

Whareroa North Proposed Plan Change 36

Joint Witness Statement – Geotechnical

Date: 03 June 2020

Venue: Via Zoom

Witnesses present:

Harshad Phadnis, Cheal Consultants

Maddison Phillips, WSP

Ian Gray, WSP

Mike Keys, KeySolutions

Environment Court Practice Note:

It is confirmed that all present:

Have ready the Environment Court Practice Note 2014 Code of Conduct and agree to abide by it.

And in particular:

Have read the Environment Court Practice Note 2014 in respect of Appendix 3 – Protocol for Expert Witness Conferencing and agree to abide by it.

1. Agenda for the expert witness conference

Geohazards

- Potential geohazards that could influence the site
 - Likelihood of such geohazards
 - Whether risks of geotechnical hazards can be ascertained using current information on site
- Whether any potential geohazards could prevent rezoning.
 - Can all geohazards to be investigated/assessed/mitigated through subdivision and building consent conditions
 - Are there any potential geohazards that cannot be mitigated?
 - Issues associated with undertaking all geotechnical investigations as 'one campaign' during the preliminary stage.
- Likelihood of “best-case” or “worst-case” scenario
 - Suitability of site for residential development if “worst-case” encountered

WRPS

- Policy 13.1 (a) and (c)
- Policy 13.2

Costs of Geotechnical Investigation

- Relevance of costs to rezoning proposal.

Liquefaction

- Likelihood of “worst-case” liquefaction scenario (TC-3) at proposed plan change site
- Implications of liquefaction and lateral spread for rezoning proposal.

Earthworks

- Relevance to rezoning proposal.

Scar Feature and Stormwater Design

- The issues relevant to rezoning.
 - Options for managing stormwater
 - Potential for positive outcomes from residential zoning.
 - Timing of stormwater design and infrastructure.

Stability

- Appropriate method to address stability issues raised in respect of proposed access road
- Potential for and implications of compressible soils and land instability associated with the “bowl”.

2. Materials used/referred to include:

The following documents were referred during the expert witness conference.

- Ref 2.1: Mitchell, M.T. (19 October 2006). Site Assessment and Supplementary Geotechnical Engineering Appraisal – Proposed Whareroa North Residential Subdivision – Hauhungaroa No. 6, Whareroa Road North, West Lake Taupo. Ref. T – 9036/1. Mark T Mitchell Limited.
- Ref 2.2: Phillips, M. and Gray, I. (31 March 2020). Proposed Plan Change 36 – Whareroa North – Initial Geotechnical Review. Ref. 2-37780.00. WSP Opus.
- Ref 2.3: Phillips, M. (22 April 2020). Statement of evidence for the Taupo District Council (Geotechnical). WSP Opus.
- Ref 2.4: Phadnis, H. (29 April 2020). Statement of evidence on behalf of The Proprietors of Hauhungaroa No. 6. Cheal.
- Ref 2.5: Phillips, M. (15 May 2020). Rebuttal evidence (Geotechnical). WSP Opus.

3. Agreed Issues/Resolved Issues – Specific issues which are agreed between the experts

- It was agreed that all geo-hazards that can potentially affect the site have been identified in Section 9.2 of Ref. 2.4 and the geotechnical investigation plan presented in Attachment 12 of Ref. 2.4 is comprehensive.
- It was agreed that adequate geotechnical investigation is required to assess geo-hazards identified for the site and to determine appropriate mitigations. It is agreed that the geo-hazards identified for the site can generally be mitigated through engineering, albeit there is potential for those solutions to be complex and costly.
- It was agreed that risk posed by expansive soils, soil contamination, and presence of uncontrolled fill (if any) can be mitigated through engineering.
- It was agreed that the risk of inundation and groundwater flooding must be considered. It was agreed that this risk can be mitigated through engineering.
- Waikato Regional Council's map that identifies large and small geothermal systems has been presented in Attachment 1. Based on this, risk posed by corrosive soils, geothermal eruptions, geothermal gas and geothermal subsidence is anticipated to be low.
- It was agreed that some earthworks will be required at the site, as is typical with development of land. It was also agreed that there is not enough geotechnical investigation or assessment available at this stage to provide any detail on the likely extent, volume or level of earthworks required for the general development of the site. Details related to earthworks are not considered necessary at the Plan Change stage.

4. Unresolved Issues – Specific issues not agreed between the experts and reasons

- Harshad Phadnis notes that in an ideal scenario, geotechnical investigations would have been performed at the plan change stage. Performing investigations will require some vegetation to be cleared and tracks being established using diggers and other construction equipment. Some areas, along the proposed access road and near the bridge, are classified as Significant Natural Areas (SNA) and hence will require a resource consent to be granted before any activity is undertaken in those areas. Hence, Harshad Phadnis considers it reasonable to perform all investigations in one campaign during the subdivision consent stage. Maddison Phillips considers that there's not enough information to determine the likely impact of geo-hazards on the proposed development and it is not appropriate to investigate, assess and mitigate all potential geo-hazards through subdivision and building consent conditions and hence, some investigation and assessment must be done at the plan change stage. It was noted that Resource Consent would not be required to carry out preliminary geotechnical investigation over a large proportion of the proposed development site and creating access tracks to enable investigation is not unusual.
- Maddison Phillips considers that as enough geotechnical investigations and analyses have not been completed, no comment can be made on the likelihood of geo-hazards.
Harshad Phadnis considers that all geo-hazards that can potentially affect the site have been identified in Section 9.2 of Ref. 2.4 and based on details provided in Section 9 of Ref. 2.4, comments on the likelihood of these geo-hazards can be made. Additionally, typical and worst-case scenario and related mitigation solutions which are used routinely by professional engineers in the area have been summarised in the table presented in Section 12.1 of Ref. 2.4, and hence, the site and access corridor is or can be made to be suitable for residential development.
- Harshad Phadnis considers that risk posed by settlement including differential settlement) due to compressible soils, settlements in fills (if any), slope instability, the scar feature and stormwater design can be mitigated as mentioned in Sec 9 of Ref. 2.4.
Maddison Phillips considers that preliminary geotechnical investigation is required so that the likelihood, magnitude and extent of the compressible soils issue can be understood at the plan change stage. High level mitigation solutions based on factual information, specific to the site, could then be identified to ensure that future residential development of the site does not create intolerable risk.
- Harshad Phadnis consider that the groundwater level will be controlled by the Whareroa Stream at approximately RL 360m whereas the proposed lots are on an elevated terrace ranging approximately from RL 395m to RL 420m. The groundwater level under the proposed lots will therefore be approximately 35m deep. Therefore, saturated conditions which are necessary to cause liquefaction are not expected in the top 35m of the soil profile so liquefaction, flow liquefaction and lateral spreading are not anticipated to occur. Effects of any liquefaction below this depth will be negligible.
Maddison Phillips considers that as no geotechnical information or assessment is available, depth to saturated soils is not known and hence, no comment

made on the likelihood of liquefaction, flow liquefaction and lateral spreading. The potential for a perched water table within the bowl was identified in the Geotechnical Verification Letter prepared by Cheal in 2018.

- Even though it was agreed that all the tabled geo-hazards can potentially be mitigated, Maddison Phillips considers that assuming worst case scenarios leads to a conclusion that costs associated with development of this site are likely to be significantly more than development of other greenfield sites. Harshad Phadnis considers that expenses related to developing the site is the developer's prerogative.
- Harshad Phadnis considers that as all geo-hazards that can potentially affect the site and potential mitigations for the worst-case and expected scenario have been identified in Section 9 of Ref. 2.4, the assessment is as per Policy 13.1 (a) and (c) and Policy 13.2 of the Waikato Regional Policy Statement. Maddison Phillips considers that there is not sufficient geotechnical investigation or assessment to confirm if the proposed zone change is aligned with Policy 13.1 (a) and (c) and Policy 13.2 of the Waikato Regional Policy Statement.

5. Summary of discussion & positions on Geotechnical Considerations

It was agreed by Harshad Phadnis and Maddison Phillips that all geo-hazards that can potentially affect the site have been identified and that the geotechnical investigation plan presented in Attachment 12 of Ref. 2.4 is comprehensive.

Harshad Phadnis notes that in an ideal scenario, geotechnical investigations would have been performed at the plan change stage. Performing investigations will require some vegetation to be cleared and tracks being established using diggers and other construction equipment. Some areas, particularly along the proposed access road and near the bridge, are classified as Significant Natural Areas (SNA) and hence will require a resource consent to be granted before any activity is undertaken in those areas. Hence, Harshad Phadnis considers it reasonable to perform all investigations in one campaign during the subdivision consent stage.

Maddison Phillips considers that there is not enough information to determine the likelihood, magnitude, likely impact or suitable mitigation methods of geo-hazards on the proposed development and it is not appropriate to investigate, assess and mitigate all potential geo-hazards through subdivision and building consent conditions and hence, preliminary investigation and assessment should be done at the plan change stage.

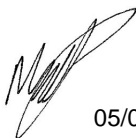
It was agreed that all geo-hazards can potentially be mitigated. Maddison Phillips considers that, assuming worst case scenarios in all cases leads to a conclusion that costs associated with development of this site are likely to be significantly more than development of other greenfield sites. Harshad Phadnis considers that expenses related to developing the site is the developer's prerogative.

Signatures:

Harshad Phadnis

05/06/2020

Harshad Phadnis



05/06/2020

Maddison Phillips

ATTACHMENTS:

1. Geothermal Systems Map – Waikato Regional Council.

Attachment 1: Geothermal Systems Map – Waikato Regional Council.



Ref. Geothermal systems map. [Online]. Waikato Regional Council. Available: <https://www.waikatoregion.govt.nz/environment/natural-resources/geothermal/geothermal-systems-map/>. [Accessed on 03 June 2022].