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In reply please quote:	FTAA-2603-1181
For enquiries please contact:	Rory Smeaton
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Comments on a Substantive Application under section 53 of the Fast-track Approvals Act 2024: Geotechnical Engineering

Fast-track project name	**Mt Welcome, Pukerua Bay, Porirua**
Fast-track application no.	FTAA-2603-1181
PCC reference	RCO26120

Technical area	Geotechnical Engineering
Date	31 July 2026
Author	Razel Ramilo, Principal Geotechnical Engineer Nick Peters, Principal Engineering Geologist Shirley Wang, Senior Geotechnical Engineer
Statement of expertise	Razel is a Chartered Professional Engineer (CPEng), Chartered Member of Engineering New Zealand (CMEngNZ), and member of the New Zealand Geotechnical Society (NZGS). She holds a Master of Science in Civil Engineering (Geotechnical Engineering) and a Bachelor of Science in Civil Engineering. She is a Technical Director, and Principal Geotechnical Engineer at Tonkin + Taylor. With over 24 years of experience across New Zealand and Australia, she has delivered geotechnical solutions for a wide range of infrastructure and land development projects. Her expertise includes geotechnical investigations and assessments, earthworks, natural hazards, groundwater and settlement, liquefaction, slope stability, retaining structures, foundation design, and geotechnical risk management. Razel has extensive experience supporting resource consent applications, geotechnical regulatory reviews and the preparation of geotechnical assessments for Assessments of Environmental Effects (AEE). She currently provides geotechnical reviews for Porirua City Council, assessing geotechnical reports for subdivision developments, retirement villages and major development projects. Nick is a Chartered Geologist (CGeol), Fellow of the Geological Society London (FGS), European Geologist (Eur Geol) and member of the New Zealand Geotechnical Society. He has a Master of Science degree in Applied Environmental Geology from University of Wales, United Kingdom. Nick has over 28 years' consulting experience in New Zealand and the United Kingdom. Nick has managed and co-ordinated geotechnical assessments on numerous large projects within the Wellington Region and across NZ. He is a T+T Project Director and Technical Director and provides high level oversight of various regulatory reviews across multiple councils, including the Plimmerton Farm Development and Muri Road Development for PCC.

	Shirley has a Bachelor of Engineering (Honours) degree in Civil Engineering – First Class Honours and completed a postgraduate-level paper in Geotechnical Earthquake Engineering. She is a member of New Zealand Geotechnical Society and serves as a Regional Coordinator for the NZGS Wellington Branch. She has over 17 years' experience and has vast experience in geotechnical design, review and management experience covering a variety of geotechnical projects in the Greater Wellington region. She works with Razel and Nick on various regulatory review including the Plimmerton Farm Development and Muri Road Development. She brings to the team sound engineering judgement, good knowledge of nature hazard risks, consenting processes, and mitigation measures.
Code of conduct	While this is not a matter before the Environment Court, we confirm on behalf of Tonkin & Taylor Limited ("T+T" or "we") that we have read and agree to comply with the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023 in respect of this engagement. This technical memorandum has been prepared in accordance with that Code. Unless stated otherwise, the opinions expressed are within T+T's area of expertise, and we have not omitted to consider material facts that might alter or detract from the opinions that we express.
Documents considered	• Appendix 10: Draft Earthworks and Construction Management Plan. Prepared by Envelope. Dated 14 November 2025. • Appendix 26: Geotechnical Investigation Part A. Prepared by ENGEO. Dated 6 November 2025. • Appendix 26: Geotechnical Investigation Part B. Prepared by ENGEO. Dated 7 November 2025. • Appendix 26: Geotechnical Investigation Part C. Prepared by ENGEO. Dated 7 November 2025. • Appendix 26: Geotechnical Investigation Part D. Prepared by ENGEO. Dated 7 November 2025. • Appendix 27: Preliminary Site Investigation. Prepared by Classic Developments Limited. Dated 17 November 2025. • Appendix 30: Drawings. Prepared by Envelope. Dated 20 November 2025. Revision R1. Reference 1753-02. • Appendix C-1753-02-SK-9400-R1-Wetland-Bund_2026-06-22. Concept design drawings of the retention Wetland Bund prepared by Envelope. Revision R1. Drawing numbers SK 9400 -9402. Dated 22 June 2026. • Appendix E-Updated-Scheme-Plan-1753-02-1010-R3. Prepared by Envelope. Revision R3. Drawing numbers 1010 – 1035. Dated 1 July 2026. • Appendix G-Geotechnical-Review-Comments-Register. Provided on 3 July 2026. Prepared by ENGEO. • Appendix 7 – Proposed Conditions (Minute 2 version) provided to us by PCC (email between Rory Smeaton and Shirley Wang)

Technical Review Comments

See attached *Mt Welcome Fast-Track - Geotechnical Regulatory Review - Summary of Requests and Responses*, prepared by Shirley Wang and dated 30 July 2026.

Our review concluded the following:

- RFI no. 4 and 21 remain unresolved and further clarification is required.
- RFI no. 12 and 22 are resolved with no resource consent conditions proposed.
- The remaining RFIs are considered resolved subject to consent conditions.

Recommended Conditions

16. At least 20 working days prior to the commencement of each stage of earthworks, the Consent Holder shall submit a stage-specific Earthworks and Construction Management Plan (ECMP) to the Manager of Resource Consents and Monitoring for certification. Photographic evidence that demonstrates earthworks have been undertaken in accordance with a stage-specific ECMP must be provided to the Manager of Resource Consents and Monitoring [EMAIL] within ten working days of the completion for each stage.
18.The ECMP must include site specific details relating to avoiding, remedying or mitigating adverse effects on the environment and neighbouring properties from demolition and construction, and management of all works associated with this development (where they are not already managed by other management plans) as follows: a. Contact details of the appointed contractor or project manager (phone number, email, posted address); b. General outline of the construction programme for each stage; c. Applicable conditions relating to the management of construction matters; d. Programme of works and hours of operation; e. Relevant details for the management of dust on Site (as per the guidance of Appendix 4 of the Ministry for the Environment's Good Practice Guide for Assessment and Managing Dust, 2016); f. Details of the approach to be undertaken for the unloading and stockpiling of materials on Site (including any necessary reference to the CTMP). g. All existing overland flow paths shall be designed with outlets matching pre-development discharge to maintain flow continuity and existing hydrology, informed by ecology and hydrology input. Details to be provided prior to earthworks.
24. ~~The Consent Holder must engage a suitably qualified and experienced engineer to supervise all excavations, retaining and foundation construction. The supervising engineer's contact details must be provided in writing to the Resource Consent Monitoring and Enforcement Team (via email: rmamonitoring@pcc.govt.nz) at least 10 Working Days prior to commencement of any excavations, retaining or foundation construction on Site.~~ At least 10 Working Days prior to the commencement of any works on the site, the Consent Holder must provide evidence to the Resource Consent Monitoring and Enforcement Team (via email: rmamonitoring@pcc.govt.nz) that a suitably qualified and experienced geotechnical professional (a Chartered Professional Engineer as included on the

Engineering New Zealand CPEng register with a Geotechnical Engineering Practice field) has been appointed to undertake or supervise:

- The geotechnical design of earthworks cut and fill slopes, retaining structures, slope stabilisation measures, and building foundation systems;
- The preparation of geotechnical technical specifications;
- Construction monitoring; and
- The certification of earthworks including cut and fill slopes, retaining structures, slope stabilisation measures, and building foundation construction, during the implementation of this consent.

The evidence provided must include the full name, qualifications, contact details, and Engineering New Zealand membership or registration number of the appointed person.

27. The Consent Holder must comply with the design, construction and as-built requirements, unless otherwise modified by condition(s) of this consent, or agreed in writing by the Manager Resource Consents and Monitoring and the ~~Wellington Water~~ Tiaki Wai Land Development Team, of the:

    a. Porirua City Council Code of Land Development and Subdivision Engineering 2010;

    b. Land Development and Subdivision Infrastructure – NZS4404:2010;

    c. Wellington Water Limited Regional Standard for Water Services December ~~2021 V3.0~~ 2024 V4.0;

    d. Wellington Water Limited Regional Specification for Water Services December ~~2021 V3.0~~ 2024 V4.0; and

    e. Water Sensitive Design for Stormwater: Treatment Device Design Guideline December 2019 Version 1.1.

Water Services Pipelines Design

Water services pipelines shall be designed as seismically resilient in accordance with the Wellington Water Regional Standard for Water Services December 2024 V4.0, Section 3.7.5 (resilient pipelines) and Table 3-1 (resilient pipe materials). The pipelines shall be able to accommodate the estimated seismic-induced ground displacements (120-1400 mm ULS), or written acceptance shall be obtained from Tiaki Wai where a lower level of post-earthquake functionality is proposed. Services shall be located outside potential failure zones where practicable, or slope stabilisation (e.g. geogrid) provided.

Cut and Fill Slope Plan

28. At least 20 working days prior to commencement of any earthworks within a particular stage, the Consent Holder must submit to the Manager Resource Consents and Monitoring a Cut and Fill Slope Plan including any temporary slopes and earth retention measures for that stage for certification. The purpose of the Cut and Fill Slope Plan is to identify any proposed cut and fill slopes, retaining structures, and slope stabilisation measures ~~on the site~~ that require a Geotechnical Assessment as

part of the Engineering Approval ~~of~~ for the earthworks undertaken on the site. The slopes identified in the final Cut and Fill Slope Plan must include, but not be limited to:

a. Fill embankments on existing in-situ materials, and cut slopes greater than 3m;

b. Fill embankments and cut slopes with gradients of 1V:2H or steeper; ~~and~~

c. Fill embankments on weak or soft or liquefiable ground~~.~~; and

d. Retaining structures and slope stabilisation measures.

Engineering Approval – Geotechnical Design of Fill Embankments, Cut Slopes, and Earth Retention Measures

29. At least 20 working days prior to the commencement of any earthworks within a particular stage, the Consent Holder must submit to the Manager, Resource Consents and Monitoring, for certification, ~~a~~ the geotechnical design ~~of~~ for the ~~permanent~~ fill embankments, ~~and~~ cut slopes, and earth retention measures ~~labelled~~ identified on the certified Cut and Fill Slope Plan for that stage ~~for certification~~. The design must be prepared by a ~~SQEP~~ a suitably qualified and experienced geotechnical professional (a Chartered Professional Engineer experienced in geotechnical engineering). The geotechnical design must include:

a. An appropriate level of site investigation to inform the design; ~~Drawings, including details of surface and subsurface drainage;~~

b. ~~Calculations; and~~ A supporting geotechnical report and drawings, including but not limited to, details of surface and subsurface drainage, surface water interception, drainage pathways, and discharge locations and outlets for fill slopes;

c. ~~Slope stability analysis that identifies mitigation measures for both the local and global stability of the proposed fill embankments and cut slopes under static and seismic load conditions, as may be required by NZS4404 and the Porirua City Council Code of Land Development and Subdivision Engineering.~~ Supporting geotechnical information and design calculations;

d. Slope stability analyses identifying mitigation measures for both the local and global stability of the proposed fill embankments and cut slopes under static and seismic load conditions, as may be required by NZS 4404 and the Porirua City Council Code of Land Development and Subdivision Engineering;

e. Fill embankments and cut slopes shall be designed to limit seismic-induced displacements to tolerable levels using appropriate remedial measures;

f. For cut batters prone to erosion (such as erosion on loess soils), erosion protection measures shall be designed to mitigate this hazard; and

g. Subsoil drainage for fill slopes over gullies or areas of significant fill depth, including discharge locations, shall be designed by a suitably qualified engineer.

h. In areas with liquefaction potential, the design and remedial measures shall address the consequences including but not limited to seismic-induced displacement, cyclic displacement, cyclic softening, settlement, and lateral spreading.

Engineering Approval – Retention Wetland Bund

30. At least 20 working days prior to the commencement of any works for the construction of ~~a~~ the Retention Wetland Bund, the Consent Holder must submit to the Manager, Resource Consents and Monitoring, for certification, the detailed design of the Retention Wetland Bund for that stage ~~for certification~~. The Retention Wetland Bund must be specifically investigated, designed, and inspected during construction by, or under the direction of, the Suitably Qualified ~~Geotechnical~~ Professional. The geotechnical detailed design must include:
    a. An appropriate level of site investigation to inform the design; ~~Drawings;~~
    b. A supporting geotechnical report and drawings, including details of drainage and subsurface drainage, surface water interception, drainage pathways and discharge locations and outlets; ~~Calculations;~~
    c. Supporting geotechnical information and calculations; ~~Slope stability analysis;~~
    d. Slope stability analyses identifying mitigation measures for both the local and global stability of the proposed Wetland Bund Embankments under static and seismic load conditions; ~~Settlement analysis;~~
    e. Retention wetland bund shall be designed to limit seismic-induced displacements to tolerable levels using appropriate mitigation measures; ~~Specifications;~~
    f. Specification; ~~Construction methodology and plans;~~
    g. ~~Evidence that the design of the Retention Wetland Bund has appropriately considered and responded to the identified liquefaction hazard on site including detailed liquefaction and lateral spread analysis;~~ Construction methodology and plans;
    h. ~~Evidence that the design of the Retention Wetland Bund has appropriately considered design water levels; and~~ Design of the Retention Wetland Bund shall consider liquefaction potential and address the consequences such as seismic-induced displacement, cyclic displacement, cyclic softening, settlement, and lateral spreading.
    i. Evidence that the construction of the bund will not adversely affect State Highway 59 or other services and utilities within State Highway 59 under all design seismic cases (OBE and SEE events).
    j. Evidence that the design of the Retention Wetland Bund has appropriately considered design water levels.
    k. Prior to approval of an application for building consent for the Restored Wetland Bund, an independent geotechnical review of the geotechnical components of the bund shall be carried out by a Suitably Qualified Geotechnical Professional. Work on the Restored Wetland Bund shall not take place until such time as a building consent has been approved.
    l. No construction works for the Restored Wetland Bund shall commence until the detailed design has been certified by the Manager Resource Consents and Monitoring.

Advice Note 1: The recommendations of NZSOLD Dam Safety Guidelines (2024) should be considered in the detailed design of the Restored Wetland Bund. A suitably Qualified Dam Professional should be involved in the design.

Advice Note 2: Refer to the NZTA Bridge Manual for the seismic displacement requirements of State Highway networks and local roads.

49. ~~All earthworks must be managed to ensure that they do not lead to any uncontrolled instability or collapse affecting either the Site or adversely affecting any neighbouring properties. In the event that uncontrolled collapse or instability does occur, it must be rectified and remediated as soon as reasonably practicable at the Consent Holder's expense and to the satisfaction of the Council.~~

a). All earthworks shall be carried out under the supervision of a suitably qualified and experienced geotechnical professional. This is to verify that the exposed ground conditions are consistent with the geotechnical model, including identifying persistent or unfavourably oriented defects, seepage in exposed cut faces, and exposed loess in permanent cut batters. Where adverse ground conditions are encountered, slopes shall be modified or stabilised as appropriate.

b) All earthworks must be managed to ensure that they do not encroach onto any neighbouring property unless formally agreed with the asset/property owner (including ground anchors or rock bolting for any boundary retention systems) or lead to any uncontrolled instability or collapse affecting either the Site or adjacent land, structures, services, or infrastructure. In the event that uncontrolled collapse or instability does occur, it must be rectified and remediated as soon as reasonably practicable at the Consent Holder's expense and to the satisfaction of the Council.

c) If at any stage in the implementation of this consent earthworks reveal adverse ground conditions, such as the presence of soft and/or water-saturated ground, or uncontrolled fill soils in areas not inferred on the current geotechnical model; the services of a suitably qualified and experienced geotechnical professional shall be obtained. Subsequent works shall follow the recommendations made by the geotechnical professional.

d) All structures and earthworks within gullies (including retention wetland bund and unsuitable soil embankments) shall be founded on competent Greywacke rock (or other suitable material approved by the supervising geotechnical professional), with founding conditions verified during construction and recorded in the Geotechnical Completion Report (GCR).

e) Where loess remains beneath structures, appropriate surface and subsurface drainage shall be installed to minimise water infiltration into the loess and the area identified as a Special Engineering Design (SED) zone in the GCR, recorded on the relevant LOT title by consent notice under s221 RMA, requiring lot-specific design prior to building consent.

f) Areas of mixed cut and fill ground subject to potential differential settlement (including fill/soil/rock interfaces and interfaces between reinforced/non-reinforced ground) shall be identified as Special Engineering Design (SED) zones in the GCR, and recorded on the relevant lot title by consent notice under s221 RMA, requiring site-specific foundation design at the building consent stage.

g) Appropriate sediment management measures shall be implemented throughout construction, and stormwater flows shall not be concentrated onto or within loess cut batters or embankments where they may cause erosion or instability.

51. There must be no deposition of earth, mud, dirt or other debris on any public road or footpath resulting from earthworks activity on the Site. Surface water and groundwater infiltration shall be managed in accordance with the approved stormwater management plan (SMP), with flows directed through the reticulated network to the designated stormwater management devices. In the event that such deposition does occur, it must immediately be removed. In no instance may roads or footpaths be washed down with water without appropriate erosion and sediment control measures in place to prevent contamination of the stormwater drainage system, watercourses and / or receiving waters.

65. Following completion of the construction of the cut and fill batters, a Geotechnical ~~Certification~~ Completion Report (GCR) and a Retention Wetland Bund Completion Report shall be submitted to the Manager, Resource Consents and Monitoring, in accordance to consent conditions 93 to 96. ~~This GCR must confirm that:~~

~~a. Full delineation of the Specific Engineered Design zones;~~

~~b. The cut and fill batters have been constructed in accordance with the certified design;~~

~~c. Any site-specific geotechnical recommendations have been implemented; and~~

~~d. The cut and fill batters are stable and suitable for their intended use.~~

~~*Earthworks*~~ *Geotechnical Completion Report*

93. Prior to approval under Section 224 of the RMA for each stage of the development, a~~n~~ ~~Earthworks~~ Geotechnical Completion Report (~~E~~GCR) covering any civil works as shown on Development Staging Plans prepared by Envelope, including roads or reserve areas to vest must be supplied to the Manager Resource Consents and Monitoring. The ~~E~~GCR must include a certificate stating the suitability of the earthworks for residential development in accordance with NZS 4431:2022 (Statement of Suitability of Earthworks Report; SSER). The ~~E~~GCR must be prepared by the Suitably Qualified Geotechnical Professional, and must include the following:
    a. An as-built plan showing the completed earthworks surfaces, details of any drainage installed, and the location of all constructed retaining walls;

    b. A statement of suitability of any cut and fill, including a schedule of the compaction tests which shall also show their location, together with a certificate prepared by the Suitably Qualified Geotechnical Professional, addressing the degree of consistency with NZS 4431:2022 – Engineered fill construction for lightweight structures, and the Land Development Manual (2010);

    c. Certification that the constructed retaining walls are fit for purpose and are capable of supporting any identified surcharge. Where retained cuts or fills are over 1.5m in height, this may be satisfied via provision of a Producer Statement – Construction Review (PS4) for the retaining walls; and

    d. Identification of any limitations on building and foundation design, for example, identifying any areas of uncertified fill, non-engineered fill, weak ground, loess, uncontrolled fill, unsuitable materials, recommended building setbacks, and Specific Engineering Design (SED) zones for building platforms or matters to be considered when designing foundations for any subsequent development onsite.

    Following completion of the construction of the fill embankments, cut slopes, and earth retention measures, the GCR must also include:

        a. An as-built plan showing the completed earthworks, including finished surface levels, drainage systems, and discharge outlets, and the location of the fill embankments, cut slopes, and earth retention measures;

        b. A statement confirming that the fill embankments, cut slopes, and earth retention measures have been constructed in accordance with the certified design or identifying and justifying any approved departures;

        c. A summary of any site-specific geotechnical recommendations implemented during construction;

        d. A statement confirming that the fill embankments, cut slopes, and earth retention measures are stable and suitable for their intended use; and

        e. A schedule of all verification, inspection, and testing undertaken, including the locations of the works inspected or tested.

94. Where the ~~E~~GCR report identifies development limitations on building or foundation design that need to be raised with future property owners, the Manager Resource Consents and Monitoring may require a consent notice as per section 221 of the RMA 1991 to be registered on the Record

of Title of the lot giving notice of the limitations or specific development requirements relating thereto.

Retention Wetland Bund Completion Report

96. Prior to any approval under Section 224 of the RMA for the relevant stage, the consent holder must submit to the Manager Resource Consents and Monitoring a Retention Wetland Bund Completion Report for certification. The completion report must be prepared by a Suitably Qualified Geotechnical Professional and must include the following:
    a. A statement that the bund has been constructed as per the detailed design plan certified under Condition 30.

    b. As-built plans showing:

        i. The completed bund surface;

        ii. Details and location of the spillway and culvert inlets;

        iii. Details and location of any drainage installed; and

        iv. Section of bund relevant to the applicable stage requirements.

    c. A statement that the bund has been constructed as per the detailed design plan certified under Condition 30.

    d. A schedule of the foundation, and compaction tests which shall also show their location, together with a certificate prepared by the Suitably Qualified Geotechnical Professional.

~~Geotechnical Slope Stability Report~~

~~97. Prior to any approval under Section 224 of the RMA for each stage of the development with a slope stability design certified under Condition 29, the consent holder must submit to the Manager Resource Consents and Monitoring, a Geotechnical Slope Stability (GSS) report prepared by a Suitably Qualified Geotechnical Professional, addressing the stability of the constructed cut or fill batters.~~

~~98. The GSS report required must give specific reference to section C2.6 of Porirua City Council's Code of Land Development 2010. The report must include a NZS4404:2010 Schedule 2A (Statement of Professional Opinion as to Suitability of Land for Building Construction) signed by a Chartered Professional Engineer experienced in geotechnical matters.~~

~~99. Where the GSS report identifies development limitations, the Manager Resource Consents and Monitoring may require that a consent notice under section 221 of the RMA on the title shall be entered into giving notice of the limitations or specific development requirements relating thereto. The consent notice must be prepared by the consent holder to the satisfaction of the Council. The cost associated with the preparation and registration of any consent notices are to be met by the consent holder.~~

~~100. The consent notice must state:~~

~~Prior to any construction, alteration or modification of a structure or retaining wall occurring within [any geotech areas of significance as identified in Condition 95 above], future landowners are require to submit a report or certificate for approval by the Manager Resource Consents, that confirms that~~

~~the proposed works are in accordance with specific engineering design by a suitably qualified chartered professional engineer that takes into account the geotechnical and slope stability matters identified in the GSS submitted under condition 90 of this consent.~~

Applicability

This technical memorandum and its attachments have been prepared for the exclusive use of our client Porirua City Council (the "Client"), with respect to the particular brief given to us and 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.

The sole purpose of this technical memorandum, its attachments and the associated services performed by T+T is to undertake a limited review of, and comment on, the geotechnical aspects of resource consent application (Mount Welcome Fast Track Substantive Application (FTA134), the "Application") in accordance with the scope of services set out in the Letter of Engagement for services relating to the Application dated 26 June 2025 between the Client and T+T (the "Contract"), and this technical memorandum and these services are being provided subject to the exclusions and limitations of liability set out in the Contract.

T+T's review was a regulatory review, undertaken on a level-of-effort basis, to provide comment to assist the Client in its decision making in relation to the Application. The responsibility for the Application remains fully with the Principal Consultant and T+T's review does not constitute a means by which that responsibility can be passed on to T+T. This technical memorandum has been prepared on behalf of, and for the exclusive use of, T+T's Client, and is subject to, and issued in accordance with, the provisions of the Contract. T+T accepts no liability or responsibility whatsoever for, or in respect of, any use of, or reliance upon, this technical memorandum by any third party.

Mt Welcome Fast-Track - Geotechnical Regulatory Review - Summary of Requests and Responses (Rev 1)
Client: Porirua City Council
Prepared by: Shirley Wang on 10 June 2026
Technical review by: Razel Ramilo on 10 June 2026
Updated by: Shirley Wang on 15 July 2026
Technical review by: Razel Ramilo on 15 July 2026
Revised by: Shirley Wang on 30 July 2026

T+T Project No. 1015972.2000

ID	T+T Review Comments	ENGEO Response	T+T Review High-level Review Comments as of 9th June 2026	ENGEO Response as of 3 July 2026	T+T Review Comments as of 9 July 2026	Proposed resource consent conditions
Site Investigation and Ground Model						
1	The number and spacing of intrusive investigation points appear insufficient to capture the anticipated variability in subsurface conditions across the site. The ground model should be supported by an appropriate level of intrusive investigation (e.g. boreholes and test pits) and laboratory testing to define soil and rock stratigraphy, groundwater conditions, areas of weak ground or uncontrolled fill, and any evidence of slope instability. As a guide, MBIE Module 2 Table 2.1 recommends a minimum number of investigation locations based on site area.	The geology of the site is not particularly variable and we consider that the investigation undertaken are sufficient for this stage of the project. Module 2 recommends 166 investigation locations. We have completed 50 and completed a comprehensive site walkover to identifiy geological and geomorphological features. Given the topography there are many parts of the site that are inaccesible for borehole rigs and excavators. An appropriate level of supervision will be required during the earthworks stage to continually reference the ground conditions to the geological model.	Further clarification is required. The number, spacing, and depth of intrusive investigation points appear insufficient to capture the anticipated variability in subsurface conditions across the site. The majority of the completed investigations are between 2.4 and 4 m depth and 11 out of the 34 test pits (test pits 16 and 27, 30, 31, 32, 33 and 34 were not completed) terminated in soils (alluvium or loess) while the proposed cut might likely exceed the depth of investigations. Consequently, the thickness of the alluvial deposits and the nature of the underlying material remain poorly defined. There is a high degree of uncertainty regarding the extent of soft, weak, compressible, or potentially liquefiable soils that may influence the geotechnical performance of the proposed development.	The main reason that the planned test pits could not be completed was because access was not possible. To complete additional investigations, extensive access tracks would be required to be constructed which is not practical at this stage of the development and would require extensive sediment control. The majority of the development is concentrated on the ridgelines where we have existing data suggesting that rock is near surface therefore the risk of soft, weak, compressible or potentially liquefiable soils in the areas where development is proposed is low. No buildings are proposed in gullies. Investigation in gullies suggests that rock is at a depth of between 1.4m and 6m (for example TP21 [depth to rock - DTR - 2.4m], TP13 [DTR 1.4m], BH05 [DTR 3.1m], BH01[DTR 6m]. All structures and earthworks (i.e. wetlands) in gullies will be founded in rock. This could be set as a consent condition. We understand that the developments to the immediate north (Muri Block) and South (Plimmerton Farm), were granted consent with a lower testing density than what has been undertaken at Mt Welcome.	Resolved subject to consent conditions.	To close this matter, we propose condition 29.
2	In the material properties and slope stability analyses, loess and colluvium have been treated as a single unit. This assumption may not be appropriate, as it does not account for differences in soil structure and the collapsible behaviour of loess and its sensitivity nature to saturation and disturbance. Further justification or sensitivity assessment is required.	For this reason we assumed very conservative parameters for the colluvium/loess unit and have used parameters for loess rather than colluvium. Limit equilibrium slope stability modelling software does not model differences in soil structure and collapsible behaviour. We have modelled the loess/colluvium unit in each slope model with a cohesion of 1 to reflect its sensitivity to saturation. Therefore we do not consider that a sensitivity assessment is required.	Further clarification is required. Loess is highly susceptible to disturbance and saturation during earthworks. Its strength is reduced significantly when disturbed. We do not believe that the friction angle of 32 degrees reflects loess's sensitivity to both saturation and disturbance during construction. Please provide justification of the adopted parameters.	Geotechnical testing in this material indicates scala blows of between 4 to 8 blows per 100mm therefore we consider that a phi of 32 is suitably conservative. The majority of the cuts proposed are at the top of ridgelines to form building platforms and roads. All cuts along the ridgelines are expected to be through the loess and into Greywacke rock; if cut batters encounter loess within permanent cuts, this will be dealt with my engineering assessment and design at the time by chartered geo-professionals, likely to be grading back the slopes to an acceptable slope angle with erosion protection blanketing. Any loess remaining on building platforms will be tagged in the GCR as a SED zone requiring specific investigation and design.	Resolved subject to consent conditions.	To close this matter, we propose conditions 29 and 49.
Liquefaction and Seismic Hazards						
3	Liquefaction-prone soils are identified within low-lying gullies and valleys; however, the assessment appears to focus on building platforms and does not clearly address wetlands or embankments constructed from unsuitable materials. Please provide information on liquefaction risks and associated consequences for these features.	We have provided a plan showing the areas where there are gully areas containing possible liquefiable soils and the proposed locations of the wetlands and the unsuitable embankment. This shows that three of the five wetlands are not within areas expected to contain potentially liquefiable soil. The ground in the proposed location of the two wetlands in gullies may be liquefiable. The proposed location of the unsuitable embankment is partially within a gully with potentially liquefiable soil. At this stage, investigations in the base of the gullies is not possible due to restricted/difficult access. Where there is potentially liquefiable soil, any fill embankments will be founded on rock or keyed in below any liquefiable material and suitable drainage will be installed.	Further clarification is required. The response does not adequately describe the hazard, associated risks, and potential consequences as per Section 106 of the RMA. In addition, there is uncertainty of liquefaction assessment, as no geotechnical investigations were undertaken within the proposed wetlands and unsuitable embankment areas. Consequently, the depth, thickness, and extent of potentially liquefiable soils in these areas remain unknown. Due to lack of geotechnical investigation data, it is unclear whether undercutting and replacement liquefiable soils is a feasible or appropriate mitigation measure. Additional investigation and justification are required to support the proposed liquefaction mitigation strategy.	We consider that there is not a significant risk of liquefaction in the gullies in accordance with Section 106. The risk is not significant because the likelihood of liquefaction of natural ground in the gullies where damage resulting from the natural hazard could occur is low. This is because any structures within the gullies will be founded on rock. Therefore, the use of the land as a wetland/embankment will not accelerate, worsen or result in material damage. More detail is in the answer to question 5.	Resolved subject to consent conditions. We accept ENGEO's Section 106 reasoning that the liquefaction risk is not significant where structures and fill embankments within the gullies are founded on competent rock. However, no intrusive investigation has been undertaken within the wetland and unsuitable-material embankment footprints, so the depth to rock and the depth, thickness and extent of potentially liquefiable soils remain unverified, and the feasibility of undercut-and-replace has not been demonstrated. We accept this on the basis that (i) founding on rock or keying in below liquefiable material, with subsoil drainage, is secured as a consent condition; and (ii) targeted geotechnical investigation is undertaken within these footprints at detailed design to confirm the ground model and the liquefaction mitigation strategy. See recommendations on the right.	To close this matter, we propose conditions 29, 30, 49.
4	Liquefaction potential within the low-lying gully and the post-seismic stability of the embankment constructed from unsuitable material, including the potential for flow failure, do not appear to have been assessed and should be addressed.	The main gully is not being developed, apart from a wetland being constructed within it (see above). We have modelled the seismic stability of the unsuitable material in Appendix 9 of the report using conservative geotechnical parameters and conservative gradients. As stated above, any fill embankment will be founded on rock or keyed in below any liquefiable material and suitable drainage will be installed. Failure of the unsuitable embankment is expected in a ULS event. We have based our risk assessment on likelihood and consequence of failure and, because the likelihood of failure is low and consequence is low as there are no structures near or below the toe of the slope, the risk to life or injury in a ULS event is low.	Further clarification is required. Please provide a conceptual design to demonstrate that the proposed wetland embankment is feasible, and all associated geotechnical risks can be mitigated and meet relevant design guidelines and RMA requirements. Please specify the standards that the risk assessment was based on and provide definition on low likelihood and low consequences in accordance with the relevant standards.	Concept provided. The risk assessment is based on the National Policy Statement for Natural Hazards. Given that the consequence of embankment failure is negligible, with no loss of use, no building repairs required and no injuries, the risk is low for every likelihood level.	Further clarification is required. To be consistent with Section 106 of the RMA (no acceleration or worsening of, or material damage to, the land or other land), we recommend a feasibility level design shall be provided to the Panel so that the potential effects of the works can be fully understand. The design shall demonstrate acceptable static and post-seismic (ULS) stability including assessment of flow-failure potential, prepared by a CPEng geo-professional. The design shall confirm that no habitable buildings, critical infrastructure or neighbouring land lie within the potential failure runout so that the consequences of failure remain low, consistent with s106 RMA, and shall document the likelihood/consequence framework (NPS for Natural Hazards).	
5	The estimated seismic-induced slope displacement ranges from 120 mm to 1400 mm. Please provide an assessment of the potential effects of these displacements on underground services.	The estimated slope displacements quoted are for ULS events. Underground services are not expected or required to remain operable after a ULS event. Underground services are, however, required to remain operable post SLS event. The majority of the services will be located beneath the roadways. Of the slopes we modelled where there may be small scale failures in a SLS event, these failures are expected either from slopes below building platforms or above building platforms where underground services are not expected to be located. All services will be located outside the potential failure zones where possible, or slope stabilisation measures will be put in place, such as, the use of geogrid.	Further clarification is required. Wellington Water Regional Standards for Water Services (Table 3-2) set out the required seismic performance criteria for critical and non-critical water services. Please confirm that the adopted performance objectives are consistent with Wellington Water's requirements for the WWL's assets or provide a written approval of Wellington Water's acceptance where a lower level of post-earthquake functionality is proposed.	Table 3-2 details the design criteria for new structures which exclude linear assets such as stormwater and wastewater pipes. Therefore, there is no requirement to comply with Table 3-2. Our original response still stands.	Resolved subject to consent conditions. We note that ENGEO's clarification that Table 3-2 applies to structures (non-linear assets) rather than buried linear assets, and we accept that the specific IL/SLS/ULS criteria in Table 3-2 are not directly applicable to the stormwater and wastewater pipe networks. However, this does not remove the seismic performance obligations for those pipes. Section 3.7.5 of the Regional Standard for Water Services deals with seismically resilient pipelines, and Section 3.7.5.2(b) states that all water supply and wastewater pipes are to be resilient irrespective of seismic criticality, with the seismic hazard of the ground being the determining factor. Section 3.7.5.4 further requires specific design consideration where pipes are laid in areas subject to significant slope failure, ground settlement or lateral spread. Given the estimated seismic-induced slope displacements of 120 mm to 1400 mm, T+T's underlying concern remains: please demonstrate how the stormwater and wastewater pipes will meet the pipeline seismic resilience requirements of Section 3.7.5 (and the resilient material selection of Table 3-1) under the predicted ground movements, or provide written confirmation from Wellington Water accepting a lower level of post-earthquake functionality for these assets.	To close this matter, we propose condition 27.
Slope Stability and Rock Behaviour						
6	The slope stability analyses do not appear to account for persistent defects or unfavourably oriented discontinuities within the rock mass. It is unclear how unfavourable defects would be managed if encountered, including any mitigation measures.	Due to the high density of fractures within Greywacke rock, it is not practical to assess continuous rock defects until the cuts are excavated. An engineering geologist will be onsite regularly during construction to identify any unfavourable or persistent defects. Slopes will be either modified if possible or suitable engineering solutions will be installed, such as, rock bolting or anchored mesh, or catch fences where suitable.	We consider this is sufficient and this should be included as a consent condition.	The Applicant will discuss condition drafting with PCC.	Resolved subject to consent conditions.	To close this matter, we propose condition 49.
7	Results of the slope stability analyses indicate that anticipated seismic displacements for the proposed fill batters are likely to be moderate to large. Mitigation measures will be required for these batters to reduce displacement risk under ULS earthquake loading. A feasibility-level design should be provided to demonstrate that suitable mitigation options are achievable.	In Section 8.2 we acknowledge that mitigation measures will be required for all fill batters due to the expected seismic displacement; mitigation will likely be either reducing the slope angles or geogrid reinforcement. We provide a slope model of the slope with the largest expected displacements (Section B) which includes the installation of geogrid beneath the building platforms. This indicates that it is possible to achieve a reduction in the expected displacement. With the geogrid as shown the displacement reduces from 340-440mm to 100-200mm in a ULS event. Note that this geogrid arrangement is not the final design.	We consider this is sufficient and this should be included as a consent condition.	The Applicant will discuss condition drafting with PCC.	Resolved subject to consent conditions.	To close this matter, we propose conditions 29 and 30.

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Updated by: Shirley Wang on 15 July 2026
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Revised by: Shirley Wang on 30 July 2026

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Drainage, Erosion and Fill Performance						
8	Please provide design details of subsoil drainage for fill slopes over gullies or within areas of significant fill depth, including discharge locations.	Slope specific subsoil drainage for fill slopes will be designed in conultation with the civil engineer. Typically, a subsoil drain will be placed up the centre of the gully at the beginning of the project. After this, laterial subsoil drains will be placed at the rear of the fill embankments at 1/3rd increments up the slope which tie into the central gully drainage trench. Additionally, during earthworks, if seepage is encountered during excavation of fill benches, this will be captured with drainage (wrapped novocoils) tied into the centre gully drainage trench.	We consider this is sufficient and this should be included as a consent condition.	The Applicant will discuss condition drafting with PCC.	Resolved subject to consent conditions.	To close this matter, we propose conditions 29 and 30.
9	ENGEO recommends diverting free-flowing water away from fill slopes and applying hydroseeding. However, the erosion control approach is not clearly defined, including surface water interception, drainage pathways, and discharge locations. Further detail is required.	The 10-year event is contained within the piped network, with erosion protection detailed at each outlet and discharge locations shown on the stormwater design plans. Scour and erosion for stormwater outlets will be designed in accordance with the SMP (Section 6.14) and detailed at detailed design. Given the steep network, 100-year flows are largely contained within the network; where overland flow occurs, it runs down the batters at shallow depths and low velocities, with batters to be planted. The 100-year flow paths are shown in the Envelope Flood Risk Assessment and Flood Maps.	We consider this is sufficient and this should be included as a consent condition.	The Applicant will discuss condition drafting with PCC.	Resolved subject to consent conditions.	To close this matter, we propose conditions 29 and 30.
10	If seepage is encountered in exposed cut faces, please comment on mitigation measures to manage slumping, muddy flows, and other associated instability.	If this occurs, drainage will be installed/drilled into the slopes to discharge to the base of slope.	We consider this is sufficient and this should be included as a consent condition.	The Applicant will discuss condition drafting with PCC.	Resolved subject to consent conditions.	To close this matter, we propose condition 49.
11	Please provide details of measures to manage surface water and groundwater infiltration.	Surface water is managed in accordance with the stormwater plans and SMP, with flows directed through the network to the designated management areas and devices	We consider this is sufficient and this should be included as a consent condition.	The Applicant will discuss condition drafting with PCC.	Resolved subject to consent conditions.	To close this matter, we propose condition 51.
12	In the slope stability analysis, please consider the potential for increased pore water pressure or saturation of fill embankments due to surface water infiltration, particularly where site-won materials contain a high proportion of fines.	In our slope models we have modelled each slope with raised groundwater as well as a saturated fill surface to consider the effects of surface water infiltration.	Further clarification is required. What are the types of structural fill are anticipated and do the adopted soil parameters adequately represent these materials in the slope stability modelling to account for increased pore water pressure or saturation of fill embankments due to surface water infiltration, particularly where site-won materials contain a high proportion of fines.	Structural fill will be blend of Greywacke rock with minor loess as is the industry standard within the area. The fines content is anticipated to be less than 25%; proctor and PSD testing will be undertaken during earthworks in line with an earthworks management plan. We consider that the parameters used in the slope stability modelling are representative of this type of fill.	Resolved.	
13	Some fill embankments will disrupt existing natural drainage paths. Please outline mitigation measures to maintain overland flow continuity.	All existing flow paths have been designed with outlets to match the pre-development discharge. This has been informed by ecology and hydrology input to ensure existing hydrology and flow paths are respected	We consider this is sufficient and this should be included as a consent condition.	The Applicant will discuss condition drafting with PCC.	Resolved subject to consent conditions.	To close this matter, we propose consent condtions 18g).
14	Discharge locations of stormwater pipes are shown; however, outlet details are not provided. If discharging to gullies, please confirm whether erosion assessments have been undertaken and provide details of mitigation measures.	Scour and erosion for stormwater outlets will be designed in accordance with the SMP (Section 6.14) and detailed at detailed design.	We consider this is sufficient and this should be included as a consent condition.	The Applicant will discuss condition drafting with PCC.	Resolved subject to consent conditions.	To close this matter, we propose consent condtions 29 and 30.
15	For cut batters greater than 8 m where loess soils are present, please provide details of the proposed erosion design to mitigate the development of tunnel gullies.	Erosion controls will need to be slope-specific and will be completed at detailed design stage. Surface water will be directed away from the cut slopes with the use of cut-off drains at the crest of slopes and slopes will be planted to minimise erosion. SED zones will be detailed in the completion report if loess is present on building platforms.	We consider this is sufficient and this should be included as a consent condition.	The Applicant will discuss condition drafting with PCC.	Resolved subject to consent conditions.	To close this matter, we propose consent conditions 29.
Materials, Settlement and Ground Conditions						
16	ENGEO considers the risk of collapsible soils to be very low; however, this is not clearly justified given the presence of loess.	Where there is loess soil beneath structures, the majority of the this will be removed therefore the risk is low. Where loess remains, drainage will be installed to direct water away. SED zones will be detailed in the completion report if loess is present on building platforms.	We consider this is sufficient and this should be included as a consent condition.	The Applicant will discuss condition drafting with PCC.	Resolved subject to consent conditions.	To close this matter, we propose consent conditions 49.
17	Please comment on the erodibility of loess soils and the potential effects of sediment generation on stormwater systems, including proposed management measures.	Where stormwater flows over loess soil, erosion is possible. Overall sediment loss will be reduced with retirement from grazing, planting and stormwater diversion. Rain gardens have been designed in accordance with Wellington Water standards and will capture 90% of sediment from the reticulated stormwater system. The project ecologist has confirmed that there will be some natural load from undeveloped areas of the site into retention wetlands, but this will be less than is occurring at present and wetlands will be able to receive the sediment without needing to be cleaned out. Stormwater flow will not be concentrated within loess cuts or embankments.	We consider this is sufficient and this should be included as a consent condition.	The Applicant will discuss condition drafting with PCC.	Resolved subject to consent conditions.	To close this matter, we propose consent conditions 29 and 49.
18	ENGEO notes potential differential settlement for buildings on mixed cut and fill ground; however, the feasibility of foundation solutions to address this has not been demonstrated and requires clarification.	Where this occurs this will be clearly stated in the completion report as a specific engineer design zone and will need to be considered during house design - by a notice on the title if required	We consider this is sufficient and this should be included as a consent condition.	The Applicant will discuss condition drafting with PCC.	Resolved subject to consent conditions.	To close this matter, we propose consent condition 93.
19	Please identify contingency measures to address potential subgrade settlement.	If soft subgrade is encountered, this will be excavated and removed.	Further clarification is required. Please specify the likely extent and voulme of soft subgrade excavation and if this is feasible for the proposed development	It is not possible to provide expected volumes of soft subgrade as this cannot be known prior to earthworks. The earthworks specification will be followed during earthworks to identify any subgrade that is unsuitable and this will be removed as cut to waste. Given that, as previously mentioned, all soil will be removed down to rock from anywhere that structures/batters are proposed within gullies, and that the majority of the development will be on the ridges which will be cut down into rock, the volume of potential soft soil is expected to be manageable, especially for a development of this scale.	Resolved subject to consent conditions.	To close this matter, we propose consent conditions 49 and 93.

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20	Please outline remedial options for areas containing non-engineered fill, weak ground, or unsuitable materials where undercutting is not feasible (e.g. due to groundwater).	We do not anticipate any non-engineered fill in areas where it cannot be excavated. In the unlikely event that areas of weak ground or unsuitable material are encountered where structures are required, preloading of the ground may be utilised.	Further clarification is required. Please advise remedial options for areas where shallow groundwater is present and preloading is impractical due to site constraints.	As described above, investigations indicates that rock is present at 1.4 to 6mbgl. Any soft material will be removed prior to fill placement via bulk earthworks. If a higher water table exists, drainage and temporary works will be utilised to remove all soft material to foundation Greywacke rock.	Resolved subject to consent conditions.	To close this matter, we propose consent condition 49 and 93.
Stormwater Wetlands and Embankments						
21	ENGEO proposes stormwater retention wetlands using site-won soils; however, ground conditions and associated geotechnical risks in these areas have not been clearly defined. Further clarification is required.	Evaluation of ground conditions and associated geotechnical risks have been assessed based on boreholes and test pits in the general areas as well as laboratory testing. Results are intended to be used to inform derivation of geotechnical parameters and assessment of the embankment geometry and configuration. ENGEO will complete a detailed design report (Overseen by a Recognised Dam Engineer (PIC/DSAP) concerning each of the wetlands which will include: - Determination of pre-development groundwater levels. - Determination of ground model (geological stratigraphy). - Derivation of geotechnical engineering parameters for soils used in modelling. - Computational slope stability and seepage analyses of stormwater embankments. We will complete iterative design of the embankments until acceptable FoS are achieved for all design cases to meet NZSOLD Dam Safety Guidelines (2024). - Consolidation / settlement analysis of embankments (using Settle 3). - Production of a Detailed Dam Design Report summarising laboratory test results and analyses for each of the stormwater embankments, including geotechnical recommendations for soil parameters, design slopes for the proposed stormwater embankments and conduit penetration recommendations. - Liaison with Civil Engineers and complete plan check on their drawings and advise on relevant earthworks specifications pertaining to the Wetland Embankments.	Further clarification is required. Please provide a conceptual design to demonstrate that the proposed wetland embankment is feasible, and all associated geotechnical risks can be mitigated and meet relevant design guidelines and RMA requirements.	Provided	Further clarification is required. To be consistent with Section 106 of the RMA (no acceleration or worsening of, or material damage to, the land or other land), we recommend a feasibility level design shall be provided to the Panel so that the potential effects of the works can be fully understand. The design shall demonstrate acceptable static and post-seismic (ULS) stability including assessment of flow-failure potential, prepared by a CPEng geo-professional. The design shall confirm that no habitable buildings, critical infrastructure or neighbouring land lie within the potential failure runout so that the consequences of failure remain low, consistent with s106 RMA, and shall document the likelihood/consequence framework (NPS for Natural Hazards).	
Earthworks within covenant areas						
22	Covenant areas within the proposed development are protected by way of Conservation Covenants under section 77 of the Reserves Act 1977. Please clarify if proposed earthworks are likely to impact on the two covenant areas shown within Lot 1311.	The Lot 1311 covenant area does not currently exist and will be created through a conservation covenant being placed on the title when created through the subdivision process following the completion of earthworks, refer to proposed conditions of consent 101, 102 and 114 in Appendix 7 of the Substantive Application.	We consider this enquiry is now resolved			