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Sweetman Planning Services
11 Mataroa Avenue
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20 May 2022

Attention: Gina Sweetman

Dear Gina,

Maitahi-Bayview Private Plan Change Request - Geotechnical Review

As requested, please find below a memorandum outlining the steps taken in my review of the geotechnical aspects of the above plan change application, and a summary of conclusions.

My full name is Paul James Horrey. I am employed as a Senior Principal Engineering Geologist with Beca Limited. I have prepared this memorandum on behalf of the Nelson City Council (**Council**) in respect of technical related matters arising from the submissions and further submissions on the Private Plan Change 28 (PPC28) to the Nelson Resource Management Plan (**NRMP**). Specifically, this memorandum relates to geological hazards and geotechnical constraints with the potential to affect the viability of PPC28.

I hold the qualifications of B.Sc in Geology and M.Sc (honours) in Engineering Geology. I am a member of Engineering New Zealand and a Chartered Professional Engineer (CMEngNZ). I am also a Chartered Geologist with the Geological Society of London (FGS, CGeol). I am a member of the New Zealand Geotechnical Society, International Society of Engineering Geologists and the International Society of Rock Mechanics.

I have over 30 years of experience in assessment and management of geological hazards. I have worked for Beca Limited for over seven years. I completed my Master of Science thesis on engineering geological constraints on land developments in the Picton area. I have participated in a wide range of slope stability assessments, slope stabilisation works, and geological hazard management studies both in New Zealand and internationally. I have undertaken slope stability assessments for land development commissions on sloping ground in the Nelson area with a previous employer. Over the last two years I have led Beca's design and construction monitoring for the Takaka Hill highway rehabilitation following Cyclone Gita. Also, I have recently provided senior oversight and technical review of studies carried out by Beca staff for ground liquefaction, slope instability and fault hazards covering the Nelson region.

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I have read the Code of Conduct for Expert Witnesses set out in the Environment Court's Practice Note 2014. I have complied with the Code of Conduct in preparing this memorandum and will continue to comply with it if required to give oral evidence before the Council's Hearings Panel. My qualifications as an expert are set out above. Except where I state I rely on the evidence of another person, I confirm that the issues addressed in this statement of evidence are within my area of expertise, and I have not omitted to consider material facts known to me that might alter or detract from my expressed opinions.

I have been involved in the PPC28 since May 2021, when Council engaged Beca to assist with a review of engineering information used to support PPC28.

I have reviewed the geotechnical assessment prepared by Tonkin and Taylor Limited which accompanies the Application. Further information was requested from Tonkin and Taylor regarding the methodology used in the assessment and the data sources consulted. Further explanation was provided on several occasions by way of email correspondence. A brief timeline of interactions is as follows:

- 4/5/21 – Dr Sarah Barrett, Engineering Geologist with Beca attended the site visit hosted by the developers and their technical experts. The visit covered aspects of the site layout and a tour the adjacent land development. Sarah discussed aspects of the geotechnical hazards identified from Tonkin and Taylor report with Mr Mark Foley, Principal Engineering Geologist with Tonkin and Taylor, including the assessment methodology used for assigning natural hazard risk zones, and how different natural hazards were addressed in the assessment.

- 14/5/21 –The outcome of the geotechnical review completed by Sarah Barrett and myself was sent to the Applicant and additional information was requested. Tonkin and Taylor were requested to supply a more detailed methodology for the geotechnical risk assessment including datasets considered in the assessment, and commentary around feasibility of the PPCR. The additional information was requested to assess the robustness of the assessment methodology and its alignment with current industry practice

- 11/6/2021 – Reply received from Mark Foley from Tonkin and Taylor regarding their geotechnical assessment and outlining that the development would be further tested at the resource consent stage.

- 30/7/2021 –Beca requested further information from Tonkin and Taylor on their geotechnical risk assessment methodology including descriptions of the steps followed, specific datasets considered in the assessment, and demonstrating the feasibility of the PPCR with respect to the natural hazard risk zones. This information was requested to further inform my review on whether their assessment is robust and whether it is feasible for the site to be developed.

- 25/8/2021 – Formal reply from Mark Lile presenting the additional information requested from Gina Sweetman in her letter dated the 3rd August which included the initial request for additional information sent on the 14/5/2021.

- 4/10/2021 – Mark Lile presented additional information from Mark Foley on behalf of Tonkin and Taylor which outlined that the subdivision would be tested against Section 106 of the RMA at the consenting

stage and therefore demonstrating details of how risk would be addressed was not required at the plan change stage.

- 6/10/2021 – An online meeting was held between Sarah Barrett and Dan Chamberose of Beca, Mark Foley of Tonkin and Taylor and Mark Lile of Landmark Lile Limited to discuss the outstanding request for further information on the geotechnical report.
    - Sarah Barrett discussed her concern regarding the lack of information on the risk assessment methodology and the need to test whether the assessment was 'robust' as part of the geotechnical review.
    - Mark Foley reiterated the assessment was based on engineering judgement and experience in the area and that the development would be tested against the RMA at the consenting stage.
    - Attendees agreed that Tonkin and Taylor would supply Beca with a more detailed summary and/or list of the steps followed in their assessment including descriptions of personal judgement criteria used to create the risk assessment maps.
- Further information to this effect was supplied by Tonkin and Taylor on 24 March 2022.

I have inspected the PPC28 area and discussed the potential geological hazards and geotechnical constraints to re-zoning and development with the Applicant's geotechnical specialist, Mr Mark Foley of Tonkin and Taylor Limited.

I have also reviewed third party submissions which put forward the view that further geotechnical assessment of hazards should be carried out now rather than waiting until resource consent stage.

The Applicant acknowledges the existence of areas of medium and high geotechnical risk within the PPC28 plan change area. In some cases, these areas coincide with areas proposed for residential zoning. It is my view that further assessment of geological hazards and geotechnical risk may be carried out at subdivision planning stage. Development layouts may then be progressively engineered to avoid, remedy or mitigate areas of geotechnical risk with the benefit of more detailed investigation and design than are appropriate or practical at the plan change stage. Regardless of zoning, development would not extend into areas where "avoidance" is shown to be the most appropriate course of action.

Myself and Mr Foley have agreed in a Joint Witness Statement that the subdivision stage is an appropriate opportunity to satisfy matters under s106 of the Resource Management Act 1991 (RMA) where significant risks from natural hazards must be taken into account, and where more detailed geotechnical assessments will be required to support resource consents for site development and individual subdivision applications. In combination with the natural hazard provisions of the NRMP, these requirements will ensure that the geotechnical risks are managed (avoided, remedied or mitigated) during the detailed assessment, design and construction phases of subdivision and development under the RM Act 1991

In my view the geotechnical assessment provided with the Application (and subsequent information) is at an appropriate level for the purposes of assessing the viability of a plan change. The assessment clearly identifies areas of medium and high geotechnical risk and acknowledges the need for further investigations in all areas at later development stages. I consider that the provisions of the RMA and NRMP which must be satisfied at resource consent stage are sufficient to require hazards to be further investigated such that they may be avoided, remedied or mitigated as development proceeds.

Yours sincerely,



Paul Horrey

Senior Principal – Engineering Geology

on behalf of

Beca Limited

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