
Hawke's Bay Regional Council



Hawke's Bay Regional Council's Land Categorisation Process and Framework following Cyclone Gabrielle






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Prepared by:	Hawkes Bay Regional Council
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The purpose of this report is to outline how the Hawke’s Bay Regional Council (HBRC) applied the Government’s Future of Severely Affected Land Risk Categorisation Framework.

BACKGROUND OF LAND CATEGORISATION

1. On 1 May 2023, the Government released its initial risk categories and associated definitions to guide local authorities’ decision making in respect of the risk categorisation of affected properties. These categories and definitions do not have a specific statutory basis.
2. The Government’s three risk categories were to be applied to flood and landslide affected properties in areas impacted by Cyclone Gabrielle and January floods across the North Island. The Government’s three categories were:
 - a. Low Risk – Repair to previous state is all that is required to manage future severe weather event risk. This means that once any flood protection near the property is repaired, the home can be rebuilt at the same site.
 - b. Managed Risk – Community or property-level interventions will manage future severe weather event risk. This could include the raising of nearby stop banks, improving drainage or raising the property.
 - c. High Risk – Areas in the high risk category are not safe to live in because of the unacceptable risk of future flooding and loss of life. Homes in these areas should not be rebuilt on their current sites.
3. The descriptions of the categories are as follows:

Category	1 	2P 	2C 	2A 	3 
Description	Repair to previous state is all that is required to manage future severe weather risk event.	Property level interventions are needed to manage future severe weather event risk, possibly in tandem with community level interventions	Community level interventions are needed for managing future severe weather risk events.	Significant further assessment is required to assess a property, as well as engagement with property owner.	Future severe weather event risk cannot be sufficiently mitigated. Some land uses may remain acceptable, while intolerable risk of inquiry or death for residential land use.
Actions	Flood damage to repair, but no need for community interventions.	Property specific measures are necessary, for example improved drainage, raising houses. Benefits accrue to property owners.	Local government could repair and enhance flood protection schemes to adequately manage the risk of future flooding events. Cost is shared by the community.	Interventions may be required or possible, but insufficient information to answer all questions. These may subsequently move between “2” categories or to categories 1 or 3.	In the face of enhanced climate risk to the property there is unacceptable risk of future flooding. This will involve combined local and central government assistance.

4. The Government has been clear that categorisation of properties (and the articulation of the technical metrics that are used to determine whether risk is “intolerable”) is the responsibility of local government.
5. Staff have developed a process and technical framework to assess risk to affected residential properties in the Hawke’s Bay region, which were primarily impacted by flooding during the Cyclone Gabrielle event. This is generally limited to impacts at a community scale rather than impacts to discrete / individual residential properties. Where the future risk to residential properties from flooding is intolerably high and where that risk cannot be sufficiently mitigated, those properties will be identified as “Category 3”.
6. Individual vulnerability to flood hazard is highly variable and context dependent, being a function of factors that reflect the specific characteristics of the areas, properties, and people exposed to flood hazard. The outcome of a risk assessment considers risks that are tolerable or acceptable, and takes into account the community’s social, cultural, environmental and economic situation. This makes the quantitative estimation of risk to life from flooding at a property level complex. Whether risks can be mitigated through viable and cost-effective property or community level interventions is a further complex consideration.
7. It is important to note that in the Hawke’s Bay region the affected areas for the purpose of categorisation relate solely to flood hazards arising from Cyclone Gabrielle, and do not include other forms of natural hazard

such as land instability, seismic related hazards (liquefaction/lateral spread) or coastal hazards (inundation and/or erosion). This is because flooding was the only known cause of community scale impacts in the Hawke’s Bay region, following Cyclone Gabrielle.

8. Additionally, the process and technical framework does not account for climate change effects such as sea level rise and the change in flood frequency relationship for the region’s rivers over time, nor future earthquake-related impacts.

NEGOTIATED FUNDING OUTCOMES

9. An integrated package of funding has been negotiated by Hawke’s Bay Councils and the Government to support recovery from Cyclone Gabrielle. HBRC sought Government funding specifically for contributions to repair, restore and construct flood protection measures.
10. On 2 August 2023, HBRC accepted the Government’s offer of \$203.5 million towards flood mitigation and approved an additional \$44.15 million of debt to fund its cost-share portion. The combined funding is based on community interventions to move properties out of Category 2 to Category 1, thus limiting the number of properties that might otherwise become Category 3. The funding package also includes other region-wide projects such as repairs and upgrades to telemetry.
11. The proposed distribution of funding for impacted communities is as follows:

Funding for flood mitigation measures*		
Wairoa (100% Crown Funded)	Potential flood mitigation measures for areas in the vicinity of Wairoa and Frasertown (2A).	\$ 70,000,000
Hastings and Central Hawkes Bay (Costs shared between Crown and HBRC)	Potential flood mitigation measures for areas in the vicinity of: <ul style="list-style-type: none"> ○ Havelock North (2C) ○ Omahu (2A) ○ Pakowhai (2C) ○ Porangahau (2A) ○ Tongoio (2A) ○ Waiohiki (2C) ○ Whirinaki (2A) 	\$109,650,000
General Works		
	Provision for additional work to rapid repair sites following technical review	\$30,000,000
	Telemetry network repairs and upgrade	\$5,000,000
	Drainage pump station repairs/upgrades required	\$30,000,000
	Scheme reviews - to reconfigure & build resilience	\$3,000,000
	Total	\$247,650,000

*These figures represent the best estimate of potential protection works required for areas in Category 2 to move to Category 1. It is noted that, following full technical assessment (particularly in relation to Category 2A), flood mitigation may not be feasible in all Category 2 areas. In such cases, affected properties will be recategorised to Category 3.

12. The availability of funding for flood mitigation works has informed the land categorisation process, in particular the application of Category 2. However, should initial investigation and design work highlight that specific proposed flood mitigations cannot be delivered, these properties will likely be recategorised to Category 3. It is envisaged that should this occur, HBRC will enter into negotiations with the Crown with a view that unused funding from the Crown for flood mitigation measures will be reallocated to the relevant territorial authority for the purpose of Category 3 buy-outs.
13. At the time of negotiations with the Government, the costings for flood mitigation measures were based on high level estimates of possible solutions to mitigate flood risk in identified areas.

DEVELOPMENT OF TECHNICAL RISK ASSESSMENT

14. Following the direction from Government, HBRC commenced work to develop a categorisation approach that satisfied the principles the Government had articulated. This approach was required for the Hawke's Bay Region to be eligible for the Government's funding contribution. HBRC's land categorisation methodology is detailed in the next section below.
15. Developing the methodology in a principled and equitable manner, whilst limiting Council's financial and legal exposure has been complex. This was compounded by the need to move at pace to meet the timeframes set by Government, including those relating to negotiations for funding contributions, and to limit as much as possible the negative social impacts on communities brought on by flood damage and the uncertainty of the land categorisation framework.
16. The over-arching consideration when determining categorisation has been whether there is an intolerable risk to life from flooding. This is a technical question that has been considered by technical experts alone. While the categorisation process is underway, work will continue to ensure the methodology and technical frameworks are appropriate and that the categorisation process is evidence-based and robust.
17. From the outset, HBRC amended the Government's risk categories and definitions to make them applicable to the Hawke's Bay context following Cyclone Gabrielle. The assessment of "managing future severe weather risks" was refined to "mitigating future flood risk from design events".
18. An additional Category 2C* was defined which enabled HBRC to move a number of communities to Category 1 at pace to avoid the prolonged uncertainty of sitting in Category 2. For Category 2C*, future flood risk is capable of being sufficiently mitigated because of existing flood infrastructure in the area that could be repaired and restored by "HBRC Rapid Repair" teams.
19. It is critical to note that being in Category 1 does not mean there is no risk to life, or that there was no impact from Cyclone Gabrielle. For the purpose of this process, Category 1 has been applied to properties where there is no intolerable risk to life.

Technical assessment

20. The considerations required for a risk to life assessment were detailed by Pattle Delamore Partners in their report from June 2023. Pattle Delamore Partners stated that risk to life for future events on the scale of Cyclone Gabrielle can be articulated in general terms but was difficult to codify. There is little national guidance in this space with the NZS9401 Managing Flood Risk – A Process Standard being the primary guiding document.
21. Assessments will involve consideration of:
 1. Damage assessment: an assessment of flood levels and damage sustained during the Cyclone Gabrielle event.
 2. Assessment of Flood Danger and Flood Damage Risk as a combination of:
 - a. Event likelihood (in terms of the probability of an event of a given magnitude being equalled or exceeded within a year – the Annual Exceedance Probability, or AEP);
 - b. Hazard (the level of risk to life by flooding);
 - c. Exposure (what is exposed to flood hazard in a given place); and
 - d. Vulnerability (propensity to suffer adverse effects of flooding, based on individual characteristics and external factors).
 3. These factors are complex, interrelated and are taken into account to inform categorisations.
22. All decision making throughout the land categorisation process has been informed by the available expert advice and applied standard industry concepts and processes as detailed in the Pattle Delamore reports. In all of the above we considered evidence from the event and from site visits in addition to other information

submitted by affected residents. The risk to life assessment used in Hawke’s Bay is detailed further in the methodology below.

Quality assurance

23. HBRC commissioned Pattle Delamore Partners to independently review and assure its provisional mapping. Site visits to all Category 3 locations were completed in order to validate the provisional mapping.
24. The Cyclone Gabrielle Recovery Taskforce Secretariat engaged Tonkin & Taylor Ltd to provide a high-level assurance review of the process followed by HBRC and Pattle Delamore Partners. Tonkin & Taylor considered that the preliminary risk categorisation process used was technically valid and appropriate given the constraints of the available information and the need for timely decision making and community engagement.
25. Tonkin & Taylor specifically noted that the process used to identify Category 2 and 3 areas relied heavily on expert judgement applied by HBRC and Pattle Delamore Partners. The process was informed by observations of the flood damage that occurred during the event with some input from territorial authorities. They considered this was a suitable approach for the initial assessment, and for very high-risk situations where Category 3 is clearly appropriate. It was acknowledged that more detailed technical assessment would be required to confirm the feasibility and levels of service for community and property-level interventions and to resolve cases on the borders between Category 2 and 3.
26. While the categorisation process is underway, the detailed technical assessment will continue to be worked through for each categorised area by teams of technical experts. Areas are recategorised as soon as possible following completion of technical assessments.
27. Pattle Delamore Partners will provide a final peer review of decision making and a quality assurance report with recommendations to the HBRC Chief Executive to inform completion of the technical risk assessment.

LAND CATEGORISATION METHODOLOGY

1. Identification of Impacted Areas

METHODOLOGY	PATHWAY
In determining areas that will be subject to the land categorisation process, a technical expert will consider the following question:	No – Area not included in provisional categorisation process.
1. Is the area impacted by flooding caused by Cyclone Gabrielle at a community scale?	Yes – Area included in provisional categorisation process.

2. Provisional Categorisation

METHODOLOGY	PATHWAY
In determining provisional categorisation, a technical expert will consider the following questions:	Category 1 - Repair to previous state is all that is required to mitigate risk to life from flooding.
1. Is there an intolerable risk to life from flooding?	Note: Category 1 does not mean there is no risk, or that there was no impact from Cyclone Gabrielle, but that there is no intolerable risk to life.
The risk to life assessment, as detailed by Pattle Delamore Partners, considers the following factors:	Category 2C* - Repairs to existing flood scheme assets are effective in
<ul style="list-style-type: none"> - The maximum depth and rate of rise of floodwater; - How swift or otherwise the flood water was; - How quickly a river rises and overtops its banks and/or flood management system (how much warning those living close to a river might have that a flood is imminent) 	

<ul style="list-style-type: none"> - How accessible safe egress is for residents of affected areas; - The volume of silt and debris entrained in the floodwater; - Particular geographic features that exacerbate the hazard eg valley confinement; - How apparent the hazard is to those potentially impacted. That encompasses understanding / awareness of the hazard (which will inevitably decline with time following Cyclone Gabrielle) but also whether the connect between the flood source and where people live is clear (whether their level of exposure is obvious or not); - The complexity of the flood hazard. <p>2. Are mitigations available to sufficiently reduce the risk to life from flooding so the area or property can be reinhabited. This includes through:</p> <ol style="list-style-type: none"> a) Repairs to flood scheme assets? b) Community level interventions? c) Property level interventions? <p>3. Is significant further assessment required to determine the risk to life?</p>	<p>mitigating future flood risk from design events.</p> <hr/> <p>Category 2C – Additional community level interventions are effective in mitigating future flood risk from design events.</p> <hr/> <p>Category 2P - Property level interventions are needed to mitigate future flood risk, including in tandem with community level interventions.</p> <hr/> <p>Category 2A - Significant further assessment required before category determined.</p> <hr/> <p>Category 3 - Future flood risk cannot be sufficiently mitigated.</p>
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3. Refinement of Categorisation Mapping

METHODOLOGY	PATHWAY
<p>Provisional mapping will be refined to address alignment of the provisional mapping boundaries for properties around the border of categorised areas.</p> <p>The further detailed assessment will take into consideration the following factors:</p> <ul style="list-style-type: none"> - Topographical features; - Known level of damage; - Property boundaries; and - How accessible safe egress is for potentially impacted residents. <p>Refinement to the boundary of categorised areas will occur where the further detailed assessment reveals issues with the alignment of the provisional mapping boundaries.</p>	<p>Refinement of categorised boundaries.</p>

4. Recategorisation of Category 2s

METHODOLOGY	PATHWAY
<p>Category 2C*</p> <p>Future flood risk can be mitigated by reinstating existing flood infrastructure to pre-Cyclone Gabrielle standards and levels of service utilising similar construction techniques and design to the original. The reinstatement of flood infrastructure must reduce risk to life to a tolerable level.</p> <p>Category 2C* areas will be recategorised to Category 1 following these steps:</p> <ol style="list-style-type: none"> 1. Asset has been reinstated to the original standard prior to Cyclone Gabrielle of 1% AEP. 2. Materials selection has been overseen by dedicated geotechnical engineers. 3. Compaction testing has been undertaken by nuclear densometer given real time results with compaction results required to be met prior to proceeding with the next layer of construction. 4. Quality assurance commenced by independent experts. <p>Note: An AEP (annual exceedance probability) of 1% for a given flood level means there is a 1% chance of having a flood exceed that level in any one year.</p>	<p>Release to Category 1.</p>

<p>Category 2C</p> <p>Additional community level interventions will be implemented to mitigate future flood risk from design events. These will be considered where there are no adequate existing flood protections.</p> <p>The intervention must contribute to reducing risk to life to a tolerable level for a community and will take into consideration the following factors:</p> <ul style="list-style-type: none"> - Land use; - Practicality and feasibility; - Favourable cost / benefit analysis; - Overall cost; - Funding availability; and - Consenting risks. <p>Subject to confirmation of this pathway, Category 2C's will be released to Category 1 when the following conditions are met:</p> <ul style="list-style-type: none"> - A sound concept that has a consenting pathway; and - A legal interest in favour of HBRC in the relevant land; and - Available funding. 	<p>Intention is to release to Category 1 but if viable solution is not found then area may be moved to Category 3.</p>
<p>Category 2P</p> <p>Additional property level interventions will be implemented in order to mitigate future flood risk.</p> <p>The intervention must contribute to reducing risk to life to a tolerable level for a residential property owner and will take into consideration the following factors:</p> <ul style="list-style-type: none"> - Practicality and feasibility; - Safe egress; - Favourable cost / benefit analysis; - Overall cost; - Funding availability; and - Consenting issues. <p>Subject to confirmation of this pathway, Category 2P's will be reclassified to Category 1 when appropriate property level interventions have been completed to the satisfaction of the building consent authority or other relevant authority.</p>	<p>Intention is to release to Category 1 but if viable solution is not found then area may be moved to Category 3.</p>
<p>Category 2A</p> <p>Significant further assessment is required before categorisation can be determined.</p> <p>The process for further assessment will involve:</p> <ol style="list-style-type: none"> 1. The appointment of independent experts to conduct a review of potential community and/or property level interventions that can mitigate risk; 2. Engagement with the community, facilitated by HBRC and the relevant territorial authority, on potential solutions; and 3. Consideration of community feedback by technical experts; and 4. Experts will then make recommendations to HBRC on future mitigation works, and final categorisation of properties. <p>Based on the outcome of the further assessments, HBRC will determine whether reclassification to Category 2C or 2P, with a view to moving to Category 1 is appropriate. If not, then Category 3 will be applied as an intolerable risk to life cannot be mitigated.</p>	<p>Significant further assessment required before category determined.</p>

5. Reassessment Process

METHODOLOGY	PATHWAY
<p>All requests for reassessment from landowners and territorial authorities will be considered while the categorisation is provisional, and where relevant new information is provided.</p> <p>Any reassessment will be undertaken by a technical expert, and may involve the following steps and considerations:</p> <ol style="list-style-type: none"> 1. Review the desktop assessment to determine if there are any errors, or other justification for reconsidering the categorisation. 2. Decide whether further information is required for an additional technical review. 3. Consult with additional experts where further detailed assessment is required. 4. Arrange a site visit where required. 5. Factors that may be considered at the point of reassessment are: <ol style="list-style-type: none"> a. Topographical features; b. Observed level of damage; c. Property boundaries; and d. How accessible safe egress is for potentially impacted residents. 6. Reassessment recommendation internally peer viewed by HBRC, with a recommendation provided to HBRC Chief Executive for decision. 7. The HBRC Chief Executive may seek further technical advice or information as required before making a final decision. 	<p>Re-categorisation where appropriate.</p>

6. Completion of Risk Assessment

METHODOLOGY	PATHWAY
<p>The land categorisation process will be completed following:</p> <ol style="list-style-type: none"> 1. Notification to affected landowners of the intent to close the land categorisation process; 2. A public meeting will occur for each Category 3 community; 3. A period of two weeks will be provided for final feedback; 4. Feedback will be considered and assessed by technical experts, including any requests for reassessment; 5. Pattle Delmore Partners will provide a final peer review and quality assurance report with recommendations to the HBRC Chief Executive. 	<p>HBRC will release completed land categorisation maps to the Government and territorial authorities to inform future processes.</p>
<p>HBRC Chief Executive will direct the release of the land categorisations to the Government and territorial authorities. HBRC will only consider further changes to land categorisations after this point in the event that new compelling information is presented that was not previously available to the technical experts.</p>	
<p>HBRC will publicly release:</p> <ul style="list-style-type: none"> - Pattle Delmore Partners provisional categorisation report; - Pattle Delmore Partners supplementary land categorisation report; - Tonkin + Taylor land categorisation process assurance report; - Land categorisation methodology; and - Land categorisation process mapping. 	