

Before Gisborne District Council

Under the Resource Management Act 1991 (the **RMA**)

In the matter of applications by Gisborne District Council for resource consents to modify a stopbank at Te Karaka

Statement of evidence of Joss Ruifrok on behalf of Gisborne District Council

Project Delivery, Community Engagement and Emergency Management

14 September 2026

MC.

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Statement of evidence of Joss Ruifrok on behalf of Gisborne District Council (Rivers and Drainage)

1 Executive summary

- 1.1 I have been directly involved in the Te Karaka Flood Resilience Improvements Project since its inception following Cyclone Gabrielle, through my role as Regional River Manager responsible for Council's flood resilience programme and flood protection infrastructure.
- 1.2 The proposed Te Karaka Flood Resilience Improvements Project has been developed in response to the severe flooding experienced during Cyclone Gabrielle in February 2023, which demonstrated the limitations of the existing flood protection scheme. The project has involved detailed hydraulic and geomorphic investigations, technical assessments, an extensive options assessment, and engagement with Te Aitanga a Māhaki, the wider community and affected landowners.
- 1.3 The proposed works involve a new stopbank alignment, together with upgrades to sections of the existing stopbank and associated flood protection and infrastructure works. The preferred alignment is approximately 4.2 km in length and has been developed to provide a 5,625 cumec design flood level with 600 mm freeboard, consistent with the level of service adopted for the wider Waipaoa River Flood Control Scheme.
- 1.4 The preferred stopbank alignment is the outcome of an iterative optioneering process in which technical performance, flood risk, environmental and cultural effects, property impacts, community feedback, affordability and funding constraints were considered. The preferred alignment provides, in my opinion, the best overall balance of flood risk reduction, resilience outcomes, affordability and long-term community benefit identified through that process. A significant feature of the preferred option is the strategic retreat of the stopbank in parts of the scheme area, providing greater floodplain capacity and reducing the extent to which the stopbank constrains the river.
- 1.5 The proposed works will substantially reduce the likelihood and consequences of flooding for Te Karaka and improve the resilience of people, homes, businesses, community facilities, infrastructure and transport connections. However, the upgraded stopbank will not eliminate flood risk. Flood events exceeding the design capacity of the scheme, stopbank failure, bridge and access constraints, and future changes within the Waipaoa catchment remain relevant residual risks.
- 1.6 The ongoing aggradation of the Waipaoa River and wider floodplain is an important consideration for the long-term sustainability of the scheme. If catchment erosion and sedimentation are not managed to sustainable levels, continued aggradation may progressively reduce the capacity of the river and floodplain to convey flood flows and, over time, reduce the level of flood protection provided by the scheme. Climate change and other changes within the catchment also mean that flood risk will continue to evolve.
- 1.7 Accordingly, I consider the proposed stopbank upgrade to be an important resilience investment and a significant improvement to the current level of

protection, but not a permanent or standalone solution to flood risk at Te Karaka. The upgraded scheme will need to sit within a broader long-term approach incorporating catchment management, monitoring of riverbed and floodplain levels, flood hazard mapping, appropriate planning and development controls, flood warning, emergency management and ongoing community preparedness.

- 1.8 If future monitoring and assessment demonstrate that maintaining the existing level of flood protection becomes technically, environmentally or economically unsustainable, longer-term adaptation options may need to be considered. This could include consideration of changes to the location or form of the Te Karaka township. However, any such response, including any consideration of relocation, should not be regarded as a predetermined outcome. The identification, assessment and implementation of any longer-term adaptation pathway should be undertaken through an appropriately community-led process, in partnership with Te Aitanga a Māhaki, affected landowners and residents, and informed by the flood risk, environmental, social, cultural and economic circumstances prevailing at that time. If catchment management and other measures are successful in maintaining an acceptable and sustainable level of flood protection, relocation may not be required.
- 1.9 The project has also been developed with recognition that flood resilience extends beyond the properties directly benefiting from the proposed works. The Applicant acknowledges that some properties and communities outside the direct benefit area, including areas such as Takipū, will continue to experience flood risk and that the current project does not resolve all flood-risk issues within the wider Waipaoa catchment. These wider issues will need to be considered through future flood resilience planning, funding programmes and Council planning processes.
- 1.10 A further important consideration is the management of residual community risk following completion of the works. The presence of an upgraded stopbank must not create a false perception that the community is fully protected from flooding. Flood forecasting and warning, evacuation planning, emergency response arrangements, community preparedness and public communication will remain necessary because the consequences of an extreme event or infrastructure failure could still be significant. The Te Karaka Flood Evacuation Contingency Plan will therefore be reviewed and updated before the project is fully completed.
- 1.11 Te Aitanga a Māhaki has been an active project partner from the inception of the project, alongside the wider community, affected landowners, technical specialists and Council staff. The project has incorporated community knowledge and experience into the technical assessment, including the calibration of the hydraulic model using flood observations collected from residents following Cyclone Gabrielle. Engagement has informed the development and assessment of the options, while recognising that it has not been possible to address every individual preference or concern.
- 1.12 In my opinion, the proposed Te Karaka Flood Resilience Improvements Project represents the outcome of a robust post-Cyclone Gabrielle investigation, optioneering and engagement process. The preferred alignment provides a significant and necessary improvement in flood resilience for Te Karaka while recognising the consequential and residual risks that remain. It is appropriately

regarded as one component of a broader and adaptive approach to flood risk management for Te Karaka and the wider Waipaoa catchment.

- 1.13 Having considered the submissions received and the matters addressed in the section 42A report, I support progressing the proposed Te Karaka Flood Resilience Improvements Project.

2 Introduction

- 2.1 My full name is Joss Palmer Ruifrok. I am employed by Gisborne District Council as a permanent employee and currently hold the position of Regional River Manager.
- 2.2 I have been asked by Gisborne District Council – Rivers and Drainage (the Applicant) to provide evidence in respect of its application for resource consents for construction of a new stopbank alignment together with upgrades to sections of the existing stopbank and associated infrastructure around Te Karaka (the **Stopbank Proposal**).
- 2.3 I hold responsibility for the delivery and governance of the Te Karaka Flood Resilience Project and have been directly involved in the development of the project since its inception following Cyclone Gabrielle.

3 Qualifications and experience

- 3.1 I have the following qualifications relevant to the evidence I shall give:
- (a) Bachelor of Science (B.Sc.), Earth Science Major from Waikato University.
 - (b) 240 out of 360 credits towards a Bachelor of Engineering Technology (Civil).
- 3.2 I have the following relevant experience:
- (a) I have held the position of Regional River Manager with the Gisborne District Council since 2023. I lead an engineering team to manage and maintain Council's flood control infrastructural assets, including over 70km of stopbanks, river schemes, 330km of land drainage networks, x4 pump stations, coastal protection works, and lead Councils flood warning team. I also lead a capital team delivering the Waipaoa stopbank upgrade major project (~63km of stopbanks successfully upgraded to date), and the investigation and delivery of a \$79.9 million flood resilience investigations and capital works project post recovery from Cyclone Gabrielle (hydraulic modelling, geomorphic assessment, community engagement, optioneering, consenting, detailed design and delivery). Annual budget expenditure of ~\$10million per year.
 - (b) I have held the position of Senior Project Engineer, delivering the Waipaoa River Stopbank Upgrade Project from consent lodgement through to construction with the Gisborne District Council from May 2017 until Feb 2023.

- (c) I have worked in the field of urban stormwater engineering for the Council since May 2008 as a Stormwater Engineer, then as Stormwater Team Leader from 2010 until May 2017.

4 Code of conduct

- 4.1 I confirm that I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023 and that I agree to comply with it. I confirm that I have considered all the material facts that I am aware of that might alter or detract from the opinions that I express, and that this evidence is within my area of expertise, except where I state that I am relying on the evidence of another person.

5 Scope of evidence

- 5.1 In my evidence, I will provide context regarding:
 - (a) the origins and objectives of the project;
 - (b) the technical investigations and optioneering process;
 - (c) the role of community and iwi engagement in project development;
 - (d) the funding arrangements and associated constraints;
 - (e) the relationship between this project and the wider Flood Resilience Programme;
 - (f) the management of residual flood risk;
 - (g) the Applicant's approach to future development and the potential "levee effect"; and
 - (h) the position of areas outside the direct benefit area, including Takipū.
- 5.2 I have grouped my evidence on these topics under three headings: project development, community engagement and emergency management.

6 Involvement with the Stopbank Proposal

- 6.1 At the time of Cyclone Gabrielle, I was employed as the Senior Project Engineer managing and leading the delivery of construction works to upgrade approximately 63 km of the Waipaoa Stopbank Flood Control Scheme. Construction works on the Waipaoa Scheme commenced in February 2019, and at the time of Cyclone Gabrielle, the stopbank upgrade programme was approximately 50% complete.
- 6.2 Following Cyclone Gabrielle, I was directly involved in numerous community hui and consultation processes associated with the optioneering and subsequent development of the Te Karaka Flood Scheme improvements. This included engagement throughout the evolution of the project from recovery to investigation and optioneering, through to the current scheme that we are now seeking consent to deliver.

- 6.3 A few months after Cyclone Gabrielle, I moved into the role of Regional River Manager, leading the engineering team responsible for managing, maintaining and future-proofing Council's flood control infrastructure. This includes more than 70 km of stopbanks, river control schemes, approximately 330 km of land drainage networks, four pump stations and 2km of coastal protection works, as well as leadership of Councils flood warning team.
- 6.4 As Regional River Manager, my responsibilities also included leading the investigation and delivery of the \$79.9 million Tairāwhiti flood resilience programme developed following Cyclone Gabrielle. This has involved hydraulic modelling, geomorphic assessments, community engagement, optioneering, consenting, detailed design and delivery of flood resilience capital works.
- 6.5 Collectively, this provides me with direct experience in managing and leading the design, consenting and delivery of the Waipaoa Stopbank Flood Control Scheme upgrade, which is now largely complete, as well as the investigation, community engagement and ongoing evolution of the proposed Te Karaka Flood Scheme following Cyclone Gabrielle.

7 Project development

Background and Project Inception

- 7.1 The historic flood record for the Waipaoa River at Kanakanaia Bridge over the past 100 years identifies the three largest and most damaging flood events: the 1948 flood, Cyclone Bola in 1988, and Cyclone Gabrielle in 2023. The peak flows associated with all three events have been estimated to be between 4,000–4,500 cumec, indicating that the three events were of broadly similar magnitude. In contrast, the Te Karaka Flood Control Scheme has been designed for a 5,625 cumec design event, together with 0.6 m of freeboard. This represents a substantially larger flood event than any recorded at Kanakanaia Bridge during the historic record. This context is important when considering the level of protection proposed for Te Karaka and the magnitude of the design event relative to observed historical flooding.
- 7.2 The Te Karaka Flood Resilience Improvements Project was initiated following the severe flooding experienced during Cyclone Gabrielle in February 2023. The event overtopped the existing Te Karaka flood protection scheme, inundated approximately 45 homes in the township, isolated the community for almost a week, disrupted critical infrastructure, and highlighted the limitations of a flood protection scheme originally designed to a standard broadly equivalent to Cyclone Bola.
- 7.3 In response, the Crown allocated \$27.6 million in tagged recovery funding for Te Karaka flood resilience improvements as part of the wider \$79.9 million Tairāwhiti Flood Resilience Programme (*\$71.1m current approved funding position + \$8.8m additional funding 'approved in principle'*). Gisborne District Council subsequently undertook a comprehensive programme of flood investigations, hydraulic modelling, engineering assessments and community engagement to determine the most appropriate flood resilience solution for the township. The project has been delivered in partnership with Te Aitanga a Māhaki from its inception.

Optioneering Process and Selection of the Preferred Alignment

- 7.4 A key feature of the project has been the extensive technical and community-led optioneering process undertaken over approximately 18 months. A detailed hydraulic model was developed and calibrated using surveyed flood levels and local observations collected from residents following Cyclone Gabrielle. This ensured community experience and local knowledge informed the technical assessment process.
- 7.5 The project initially considered nine stopbank alignment options. These were progressively refined by the Applicant's options assessment/project development process through hydraulic modelling, engineering assessment and multi-criteria analysis to six options, then four shortlisted options, before two preferred options were taken forward for wider community consultation. The final preferred alignment was selected after considering technical performance, cost, environmental effects, cultural values, property impacts and community feedback.
- 7.6 The preferred option incorporates stopbank retreat in key locations, increasing the available floodplain capacity within the scheme area and reducing the extent to which the stopbank constrains the river. This approach is consistent with international flood management best practice because it allows greater floodplain capacity, reduces required stopbank heights, lowers the consequences of a potential breach, and reduces exposure to erosion and bank scour. Community consultation showed strong support for both taking action to improve flood resilience and for the principle of stopbank retreat.

Funding Agreement, Constraints and Project Prioritisation

- 7.7 The project is funded through a Crown and Council co-funded agreement established as part of the post-Cyclone Gabrielle recovery programme. \$13.2 million was initially allocated specifically for Te Karaka flood resilience improvements, further investigation demonstrated that the preferred solution would require substantially greater investment due to land acquisition, compensation, State Highway Road raising, stopbank construction and associated infrastructure upgrades. The increase in the project budget to \$27.6 million was approved by the Crown through the reallocation of previously approved Crown flood resilience funding from other flood resilience areas.
- 7.8 Project delivery is therefore subject to a range of funding obligations and constraints, including maintaining agreed Crown and Council funding proportions, achieving required benefit-cost outcomes and complying with conditions attached to funding reallocations within the wider Flood Resilience Programme.

Wider Bridge Upgrade Programme, Funding Constraints and Prioritisation -

Programme response is based on information received from Darren Cox - Principal Capital Advisor (GDC Journeys).

- 7.9 Gisborne District Council (GDC) manages its bridge network through a structured asset management programme centred on a three-yearly rotational bridge inspection regime. These inspections assess the condition and performance of bridge assets, identify defects and emerging risks, and inform the prioritisation of renewal and upgrade projects within the Bridge Forward Works Programme. Projects are then considered for inclusion in each National Land Transport Programme (NLTP) funding cycle.

- 7.10 Local GDC Bridge renewals and component replacement works are currently funded through a partnership model, with 68% funded by NZ Transport Agency Waka Kotahi (NZTA) and 32% funded by Council through rates. Securing this funding is highly competitive. Proposed projects must demonstrate a clear asset management need, represent good value for money, and successfully progress through both Council's NLTP prioritisation process and NZTA's national investment assessment process, where they compete against similar bridge projects from across New Zealand.
- 7.11 The majority of bridge renewal activities involve the replacement or refurbishment of individual bridge components on a like-for-like basis to maintain existing levels of service, structural integrity, and asset performance. While bridges are typically designed for a service life of approximately 100 years, many structures within the GDC network have exceeded this age and continue to operate satisfactorily. As a result, bridge age alone is not a determining factor for replacement. Decisions are instead based on asset condition, performance, risk, resilience requirements, and the strategic importance of the bridge within the wider transport network.
- 7.12 Where a bridge is lost or destroyed as a result of a natural hazard event, replacement funding is subject to NZTA's Investment Proposal and Business Case assessment processes. Any proposed replacement structure must meet current NZTA Bridge Manual requirements and resilience standards, while also demonstrating a positive economic case, typically through a Benefit-Cost Ratio (BCR) of 1.0 or greater, before it can be considered for funding approval.
- 7.13 This funding and prioritisation framework means that bridge replacement projects must compete for limited national investment funding and demonstrate not only local need, but also strategic value and affordability within the broader context of New Zealand's transport infrastructure programme.

Residual Risk and Future Development

- 7.14 An important principle underpinning the project is the recognition that flood risk can be reduced but not eliminated. The proposed stopbank upgrade will provide a significant improvement in flood resilience for Te Karaka; however, it cannot remove the risk of flooding from larger events or future changes within the catchment.
- 7.15 Technical investigations identified ongoing riverbed aggradation within the Waipaoa River system and acknowledged that climate change is expected to increase future flood risks. Consequently, the proposed upgrade should be viewed as a medium-term resilience measure rather than a long-term solution. The Applicant acknowledges that longer-term catchment adaptation responses, including managed retreat, may need to be considered in the future.
- 7.16 Future development within Te Karaka will continue to be managed through flood hazard assessments, planning controls and engineering advice. Minimum floor levels and other development requirements will continue to be informed by the latest flood modelling and specialist flood engineering advice to ensure new development appropriately accounts for residual flood risk.

Management of the Potential "Levee Effect"

- 7.17 The Applicant is conscious of the risk that upgraded flood protection infrastructure could create a perception that flood risk has been completely removed. This is commonly referred to as the "levee effect".
- 7.18 The Applicant's position is that the upgraded stopbank will reduce flood risk, but it will not eliminate it. Ongoing flood hazard mapping, emergency management planning, community preparedness, flood warning, planning controls and development standards will therefore remain essential components of flood risk management. The project should be viewed as one element of a broader flood resilience strategy rather than a complete solution to flooding.

Broader Context Outside the Benefit Area Including Takipū

- 7.19 The Applicant recognises that flood resilience issues extend beyond the area directly protected by the proposed Te Karaka stopbank improvements. During engagement, concerns were raised by residents in areas such as Takipū regarding their ongoing flood risk and exclusion from the proposed scheme.
- 7.20 The current project has been specifically funded and scoped to improve flood resilience within Te Karaka Township and areas demonstrated through technical assessment to receive direct benefit from the proposed works. Consequently, the project does not provide direct flood protection improvements to all areas within the wider catchment.
- 7.21 The Applicant acknowledges the proposal has both substantial flood-risk benefits and identified consequential adverse effects, which are being addressed through the project's mitigation/compensation approach. Consideration of future investment, service levels, rating arrangements and flood resilience measures for these areas will occur through future Long Term Plan processes, Revenue and Financing policy reviews, flood resilience planning and future funding opportunities.
- 7.22 In that context, the Te Karaka Flood Resilience Improvements Project should be viewed as one important component of a wider, long-term programme of flood resilience investment across Tairāwhiti, rather than a complete solution for all flood risks within the wider catchment.

Conclusion

- 7.23 In my opinion, the proposed Te Karaka Flood Resilience Project represents the outcome of a robust post-Cyclone Gabrielle assessment process involving detailed technical investigations, extensive community engagement and careful consideration of funding and programme constraints.
- 7.24 The preferred alignment provides the best overall balance of flood risk reduction, resilience outcomes, affordability and long-term community benefit identified through the optioneering process.
- 7.25 While the project will not eliminate flooding, it will substantially improve the resilience of Te Karaka and forms an important component of Council's broader approach to flood risk management across Tairāwhiti.

8 Community engagement

Engagement Undertaken During Optioneering and Design Development

- 8.1 The Te Karaka Flood Resilience Improvements Project was developed through an extensive 18-month engagement and optioneering process undertaken in partnership with Te Aitanga a Māhaki, the wider community, affected landowners, technical specialists and Council staff. Engagement included community hui, a dedicated ~22-person community flood group, public workshops, online consultation and ongoing discussions with iwi representatives. A detailed and peer-reviewed hydraulic model was calibrated using flood observations provided by local residents following Cyclone Gabrielle, ensuring local experience and knowledge informed both the modelling and subsequent option development.
- 8.2 The optioneering process progressed from nine initial alignment options, to six options, then four shortlisted options and ultimately two preferred options. Community feedback, local flood knowledge, cultural values and technical assessments were considered throughout this process. While it was not possible to address every community preference or concern, the process provided multiple opportunities for community input, and community feedback was one of the matters considered in selecting the preferred alignment.

Engagement with Directly Affected Landowners

- 8.3 As the preferred alignment evolved, engagement increasingly focused on landowners directly affected by the proposed stopbank retreat, land acquisition requirements and changes in flood risk. Property owners were engaged throughout the options assessment process, the detailed design, consenting and property negotiation phases, and informed of potential impacts as the project progressed. Discussions included land requirements, compensation arrangements, and changes to flood protection levels. This engagement remains ongoing and will continue through to construction.

River Aggradation, Sustainability & Long-term Planning

- 8.4 Because ongoing riverbed and berm aggradation trends are evident in the historical record around the Te Karaka area, there is a risk that, if the upstream catchment erosion and sedimentation are not effectively managed to sustainable levels, the riverbed and wider floodplain will progressively rise over coming decades. If that occurs, it will reduce the available capacity of the river and floodplain to convey successive flood events, resulting in higher flood levels and a gradual degradation of the flood protection level of service for Te Karaka.
- 8.5 If sustainable catchment management policies and investment are ultimately unsuccessful in controlling this trend, the community may need to consider longer-term adaptation responses following completion of the current stopbank improvements. This could include establishing a contingency pathway for the progressive transition of Te Karaka township to a safer location, should maintaining the existing level of flood protection become technically, environmentally or economically unsustainable. Any such future adaptation response, including consideration of relocation, should not be regarded as a predetermined outcome. Rather, the identification, assessment and implementation of any longer-term pathway should be undertaken through an

appropriately community-led process, in partnership with Te Aitanga a Māhaki and affected landowners and residents, and informed by the prevailing flood risk, environmental, social, cultural and economic circumstances at that time. The purpose of this forward planning would be to ensure that the community retains meaningful choices about its future, rather than predetermining a particular outcome. If catchment management measures are successful, or the existing level of service can otherwise be sustainably maintained, relocation may not be required.

Engagement with Tangata Whenua / Iwi and the Community

- 8.6 Te Aitanga a Māhaki has been an active project partner since the project's inception, participating in steering groups, community hui, optioneering workshops and decision-making discussions. This partnership approach ensured tangata whenua perspectives, cultural values and aspirations were considered alongside engineering, environmental and financial considerations. Particular attention was given to the effects on Māori land, sites of significance and the importance of maintaining mana whenua involvement throughout project development.
- 8.7 Community engagement identified several recurring themes, including protection of cultural values, the importance of community refuge and emergency preparedness, and concerns regarding areas outside the project's benefit area, particularly Takipū. While the current project is funded and scoped to improve flood resilience within the Te Karaka Township, the Applicant acknowledges the wider flood resilience challenges facing neighbouring communities and recognises that these matters may need to be considered through future resilience planning, funding programmes and Long-Term Plan processes.
- 8.8 Finally, throughout engagement, the Applicant has consistently communicated that the proposed scheme is a medium-term resilience improvement rather than a permanent flood-proofing solution. Ongoing river aggradation, climate change and residual flood risk mean that future adaptation measures and long-term resilience planning will remain important considerations for Te Karaka and the wider catchment.

9 Emergency Management

Sections 9.1 to 9.8 below covering the Emergency Management response is based on information received from Ben Green - Emergency Management Group Manager (GDC - Civil Defence Emergency Management (CDEM))

Changes to Emergency Response Arrangements Since Cyclone Gabrielle

- 9.1 Cyclone Gabrielle was a significant flood event that exceeded the level of protection provided by the existing flood mitigation infrastructure at Te Karaka and resulted in significant flooding of the township. The event reinforced the reality that communities located within floodplains remain exposed to residual flood risk during severe events, regardless of the level of structural protection provided.
- 9.2 From an emergency management perspective, Cyclone Gabrielle did not fundamentally alter the principles of warning, preparedness, evacuation and response that were in place at the time. Advance weather forecasting, public

warnings and coordinated agency response activities were implemented before and during the event. While the township experienced significant flooding, no loss of life occurred as a direct consequence of the flooding within the Township.

- 9.3 A key lesson from Cyclone Gabrielle was the vulnerability of critical infrastructure systems, particularly telecommunications, telemetry, power supply and other communication networks. The widespread loss of these systems reduced situational awareness and complicated coordination across agencies and communities.
- 9.4 As a result, considerable effort has since been directed toward strengthening the resilience of communications and information systems. This includes the development of layered and redundancy communication arrangements, improvements to emergency communications capability, increased interoperability between agencies, and the diversification of systems used to maintain situational awareness during major flood events. These enhancements are intended to ensure that critical information can continue to be shared, and emergency management functions maintained when primary systems fail.
- 9.5 This approach recognises that while future extreme flood events may still occur, the resilience of the supporting response infrastructure can be strengthened to improve coordination, decision-making and community safety outcomes.
- 9.6 Residual risk will continue to be managed through flood forecasting, flood warning e-text, public warnings, evacuation planning, community education and emergency response procedures. A key focus will be ensuring ongoing public awareness of residual flood risk while avoiding complacency and warning fatigue through clear and consistent risk communication.
- 9.7 An important point for the hearing is that a stopbank is a flood mitigation measure, not a life-safety guarantee.
- 9.8 From an emergency management perspective, the residual risk is that:
 - (a) there remains a risk to life in events that exceed the design standard or where infrastructure fails;
 - (b) people may incorrectly assume they are safe because of the presence of a stopbank;
 - (c) the consequence of delayed evacuation can actually increase where confidence in structural protection leads people to stay longer than they otherwise would; and
 - (d) emergency planning, warnings and evacuation arrangements remain necessary regardless of the upgraded protection standard.

Management of Residual Community Risk

- 9.9 The proposed stopbank upgrade will significantly reduce the likelihood and consequences of flooding for Te Karaka during the range of events for which it has been designed. However, the purpose of a stopbank is to reduce flood risk, not eliminate it. Extreme flood events that exceed the design capacity of the

scheme, infrastructure failures, or other unforeseen circumstances may still result in flooding and associated risks to life, property and critical infrastructure.

- 9.10 For this reason, emergency management planning must continue to assume that floodwaters may enter the community and that evacuation may be required. Public warning systems, flood forecasting, evacuation planning, community preparedness programmes and response arrangements will remain essential components of risk management following completion of the project.
- 9.11 A particular consideration is the potential for a "levee effect", whereby the presence of improved flood protection infrastructure creates a perception that the community is fully protected from flooding. This can result in individuals delaying preparedness actions or choosing to remain in place for longer during a threatening event because they believe the stopbank will provide complete protection. Such behaviour can increase risk to life should floodwaters exceed the scheme design standard or should structural failure occur.
- 9.12 Accordingly, a key emergency management objective will be maintaining community understanding that the upgraded stopbank reduces flood risk but does not remove it. Ongoing public education, warning messages and evacuation planning will continue to emphasise that people should respond promptly to official warnings and evacuation advice, regardless of the level of structural flood protection in place.
- (a) The engineering purpose of the stopbank (risk reduction).
 - (b) The residual life-safety risk that remains.
 - (c) The behavioural risk created by false confidence ("levee effect").
 - (d) Why emergency management measures must continue after the project is completed.

Emergency Centre, Emergency Services and Residual Bridge Risk

- 9.13 Emergency planning will continue to assume that over-design flood events remain possible. Accordingly, access to emergency services, community refuge facilities and critical infrastructure will continue to be managed through established emergency management procedures. Bridge risks will continue to be managed through monitoring, warning systems and pre-emptive road and bridge closure protocols during significant flood events to ensure public safety.

Potential Alternative Access Arrangements

- 9.14 The Applicant recognises the importance of maintaining access during emergency events. Further work has been undertaken, and continues to be explored, regarding potential alternative access arrangements should either the Rangatira Bridge or Kanakanaia Bridge become unavailable or fail during a significant flood event. Such arrangements form part of wider resilience and emergency management planning.

Te Karaka Flood Evacuation Contingency Plan

- 9.15 The Te Karaka Flood Evacuation Contingency Plan shall be reviewed and updated before the Te Karaka flood protection scheme project is fully completed.

- 9.16 Consideration under the Te Karaka Flood Evacuation Contingency Plan should also be given to whether future evacuation planning extends beyond the immediate township to incorporate surrounding communities that rely on the same transport and emergency response networks.

10 Conclusion

- 10.1 After considering submissions and the S42A report I support progressing the project.

Joss Palmer Ruifrok

14 September 2026