SECTION 53 COMMENTS FLOOD HAZARD RESPONSE

Project	Waikanae North Development
Application reference	FTAA-2603-1194
Site	169-171 Peka Peka Road, Waikanae, Kapiti Coast
Document	Response to comments received under section 53, Fast-track Approvals Act 2024 Flood Hazard
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Date	10 August 2026
Status	Final

1. Purpose and scope

This report responds to the comments received under section 53 of the Fast-track Approvals Act 2024 on the Waikanae North Development substantive application (FTAA-2603-1194) that fall within the flood hazard discipline. It forms part of a set comprising a covering note addressing planning, legal and conditions matters, individual topic area reports, and a tabulated response covering every comment received.

For each topic this report sets out the comment as made, where relevant a response drawn from the application as lodged, and also contains new additional information responding to the comments received where appropriate.

Comments are grouped by topic. Individual comment numbers and commenters are tagged against each topic so that complete coverage can be verified against the Section 53 Comments Register.

2. Author(s) and Code of Conduct

This response has been prepared by Tony Trueman of Awa and Ray O'Callaghan of Ocdl.

Although this document has not been written as a statement of expert evidence, we confirm that at all times we have complied with the Environment Court's Code of Conduct for Expert Witnesses contained in its Practice Note 2023.

3. Comments allocated to this discipline

Topic	Comment reference(s)	Commenter(s)
F1 Off-site flood effects on Paetawa Road properties	5.1, 8.1	5 Nicholas Brown; 8 Paul Westbury
F2 Currency of the flood hazard mapping relied on	5.2	5 Nicholas Brown
F3 Flood risk arising from densification and hard surfacing	11.5, 16.5	11 Kevin & Karen Baker; 16 Glynn & Jennifer Cowley
F4 Flood effects on [redacted] (horse arena and pond)	1.3	1 Sally & John Killick
F5 Recommended conditions and the section 85(3) FTAA test	5.5, 8.1	5 Nicholas Brown; 8 Paul Westbury
F6 Flood hazard classification mapping and duration of road inundation	24.9	24 Greater Wellington Regional Council
F7 Twin barrel culvert blockage scenario	24.9	24 Greater Wellington Regional Council
F8 Climate scenarios, emissions pathway and sensitivity testing	24.9	24 Greater Wellington Regional Council
F9 Maintenance of flood protection infrastructure	24.9	24 Greater Wellington Regional Council
F10 Minimum building floor levels to be set by condition	21.9	21 Kapiti Coast District Council
F11 Provision of the Awa report and macro stormwater modelling	21.11	21 Kapiti Coast District Council

Total: 11 topics covering 10 individual comment issues.

3. Topic responses

F1 Off-site flood effects on Paetawa Road properties

Comments: 5.1, 8.1 | Commenters: 5 Nicholas Brown; 8 Paul Westbury

Comment. Mr Brown comments in his paragraph 4 that the application gives no analysis of flooding impacts on the Paetawa Road properties to the north-west, notwithstanding assessment of effects to the north-east, east and south. Paragraphs 5 – 8 of Mr Brown's comments deal with flooding in the Paetawa Road area in the 2021 – 2022 period and he presents a view that the 2021/22 flooding of approximately 50 properties demonstrates direct correlation between groundwater levels in the local area and flood risk of these properties. Mr Westbury endorses that submission and considers the Panel should either impose Mr Brown's recommended conditions or decline the application.

Response. The Flood Hazard Assessment models the KCDC 2-year, 10-year, 50-year and 100-year 2130 rainfall design events with the design earthworks surface and downstream twin culvert flow control structure incorporated into the model.

The model estimates peak flood water level for each design event across the area modelled (the Waikanae catchment, which includes Te Harakeke Swamp). The model incorporates the potential influence of groundwater level on available depth to groundwater to calculate expected soakage characteristics. The model output has been used to assess expected increases and decreases in maximum flood water levels within the site and the surrounding properties - comparing the pre-development and post-development scenarios.

The results of this analysis are presented in Figures 16 – 19 in the Awa Flood Hazard Assessment of Effects Report. These figures show no difference in estimated maximum flood water levels for all 4 design events adjacent to the Paetawa Road properties at the Te Harakeke Swamp. This is because after detailed assessment the model has established that there will be no changes in expected maximum flood water level at this location.

Mr Brown is incorrect in his assumption that the model did not consider this area. The model has considered this area, as evidenced by Figures 11 – 14 in the Awa report, which show the extent of maximum flood water in the Paetawa Road area for the 4 design events.

We acknowledge that there was notable inundation on parts of some Paetawa Road properties and within the Te Harakeke Swamp in the 2021 – 2022 period and subsequent downstream drain clearance by KCDC reduced the height of the water in the area. Mr Brown considers the extensive inundation during that period was caused by high groundwater levels which were influenced by downstream capacity restrictions. We agree with Mr Brown that there is likely to be a strong correlation between water level in the Te Harakeke Swamp area and downstream drain capacity/invert level control but with the distinction that this correlation is only likely to exist once the groundwater level rises above the invert level of the downstream drainage system. This is because groundwater below ground level is not affected to any material extent by the drain flow capacity or associated degree of drain maintenance.

Maintenance of the drainage system downstream of the Te Harakeke Swamp is the responsibility of KCDC. The applicant has no control over it. It is for KCDC and GWRC to agree on a drain maintenance strategy that balances environmental objectives with flood protection.

What matters for present purposes is whether the development would increase the risk of flooding on neighbouring properties. As discussed above, the Awa modelling demonstrates that there will be no increase in surface water flood risk associated with the development. It is worth noting that the Awa model exercise assumed that management of stormwater runoff from the developed areas within the project site would achieve stormwater neutrality. As Mr Brown points out in his paragraphs 4 and 13, the stormwater management strategy for the western area that drains to Te Harakeke Swamp has some additional surface water runoff from the roads within the western catchment area draining to the Te Harakeke Swamp for ecological enhancement purposes. Any perceived "disconnect" between the stormwater management strategy and the Awa macro flood modelling is discussed in F11 of this response.

However, assuming the final approved stormwater management strategy in the western zone of the site remains as proposed - with houses discharging to tanks and soakage to achieve stormwater neutrality, and runoff from roads to be passed through stormwater treatment basins and discharged to Te Harakeke Swamp without additional detention storage, the additional runoff above existing conditions is estimated to be approximately 825m^3 (3.7Ha catchment of roads, 223m^3/Ha additional volume in 1% AEP – page 31 of SMP). This volume would be discharged to a ponded wetland area (within the site boundaries) of approximately 110,000m^2, resulting in a potential increase in wetland maximum flood water level of approximately 8mm at the peak of the storm event. However, in practice the actual increase is expected to be less than 8mm because it will flow into a much larger water body extending well beyond the site boundaries at the peak of the event. Whichever scenario is being considered, this would result in a negligible increase in water level.

Mr Brown is not correct at his paragraph 14 where he considers peat removal in the eastern part of the site will remove water storage capacity. This is because the area where peat removal is to be carried out is in a different stormwater catchment area and does not drain to Te Harakeke Swamp and the voids within the sand placed to replace the excavated peat will be saturated with groundwater within days of placement where they are within the groundwater system. Thus, the peat removal in the eastern part of the site has no effect on water level at Te Harakeke Swamp. As discussed above, the proposed houses within the Te Harakeke Swamp

catchment will have attenuation and soakage to achieve stormwater neutrality and so they have no measurable effect on water levels at the wetland.

We are therefore highly confident that the proposed development will not contribute to the conditions that led to the flooding in the Paetawa Road area in 2021 -22, as claimed by Mr Brown at his paragraph 15. As mentioned already, those conditions were created by downstream management, rather than any activity being undertaken on the site.

The proposed conditions include a requirement to carry out final macro flood modelling at detailed design stage with the model incorporating the final stormwater management discharge (if any) from the development into the macro model catchment assessment. This will ensure final design captures all stormwater inputs as part of the final flood assessment.

F2 Currency of the flood hazard mapping relied on

Comments: 5.2 | Commenters: 5 Nicholas Brown

Comment. Mr Brown submits that Figure 51 of the application and Figure 2 of Appendix 20 rely on the older KCDC Flood Hazard Planning Maps, which show no Paetawa Road flood risk only because the area was never modelled; that KCDC's 2025 modelling shows many of those properties at risk; and that a revised draft map is due imminently. He urges the Panel to obtain the 2025 draft map.

Response. The Awa model assessment is based on the KCDC Local Waikanae TUFLOW models for the 2-year, 10-year, 50-year and 100-year 2130 events, based on the KCDC 2017 LIDAR data and conducted in the 1953 Chart Datum. Mr Brown's reference to KCDC's 2025 model output is essentially the same model but using 2025 LIDAR data and with an adjustment in vertical datum to the 2016 NZ vertical datum. Awa has carried out the updated modelling for KCDC and confirms that the change to the 2025 LIDAR inputs is not resulting in any appreciable change in estimated flood water depth where there have been no changes to ground surface from activities such as earthworks. The datum change only affects the relative level (RL) in the way the information is presented. There have been no changes to ground levels within the site area, and the 2017 LIDAR information is therefore still appropriate for this assessment. The Awa assessment report can therefore be relied upon in considering estimated maximum flood water levels associated with the proposal.

F3 Flood risk arising from densification and hard surfacing

Comments: 11.5, 16.5 | Commenters: 11 Kevin & Karen Baker; 16 Glynn & Jennifer Cowley

Comment. Mr and Mrs Baker submit that the site is flood-prone for 2 to 100-year events, that Figure 51 shows the majority of the build area as flood-prone, and that converting free-draining sand to impervious surfaces will increase flood risk on site and to neighbours, worsened by climate change. Mr and Mrs Cowley submit that some properties already flood in heavy rain and that significant groundworks plus increased hard surfaces would pose additional risk to lower-lying properties or create a problem for ratepayers to resolve.

Response. The design situation modelling incorporates the proposed earthworks and mitigation and demonstrates the resulting flood hazard within the site, with flows from the three culverts east of the site conveyed through design channels into storage and attenuation areas in the low-lying parts of the site, and the design open channel increasing conveyance and storage. Low impact design is the primary form of stormwater mitigation, using soakage and attenuation within lots, road reserve and open space. Notwithstanding that the finished surfaces will be above flood water levels, recommended minimum building floor levels are to be specified to ensure the houses are above design flood water levels. The modelling is undertaken against 2130 climate-adjusted events, so climate change is incorporated rather than omitted.

The flood assessment presented in the Awa report discusses potential changes in estimated maximum flood water level on properties adjacent to the site and concludes the development can be implemented with less than minor effects on surrounding flood levels, with decreases in existing peak flood depths in a number of surrounding properties as a result of the development mitigation design. The only property that is modelled to experience a slight increase in flood levels ([redacted]) has provided a comment in support of the proposal.

F4 Flood effects on [redacted] (horse arena and pond)

Comments: 1.3 | Commenters: 1 Sally & John Killick

Comment. The Killicks seek assurance on flood mitigation for the rear of their property, having invested in a horse arena and pond.

Response. The Flood Hazard Assessment has confirmed that there will be no increase in flooding risk to this property from surface water flooding. The proposal does not raise water levels in the Te Harakeke Swamp to any material extent, and the design maintains hydrological independence from the swamp, as discussed in topic H4.

F5 Recommended conditions and the section 85(3) FTAA test

Comments: 5.5, 8.1 | Commenters: 5 Nicholas Brown; 8 Paul Westbury

Comment. Mr Brown recommends a suite of conditions and raises the section 85(3) FTAA refusal test and a tort and statutory-authority concern that Paetawa Road owners may have no redress. Mr Westbury submits the Panel should impose those conditions or decline under Schedule 5, clause 17(5).

Response. The technical response to the individual conditions sought is at Topic H5. The statutory questions raised are addressed in the covering note at Topic P4.

F6 Flood hazard classification mapping and duration of road inundation

Comments: 24.9 | Commenters: 24 Greater Wellington Regional Council

Comment. Greater Wellington's Flood Advisory team records that egress from several properties is shown to be affected during smaller, more frequent flood events as well as during the 1% AEP event, and that several roads are expected to be significantly inundated during moderate to severe flood events, restricting access and egress. Flood depths greater than 0.5 metres may prevent emergency vehicles from reaching parts of the development. Greater Wellington considers further assessment is required to understand the implications for movement within the completed development, including whether people could safely walk or drive through inundated areas, and asks that the applicant provide flood hazard mapping using the Australian Rainfall and Runoff H1-H6 hazard classifications to inform emergency management planning, together with comment on the duration of road inundation.

Response. The Flood Hazard Assessment presents design situation modelling of peak depths for the 2-year, 10-year, 50-year and 100-year 2130 events with the design earthworks and mitigation in place.

The model has used the design surface created by the earthworks model. The earthworks model design surface is a preliminary design surface developed to sufficient detail to confirm engineering aspects such as earthworks volumes, road gradients, minimum gradients for services, stormwater sub-catchment areas and the relationship between the design surface and the flood model output. The earthworks surface model does not include stormwater drainage elements such as sumps, stormwater pipes, specific swale design etc because that level of information is not usually necessary at this consenting/preliminary design phase.

Conversely, the Awa macro flood model does not incorporate (at this stage) the final design road levels, road drainage elements and wider stormwater drainage pipes etc because the macro model assumes the stormwater runoff from within the development will achieve stormwater neutrality. Hence, the Awa macro model has simply accumulated the rainfall within the developed areas without discharge through road drainage elements. Therefore Figures 11 – 14 in the Awa report that show ponded depth for the 2-year, 10-year, 50-year and 100-year return period rainfall events, with allowance for climate change, do not accurately reflect ponding depth on the proposed development footprint i.e. roads and lots. As this aspect of the model output is not relative to the assessment of the wider potential flood effects no attempt was made in the Awa model to adjust the model output relating to internal roads.

The conclusion by GW that ponding depths on the roads might reach as much as 0.5m may have been based on their assessment of these figures in the Flood Hazard Assessment report, which indicate potential ponding depths of 0.2 – 0.5m.

The design has not placed any weight on the Awa model output relating to ponding on the proposed roads for the reasons outlined above. However, maximum ponding on roads is controlled by KCDC Land Development Minimum Requirements 2022 (LDMR22). The LDMR specifies that ponded water depth on roads, in a 1% AEP must not exceed 0.2m. Section 6 (page 30) of the Engineering & Infrastructure Report states the final approved road design will comply with the KCDC LDMR22 requirements. This is further captured by proposed KCDC condition 26 which requires the detailed stormwater design to be in accordance with the LDMR and condition 26(b) that specifically relates to final road levels.

We therefore consider that flood ponding depths will be managed through the detailed design stage to ensure that they do not exceed 0.2m and they will comply with Council's LDMR requirements. We are confident that these outcomes can and will be achieved at detailed design.

F7 Twin box culvert blockage scenario

Comments: 24.9 | Commenters: 24 Greater Wellington Regional Council

Comment. Greater Wellington records that the twin-box culvert at the downstream end of the Lower Ngarara Wetland Cluster requires further consideration through detailed design. The culvert has been modelled with a 50% blockage assumed to represent sediment build-up, and Greater Wellington considers that this blockage scenario, including the potential for both sediment and debris accumulation, should be tested during detailed design to confirm that the culvert can operate as intended and that no adverse flood effects would result. Greater Wellington seeks a condition to that effect.

Response. The downstream twin box culvert structure is modelled as throttling peak flows, resulting in an increase in peak flood depths within the low-lying design storage and attenuation areas, which is the intended design behaviour. The catchment area immediately upstream of the culvert structure, within the development site is very flat with peak flood water gradients of less than 0.01%, resulting in very low flow velocities approaching the culvert structure. These low gradients reduce the risk of culvert blockage because the low flow velocity has very limited energy to transport vegetation to the culverts. In addition, the catchment within the site is largely protected from receiving large vegetation and trees from above the site by the culverts beneath the Kapiti Expressway at the eastern boundary of the site. A further mitigating factor indicating there is, at most a minimal risk of blockage is the relatively large size of the twin culvert system and the controlled secondary flow path over the weir if partial blockage occurs. It is therefore concluded that culvert blockage assessment at detailed design is not expected to raise any design issues. Notwithstanding these factors, an amendment to condition 131 requiring the inclusion of an assessment of partial blockage on design water levels at detailed design can be provided.

F8 Climate scenarios, emissions pathway and sensitivity testing

Comments: 24.9 | Commenters: 24 Greater Wellington Regional Council

Comment. Greater Wellington records that it is unclear which climate scenarios have been used in the Awa modelling, noting that Awa's projections extend to a 2130 horizon whereas Landlink's stormwater assessment extends only to 2090, and that it is also unclear which emissions pathway or scenario Awa has adopted. Greater Wellington considers sensitivity testing should be undertaken for key flooding scenarios and model parameters, including blockage of culverts and outlets from both debris and sedimentation, changes in hydraulic roughness, and elevated groundwater levels coinciding with rainfall events. It seeks that details of the climate scenarios, sensitivity analysis and emissions pathways used in flood modelling be provided.

Response. The Awa Flood Hazard Assessment uses the KCDC 2-year, 10-year, 50-year and 100-year 2130 Local Waikanae TUFLOW models, modified with the design earthworks and mitigation measures. This model process is to assess macro flooding issues and assess effectiveness of the proposed design mitigation solutions to confirm an acceptable solution for flood protection. By necessity, the assessment incorporates a 2130 design horizon with the required allowance for climate change. The climate change allowance incorporated into the Awa model is SSP5-8.5M and for groundwater the 50th percentile 2130.

In contrast, the design of the stormwater management solutions within the site are controlled by KCDC LDMR22 requirements. Clause 4.2.9 of this document requires the design to be based on 2090 rainfall criteria which have been set by KCDC and have a mid-range allowance for climate change. Landlink have based the Stormwater Management Plan on this document, as required by KCDC.

We confirm there is no material inconsistency and that a best practice approach has been taken for both modeling exercises for the surface water management design solutions.

F9 Maintenance of flood protection infrastructure

Comments: 24.9 | Commenters: 24 Greater Wellington Regional Council

Comment. Greater Wellington records that significant flood protection infrastructure is proposed but that details of the maintenance requirements, including design life, and how maintenance will be carried out - for example where sediment and debris can be removed - are not provided. It seeks conditions ensuring the detailed design addresses these matters.

Response. The consent holder is required to remain responsible for structures and to monitor and maintain them (Appendix 33, Condition 134), and to provide a monitoring and maintenance plan to the Manager within a specified period (Condition 135). The applicant does not oppose a condition making the maintenance requirements for flood protection infrastructure explicit. The consent for stormwater structures will transfer to KCDC as the structures pass to KCDC as part of the 224(c) certification process for each completed stage.

F10 Minimum building floor levels to be set by condition

Comments: 21.9 | Commenters: 21 Kapiti Coast District Council

Comment. Kapiti Coast District Council's preference is for minimum building floor levels to be explicitly defined through the consenting process rather than through building consent or engineering approval. KCDC considers this provides certainty for both Council and future landowners and helps prevent subsequent earthworks or site modifications that could alter overland flow paths, reduce flood storage, or otherwise increase flood hazard on neighbouring properties, and seeks suitably worded consent conditions stipulating minimum building floor levels.

Response. The Flood Hazard Assessment recommends minimum building floor levels that would be achieved at a site wide scale through a finished earthworks surface. Notwithstanding that site-wide solution, specifying those levels through conditions is not opposed, rather than being a matter to be left to the engineering approval or building consent stage. The applicant will prepare a proposed condition of consent that secures this outcome, with the provision that final minimum floor levels for each lot adjacent to floodable areas shall have a minimum floor level set in 2016VD terms by the updated flood assessment at time of detailed design and these levels shall be certified as having been constructed via a certificate from a licensed surveyor at time of 224(c) certification and the levels shall be recorded on the titles by consent notice.

F11 Provision of the Awa report and macro stormwater modelling

Comments: 21.11 | Commenters: 21 Kapiti Coast District Council

Comment. Kapiti Coast District Council seeks provision of the Awa report for review in relation to the Stormwater Impact Assessment report and macro stormwater modelling.

Response. The Awa report was provided as part of the Application at Appendix 20. The underlying modelling supports the Flood Hazard Assessment at Appendix 20. The Stormwater Management Plan at Appendix 16 provides the framework for management of stormwater within the site. The areas of concern raised at point 11 of KCDC's comments are covered by the responses set out in F1 – F9 above.