiable deposits be identified.

Michael Nugent, BA (Geology), PG (USA)

Dated: 13 March 2024