Kurt Bowen

Subject: FW: 177 Tomahawk Road

From: Mark Walrond <mwalrond@geosolve.co.nz>
Sent: Friday, 5 August, 2022 3:23 PM
To: Kurt Bowen <Kurt.Bowen@ppgroup.co.nz>
Cc: Andrew Robinson <Andrew.Robinson@ppgroup.co.nz>
Subject: RE: 177 Tomahawk Road

Hi Kurt and Andrew,

As discussed, we understand that Dani Nicolson is seeking to include 177 Tomahawk Road as part of the 2GP Variation 2 (Greenfields) process. We have previously provided a preliminary geotechnical appraisal of the site based on an engineering geological assessment and desktop review of hazards (ref. 210891, dated 14 Dec 2021). Please refer to that report for further details.

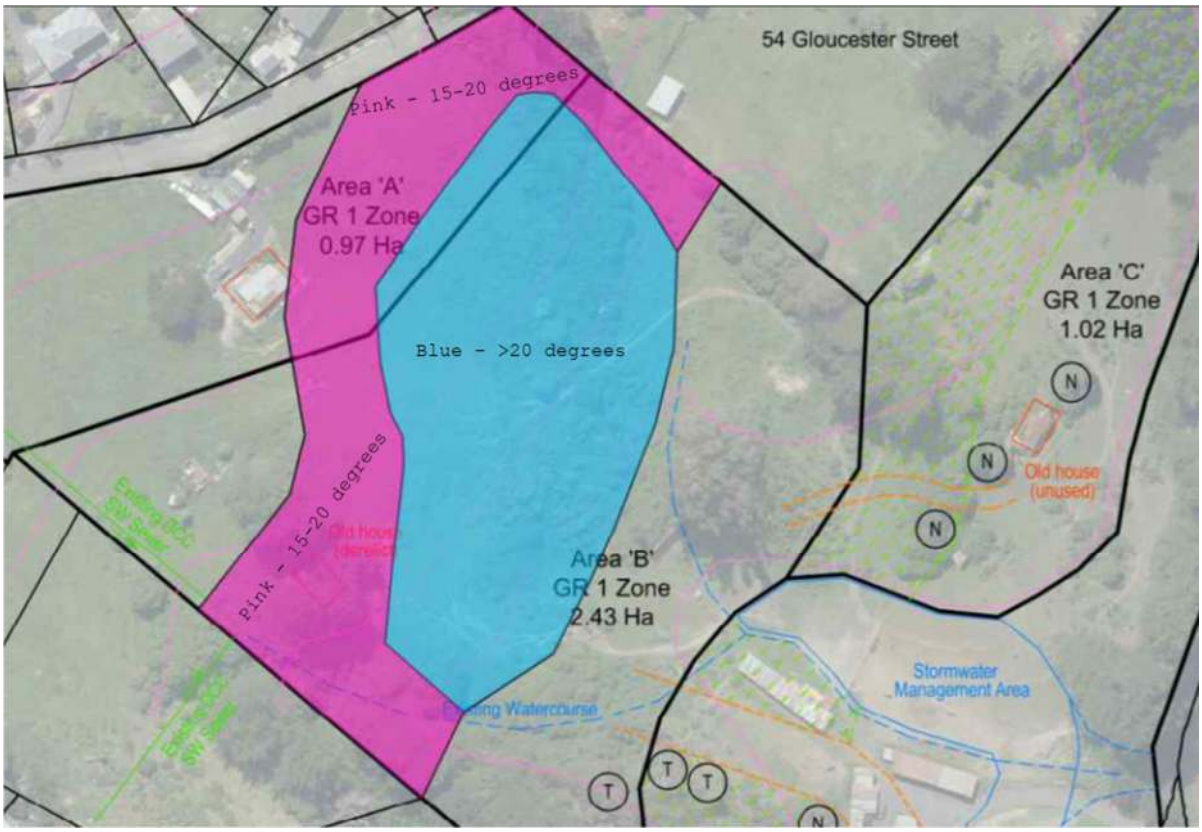
We have also now reviewed evidence provided by Stantec NZ Ltd (Council's geotechnical advisor) and this email provides a response to some concerns that have been raised.

Stantec assess the site as high level hazard and the main concerns are as follows:

1. *Liquefaction Domain C risk on the flats – settlement and lateral spread risks.*
2. *Land instability (landfill) on the flats.*
3. *Although not listed as a hazard, the slopes are very steep and are likely to present land stability risks with such a dense format as GR1. Stantec consider that global stability of slopes >20 degrees could be affected by development, especially earthworks and groundwater changes.*

We have reviewed the proposed structure plan (Paterson Pitts ref. 177 Tomahawk, 19/07/2022), and the following provides comment to address the concerns noted above (in the same numerical order):

1. The structure plan shows that the Domain C liquefaction risk awareness area coincides with Development Area D which will be a recreation area only as well as a proposed legal road. The access road will occupy the western-most extents of Domain C. Liquefaction risks can be mitigated by undercutting and replacement of susceptible soils or other engineering solutions if liquefaction risk to the accessway is a credible constraint (i.e. if proven to be applicable following subdivision geotechnical investigations and analysis).
2. The landfill areas are not expected to be part of the residential development areas and these can be managed as recreation areas. No significant geotechnical considerations are likely to apply to this area.
3. There are no known mapped landslides on the site and no instability was observed during our assessment. We have also reviewed stereoscopic aerial photography which confirms no landslips are present on site in 1947 (Run: SN399 Run S-60). The slopes are steep however a significant area of the site that is proposed for residential development (Areas A and B) is likely to be relatively straightforward for development (e.g. including all of the pink area below which slopes at between 15-20 degrees and the upslope remainder at lesser angles). The blue area slopes at greater than 20 degrees, however provided that rock is present and that foundations are specifically engineered, some residential development in this area is also likely to be possible. The accessway will need to traverse some relatively steep slopes, however there are solutions to enable a sidling road alignment with retaining structures.



In conclusion, there are no major constraints apparent within A and B at this stage, apart from some localised steep land. Although geological investigations have been suggested by Stantec as a requirement to determine the suitability of the site at this stage, we consider that there is no evidence to suggest a high risk of global instability, provided that the subdivision is carried out with detailed geotechnical investigation and advice. Engineering solutions are readily available to enable development on slopes up to 20 degrees and even steeper in some cases, especially where volcanic rock is present.

It will need to be acknowledged that there would be some areas within Area B that will need more detailed geotechnical investigations and specific engineering (we understand that the Structure Plan could contain a rule that requires a more comprehensive property-wide geotechnical investigation prior to the first subdivision).

Let me know if you have any questions.

Regards
Mark

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