

Memo



Date	13/09/2026	Job No	26501
To	Tiffany Gower	From	Jon Bell

Project Name Proposed Plan Change 3

Subject Response to Flood Hazard Issues Raised by Submissions

Introduction

My full name is Jonathon David Bell, and I am currently employed by Fox Environmental as a Principal Rivers and Hydraulic Engineer. I have been engaged by Rangitikei District Council to assess and provide guidance on matters associated with flood hazard for Proposed Plan Change 3.

I hold the qualification of Master of Engineering from Cardiff University, UK. I am a Chartered Professional Engineer and am a Chartered Member of Engineering New Zealand. I am currently the Deputy Chair of the New Zealand Rivers Group (a joint technical interest group of Engineering New Zealand and Water NZ).

I have 19 years of professional experience as a civil engineer with a particular interest in flood risk and river management. I have experience in the assessment of flood risk, hydraulic modelling, and the development of flood mitigation solutions. I also have experience of working with both Regional and Territorial Authorities to consider flood risk as part of Plans and Policies.

I started work on PPC3 in 2025 and have undertaken assessments of flood hazards for the Growth Area BUL02, BUL03, MAR01, MAR02, & MAR07.

I confirm that I have read the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2023 and that I have complied with it when undertaking this work and I will continue to comply with it while giving oral evidence.

This memorandum responds to flood-hazard matters raised in submissions on Proposed Plan Change 3 and should be read alongside the flood-hazard assessments prepared for the relevant growth areas.

Submission 7

The submitter opposes the rezoning of MAR01 to General Urban. The submission notes:

"The area is prone to significant flooding that can also impact Armagh Terrace. Any development of the area would place residents of the area, and surrounding areas, at risk of flood damage. It would require significant stormwater infrastructure development to mitigate the risk, and to avoid increasing the risk to surrounding properties."

The submitter provides further commentary that has been reproduced below:

Water.
Land.
Legacy.

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"I find it very surprising that none of the documents relating to the proposed development of the Marl site mention flooding hazard. It's also interesting that the earth retention dam and associated stormwater infrastructure behind the property at 10 Armagh Terrace is not mentioned. This infrastructure is clearly seen (in green) on the Utilities map on Council's website.

It is my understanding that this infrastructure was put in place to mitigate flooding risks on Armagh Terrace. It is hard to understand how RDC could be unaware of a) the existence of this infrastructure, b) the reason it is there, and c) the potential impact of development.

In heavy rain events water accumulates along the "minor undulation" crossing the site, builds up behind the dam and creates a significant lake. It can take quite some time for the water to recede as it has to drain away through a single stormwater intake. I would estimate the depth of this lake to be at least a metre and possibly more in parts.

At times the water builds up faster than it can drain away, and overtops the dam. This causes floodwater to flow through the property at 10 Armagh Terrace, onto the road and down to the Armagh Terrace/Tutaenui Road intersection. If the stormwater grates at the intersection are clogged by debris, water accumulates across the road. If the water at the intersection builds up, it puts neighbouring properties at risk of flooding.

Development of the Marl site would need to take this potential flooding into account, as when the lake forms it would block the proposed southern access route from Tutaenui Road, and probably flood a number of properties. If residential properties are built in this area, residents would have a justifiable claim against RDC for any damage caused by that flooding, given that it is improbable that RDC is unaware of the risks, since it presumably installed the stormwater infrastructure.

Development would increase the hard surface of the Marl area, causing greater water runoff during rain, and could significantly increase the frequency and severity of flooding both on the Marl site and on Armagh Terrace, especially at the Tutaenui Road intersection.

When water overtops the dam it runs directly under the residential property at 10 Armagh Terrace. Any increase in the frequency or severity of those events could create a significant impact. As the owner of that property, I expect Rangitikei District Council to be looking at ways to reduce, not increase, risks to my property.

Given that climate change projections suggest more frequent and severe rain events in the Rangitikei district, it seems beyond foolish to consider opening up a flood-prone area for future development.

The only safe and acceptable option would be to undertake significant work to mitigate the flooding risk, which would be expensive and could make the area uneconomic for development."

As the submitter notes there is a Rangitikei District Council culvert asset that picks up stormwater behind the property at 10 Armagh Terrace. The small "dam" referred to in the submission is clearly visible on aerial photography, however it does not appear to be listed as an asset owned by RDC.

GHD estimated that the MAR01 Growth Area contains approximately 15,120 m³ of floodwater during the modelled event. This volume, together with additional runoff generated by development, will need to be managed within the growth area. Detailed hydrological and hydraulic modelling of the 0.5% AEP event, including climate-change effects, should inform the site layout, stormwater management, finished floor levels, and safe access and egress.

The requirements to manage stormwater within the growth area will ensure that flood risk to neighbouring properties will not be created or exacerbated.

Most of MAR01 is classified as low flood risk, with isolated medium-risk areas within ephemeral watercourses and near the Tutaenui Scheme detention dam. Development should avoid or specifically address these areas, maintain overland flow paths and flood-conveyance capacity, and demonstrate through detailed modelling that buildings and access routes will be appropriately protected.

Submission 8

Submission 8 supports the rezoning of land in Marton to residential. However, it is noted that:

“the MAR07 land has a higher elevation to southern neighbouring properties (McIlwaine, McDonald, Armagh, etc) and increased run-off MUST be diverted from existing housing. These dwellings are at risk of flooding otherwise.”

GHD estimated that the MAR07 Growth Area contains approximately 18,186 m³ of floodwater during the modelled event. This volume, together with additional runoff generated by development, will need to be managed within the growth area so that flood risk to downstream and neighbouring properties is not increased.

The requirements to manage stormwater within the growth area will ensure that flood risk to neighbouring properties will not be created or exacerbated.

Submission 14

Whilst generally in support of the rezoning of land the submitter raises the concern:

“stormwater – currently have a retention dam and a water course that will require remedy.”

This point is elaborated on, where it is stated:

“There are two significant factors

(a) the Horizons retention dam. Usually fills once a year, used the spillway three times in 8 yrs. I have been here.

(b) Depression in front paddock (Rangitikei Developments) collects, and forms into a watercourse. In major weather events (more than 50 mm/12 hrs) this flows in front of the winery building and across the road. It flows behind the houses on Wanganui Road, before being piped under the road through Saleyards Close.”

The dam referred to in the submission is managed by Horizons Regional Council as part of the Tutaenui Scheme, which provides flood protection to urban Marton. Plan Change provisions should ensure that development does not reduce the dam's capacity or effectiveness, prevent additional development runoff from using its existing ponding

area, and maintain a 4 m-wide access corridor and a 4 m development setback from the dam toe.

Depressions and watercourses occur across the MAR01, MAR04 and MAR07 Growth Areas and will need to be incorporated into development layouts and stormwater design. Stormwater management should accommodate existing modelled flood volumes and additional runoff generated by development, maintain overland flow paths and flood-conveyance capacity, and avoid increasing flood risk on neighbouring or downstream land.

Submission 23

The submission opposes the Plan Change. It states:

"I have a Natural Hazards put on my title – I understand due to Horizon's Dam/Creek/stream?? I was informed around 30 Wanganui Road when I verbally spoke to Tiffany Glover.

What will be done to mitigate, drainage, potential development to contain this water way, relevant Resource Consents. And will future work remove this Natural Hazard to have removed mine and any other properties around this off our titles following work if this is addressed as part of a requirement any approved new subdivision and future building work.

Guarantee not affect surrounding areas, buildup, create further hazard."

It is understood that the dam referred to in this submission is managed by Horizons Regional Council as part of their Tutaenui Scheme that provides flood protection to the urban parts of Marton. The importance, and criticality, of these assets is understood and as such the Plan Change will need to make provisions that:

- Ensure that the operation and performance of these dams is not adversely affected by any development
- Access is provided for Horizons' inspections and maintenance activities.

The stormwater flood hazard has been considered by GHD¹ and it was found that the growth area MAR02 contains a total flood volume of 10,871 m³ within its boundary. This volume, as well as any additional runoff volume generated by development, will need to be managed within the growth area.

The requirements to manage stormwater within the growth area will ensure that flood risk to neighbouring properties will not be created or exacerbated.

Removal or amendment of natural-hazard information recorded on individual property titles is outside the scope of Proposed Plan Change 3. The Plan Change can, however, require future subdivision and development to manage stormwater and flood risk so that surrounding properties are not adversely affected.

Submission 26

The submission opposes the Plan Change in relation to Oaklea Avenue. The submission includes information and photographs that describe stormwater issues in the area.

The available catchment information indicates that the MAR01, MAR04 and MAR07 Growth Areas do not drain directly to the Oaklea Avenue area described in the submission. Development within those growth areas should nevertheless be subject to

¹ 3 Waters Growth Strategy – Growth Assessment, GHD Ltd, 17 February 2026

stormwater-management requirements that prevent any increase in downstream flood or erosion risk.

Submission 35

The submission from Horizons Regional Council seeks relief in a number of areas related to Flood Hazard. These are summarised and discussed below:

Flood Hazard

“horizons requests that council:

- 1) amend PPC3 provisions to explicitly require that safe access and evacuation routes are maintained during flood events to give effect to RPS HAZ-NH Policy 10 (4)(b)*
- 2) amend the Intensification Overlay of PPC 3 to exclude areas that overlap with modelled inundated extent resulting from a potential failure of Marton B Dam.*
- 3) amend PPC3 provisions to ensure that future development:*
 - a. does not reduce the effectiveness or capacity of existing flood management infrastructure, including detention dams and associated systems.*
 - b. does not increase or alter runoff characteristics in a manner than compromises plod (sic) protection, and*
 - c. maintains safe and practical access for operation of flood management assets.*

The Plan Change provisions should explicitly require safe access and evacuation routes to be maintained during the 0.5% AEP flood event, consistent with RPS-HAZ-NH Policy 10(4)(b).

It is understood that the purpose of the second point is to not allow new development in areas that would be at risk in the event of a dam breach. There are 2 growth areas that have been shown to include areas at risk – MAR01 and BUL03.

In the case of MAR01 there are 2 small areas in the north eastern and south eastern corners of the growth area that are modelled as being at risk. It is recommended that these areas are either removed from the growth area, or that provision is made to ensure that development does not occur in these areas.

For BUL03, the modelled dam-breach inundation is substantially less extensive than the modelled 0.5% AEP Tutaenui Stream flood extent. The BUL03 assessment concludes that part of the upper terrace may remain suitable for residential development if the lower terrace is retained for flood conveyance and stormwater detention or retention, and detailed design confirms that the western conveyance corridor, finished levels and safe access can accommodate both hazards without increasing flood risk elsewhere.

3 a&b can be addressed through a provision of the Plan Change.

3c has been discussed with Horizons Regional Council. The access requirement has been confirmed to be a 4 m-wide access corridor and a 4 m development setback from the toe of the dam. This can be required as a provision of the Plan Change.

RDC 3 Waters Growth Strategy

In this section HRC seek that the Council:

- 1) *clarify the flood modelling approach used in the Three Waters Growth Strategy, including model assumptions, limitations, and design event(s).*
- 2) *update flood hazard and risk assessments once modelling is complete, and reflect any material changes in plan provisions and spatial layers*
- 3) *Ensure alignment with Horizon's flood modelling, or clearly justify any differences.*
- 4) *Amend PPC3 provisions to require future development:*
 - a. *does not increase flood or erosion risk*
 - b. *Does not compromise flood control and drainage infrastructure, and*
 - c. *Maintains access for operation and maintenance of the Tutaenui Scheme.*

The flood-hazard assessments use available HRC and GHD model results to identify the general extent and pattern of flood risk. These models are not suitable for establishing site-specific design flood levels. Plan Change provisions should therefore require detailed, site-specific hydrological and hydraulic modelling of the 0.5% AEP event, including climate-change effects, to inform development layouts, stormwater management, finished floor levels, and safe access and egress.

Point 4 can be addressed through the Plan Change Provisions.

Stormwater Management

In this section HRC request that the Council:

- 1) *Amend the PPC3 provisions to require hydraulic neutrality (or equivalent stormwater management outcomes) for greenfield development.*
- 2) *Clearly demonstrate how the stormwater will be managed to achieve, the intended outcome, and the consistency with NPS-FM Policy 3 and RPS HAZ-NH Policy 12 and 13.*

The PPC3 provisions should require hydraulic neutrality, or an equivalent stormwater-management outcome, for greenfield development.

Detailed subdivision and development design should demonstrate how stormwater will be managed to achieve the required outcome and maintain consistency with NPS-FM Policy 3 and RPS HAZ-NH Policies 12 and 13.