Jo Michalakis

From: Sven Exeter <Sven@stradegy.co.nz>
Sent: Wednesday, 1 July 2026 11:13 am
To: Jo Michalakis
Cc: Dean Foote
Subject: RE: Flood Frequency Analysis

Hi Jo

As discussed, I am happy for this to be our final s92 response email which can be put up online. Note the below response in **red** is my high-level planning opinion. Minor grammar and font colour fixed, so please use this email chain.

Thanks

SVEN EXETER
SENIOR ASSOCIATE - PLANNING AND SUSTAINABILITY

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From: Sven Exeter
Sent: Tuesday, 30 June 2026 3:28 pm
To: Jo Michalakis <jmichalakis@align.net.nz>
Cc: Dean Foote <dean.foote@gdc.govt.nz>
Subject: RE: Flood Frequency Analysis

Hi Jo

Thanks for this and for the call, appreciated. Please see my response in ***red***. I don't think any of these clarifications should preclude public notification. I think we can deal with all of these matters after notification through S92 round 2 or evidence if required, with any outstanding matters tagged in your s42A officer's report.

Thanks

From: Jo Michalakis <jmichalakis@align.net.nz>
Sent: Tuesday, 30 June 2026 11:05 am
To: Sven Exeter <Sven@stradegy.co.nz>
Subject: RE: Flood Frequency Analysis

Thanks Sven

I've passed this on. I had followed up Stantec yesterday so that I had the required clarifications in writing; these were to be sent through overnight. I will forward back upon receipt.

Roading confirmed yesterday that there are no further questions.

I also received the revised landscape s92 yesterday. As we agreed if you can't answer these questions this week, it can wait until after notification. I have not received the full LVIA peer review:
Thanks, lets address this after notification.

i. *Please confirm the extent to which the conclusions reached for views of works from private residences are representative of houses closest to the proposal, and provide clear references to distinguish which properties the assessment outcomes are referring to. In particular, please provide clarity of effects for properties at 9 and 11 Rangatira Road, 29 Morris Road, 59 Kipling Road and 35 Paulson Road.*

ii. *The Tairāwhiti Resource Management Plan has been considered within the report, however there is no assessment against relevant provisions of the RMA. Please confirm: • effects of the proposal with regards to natural character under Section 6(a) of the RMA (given the flood banks location within the river corridor);*
• the extent of input from the river geomorphologist and ecologist with regards to natural character (to address abiotic and biotic factors relevant to natura character); and
• consideration of the proposal with regard to Sections 7(c), 7(f) and any further relevant provisions within the RMA;

iii. *The assessment summarises landscape characteristics and features pertinent to the surrounding area and recognizes the shared values of the present-day environment. Please confirm the extent to which values to mana whenua and other historical associations and, or features have been considered in relation to the proposal including reference to other specialist reports*

iv. *5.1 excerpt of the Ecological Report states no intention of removing trees to undertake the works, however the proposal appears to cut through shelter-belts in a couple of locations (particularly on the eastern side), and encroach on vegetation with proposed road earthworks – meaning there may be localised tree removal at these locations. Please confirm that this is correct.*

Environmental Science – they have reviewed the s92 response – they would like further information on items **17** and **18** and a minor clarification on item **19** from the original s92 letter. I have not abridged, to avoid losing any context.

17. Effects of all flooding outside the proposed stopbanks.

It appears to me this item has not been adequately addressed.

P.13 of the application includes the following statement.

Benefits and positive effects summary

The consequential flood risk assessment results indicate that while the stopbank protects approximately 161 hectares during the design event, it reduces effective floodplain storage and forces flows into a narrower corridor. Consequently, land immediately upstream and adjacent to the stopbank experiences increases in flood depth, velocity and hazard, with 10 hectares of newly flooded land and 157 hectares experiencing a hazard category increase during the design event.

The above reference to 'the design event' is ubiquitous throughout material in the application relating to the consequential flood risk assessment (CFRA).
It appears to me the CFRA ***considers*** *only increases in flood depth, area, velocity etc during 'the design event' (the maximum event the works are designed to mitigate), a 'cyclone Gabrielle event' (less than the design event) and an 'over-design event' – p.451 of the application.*
Whereas, being entirely without flood protection under the proposal, areas outside the new stopbanks could be flooded much more often than the occurrence of the design event, and/or either of the other events considered.
Again, the CFRA states:

2 Flood model runs overview

To assess the consequential flood effects of the proposed stopbank, DHI Group Ltd (DHI) has simulated different flood scenarios using a 2-dimensional hydraulic model. Six runs have been modelled, based on three different hydrological events, each compared between the "pre-upgrade"

So is it only the effects of three, high magnitude flood events that have been modelled? ***Six scenarios (0.2% x2, 1% x2, 2.5% x2) were modelled and assessed in the CFRA but the 1% design event was the focus of the effects assessment. Flood events less than 1% are already inherently captured in the PWA process.***
Even the flood hazard classification appears to be assessed according to depth and velocity only for the three modelled events (not frequency of inundation in any event). ***The frequency of inundation is difficult to predict as it is based on future weather events and subject to climate change therefore it is the RMA industry standard approach for stopbank flood schemes to use a design event for the assessment. As noted in the T&T CFRA (page 21) "During lower flows, the proposed stopbank upgrade and realignment has a minimal effect on hazard class and nearby dwellings" therefore displaying the outcomes of this assessment would not change the conclusions of the design event assessment. Flood hazard classification for less than the 1% AEP is already captured via the PWA process regardless of the frequency.***
In essence, I do not see that the consequential flood assessment considers the frequency of all flooding of any depth on newly exposed land. ***As noted above, lesser flood events (2.5%) are not consequential to flooding and would show little change in flood depths given that the 1%AEP design event shows that 161ha is no longer flooded in the post-upgrade case. We've assessed the design event and worst-case magnitude which is considered appropriate, so no new assessment is considered required.***
An engineer may need to verify.
For example, the section below assesses effects on productive soils as minimal based on frequency of the design event which exceeds Gabrielle?
Being outside the stopbanks, these areas could be flooded every year in lesser events?

6.9.10 Effects on productive soils

The consequential flood risk assessment did not explicitly cover the potential effects on productive soils however the following observations have been made:

- Given the relative infrequency of the design event, the impact on productive capacity of land is expected to be minimal.

According to the High Level Geomorphic Assessment (HLGA), the chance of a 'major' high rainfall event in any year is about 29%; so they happen often. (p.8 of the HLGA)

One relevance of the above to freshwater effects is that areas of arable land which are exposed to riverside flooding will discharge fine sediment to the river, for which the Waipaoa River is already degraded. ***The newly exposed land and potential soil loss is insignificant based on the wider catchment contributions (150,000 ha upstream compared to 10ha is only a 0.0067% potential increase in areal change). The proposal reduces the risk of township raw sewage being flooded into the Waipaoa River therefore any potential increase in fine sediment migrating to the river during floods needs to be considered against the scheme benefits.***

This type of discharge would occur whenever the riverside land is inundated; not in the modelled scenarios only. ***This could occur regardless of there being a stopbank or not. Again, compared to the existing stopbank, any soil loss would be similar when comparing the current stopbank to the proposed stopbank.*** *As mentioned in my comment, this type of land alongside the Waipaoa River, even when in pasture, appears often to be ploughed every year.*

18. Increased flooding and discharges from riverside land.

This item has not been adequately addressed.

The key contaminants relevant to this item are fine suspended sediment and, if riverside land were to be intensively stocked, pathogens.
The High Level Geomorphic Assessment (HLGA) does not address these matters as asserted in the response. 'Sediment' as considered in the HLGA relates to bulk movements of rocks, stones and gravels as well as fine sediment i.e. it is an analysis of river form, aggradation and erosion, not contamination of river water.
With regard to the latter the response states:

> It is considered that any difference in water quality run off from different permutations of land use would be insignificant during flood events when compared to the wider river catchment contribution, and any such adverse effects are considered less than minor.

I do not think the above approach is consistent with the RMA or regional plan (TRMP) policy approach to effects of discharges. These require assessment of the effects of contaminants in combination with existing effects, and in some instances the TRMP does not allow new discharges of 'contaminants of concern' i.e. those for which the river is already degraded.
Degradation according to these provisions does not enable further degradation. ***It is considered that the proposal is not contrary to relevant TRMP and RPS policies and aligned with the intent of the RMA when the proposal is considered wholistically. The above review comments indicates that detailed modelling assessment may be required. It is considered that quantitative modelling is not commensurate to the scale of the activity and effects. The proposal has wholistically and qualitatively considered the benefits and net effects of the project such as reducing the maximum hazard class from H6 to H1 for the Te Karaka Wastewater Treatment Ponds; i.e. the existing effects from the current stopbank vs the proposal, should also consider the resultant reduction in risk of human pathogens being flooded into the Waipaoa River.***

When a river is degraded but still holds significant values e.g. as habitat for At risk (longfin eel) and Threatened (inanga) species, it is difficult to say that an increase in degradation is insignificant. I am not able to support that assumption on any technical basis, and none has been provided by the applicant. ***As above, these comments should be balanced against the proposed scheme benefits including reducing the risk of human sewage pathogens being flooded into the Waipaoa River as well as the proposed fish passage improvements e.g. ramps for eels.***
The response to this item is also affected by the same issues discussed for item 17, that lesser flood events, well below the design event but much more frequent, have apparently not been modelled or assessed. ***As above.***
Increased discharges in such events, when background levels may not be so greatly elevated as in the largest events, could be more significant. ***As above.***
These effects are also of a permanent nature – not only related to the construction period etc.

19. Interim flood protection for Te Karaka during the works.

This item has been addressed as follows.

The above sequence however is not in agreement with the one proposed in the application:

a. Establish working site (remove fencing, spray grass, create workers compound) and erosion and sediment controls.
b. Strip topsoil from existing stopbank. The required depth of stripping will typically be around 0.2m to 0.5m. This work will be undertaken by a combination of bulldozer, grader, or excavator. Material will be stockpiled for reuse.
c. Once the foundation is prepared, material from the existing stopbank and borrow pit will be placed, spread, and compacted using truck, excavator, bulldozer or roller until design height and slope batter is achieved.
d. Grass will be seeded directly on the raised stopbank and any exposed earthworks areas will also be grassed.

It is a simple enough matter to condition for the sequence proposed in the s.92 response, however, seeing that is quite different to the one originally proposed, I think it would be worth checking that the revised sequence is practical and actionable from an operational point of view. Please confirm. ***Agreed, this can be dealt with via a consent condition. It is construction contractor detail that would be worked through.***

I don't anticipate any other questions now, apart from minor clarifications that may come up in report writing.

Ngā mihi

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National Manager – Planning

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Align

From: Sven Exeter <Sven@stradegy.co.nz>
Sent: Tuesday, 30 June 2026 8:20 am
To: Jo Michalakis <jmichalakis@align.net.nz>
Cc: Dean Foote <dean.foote@gdc.govt.nz>
Subject: Flood Frequency Analysis

Hi Jo

Please see below the additional response to Stantec Issue 1 *"The basis for the adopted design event and level of service, including how future performance and climate change effects have been considered"* and *"The extent to which reliance on potentially outdated hydrological inputs affects confidence in the conclusions reached"*.

Overall, it is considered that the effects assessment is representative of the proposed activity.

Thanks

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From: Dean Foote <Dean.Foote@gdc.govt.nz>
Sent: Monday, 29 June 2026 4:37 pm
To: Sven Exeter <Sven@stradegy.co.nz>
Subject: Flood Frequency Analysis

Hi Sven,

Gauged flow data is generally considered more accurate than rainfall run-off for a flood frequency analysis and the Kanakanaia Bridge gauge has 60 years of flow data. However, there is inherent statistical uncertainty in extrapolating from limited timeseries data of this nature. Furthermore, there is uncertainty in the actual historical flows of events such as Cyclone Bola and Cyclone Gabrielle due to being at the top end of the stage/discharge relationship.

NIWA undertook an analysis in the wake of Cyclone Gabrielle and determined that the peak discharge was between 4000 cumecs and 4500 cumecs.

The table below shows the different return periods for each distribution assuming Gabrielle had a 4000 cumec peak discharge at Kanakanaia. The variation between the different distributions clearly highlights the inherent uncertainty, however a 5625 cumec event is generally consistent with a 100 year ARI (a 1% AEP).

I discussed this with our hydrology team early in the project and they didn't think it was feasible to produce a more accurate result than the analysis which NIWA undertook and which they peer reviewed.

Importantly, the modelled discharge is consistent in the before and after scenario for each event. Any refinement of the 1% AEP discharge would not appreciably change the effects assessment.

	2023 Peak flood m^3/s
19701 - Waipaoa River at Kanakanaia	4000

Return Period	Probability Non-Exc	GEV	Gumbel	Log-Normal	LP3	Pearson III
2	0.5	1,059	1,217	1,042	1,043	1,011
5	0.8	1,835	2,060	1,880	1,878	1,969
10	0.9	2,516	2,618	2,605	2,634	2,734
25	0.96	3,631	3,323	3,721	3,874	3,771
50	0.98	4,692	3,847	4,703	5,038	4,568
75	0.987	5,421	4,151	5,337	5,827	5,038
100	0.99	5,995	4,366	5,816	6,441	5,372
200	0.995	7,598	4,883	7,073	8,129	6,181
500	0.998	10,305	5,566	8,978	10,887	7,257
1000	0.999	12,913	6,082	10,621	13,453	8,075

Thanks,

Dean Foote
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