

TAUPŌ DISTRICT PLAN

Under: the Resource Management Act 1991

In the matter of: **Proposed Plan Change 36**
Whareroa North – Rezone land from rural
environment to residential environment

REBUTTAL EVIDENCE (GEOTECHNICAL)

1. My full name is Maddison Thelma Phillips. I am a Geotechnical Engineer at WSP (previously Opus). I have held this position since 2017.
2. My understanding of matters raised through Proposed Plan Change (PPC36) is based on the following:
 - a. 19 October 2006, Site Assessment and Supplementary Geotechnical Engineering Appraisal Proposed Whareroa North Residential Subdivision, Hauhungaroa No. 6, Whareroa Road North, West Lake Taupō.
 - b. 18 October 2018, Whareroa North Subdivision: Verification of Geotechnical Constraints for Residential Development, (Cheal, 2018).
 - c. 26 September 2019, Whareroa North Preliminary Stormwater Assessment, Rev 4, (Cheal, 2019).
 - d. Additional information provided by the Proponent's planner via email on Thursday 9 April 2020.
 - e. Whareroa North Appendix 8, Outline Development Plan, Amended Provisions, Lewis Consultancy, 9 April 2020.
 - f. Meetings with the Proponents on 3 April and 7 April 2020.
 - g. Statement of Evidence by Michael Keys on behalf of The Proprietors of Hauhungaroa No. 6, 29 April 2020.
 - h. Statement of Evidence by Harshad Phadnis on behalf of The Proprietors of Hauhungaroa No. 6, 29 April 2020.
3. I provided expert evidence to accompany the Section 42A Report.

4. The purpose of this Rebuttal Evidence is to respond to the evidence of Mr Harshad Phadnis (geotechnical) and Mr Michael Keys (engineering).
5. I have read and I am familiar with the Environment Court's Code of Conduct 2014 for Expert Witnesses. For the purpose of this hearing, I agree to be bound by that Code of Conduct and have familiarized myself with the requirements as set out in the Code.

Summary of Evidence

6. In my evidence I identified the following concerns with the geotechnical information presented by the Proponent to date:
 - a. Information provided by the Proponent was not sufficient to determine the likely impact geohazards could have on future residential development, most notable the lack of deep geotechnical investigation;
 - b. I do not believe it is appropriate to investigate, assess and mitigate all potential geohazards through subdivision and building consent conditions.
 - c. In my opinion preliminary investigation and assessment of geohazards is required at the Plan Change stage, which is consistent with the guidance provided in the New Zealand Geotechnical Society (NZGS) and Ministry of Business, Innovation and Employment (MBIE) Earthquake Geotechnical Engineering Practice Guidelines.
 - d. Due to the information gaps it is not possible to determine realistic geotechnical costs associated with developing the land under a Residential Environment. If we simplistically assume a 'worst case' scenario the costs associated with geotechnical development of the land are likely to be significantly more than development of other greenfield sites of the same size not affected by similar geohazards.
7. I have reviewed the evidence prepared by Mr Phadnis, and identify the following:
 - a. *"I am confident that there is sufficient geotechnical information presently available to support the change for residential development"* [2.4 Phadnis].

No further investigation has been carried out since preparation of my evidence, and I therefore disagree with this statement.
 - b. *"Comprehensive geotechnical investigations are required before applying for subdivision consent. These investigations will enable us to determine whether*

any of the geo-hazards listed in Table 9.2 do pose a risk to the development and to provide solutions if they do.” [2.3 Phadnis].

I agree that comprehensive investigation is required to support a subdivision consent application, but in my opinion an initial investigation phase is required to confirm implications of geo-hazards at the Plan Change stage.

- c. *“...it is my opinion that the land affected by the Whareroa North proposal is not a “primary hazard zone” and the proposal will not create an “intolerable risk”.* [2.6 Phadnis].

I do not believe that sufficient investigation or assessment has been carried out to provide a factual basis on which to substantiate this opinion. Should any of the significant geohazards mooted as potentially affecting the site by the Proponent prove to affect the site, these could readily indicate that the site is in fact a ‘primary hazard zone’.

- d. *“Performing only one machine drilled borehole and four cone penetration tests will not provide information across the entire site as the soil strata is anticipated to vary to a certain degree across the entire site. Thus, we cannot discuss the effects of geo-hazards across the entire site based on one machine drilled borehole and four cone penetration tests” [9.5 Phadnis].*

I agree that the investigation proposed in my evidence is not sufficient to support subdivision design for the site, that was never stated as the intent.

The purpose of the investigation proposed in my evidence was clearly aimed at necessary geotechnical investigation to gather broadly spaced data points, formulate a high-level understanding of the subsoil conditions and provide a factual basis for confirming the site is suitable for residential development.

I believe this phased approach is consistent with standard, and indeed orthodox, industry process and is in line with current New Zealand geotechnical practice guidelines. Some deep testing, analysis and reporting is required to determine whether the tabled significant geohazards affect the site or not. The quantity and spatial distribution is up to the Proponent to devise such that they can determine with an appropriate level of confidence whether the site is affected by any of their mooted geohazards, and thus whether the site is suitable for residential development.

- e. *“...I believe the better stormwater management that will be incorporated into the development (compared with the status quo) will arrest the situation”* [9.8 Phadnis].

I agree that residential development of the land presents an opportunity to remove the issue contributing to the large scour if stormwater disposal is carefully designed. I also agree that additional geotechnical investigation and assessment is required before the most appropriate stormwater management approach is confirmed.

It is not yet possible to confirm that the site is suitable for stormwater disposal via soakage from a geotechnical point of view. Stormwater disposal to ground through soakage is closely linked to the boundary parameters of a number of the significant geohazards tabled by the Proponent. In almost all cases, disposal to ground (from newly established impermeable surfaces) would be highly likely to exacerbate the effects of those geohazards.

- f. *“I consider that pumiceous soils/ignimbrite can stand up very well at slopes of 1H:4V. If the cut heights are greater than 5m then benching with a minimum width of 3m should be utilised.”* [9.15 Phadnis].

I agree that this arrangement is typically appropriate in the Taupō region. Modelling presented in Appendix 11 of Mr Phadnis' evidence appears to show cut slopes in the order of 15m high. This is a significant undertaking, much larger than the slope pictures presented in Appendix 10 of Mr Phadnis' evidence and will require carefully considered assessment to ensure the future access road is not plagued with ongoing stability issues. Steep cut slopes in pumiceous soils will experience ongoing erosion and frittering of the slope face. Establishing and maintaining low vegetation growth to reduce the risk of erosion is a typical mitigation method, however this could be problematic on a south-east facing slope of this magnitude.

Issues in terms of process and implementation

8. I understand that the Proponent intends to carry out extensive geotechnical investigation after the Plan Change application has been approved.
9. The *'Proposed Development Geotechnical Investigation Location Plan'* presented as Appendix 12 of Mr Phadnis' evidence indicates the extent and type of investigation that is planned.

10. My opinion that an initial stage of investigation is required to inform the proposed Plan Change remains unchanged because:
 - a. Site specific evidence is required to confirm that the site is not a 'Primary Hazard Zone' nor creates 'intolerable risk' as per the Waikato Regional Policy Statement policies on natural hazards.
 - b. The purpose of an initial investigation is not to precisely define subsoil conditions nor to collect enough information from which to design a subdivision. The purpose of an initial investigation is to broadly identify subsoil and groundwater conditions and assess at a high level how geo-hazards are likely to affect the site. The initial investigation and assessment will undoubtedly be refined through further work prior to subdivision.
 - c. If investigation is carried out after the Plan Change is approved, and geotechnical issues that create 'intolerable risk' are identified, the residential zone will not be the most appropriate zone to give effect to Waikato Regional Policy Statement Objective 3.24(b) and Policy 13.1(a) and (c), nor achieve Objective 31.2 and associated policies of the Taupō District Plan.
11. I understand the difficulties of conducting a site investigation, and the Proponent's desire to 'do it once'. My expert opinion as to the need for an initial investigation phase to inform the Plan Change due to reasons outlined above, is also I believe ultimately of benefit to the Proponent. The initial phase could be carried out practically, in areas that are easiest to access and not within the SNA. The results of an initial phase could be used to inform a more targeted approach at subdivision stage and reduce the overall geotechnical investigation effort required.
12. There is a theme through the evidence of both Mr Phadnis and Mr Keys that engineering solutions are available to overcome any geotechnical issue that is encountered on site. While that could be true for almost any scenario, it does not address the shortcomings in the investigative process and reporting to date which are significantly at odds with both industry best practise and the most current and relevant guidelines pertaining to a plan change process. Overcoming geohazards such as these can be technically challenging and very costly, which can significantly alter the economic viability of development.
13. An appropriately staged investigation and reporting phase is intended to inform all parties so that decisions can be made based on the risks at a particular stage. Currently there are multiple significant potential geohazards mooted by the Proponents as potentially affecting the site. Should these geotechnical issues be realised during later project stages

as the Proponent is suggesting, it could be quite a conceivable result in the fact that the site was not actually suitable for residential purposes.

14. A suitable investigation and reporting process is relatively straight forward and would rapidly answer whether the site is subject to any of the Proponent's tabled significant geohazards and thus whether the land is suitable for re zoning to residential environment.
15. **In conclusion**, based on the current lack of geotechnical information presented my position on the Plan Change application remains unchanged.

Dated 15 May 2020

A handwritten signature in black ink, appearing to read 'Maddison Phillips', written in a cursive style.

Maddison Phillips