



22 September 2023

Hilary Samuel
Taupō District Council
30 Tongariro Street
Taupō, 3330

Plan Change 42 – Te Tuhi – Initial Geotechnical Review

2-38030.00

Dear Hilary,

I understand that Plan Change 42 proposes to split the existing Rural Environment defined within the Taupō Operative District Plan (ODP) into General Rural and Rural Lifestyle Environments. Currently, there is no spatial provision for lifestyle or rural-residential development within the ODP. Decisions about development, until now, have been made during the resource consenting phase depending on the suitability of each application received.

I understand that a Section 32 process has been completed for Plan Change 42 and a hearing was held on 21-24 August 2023. As part of this process, a submission was received that sought to re-zone 387 Whakaroa Road to Rural Lifestyle. This site would be zoned General Rural under the proposed Plan Change 42.

WSP has been engaged by Taupō District Council (TDC) to review geotechnical elements relating to the Te Tuhi proposal. WSP has specifically been asked to comment on the completeness of geotechnical assessment completed by Te Tuhi to date. WSP has not had any prior involvement in Plan Change 42.

Te Tuhi Proposal

The Te Tuhi Precinct is located at 387 Whakaroa Road (legally described as Lot 2 and Lot 4 DP 408156). The site is located within the western bays of Lake Taupō. Te Tuhi is described as an integrated subdivision, that includes plans for a tourism lodge complex, equestrian centre, and clustered rural lifestyle sections.

The current proposal consists of 112 rural-residential lifestyle lots that generally range in size from 2,000m² to 5,000m². It also includes a lodge, associated chalets, an equestrian centre, a restaurant, café bar, wellness centre and chapel. The site is accessed off Whakaroa Road, and the proposal sets out a private roading and water infrastructure network within the precinct.

Information Reviewed by WSP

WSP has completed a high-level review of the Te Tuhi proposal based on the following documents that were supplied by TDC:

- Infrastructure Report, Te Tuhi Estate, Envelope Engineering, 10 August 2023, ref: 1671-01
- Civil Drawings, Te Tuhi Estate, Envelope Engineering, R1, 10 August 2023, ref: 1671-01

Section 2.1.1 of Envelope Engineering's Infrastructure Report refers to geotechnical investigations completed by Core50. The Infrastructure Report also states that building platforms have been positioned in accordance with recommendations by Core50. Reporting by Core50 nor any other geotechnical engineering assessment has been provided to TDC as part of the Plan Change 42 submission process. It is understood that TDC has requested this referenced Geotechnical Report, but the report has not been shared with TDC as of the date of this letter.

Geotechnical Observations

Given the lack of geotechnical assessment, review comments are limited to the information available in the Infrastructure Report and Civil Drawing set. The following observations have been made:

- Fault avoidance zones are shown on the Civil Drawing set. These appear to be consistent with GNS's report titled Active Fault Hazards in the Taupō District (August 2020) however this is not explicitly stated. The proposed internal roading network and shared path cross fault avoidance zones at multiple locations. Proposed building platforms are all located outside of the mapped fault avoidance zones, although many building platforms are located directly on the edge of the fault avoidance zones.
- Significant earthworks are proposed over the site. Earthworks plans show cut and fill depths to 5m, although typically less than 3m. Some very steep cut slopes, in the order of 1H:10V (85 degrees) are proposed to construct the internal roading network. Typical sections across the residential lots are not included in the drawing set, so it is unclear how slope stability may or may not impact building platforms. There are no statements to support a specific earthworks methodology, nor any description of specific site stability risks.
- Section 5.5 of the Infrastructure Report states that 'ground conditions are permeable with low groundwater' and that stormwater soakage devices are located away from any stated geotechnical setbacks or other identified geotechnical hazards. Geotechnical setbacks, however, are not defined anywhere in the report. Private disposal of stormwater on residential lots is proposed, and roadside swales will be directed to 'appropriate discharge points'. Stormwater outlets are shown on the Civil Drawings but it is not clear if these outlets have been located with input from a geotechnical engineer.

Recommendations

Although Submission 74 seeks rezoning to Rural Lifestyle, I understand this to have a proposed non-complying activity status below 2Ha. The Te Tuhi proposal, through its precinct plan, has a density more akin to low density residential (at between 2,000 m² - 5,000m²). I also understand the proposed Rural Lifestyle subdivision rules within Plan Change 42 include matters of control for assessing hazards (matters b and g associated with rules 4b.5.2 and 4b.5.3). However, because the Te Tuhi proposal has its own subdivision rule (4b.5.10) it defaults to discretionary if it is in accordance with the Te Tuhi Precinct Plan. There are no specific geotechnical provisions for the Te Tuhi site.

Further to the point above, with a 2-4Ha site (as proposed within Rural Lifestyle by Plan Change 42) there is some flexibility to move building sites to avoid hazards. With a 2,000 m² - 5,000m² site, there is much less flexibility when positioning building sites. My understanding of the subdivision rule as proposed by Submitter 74 means that the

development needs to be in accordance with the Te Tuhi Precinct Plan to be discretionary, otherwise it defaults to non-complying. Without sighting the Geotechnical Assessment Report there is no certainty that the proposed building sites would be suitably located in geotechnical terms, and therefore be able to remain in accordance with the Precinct Plan.

Generally, a Geotechnical Assessment Report prepared by a suitably qualified Geotechnical Engineer would be required to support a change of land use as proposed by Te Tuhi. The geotechnical assessment should include a detailed site description, desktop study to understand the geological setting of the site and an assessment of the site's susceptibility to the following geotechnical risks (as a minimum):

- Earthquakes (fault rupture, liquefaction, lateral spreading)
- Slope stability
- Presence of soft soils, historic fill or deep organics
- Expansive soils
- Hot ground
- Subsurface erosion (i.e. tomos)

The report must also provide recommendations for the proposed development, with a particular focus on how the geotechnical risks identified above can be mitigated to a tolerable level. Based on WSP's high level review of the site, understanding the risk of fault rupture, slope stability and potential for subsurface erosion is critical for the proposed development – all these hazards have the potential to create intolerable risk.

The Geotechnical Assessment Report should also be informed by geotechnical investigation in accordance with guidance provided in the New Zealand Geotechnical Society (NZGS) and Ministry of Business, Innovation and Employment (MBIE) Earthquake Engineering Geotechnical Engineering Practice Guidelines Module 2, dated November 2021. Recommended minimum deep geotechnical investigation intensity to support a change of land use is provided in Table 2.1 and 2.2 of Module 2. Some judgement will be required to determine an appropriate level of investigation for Te Tuhi, given the density of development proposed is greater than 'rural-residential' as defined in Module 2.

Without the above recommended assessment, it is not possible to confirm that the proposal is consistent with the ODP policies and objectives relating to natural hazards – specifically 31.2.1 (*Protection of activities, development and life from the adverse effects of natural hazards*) and 31.2.2 (*Activities and development do not create, accelerate, displace, or increase the effects of a natural hazard*) and the associated policies. WSP is unable to comment on the site's suitability for the Te Tuhi development at this stage.

Regards



Maddison Phillips
CPEng (Geotechnical)