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14 May 2025

Far North District Council
Private Bag 752
Kaikohe 0472

Attention: Theresa Burkhardt

Dear Theresa

Re: Hearing 10 – Peer Review of Vision Consulting Engineers *High Level Civil Engineering Assessment*, Tapuaetahi Development, prepared for Tapuaetahi Incorporation

Introduction and Scope

Haigh Workman Ltd has been engaged by Far North District Council to carry out a peer review of Vision Consulting Engineers *High Level Civil Engineering Assessment*, Tapuaetahi Development, prepared for Tapuaetahi Incorporation ("the Vision report") which was submitted as evidence to Hearing 10 - Māori Purpose Zone & Treaty Settlement Land Overlay.

The specific objective of the peer review is to provide Council's reporting planner with sufficient understanding and confidence that the scale and development proposed by the report is appropriate for the site and location given that it is a *'high level civil engineering assessment to identify potential challenges and opportunities for the subdivision layout'* and to ensure that the servicing options are reasonably practicable.

The scope of the Vision report and this peer review includes consideration of the following engineering elements relating to land use feasibility for development of 18 to 22 allotments on Lot 1 DP 1847896 shown on the Littoralis concept plan dated 19/12/2024 ("the Site" or "the concept plan") and appended to the Vision report:

- Geology and geomorphology
- Natural hazards
- Geotechnical considerations
- Stormwater management
- Wastewater management
- Water supply and firefighting, and
- Internal Access

The access section of the Vision report only addresses internal access within the Site. Within the scope of this review we have therefore also included consideration the Site access from Taronui road and the vehicle crossing onto Pururua road. A site visit has not been conducted as part of this peer review.

Geology

The geology of the Site is mapped as Kerikeri volcanic group[1]. The residual soils are mapped as Otaha clay / Otaha Gravelly clay which is described as imperfectly to poorly drained or Okaihau gravelly friable clay which is described as well to moderately well drained[2].

The mapped geology is consistent with our observations of the columnar basalt cliffs which form the steep bluff behind the coastal settlement of Tapuaetahi. It is likely that the Site comprises residual soils of the Kerikeri volcanic group overlying basalt rock in accordance with geological mapping.

Geomorphology

The Site is located on a flat to gently sloping plateau, with the following features mapped from LiDAR data:

- Steep bluff below the Site to the northwest (being the columnar basalt observed behind the coastal settlement of Tapuaetahi)
- Moderate to steep slopes to the northeast, being a bush clad gully which descends down to Waiotaia Stream

It is noted that the moderate to steep slopes below the Site show signs of historic land instability and that moderate slopes within the site exhibit signs of shear creep within the upper soil mantle (terracettes etc).

Natural Hazards

The Vision report identified that there are no mapped natural hazards (landslide, river and coastal flooding) which impact the Site. However, coastal flooding risk has been identified as potentially impacting the coastal settlement of Tapuaetahi, and river flood hazards within the Waiotia stream downstream of the Site.

The mapped flood hazard of Waiotia stream follows the stream alignment to the outlet at the north end of Tapuaetahi beach where it is indicated that buildings located at 45 and 46 Taronui Road may be prone to flooding in the 10-year, 50-year and 100-year plus climate change events (see Figure 1).

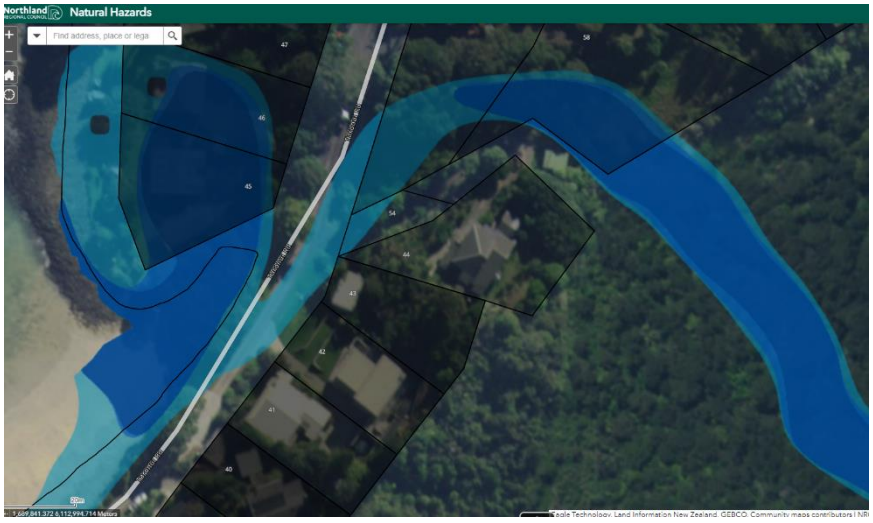

Figure 1: Mapped flood hazard downstream of Site

[1] Geology of the Whangarei Area (Ebrooke and Brook et al 2009)
[2] Landcare Research (Harmsworth, 1996)

Geotechnical Considerations

The Vision report includes an assessment of land which may be susceptible to instability based upon slope gradient and observed features. The moderate to steep slopes to the northeast and northwest of the Site have been mapped as a high risk of instability. Moderate gradients within the site have been mapped as a medium instability risk where terracettes have been observed. Flat to gently sloping areas have been mapped as low instability risk.

A 10 m building restriction line has been adopted to provide a minimum building setback from the crest of high to medium instability hazard slopes.

All of the building platforms have been located on low hazard areas, and outside of the 10 m setback line adopted. A detailed geotechnical assessment is required for the development, however it is likely that stable building platforms are able to be demonstrated and/or created.

Stormwater Management

The Site naturally drains to the northeast into the bush clad valley of Waiotia stream where stormwater promulages before discharging to the sea at the north end of Tapuaetahi beach. As 45 and 46 Taronui Road are potentially impacted by river flooding downstream of the site, a detailed stormwater assessment will be required to ensure that downstream flood hazards are not worsened[3]

Low Impact stormwater design is recommended in the Vision report. Consideration to point of discharge will be required to ensure slope stability risk is not worsened. Subject to future detailed design and consent processes, it's likely that appropriate stormwater management can be achieved to avoid any adverse effects.

Wastewater Management

At the time of future development, each site will need to be serviced by a wastewater management system that complies with the Northland Regional Plan. A central policy of the Regional Plan is that overall water quality is maintained. Wastewater systems that comply with the Northland Regional Plan are not to result in any off-site environmental effects.

Due to the soil conditions and available technology, one option for wastewater management systems is for drip irrigation of secondary treated effluent. The Vision report estimates an occupancy of 6 persons per dwelling and a design loading rate of 180 L/person/day which results in a average daily loading rate of 1,080 litres/day. The disposal area has been assessed based upon the mapped geology with a design irrigation rate of 3 mm per day which results in a 360 m^2 disposal area per dwelling. In addition, a 50 % reserve are of 180 m^2 has been adopted, resulting in an aerial requirement of 540 m^2 per dwelling.

[3] Rule C.6.4.2 of the Regional Plan for Northland (operative in part), provides for the diversion and discharge of stormwater from a public stormwater into water or onto land from an impervious area or by way of a stormwater collection system, is a permitted
activity, provided (amongst other conditions)
2*) the diversion and discharge does not cause or increase flooding of land on another property in a storm event of up to and including a 10 percent annual exceedance probability, or flooding of buildings on another property in a storm event of up to and including a one percent annual exceedance probability, and*
6*) the diversion and discharge does not cause permanent scouring or erosion of the bed of a water body at the point of discharge.*

Due to the clustered building platforms which limits available disposal area on a site by site basis, an option of a clustered wastewater system has been considered by Vision. The required disposal area has been assessed at 360 m^2 x 22 = 7,920 m^2 plus 3,960 m^2 (50 %) reserve. The location of suitable disposal field is indicated in Figure 12 of the Vision report which appears to be located outside of the nominated building locations indicated on the concept plan.

If a clustered wastewater system is adopted it will likely exceed the maximum permitted discharge of 2,000 litres/day under the Regional Plan. All other rules may be complied with. Future detailed design and consenting processes will ensure appropriate assessment of any such discharges. It is likely future wastewater systems will be able to achieve a good level of compliance with the Regional Plan.

Water Supply and firefighting

The Vision report advises that water will be collected from building roofs. For roof water collection, a typical water supply is likely to comprise three 25,000 litre water tanks per dwelling (a total of 75,000 litres), to provide an adequate supply of potable water and dedicated firefighting storage. The storage requirements for water supply and firefighting can be secured by future detailed design work, however it is likely that water supply is not a constraint on the proposed rezoning.

Site Access

Access to the Site is off Taronui Road. Taronui Road is a private road formed on Lot 1 DP 1847896 with a gated entry and vehicle crossing at Purerua Road. The formation of Taronui road from the entrance to the Site comprises a rural road formation with a sealed carriageway of approximately 5 m width.

Taronui road currently provides access to 59 allotments within the coastal settlement of Tapuaetahi. It is assumed that access within the Site is intended to remain private. An appropriate formation would likely comprise a minimum 5.5 m wide carriageway width to accommodate the proposed development[4].

It is assumed that the existing vehicle crossing onto Purerua road will be retained. There is approximately 190 m sight distance to the south (see figure 2 and 3) and 500 m to the north from the existing vehicle crossing.

[4] FNDC Engineering Standards Table 3-16 Mimimum Width Requirements – Private Access stipulates a minimum 5.5 m surfacing width plus 0.5 m wide shoulders for 6-8 household Units. NZS4404:2010 *Land Development and Subdivision Infrastructure* Table 3.2 Road design standards Figure E3 similarly recommends a minimum 5.5 m carriageway plus a 0.5 m wide shoulder for 1 to 20 dwelling units (~ 200 vehicles per day), with the shoulder increased to 1.0 m width for 1 to 150 dwelling units (~ 1000 vehicles per day).

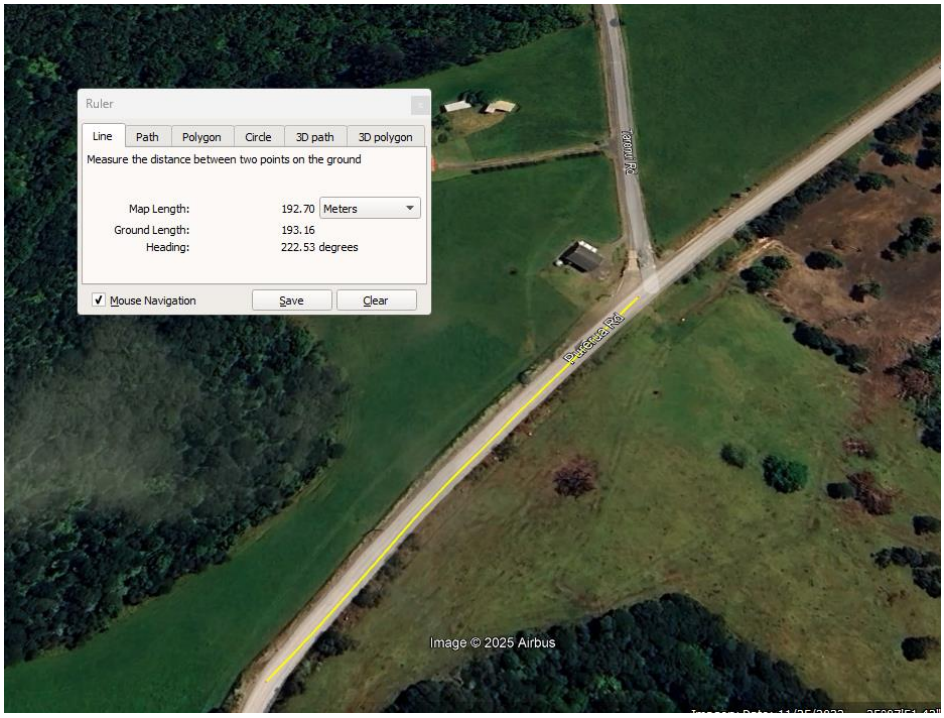

Figure 2: Sight distance to the south (source: google maps)

Figure 3: Site distance to the South (source: google street view)

According to Mobile Roads[5] the Average Daily Traffic on Purerua road north of the vehicle crossing is 107 vehicles per day, and south of the crossing is 734 vehicles per day. This section of Purerua road is an unsealed and is defined as a secondary collector to the south, and access (low volume) to the north.

According to NZTA MegaMaps 2024 Edition[6] the posted speed limit is 100 km/h. The minimum sight distance recommended for a posted limit of 100 km/h in the Proposed District Plan / 2023 Engineering

[5] https://mobileroad.org
[6] MegaMaps | NZ Transport Agency Waka Kotahi

standards is 195 m for a low volume access, or 210 m for a secondary collector. However, FNDC speed limit changes rolled out in 2024 indicate that Purerua road from 100 m before Te Tii Road to the end is reduced from 100 km/h to 60 km/hr, for which the minimum sight distance reduces to 85 to 90 m. Whilst the Proposed District Plan relies on posted speed limit for determining safe sight distance, Operating speed based upon a traffic survey will likely be the governing criteria for determining safe sight distances.

An Integrated Transport Assessment is required to determine any safety issues and upgrade requirements for the development, however it is likely that safe access is able created to support future development.

Internal Access

It is assumed that internal access will also be private. The main access link within the Site comprises a 5 m carriageway, with spines of 3 m width where serving 1-3 dwellings. These widths are typical to the Operative District Plan for private access, however they may require some additional width to comply with the Proposed District Plan and 2023 Engineering Standards. Due to the gradient and number of lots served the accessway will likely need to be sealed.

The proposed vehicle crossing location may not provide adequate sight distance to the north and repositioning may be required. A more suitable location may be available 90 m to the south of the currently drawn position (see Figure 4).

The location of the vehicle crossing indicated on the concept plan will require consideration as part of the Integrated Transport Assessment. Again, it is likely that safe access is able to be created to support future development.

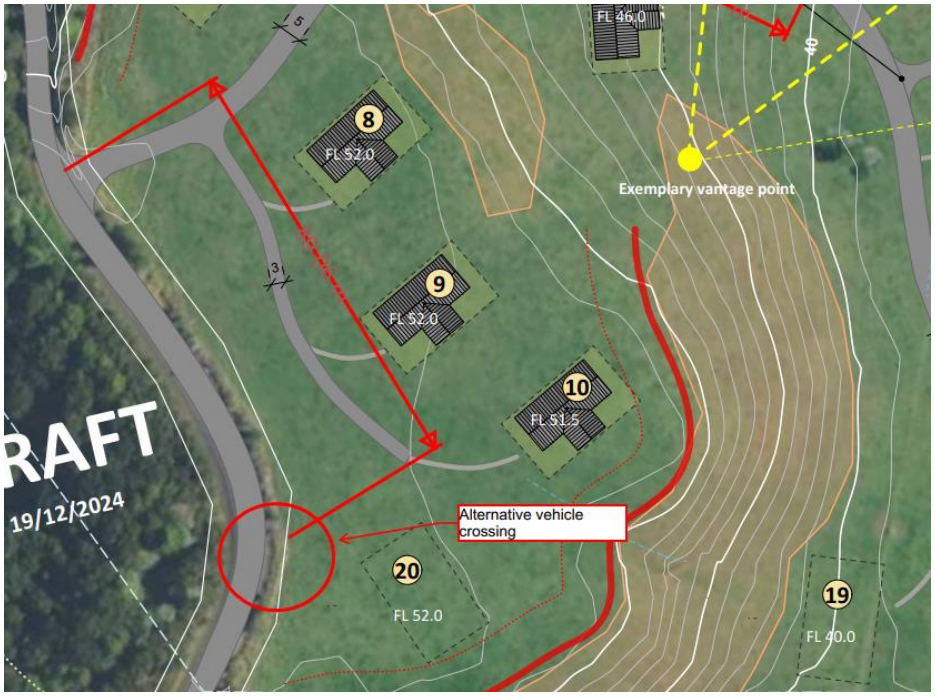

Figure 4: Alternative vehicle crossing to Taronui Road.

Conclusions and Recommendations

The geology of the site is mapped as Kerikeri volcanic group which is a low hazard geology unit. The concept plan includes the identification of house sites on gently sloping land that has been ranked as a low risk of being susceptible to instability, together with allowance of a 10 m setback from moderate to steep slopes. It is likely that stable building platforms can be demonstrated as part of a detailed geotechnical assessment for the Site.

It is likely that future stormwater and wastewater management systems servicing development can be managed to comply with the requirements of the Regional Plan. Stormwater management will need to ensure that site stability is maintained, and that downstream flooding isn't worsened. If a clustered wastewater system is adopted, it will likely exceed the maximum permitted discharge of 2,000 litres/day under the Regional Plan. All other rules may be complied with.

Water supply may be via roof water collection. It is unlikely that water supply is a constraint on the development.

Access to the Site is via Taronui Road, which is a private road with a crossing place on Purerua road. It is likely that safe access to the site can be formed to the requirements determined by an Integrated Transport Assessment.

Detailed mitigation measures can be considered through the plan change provisions and/or subsequent consent processes.

Disclaimer

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Yours faithfully

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