

**BEFORE THE INDEPENDENT HEARINGS PANEL
APPOINTED ON BEHALF OF THE WAIMAKARIRI DISTRICT
COUNCIL**

UNDER the Resource Management Act 1991

AND

IN THE MATTER OF the Proposed Waimakariri District
Plan - Hearing Stream 12E -
Rangiora, Kaiapoi, Woodend,
Variation 1

AND the submissions of B & A Stokes on
the Proposed Waimakariri District
Plan (#214) and Variation 1 (#29)

**JOINT WITNESS STATEMENT
Stormwater**

Dated: 30th September 2024

1 INTRODUCTION

- 1.1 This joint witness statement relates to submissions made by B & A Stokes on the Proposed Waimakariri District Plan (**PDP**) and Variation 1 to the PDP (**Variation 1**), requesting the rezoning of their land at 81 Gressons Road and 1375 Main North Road, Waikuku (the **Site**) to enable residential development on the Site in accordance with an outline development plan (**ODP**) (the **Proposal**).
- 1.2 It specifically relates to three matters addressed in the s.42a Report that the Panel have requested to be conferenced between engineers:
- (a) downstream capacity for stormwater, both through the culverts under State Highway 1 (SH1), and beyond;
 - (b) the effects on infrastructure relating to different yields that the subdivision may eventually evolve into. Particularly in respect of the PDP requirements to achieve 15 households per hectare; and
 - (c) the rule framework, and/or other mechanisms that will ensure the necessary upgrades occur prior to development commencing, and/or are appropriately staged as development occurs.
- 1.3 The stormwater joint witness conference attendees are as follows:
- (a) Andrew Hall (**AH**) on behalf of the Stokes.
 - (b) John Aramowicz (**JA**) on behalf of the Waimakariri District Council.
- 1.4 Conferencing took place on Thursday the 12th September 2024.
- 1.5 This joint statement has been prepared in accordance with sections 9.4 and 9.5 of the Environment Court Practice Note 2023, which relates specifically to expert conferencing. The attendees confirm they have read, and agree to abide with, the updated Code of Conduct for Expert Witnesses included in Section 9 of the Environment Court Practice Note 2023.

- 1.6 This joint witness statement sets out all matters that we discussed that were agreed and not agreed by the relevant experts, with an outline of the reasons for disagreement provided, where appropriate.
- 1.7 It is assumed that all submitted evidence has been reviewed and understood as a precursor to this joint witness statement.

2 MATTERS AGREED

Stormwater design criteria

- 2.1 Clause 5.4.5 of the Waimakariri District Council's Engineering Code of Practice (ECoP) states '*Development must not increase upstream or downstream flood levels, unless any increase is negligible and can be shown to have no detrimental effects*'. Refer below;



WAIMAKARIRI
DISTRICT COUNCIL

ENGINEERING CODE OF PRACTICE

QP-C814
Issue: 4
Date: 16/09/19
Page 11 of 33

Part 5: Stormwater & Land Drainage

5.4.5 Catchments and Off-Site Effects

All stormwater systems must provide for the collection and controlled disposal of surface water from within the land being developed, together with any existing run-off from upstream catchments. In designing downstream facilities, consider the upstream catchment to be fully developed, including both the existing zoning and any catchment management plans.

For all land development works (including projects involving changes in land use or coverage), include an evaluation of stormwater run-off changes on upstream and downstream properties. This evaluation will generally be required at the resource consent stage.

Development must not increase upstream or downstream flood levels, unless any increase is negligible and can be shown to have no detrimental effects.

Investigate downstream impacts including changes in flow peaks and patterns, flood water levels, contamination levels, erosion or silting effects, and effects on the existing stormwater drainage system. Where such impacts are considered detrimental, mitigation measures (e.g. peak flow attenuation, velocity control, contamination reduction facilities) on or around the development site, or the upgrading of downstream stormwater disposal systems at the developer's expense, will be required.

- 2.2 Clause 5.5.2 of WDC's ECoP details the standards to be met for land drainage systems. As part of this clause there is reference to the District Plans chapter relating to Natural Hazards. Refer below;

5.5.2 Minimum Protection Standards for New Developments

Design all new surface water and land drainage systems to cope with design storms in accordance with Table 5.1 and *WWDG Part B* chapters 20, 21 and 22.

Table 5.1 Design Storm AEP for System or Infrastructure

System or Infrastructure	AEP
Primary reticulation system – general	20%
Primary reticulation – Rangiora and Kaiapoi CBD	10%
Secondary flowpaths	2%
Culvert (Refer also NZTA Bridge Manual Clause 2.3 for heading up and maximum levels below road surface).	10%
Bridge (Refer also NZTA Bridge Manual Appendix A3 for minimum clearance above water level).	1%

Post-development peak flows for all intensity events shall be less than pre-development flows.

The minimum floor level must be as specified in the *District Plan Chapter 27: Natural Hazards* where those plans apply, otherwise as specified in the Building Code E1/AS1 subject to the limitations of that document. Where neither document is applicable, specific flooding design shall be required to demonstrate compliance with the Building Code.

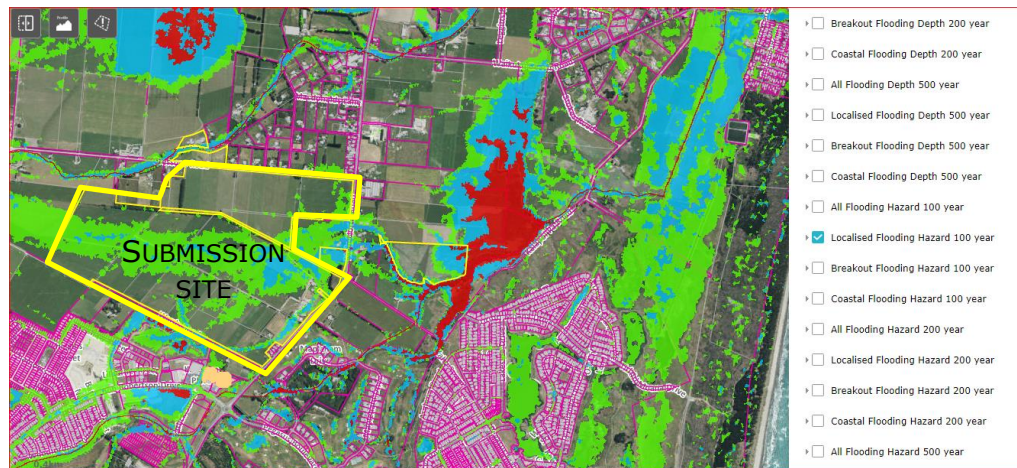
Note:

- The Building Code requires that the floor height must be above the 2% AEP (annual exceedance probability) flood level, plus a set freeboard depending on the building site. Freeboard is the provision for flood level design estimate imprecision, construction tolerances and natural phenomena (e.g. waves, debris, aggradations, channel transition and bend effects) not explicitly included in the calculations.
- Discuss commercial and industrial developments with special circumstances with the Council.
- In circumstances where ponding water on roads will exceed 100 mm a greater freeboard may be required.
- It is the responsibility of the developer to identify the 2% AEP level and ensure the accuracy of that information.

Discuss protection standards in tidal areas with ECan and the Council at an early stage. Storm surge and tsunami hazards, climate change, the *District Plan* requirements, and sea level rise must be considered, and a precautionary design approach is recommended.

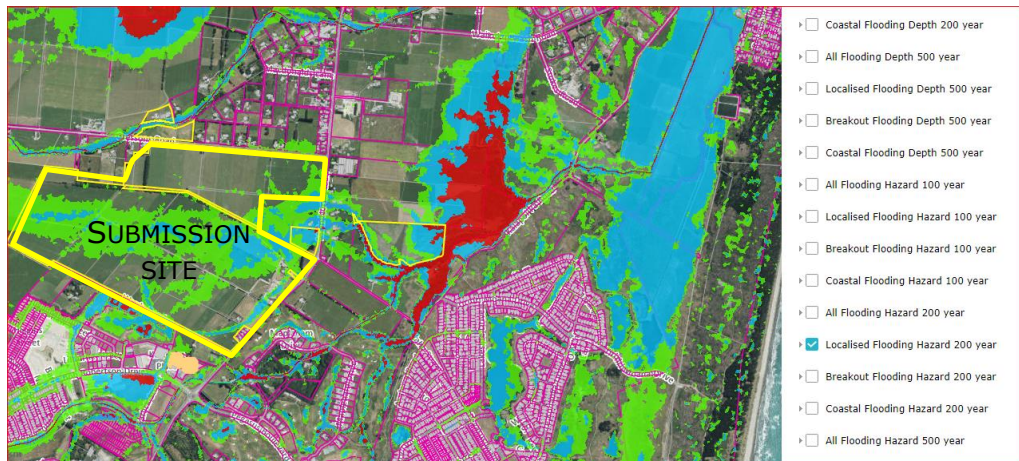
Existing flood hazard

2.3 The Waimakariri District Council’s 1-in-100 year Localised Flood Hazard modelling indicates there is an area of High flood hazard (red shading) that starts around 215m downstream (east) of the site. Refer below;



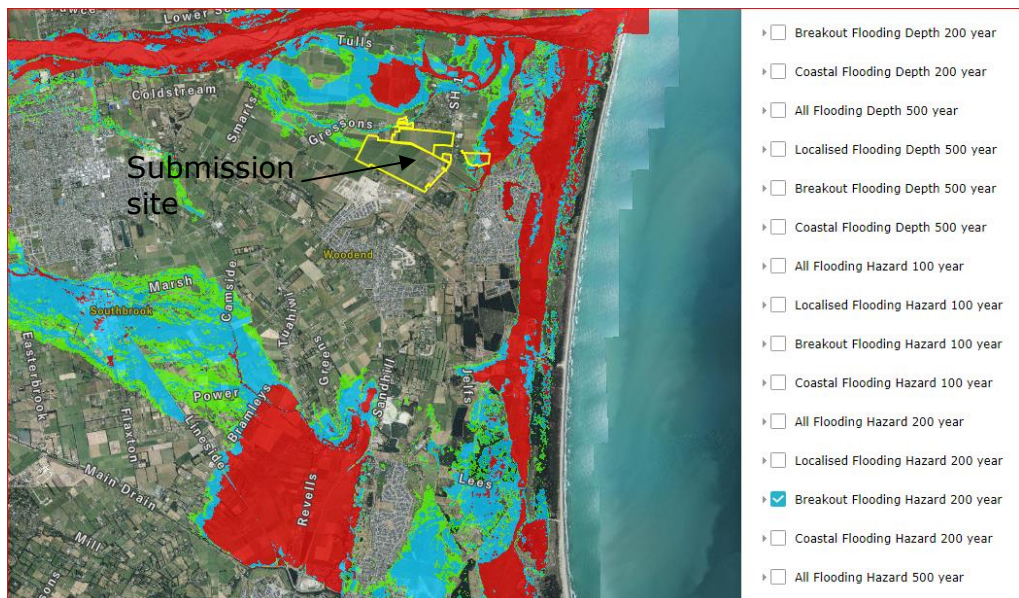
2.4 The Waimakariri District Council’s 1-in-200 year Localised Flood Hazard modelling indicates there is a similar area of High flood hazard

(red shading) that starts around 215m downstream (east) of the site. Refer below;



2.5 In summary, for the Localised Flood Hazard, there is only a minor difference between the 100yr and 200yr High Hazard areas.

2.6 The Waimakariri District Council's 1-in-200 year Ashley River Breakout Flood Hazard model indicates there is a much larger area of High flood hazard (red shading) that will occur in a Breakout scenario that would affect large areas to the east. Refer below;



Downstream effects

2.7 Flood modelling needs to be carried out to assess the potential effects to the downstream environment that could arise from the discharge of stormwater from the proposed development in a 1 in 200 year event, particularly for the Localised Flood Hazard scenario as the existing High

Hazard area is tidally influenced and drainage is limited by way of tide-gates that are located further north near the Ashley River.

- 2.8 At this stage, flood modelling to investigate the potential effects from the proposed development has not been undertaken by the submitter.
- 2.9 Given this, it is unknown if the proposed discharge of stormwater from the proposed development of the Stokes land will have any adverse effects to the downstream environment.

Onsite effects

- 2.10 There is an area of Low-Medium flood hazard that extends from west to east across the mid part of the submission site. Refer to flood hazard images above.
- 2.11 It is agreed that the design of onsite stormwater treatment and attenuation for a future subdivision will need to satisfy the minimum standards set by the most recent version of Waimakariri District Council's Engineering Code of Practice. This has been detailed in item 2.2.
- 2.12 The evidence previously submitted indicates the rate of discharge of stormwater from the proposed development can be limited to peak pre-development flowrates for a 1 in 50 year storm event. This can be achieved using onsite stormwater attenuation basins and/or wetlands.
- 2.13 However, the proposed development will increase the total volume of stormwater runoff from the site, compared to pre-development conditions. The effect of this increase in total stormwater volume that will need to be discharged to the downstream environment has not been assessed by flood modelling.
- 2.14 Should the modelling indicate that more than negligible effects could occur, then this would typically be mitigated by provision of additional on-site attenuation of stormwater.
- 2.15 The ability to avoid any more than minor increase in the flood hazard to downstream property should be demonstrated as part of site-specific Flood Modelling. For land that is zoned for residential development, this would need to be undertaken prior to application for Subdivision Consent, and in conjunction with the detailed engineering

design aspects associated with stormwater, including the attenuation of the 2%AEP event and the establishment of Finished Floor Levels on the development site.

Effect of minimum Site Yield on Infrastructure.

- 2.16 The areas needed for stormwater treatment, attenuation and conveyance will depend on the results of Flood Modelling, along with appropriate runoff coefficients to be agreed with Council at the time of Detailed Design.
- 2.17 A higher housing density will typically require larger areas to be set aside for on-site stormwater management.
- 2.18 Wastewater and water supply networks will be sized to meet the demand created by a particular consented site yield.

Mechanisms for the funding of Infrastructure

- 2.19 It is agreed between the two parties that the funding of infrastructure can be carried out under one or more of the existing methods accepted by Council. Those being
- (a) Fully developer funded where the only beneficiary is the developer
 - (b) By the developer paying Development Contributions towards existing Council Infrastructure projects detailed in the WDC Long Term Plan and as approved in the Subdivision Consent.
 - (c) By way of an agreement between the Council and the Developer for shared infrastructure. Examples of an agreement may be a Private Developer Agreement (PDA) or and Infrastructure Provision Agreement (IPA).

3 MATTERS OF DISAGREEMENT

John Aramowicz

- 3.1 The submitter has not demonstrated the proposed rezoning and a future subdivision of the site can be undertaken in a manner that does not result in a more-than-minor increase in the areas of medium-high flood hazard downstream.

- 3.2 I accept that detailed flood modelling would need to be carried out to support an application for subdivision consent and for detailed engineering design.
- 3.3 However, high-level flood modelling should have been undertaken to support the Applicant's submission for rezoning as it would;
- (a) ensure any potential adverse effects to the existing areas of medium and high flood hazard that are present just downstream are identified, and if adverse effects are shown, then to;
 - (b) demonstrate that, for instance, additional on-site attenuation will be an effective form of mitigation, and/or
 - (c) identify if infrastructure upgrades will be necessary to mitigate the potential effects, such as by upgrading the flow channels and/or the tide-gates downstream of the Stokes property,
 - (d) estimate the area of any additional land on the submission site that is likely to be needed to avoid a more-than-minor increase in the flood hazard to downstream properties

Andrew Hall

- 3.4 Clause 5.5.2 of WDC's ECoP details the standards to be met for land drainage systems. This clause is detailed in item 2.2 above. The last paragraph of clause 5.5.2 details that protection standards in tidal areas needs to be discussed with WDC and ECan at an early stage. This proposal is not in a tidal area. The average site level is approximately 7.5m above mean sea level.
- 3.5 Regardless of this, modelling is underway to determine the potential effects of the proposed development on tidal levels. This modelling would have been initiated earlier had we known that this was the specific stormwater detail required by the Council. We did not learn this until we met post hearing. A pre-hearing meeting with Council Engineers had been requested by the applicant, but we were denied. If we had been allowed to meet pre-hearing, then the modelling would be completed by now. DHI have been instructed to model the 1/200 year event to determine any effects on tidal levels. These results will not be due until the end of October.

- 3.6 I have never been requested to provide evidence of the effects of a development on tide levels, for developments outside of tidal areas.
- 3.7 I have never seen consent conditions requiring additional storage on a development site, beyond the critical 1 in 50 year event, to deal with the effects of the development on tides.
- 3.8 I have read the Joint Witness Statement for the Hearing Stream 12D: Ōhoka Submission and note that the item 4 relates to Tidal Effects. The experts agreed here that there is no effect.
- 3.9 I have read the supplementary evidence of Gregory Mark Whyte on behalf of Hearing Stream 12e - Mike Greer Homes NZ Limited. The evidence shows that the tidal effects of the 1 in 200 year event are negligible.
- 3.10 The WDC flood modelling currently assumes an arbitrary 1.0m Sea Level Rise at the coast. The models contain a static 1.0m high water level boundary condition. This 1.0m contingency is significantly more than what would be expected in any effects from development.
- 3.11 In the unlikely event that the effects are more than minor, the best way to deal with it is the addition of storage to the basins already proposed. Alternatively, the effects may be mitigated through the alteration of the tide gates or maintenance of the waterways. However, the modelling to determine the effects can only be completed where there is detail about the housing density, runoff coefficients, the dynamics of the 2% AEP storm facilities, and the conditions arising from the Regional and District Council Consents. At this stage we do not have the detail to meet the criteria stipulated in the points that JA makes in item 3.3. We simply are not in a position to justify an accurate model.
- 3.12 The detailed design of the stormwater system for a development is undertaken as part of the Subdivision Consenting and Detailed Engineering Design. The modelling is part of this process. The stormwater issues arising here can all be resolved at the time of Subdivision Consent when other relevant details become finalised and the full effects of development become apparent.

3.13 It is my opinion that any greater than minor effects on tidal water levels, created by the proposed re-zoning, can be dealt with at the time of Subdivision Consent and mitigated within the detailed design.

Signed:



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John Aramowicz on behalf of Waimakariri District Council

Signed:



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Andrew Hall on behalf of B & A Stokes