

4 June 2025 Job No: 1097366.0000

Kāpiti Coast District Council 175 Rimu Road Paraparaumu 5032

Attention: Alfred Lison and Aastha Shretha

Dear Alfred and Aastha

Geotechnical Compliance Review 100 and 110 Te Moana Road, Waikanae

1 Summary

Geotechnical compliance review: Private plan change consent application (change from General Rural to General Residential Zone)

Consent Number: not provided

Legal description: LOT 1 DP 71916 and LOT 2 DP 71916 C/T 44C/426 PT SUBJ TO QE II OPEN SPACE COVENANT

Application documents reviewed:

Geotechnical aspects of the following documents have been reviewed.

- Proposed plan change to the Kāpiti Coast District Plan and Section 32 assessment dated 6 May 2025 prepared by Mitchell Daysh Limited.
- Geotechnical assessment report dated 2 May 2025 prepared by CGW Consulting Engineers.
- Infrastructure assessment report dated 3 April 2025 prepared by Cuttriss Consultants Ltd.
- Flooding assessment memo dated 13 March 2025 prepared by Awa Environmental Limited.
- Soil report dated February 2023 prepared by Land Vision Ltd.
- Concept plans dated 25 November 2024 prepared by Wayfinder.

2 Background

Tonkin & Taylor Ltd (T+T) completed a pre-application review as requested by Kāpiti Coast District Council (KCDC) in late 2024/January 2025. Our comments were summarised and presented in a letter dated 31 January 2025 (T+T reference no. 1097366.0000).

This letter presents our geotechnical comments on the documents submitted for the formal lodgement of the Private Plan Change (PPC) application. This letter shall be read in conjunction with the previous compliance review letter dated 31 January 2025 (T+T reference no. 1097366.0000).

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The application is to rezone the land at 100 and 110 Te Moana Road from General Rural Zone to General Residential Zone under the Operative Kāpiti Coast District Plan (the district plan). The total area of the site is approximately 5.5 ha. The proposed plan change will accommodate 40 to 45 dwelling units.

The site is located in Waikanae, Kāpiti Coast, to the northwest of the Mackays to Peka Peka Expressway ('M2PP'). It comprises inactive dunes at the southern part of the site, a natural wetland and a constructed pond (protected by the **QE II OPEN SPACE COVENANT**) in the middle, and relatively flat pastureland at the northern part of the site.

Parts of the northern flat site and near the wetland are considered 'highly productive land' LUC 3 as currently defined in the National Policy Statement on Highly Productive Land 2022 ('NPS-HPL').

The application proposes to have the PPC divided into two stages: Stage 1 to cover the southern dunes and the area surrounding the wetland (110 Te Moana Road) and Stage 2, the northern low-lying pastureland (100 Te Moana Road). The proposed residential development involves both stages.

As requested by KCDC, T+T is undertaking a geotechnical, transportation, and ecological review of the received documents. This letter summarises the geotechnical review only. The transportation and ecological reviews are provided in separate letters.

3 Geotechnical review comments

Our geotechnical review comments, based on review and interpretation of CGW's geotechnical report, Cuttriss's infrastructure report, AWA's flood assessment memo and Land Vision's soil report listed in Section 1 of this letter, are presented in Appendix A.

4 Request for further information

We consider that our requests no. 1, 2 and 4 in a letter dated 31 January 2025 (T+T reference no. 1097366.0000) were resolved. We recommend that the following information be supplied with the application (refer Appendix A).

- 3a Please clarify if the SPT based liquefaction analysis report attached in Appendix E of the CGW geotechnical report is for CPT04 rather than CPT01 between the depth of 3.4 and 8.6m.
- 3b In CGW's CPT based liquefaction analysis for the dune area, two of the three analyses predicted liquefaction induced settlements are greater than 100 mm. However, the CGW's report states that "The dune area is not necessarily subject to any risks as per Section 106 of the RMA; however, low bearing capacity is a geotechnical aspect that requires consideration". Please comment on the expected settlement (total and differential settlement in terms of liquefaction induced free field settlement and seismic shakedown) for the dune area.
- 5a It is uncertain whether the geotechnical risks associated with flooding in the low-lying area can be effectively mitigated by the proposed large-scale earthworks (built-up) as additional flood modelling is required to confirm that such works will not lead to unacceptable adverse environmental impacts or increased risks from natural hazards. Please comment on any foreseeable adverse environmental impacts associated with the proposed earthworks at the site and to the neighbouring properties. If any adverse environmental impacts are identified, please provide comments on potential mitigation options.
- 6a Soft soil/weak ground was encountered in the April 2025 CPT investigation. Please comment on the expected bearing capacity, static and long-term settlement for the proposed future development for the low-lying area with soft soil/weak ground and high groundwater table. Please also assess the viability of the proposed mitigation options and identify any adverse environmental effects associated with them.

7a The CGW geotechnical report did not provide comments on the likely foundation options. Please comment on the likely foundation options and possible mitigation measures that may be required for the proposed future development and the viability of those possible mitigation measures.

5 Recommendations and conclusion

From a geotechnical perspective, insufficient information has been provided to support the private plan change application.

We consider that additional information, as detailed above, is required to enable the Council to better understand the ways in which adverse effects associated with geotechnical matters may be mitigated and to make an informed decision on the suitability of the site to be changed from General Rural to General Residential Zone.

In addition to the above, we recommend the following items should be assessed and addressed in subdivision consent stage:

- 1 Please undertake geotechnical groundwater monitoring and assess the expected range of groundwater level in the low-lying area and the dune area.
- 2 Confirm the design groundwater level based on the groundwater monitoring record, considering seasonal variations, long-term trends, and fluctuations due to climate conditions, as well as proposed future development and different geological formations.
- 3 Revise the assessment of the liquefaction risks, consolidation settlement and bearing capacity for the entire site.
- 4 Assess the constructability of the proposed future development and its environmental effects (e.g. removal of soft soils below the groundwater level, dewatering and decrease in groundwater recharge due to an increase in impermeable surfaces associated with future development).

6 Applicability

This report has been prepared for the exclusive use of our client Kāpiti Coast District Council, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

Tonkin & Taylor Ltd

Report prepared by:

Authorised for Tonkin & Taylor Ltd by:

Shirley Wang Senior Geotechnical Engineer

Nick Peters Project Director

Report reviewed by: Razel Ramilo, Principal Geotechnical Engineer

Appendix A: Geotechnical review comments summary

4-Jun-25

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Appendix A

Table 1 : Geotechnical review comments summary

T+T's previous geotechnical comments on draft plan change request	Geotechnical observations/comments of the private plan change application	Request for further information
 We note that the current investigation, consisting of a single CPT, does not meet the 	1. Based on a review of the 2024-2025 reports supplied, we understand that in total six cone penetration tests	We consider this has been resolved for the Private Plan Change (PPC) application.
recommended investigation density outlined in MBIE Module 2, which considers factors	(CPTs) and two hand auger investigations were completed by CGW at the site:	
such as site variability and development scale. Given the site's geomorphology and the	-In September 2024, CGW conducted one deep geotechnical investigation, a single cone penetration	We recommend the following works to be undertaken to support future consent stages:
potential for liquefaction, we consider that a single CPT is insufficient to assess the ground conditions at the site. Please provide additional deep ground investigation information	test (CPT) at 110 Te Moana Road, which identified the presence of dune sand: however, the ground conditions at	1. Undertake groundwater monitoring in the low-lying area and the dune area to support
and groundwater monitoring information, with an investigation density sufficient to	LUU Te Moana Road remain uncertain.	Tuture consenting stages.
adequately cover the proposed development site area in accordance with MBIE Module 2.	14.94 meters, along with two hand auger tests to depths of 2.3 to 3 meters. The hand auger within the low-lying	considering seasonal variations, long-term trends, and fluctuations due to climate
Please update the geotechnical assessment, and potential effects of the works	area encountered a groundwater level of 1.0m bgl. The hand auger within the dune area, was 3 m deep, and	conditions, as well as proposed future development and different geological formations.
subsequently.	encountered no groundwater at the time of the investigation. Hence the groundwater level at the time of the	3. Revise the assessment of the liquefaction risks, consolidation settlement and bearing
	Investigation within the dune area could be deeper than 3m bgl.	capacity for the entire site.
	- Cuttriss. AWA and Land Vision also carried out shallow investigations (hand augers, soakage tests and	effects (e.g. removal of soft soils below the groundwater level, dewatering and decrease in
	test pits) in 2022-2024; no groundwater monitoring was undertaken.	groundwater recharge due to an increase in impermeable surfaces associated with future
	2. We consider that the MBIE Module 2 requirements are applicable for this site considering the site	development).
	geomorphology and the scale of the proposed development.	
	3. Given the site's geomorphology, the potential for liquefaction and high groundwater level, we recommend	
	the natural hazard risk and to support future consent stages.	
2. Please provide an updated geotechnical ground model based on additional	The CGW 2025 geotechnical report provided two geotechnical ground models based on the latest geotechnical	We consider this has been resolved for the Private Plan Change (PPC) application. See
geotechnical investigation to adequately cover the entire proposed development site as	investigations: one for the low-lying site and the other for the dune area. The CGW geotechnical report assumes	recommendations no. 1 to 4 related to future consenting stages.
	groundwater information provided in CGW's geotechnical report, Cuttriss infrastructure report, AWA's flood	
	assessment memo and Land Vision's soil report, we consider the design groundwater level for the low-lying area	
	and the dune area could have greater variance than the adopted values in CGW's geotechnical report.	
3. We consider that a single CPT is insufficient to assess the liquefaction risk and	•We noted that in Section 8.1 of the geotechnical report, there is an error on the Illtimate I imit State (III S) Peak	This request remains unresolved.
associated consequences at the site. Please provide liquefaction analysis from additional	Ground Acceleration and magnitude (ULS Mw 6.7, PGA 0.53g). We noted that correct ULS PGA 0.68g and Mw 7.7	RFI item no. 3a
test locations covering the entire proposed development site and update the assessment	was adopted in the ULS liquefaction analysis.	Please clarify if the SPT based liquefaction analysis report attached in Appendix E of the
of the liquefaction risks and associated consequences.	•We noted that a SPT based liquefaction analysis report attached in Appendix E is titled as CPT 01. Based on the	CGW geotechnical report is for CPT04 which was completed in April 2025 as part of the
	for CPT04 which completed in April 2025 as part of the CPT04 (DPSH) 3.2 to 8.6m. We have requested a	RFI item no. 3b
	clarification in further request of information.	In CGW's CPT based liquefaction analysis for the dune area, two of the three analyses
	•CGW's liquefaction assessment indicates that the site has a potential risk of liquefaction-induced free field	predicted liquefaction induced settlements are greater than 100 mm. However, CGW's
	settlement and lateral spread. CGW considers the site to be susceptible to minor to moderate liquefaction-	report states that "The dune area is not necessarily subject to any risks as per Section 106 of
	Induced lateral stretch or minor to major global lateral movements, depending on location within the site. Areas	the RMA; however, low bearing capacity is a geotechnical aspect that requires
	that the low-lying area and the dune area is TC3 and TC2 in terms of expected future land performance categories	settlement in terms of liquefaction induced free field settlement and seismic shakedown) for
	based on the current MBIE Technical Category. The CGW's geotechnical report concluded that more than 100 mm	the dune area.
	vertical liquefaction induced free field settlement in an ULS earthquake event (e.g. CPT02 and CPT01-2024, 2 out	
	of the 3 CPT analysis for the low-lying area). The CGW's report also states that "The dune area is not necessarily	
	subject to any risks as per Section 106 of the RMA nowever tow bearing capacity is a geotechnical aspect that requires consideration? We recommend CGW to also assessment total and differential settlement in the dune	
	area associated with seimsic risks.	
4. Please comment on the likely presence of high groundwater level at the site, the	1. The CGW's geotechnical report advised that the low-lying area is likely to have high groundwater and at risk of	We consider this has been resolved for the Private Plan Change (PPC) application. See
associated geotechnical risks if present, and the potential mitigation measures for the	inundation, liquefaction spreading and lateral spreading. Deep ground improvement and in-ground retaining were	recommendations no. 1 to 4 related to future consenting stages.
proposed development.	mentioned as mitigations to liquefaction risks.	
	2. Based on available groundwater information mentioned in the CGW's geotechnical report, Cuttriss's	
	groundwater level could be higher than the values adopted in the CGW's 2025 report, which is likely result in	
	greater liquefaction-induced free-field settlement. We consider the geotechnical risk associated with the high	
	groundwater levelto be moderate to high.	
	- Section 1 of the CGW's geotechnical report states that the groundwater table for the entire site is at	
	approximately 1.5m RL.	
	approximately 1.5 m (investigation date unknown):	
	a. The AWA report indicates the groundwater table was encountered at approximately 1.3 m RL (NZVD 2016),	
	around 1.5 m below ground level (bgl) at soakage test location no. 4 within 100 Te Moana Road.	
	b. The Cuttriss report notes that the observed groundwater level within 100 Te Moana Road was approximately 0.6	
	c. The Land Vision soil report states that the groundwater table could be at the ground surface level in winter	
	(approximately 2 to 3m RL within the low-lying area).	
	The elevation at the investigation location, weather events, and the time of the groundwater investigation could	
	contribute to the reported difference. We expect the groundwater table depth will vary across the site.	
5. Please comment on the geotechnical risk associated with flood and tsunami, and the	Cuttriss's report and the CGW's gentechnical report suggest that large-scale earthworks (huilt-up) are required to	This request remains unresolved
mitigation measures for the proposed development.	address the flood risk. It is uncertain whether the geotechnical risks associated with flooding can be effectively	RFI item no. 5a
	mitigated by the proposed large-scale earthworks (built-up) as additional flood modelling is required to confirm	It is uncertain whether the geotechnical risks associated with flooding in the low-lying area
	that such works will not lead to unacceptable adverse environmental impacts or increased risks from natural	can be effectively mitigated by the proposed large-scale earthworks (built-up) as additional
	hazards. Currently, no details of the built-up earthworks have been provided.	flood modelling is required to confirm that such works will not lead to unacceptable adverse
		environmental impacts or increased risks from natural nazards. Please comment on any foreseeable adverse environmental impacts associated with the proposed earthworks at the
		site and to the neighbouring properties. If any adverse environmental impacts are identified,
		please provide comments on potential mitigation options.
6. Please comment on the likely presence of soft soil/weak ground at the site, the	1. Based on a review of CGW's April 2025 Geotechnical investigation CPT logs, we consider soft soil/weak ground	This request remains unresolved.
associated geotechnical risks if present, and the potential mitigation measures for the	was encountered. We disagree with the conclusion in Section 10.3 of the geotechnical which states that "soft	RFI item no. 6a
proposed development.	and/or weak soils were not encountered during the site investigation"	Soft soil/weak ground was encountered in the April 2025 CPT investigation. Please comment
	a. CP103 -CP105 of April 2025 geotechnical investigation suggests the presence of sensitive fine grain and very soft soils, up to 2m thickness, within the ton 3m within the low-lying area.	on the expected bearing capacity, static and long-term settlement for the proposed future development for the low-lying area with soft soil/weak ground and high groundwater table
	b. CPT01 (2024) of 2024 geotechnical investigation shows the presence of very loose to loose silty sand	Please also assess the viability of the proposed mitigation options and identify any adverse
	to sandy silt, up to 0.5m thickness within the top 5.5m of the dune area.	environmental effects associated with them.
	2. We noted that Section 8.6 of the geotechnical report which states that "with reference to the Dynamic Cone	
	Prenetrometer results, in accordance with NZS3604:2011 and the MBIE Guidance, an Ultimate Bearing Capacity of	
	near the surface with high groundwater level, this ultimate bearing capacity of 200 kPa might not be achieved.	
	3. We agree with the statement in Section 10. 3 of the geotechnical report which states that "we anticipate that	
	these types of soils are likely present in the wetland area and potentially around the margins of the wetland also.	
	Inese soils could result in static and long-term creep settlements under any potential developments. Mitigation	
	We consider that the extent of removal of weak soils or the creation of a buffer zone could be extensive across the	
	low-lying area. The removal of weak soils could be up to 3m below the existing ground level and might require	
	dewatering. We consider that the removal of soils and dewatering within the low-lying area could have adverse	
	environmental effects on the hearby stream and wetlands.	
7. Please comment on the likely foundation options, and possible mitigation measures	No foundation options are provided in the CGW's geotechnical report. Deep gound improvement and in-ground	This request remains unresolved.
that may be required for the proposed development.	retaining were mentioned as mitigations to liquefaction risks.	KH item no. 7a Please comment on the likely foundation ontions and possible mitigation measures that may
		be required for the proposed development and the viability of those possible mitigation
		measures.