

Debris Flow Risk: A way forward for the Awatarariki Fanhead



Subject: **A WAY FORWARD FOR THE AWATARARIKI FANHEAD**

To: **WHAKATĀNE DISTRICT COUNCIL**

Meeting Date: **THURSDAY, 15 DECEMBER 2016**

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MANAGER**

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1 REASON FOR THE REPORT

The purpose of this report is to update Council on the Draft Indicative Business Case (IBC). Council's agreement is also sought to formally engage with the Bay of Plenty Regional Council and central government to further develop and finalise the IBC, and to formally request that they become funding partners in this project.

A summary of the key concepts from the Draft IBC are summarised below for Council's consideration.

2 KEY CONCEPTS FROM THE DRAFT INDICATIVE BUSINESS CASE

The primary focus of this IBC is protecting the life safety of residents at Awatarariki fanhead. It is about a managed intervention to prevent a predictable disaster from a future, inevitable, highly destructive, debris flow natural hazard event. The intention is to secure agreement from partner organisations to invest in a way forward for the property owners of the Awatarariki Stream fanhead.

The IBC follows the Better Business Case methodology and is organised around the five case model to demonstrate that the investment:

1. is supported by a compelling case for change – the 'strategic case'
2. optimises value for money – the 'economic case'
3. is commercially viable – the 'commercial case'
4. is financially affordable – the 'financial case'
5. is achievable – the 'management case'.

The document is based on the numerous research programmes and investigations that have been carried out following the 2005 debris flow event at Matatā.

Each of the five cases are summarised below.

2.1 Strategic Case – compelling case for change

The people residing in 16 homes in the debris flow fanhead area at the mouth of the Awatarariki Stream in Matatā are exposed to a very high loss-of-life risk from future debris flows. The owners of a further 18 vacant sections are not permitted to develop their properties and have little prospect of being able to sell them. The IBC outlines options for a way forward for Awatarariki Fanhead property owners, which would allow them to relocate from the high hazard zone, and thereby mitigate the risk to their lives from future debris flow events.

Since 2005, residents of the Awatarariki fanhead high debris flow risk area have been living in limbo. The community continuously lives with the risk of another debris flow event occurring that could be larger than the 2005 event. This has an enormous social and emotional impact on people and a negative economic impact on the value of their properties. Although the land is zoned residential under the District Plan, property owners are unable to construct new dwellings; are unable to sell and move on; and in some cases, are unable to insure. In essence, people have been unable to recover from the traumatic event that occurred 11 years ago. Long-term uncertainty about the possibility of another debris flow event, the future of their properties, and their ongoing life safety has resulted in a fatigued, frustrated and apprehensive community that has lost confidence in the future.

To understand the current situation, it is important to consider the events that occurred on 18 May 2005. A band of intense rain fell over the catchments behind the coastal settlement of Matatā, triggering landslides and debris avalanches into the headwaters of a number of streams. That exceptionally heavy rainfall event resulted in several large debris flows. Debris flows consist of a mass of fluid with the consistency of slushy concrete, which are capable of carrying rocks up to seven metres or more in diameter. In this instance, the Awatarariki debris flow is estimated to have travelled at 15-30 kilometres per hour within the confines of the Awatarariki stream catchment, before depositing an estimated 300,000 cubic metres of rock, wooden debris and slurry on the fanhead properties. Debris flows, with their associated flooding, cut major transport links, destroyed 27 homes and caused \$20 million in damage in the Matatā area (Figure 1). Some of the people who experienced the event remain severely traumatised 11 years later. It was extremely lucky that no one died in this event, as risk assessment modelling for an event of the same size and scale has indicated a likelihood of five fatalities.

Figure 1: Photo showing the extent of damage following debris flows May 2005



Following the 2005 event, mitigation protection measures for all Matata catchments, other than the Awatarariki Stream catchment, have been completed. For the Awatarariki Stream catchment, a number of potential engineering solutions were explored with the community and with experts on debris flows. Options to protect the community residing on the Awatarariki Stream fanhead have included both engineering and planning solutions. Unfortunately, debris flow events are difficult to engineer mitigation measures against, and in 2012, the Council's engineering consultants advised the Council that there was no viable engineering option to protect properties on the Awatarariki Stream fanhead.

From late December 2012, the Council has focused on developing a planning solution.

The community is highly-frustrated with the apparent lack of progress over 11 years and there is strong community support for a decision that will provide certainty for property owners. This would create the confidence and capability required for people to be able to move on with their lives.

Experts are in strong agreement that the Awatarariki fanhead is a 'high loss-of-life risk zone' for future debris flows. Investigations into this event identified that historical destructive debris flow events, some potentially much larger, had occurred in the Awatarariki catchment at approximately 50-150 year intervals. The annualised risk of loss of life risk identified through modelling, and validated by independent peer review, is significant, ranging from 10^{-2} to 10^{-5} for anyone residing in the high-risk zone on the stream fanhead.

This assessment has been peer reviewed by two debris flow experts of international standing. The peer reviewers concluded that the high risk zone boundary should be extended to include two additional properties, meaning that the high risk area on the fanhead now comprises 45 properties where the risk is assessed as 'intolerable'. This geographical area consists of 16 homes, 18 privately owned sections and 11 properties in public ownership. The experts have recommended that retreat is the only safe option for addressing the loss-of-life risk in the high risk hazard zone. The Consensus Development Group also agreed that voluntary retreat was the most feasible solution.

As a consequence of identifying the level of risk, the Whakatāne District Council has declined applications for new building consents in the high debris flow risk area. The appropriateness of that position has been endorsed by a building determination issued by the Ministry of Business Innovation and Employment under the Building Act 2004. The inability of property owners to construct new dwellings, or undertake alterations that will increase the level of risk, will be a key driver of a proposal to undertake a change to the natural hazard provisions of the District Plan. The District Plan change will likely result in rezoning of the high debris flow risk area to a zone that better recognises the natural hazard risk, such as natural hazard or coastal reserve.

Internationally, nationally, regionally and locally, natural hazard management policies are clearly focusing on strengthening natural hazard risk management measures. Through the Bay of Plenty Regional Policy Statement (RPS) natural hazard provisions, the Whakatāne District Council is required to initiate actions to implement the RPS. This includes reducing high levels of natural hazard risk. Implementing the RPS provisions on the Awatarariki fanhead should also incorporate measures which will allow the community to recover from the 2005 debris flow event and foster community resilience for the future.

The Strategic Case clearly illustrates that there is a compelling case for change and a need for investment to allow owners of properties within the high debris flow risk area on the Awatarariki fanhead to retreat from the intolerable loss-of-life risk from future debris flow events. There is also a secondary need to provide certainty to Awatarariki fanhead property owners about the future use of their properties and the future of the community.

2.2 Economic Case – value for money

The economic case identifies and assesses options to address this natural hazard issue and to determine potential value for money. It does this through assessing options alongside investment objectives and critical success factors in order to identify a preferred way forward.

The investment objectives for this investment proposal are to:

- protect the life safety of the residents at Awatarariki Fanhead; and to
- create a state of certainty as the basis for Matatā town and its community to recover from the 2005 event and to support future community resilience.

2.2.1 Shortlisting options

Options were identified and assessed by both the Consensus Development Group and the Project Team, including the option of status quo/doing nothing. On the basis of the initial assessment of the long-list options (by dimension), the following short-listed options were selected for further economic analysis:

- **Option 0: Status Quo** – to be used as baseline comparator.
- **Option 1: Do Minimum** – Managed voluntary retreat for existing dwellings only (16 homes), based on magnitude event of 300,000m³, delivered by WDC by 2020 and funded by central and local government through a voluntary retreat package.

A magnitude 300,000m³ event has been chosen as this best represents a similar event to the 2005 debris flows (Tonkin & Taylor, 2015). Planning for anything less than this event is unacceptable as a risk to life safety would remain. The risk to life safety of a repeat debris flow of this magnitude has been modelled as affected an area containing 16 homes.

- **Option 2: Intermediate** – Managed voluntary retreat for all properties (16 homes and 19 vacant sections), based on magnitude event of 300,000m³, delivered by WDC by 2020 and funded by central and local government with a voluntary retreat package.

The scale of event planned for is the same as Option 1. Option 2, however, also includes the 19 vacant privately owned sections as well as the 16 homes.

- **Option 3: Less Ambitious** – Managed voluntary retreat for all properties (18 homes and 19 vacant sections), based on magnitude event of 450,000m³, delivered by WDC by 2036 and funded by central and local government through a voluntary retreat package.

A magnitude 450,000m³ event was also modelled by Tonkin and Taylor (2015) as a possibility and has been chosen to represent planning for a larger event compared with the 2005 debris flows. The risk to life safety of a repeat debris flow of this magnitude has been modelled as affected an area containing 18 homes (2 additional properties than Options 1 and 2) and 19 privately owned sections.

- **Option 4: Ambitious** – Compulsory retreat for all properties (18 homes and 19 vacant sections), based on magnitude event of 450,000m³ delivered by BOPRC or central government by 2020 and funded by BOPRC and/or central government.

2.2.2 Costs, benefits and risks

All four options were explored in further detail to define costs, benefits and risks. A summary is provided in Table 1 and Figure 2. Indicative project capital costs ranged from \$3.0 million (option 0: Do nothing) to \$15.3 million (Option 4: Compulsory retreat).

Cost benefit analysis (CBA) and Multi-Criteria Analysis (MCA) were used to compare the short-listed options.

In the CBA, overall actual costs and benefits are comparable (options 1, 2 and 4 have either higher or similar benefits to costs). Benefits include the avoided costs of a repeat event, including the avoided cost of multiple fatalities for people remaining on the Awatarariki fanhead. Unsurprisingly, net present value analysis results in significant negative values, ranging from (-\$5.3 million (Option 1) to -\$13.9 million (Option 4). Reasons for the negative NPV's can be attributed to the 200 year timeframe with significant upfront project costs coupled with discounted benefits (avoided costs).

Loss of life, wellbeing, mental stress, and providing certainty for residents are difficult factors to monetise and therefore have been considered as part of the MCA. The short-listed options deliver different levels of benefits. Overall, voluntary managed retreat solutions (options 2 and 3) are assessed more favourably for benefits, as these options generally provide property owners with a choice, reducing stress levels, and are more likely to be achievable to implement.

Risk analysis has shown that the likelihood and impact of risks manifesting is similar for all four options. Option 4 (compulsory retreat) ranked most favourably, followed by the voluntary managed retreat options 2 and 3. A stakeholder risks analysis was also undertaken for the status quo option. This identified that there was a compelling case for the Government, BOPRC, and the Council, to support the voluntary retreat option as a collaborative preferred solution.

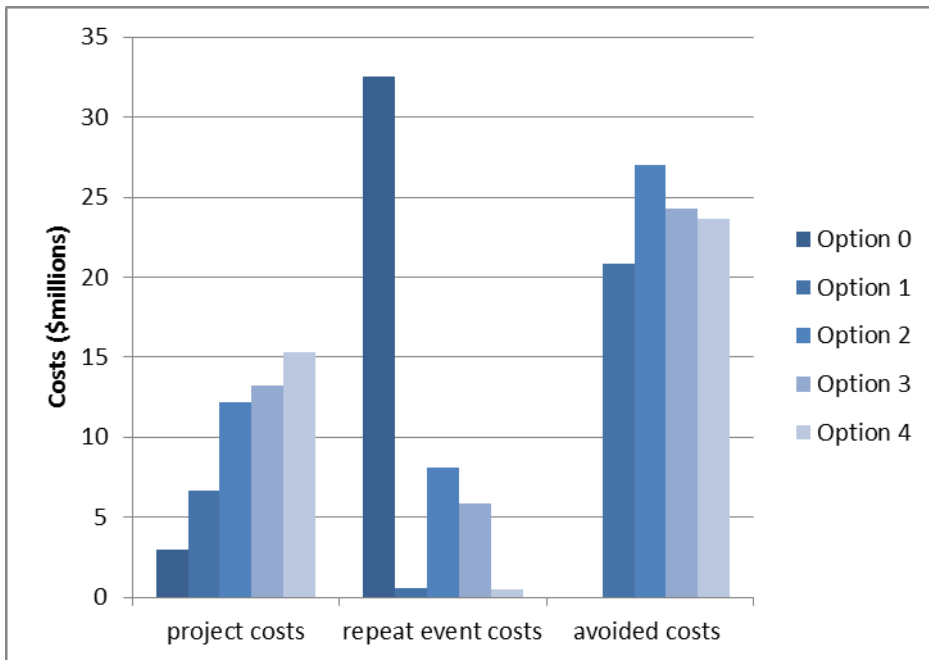
Table 1: Awatarariki Fanhead Options: Cost Benefit Analysis

Options	0	1	2	3	4
	0; Status Quo	1: Do Minimum	2: Intermediate	3: Less Ambitious	4: Ambitious
Description		Managed voluntary retreat – existing dwellings only	Managed voluntary retreat – all properties	Managed voluntary retreat – all properties	Compulsory retreat
Magnitude event	300,000m ³	300,000m ³	300,000m ³	450,000m ³	450,000m ³
Appraisal Period (years)	200	200	200	200	200
Capital Costs – project (\$m)	\$3.0	\$6.8	\$12.2	\$13.3	\$15.3
Repeat event costs	\$32.5	\$8.0	\$8.1	\$7.9	\$0.5
Operational Costs (\$m)	-	\$0.4	\$11.5	\$11.5	\$16.3
Benefits (\$m)	nil	\$20.8	\$26.9	\$23.6	\$23.6
Net Present Value of Benefits (\$m)	nil	\$1.4	\$1.8	\$0.4	\$1.6
Net Present Costs (\$m)	\$5.3	\$7.3	\$13.1	\$10.8	\$15.5
Net Present Value ¹ (NPV, \$m)	-\$5.3	-\$5.9	-\$11.3	-\$10.4	-\$13.9
Objectives met ²	No	Yes/Partial	Yes/Partial	Yes/Partial	Yes
Multi-Criteria Analysis rank	5	4	1/2	1/2	3
Non-Monetary Benefit score (out of 10)	1.6	4.9	5.2	5.1	5.5
Benefit Rank	5	4	2	3	1
Risk Score (out of 10)	4.7	3.2	3.0	3.0	2.3
Risk Rank	5	4	2/3	2/3	1
No. of properties affected	35	16	35	37	37
<i>Preferred option</i>			Preferred		

Figure 2: Summary of costs and avoided costs across options

¹ Net Present Value (NPV) is a capital budgeting technique that takes into account the time value of money. Table 8 represents the difference between the present value of cash inflows and the present value of cash outflows associated with each option over a 50 year period.

² Options 1-3 meet the objective if all people choose to relocate.



Project costs across the options range from \$3.0 million (Option 0) for the cost of ‘doing nothing’ (this includes costs of a legal challenge and the creation of an escape route) to \$15.3 million for compulsory retreat (majority of costs fall on private individuals through the loss of homes and land).

The preferred option of managed voluntary retreat (Option 2) is estimated at \$12.2 million, primarily for property acquisition of 75% of properties with dwellings and 100% of sections as well as reserve creation costs.

2.2.3 Preferred way forward – voluntary managed retreat (repeat debris flow event of 300,000m3)

The preferred way forward is a voluntary managed retreat of all properties on the Awatarariki fanhead. This option is represented by Option 2 in the short listed options – the ‘intermediate’ option. A voluntary retreat means that although residents are encouraged to vacate their land and homes, they do have a choice to remain.

Option 2 is a voluntary managed retreat of 34 private properties on the Awatarariki fanhead within the high risk zone (refer to hashed line on Figure 3). This reflects properties within the high debris flow risk area and consists of 16 residential homes and 18 vacant sites. An additional 11 publicly owned vacant sites (owned by Whakatane District Council, the Crown and Kiwi Rail) are also included within this area but are outside the scope of this IBC, primarily because the sites are in public ownership and the status of the land is not proposed to change.

Figure 3: Properties affected within the high debris flow zone



If property owners decide to accept the retreat offer, an investment of approximately \$12.2 million to \$14.2 million (capital project costs, excluding existing spend to date) in the 2016-2019 financial years would be required to acquire the 34 private properties on the fanhead.

The preferred way forward is heavily dependent on external funding.

2.3 Commercial Case – is it viable?

The commercial case outlines the proposed deal in relation to the preferred way forward – voluntary managed retreat of privately-owned properties in the high risk zone by 2020 (Option 2).

An acquisition strategy has been developed to encourage residents to relocate away from the high debris flow risk area on the Awatarariki Stream fanhead. Although there is no legal requirement to provide any type of funding package for retreat, an incentivised solution is considered necessary for a voluntary retreat to be successful. Initial conversations with affected property owners have taken place and it is estimated that over 90% are interested in seeing the property acquisition offer delivered. The funding package provides an incentive for residents to voluntarily relocate away from a high natural hazard risk. Realisation of the voluntary retreat strategy is not achievable by the Council alone. Additional funding support from other parties is required.

The required services for the preferred approach that would be subject to procurement are:

- Establishment of an escape route to deliver an immediate life safety benefit to Clem Elliott Drive residents;
- Implementing the acquisition strategy (includes negotiation with property owners, legal processes);
- Developing a Plan Change process to the Whakatāne District Plan to rezone the affected area from residential to reserve (or equivalent);
- Demolition/ relocation costs of existing residences;
- Section clean-up costs;

- Reserve creation following retreat; and
- Maintaining capacity to absorb future debris flow events on the reserve.

2.4 Financial Case – is it affordable?

The estimated capital cost for the proposed project is \$12.2 - \$14.3 million, depending on the proportion of take-up by property owners (not including existing spend). These figures are based on 75% to 100% take-up by affected property owners.

Affordability to the community is the key determinant of whether or not the project will proceed through to implementation. The project team believes there are strong reasons for both central government and the Bay of Plenty Regional Council to invest in the Matatā community through supporting a collaborative funding response. We intend to work with funding partners to finalise the business case and the funding model.

The commitment to the Sendai Framework³ and amendments to the RMA signals the Government's intentions to deliver improved natural hazard management in New Zealand. Bay of Plenty Regional Council plays an important role in risk management of natural hazards in the region. The collaborative approach proposed would achieve the goals of the newly adopted Change 2 (Natural Hazards) to the RPS by reducing the risk to life safety on the Awatarariki Stream fanhead.

2.5 Management Case – is it achievable?

The management case addresses the achievability of the proposal and planning arrangements required to both ensure successful delivery and to manage project risks.

A voluntary managed retreat (Option 2) will be operated as a project and managed in line with the Council's Project Management processes. The project will involve four stages:

1. Project initiation (of which this IBC is part of)
2. Project planning
3. Project execution
4. Project completion and evaluation.

The Project Sponsor, Project Director and Project Manager will oversee the project in accordance with standard Council methodology.

2.6 Next steps

The IBC clearly confirms the strategic need to invest. The preferred option is a voluntary managed retreat of the 34 affected properties. This involves an incentivised approach to voluntarily relocate away from the high natural hazard risk through the use of a property acquisition process. This will significantly reduce the risk to life and also provide certainty and create confidence for people to move forward with their lives, which will also enable wider community recovery and resilience.

Uncertainties associated with this project include the:

- level of 'take-up' by the 34 property owners (although initial consultation indicated that this is likely to be in excess of 75%)
- ability to secure adequate external funding.

³ Sendai Framework for Disaster Risk Reduction 2015-30 (SFDRR) was adopted by 187 member states at the 3rd UN World Conference for Disaster Risk Reduction in 2015. New Zealand is a signatory to the SFDRR.

This IBC recognises funding support from Government and the Bay of Plenty Regional Council will be necessary to commence the process of property acquisition, based on the preferred way forward and the short-listed options above.

Proposed next steps are:

1. Formal engagement with Government and BOPRC to obtain support to develop the business case and in particular the funding strategy.
2. Once funding has been confirmed, voluntary retreat from the properties in private ownership to be initiated and managed through the Acquisition Strategy developed by the Property Group. The Acquisition Strategy recognises:
 - Mitigating high loss-of-life risk is the key driver of the Strategy
 - Property owners have a choice to participate
 - Implementation of the Strategy is reliant on the Council securing funding support from the Government and the BOPRC
 - The process must be a fair and legal (despite the Public Works Act not being applicable in this instance, its tried and tested acquisition principles have been incorporated into the Strategy).
3. Initiation of a plan change to the District Plan to rezone residential land on the Awatarariki fanhead to reserve.

3 OPTIONS

At this stage, the Council needs to determine whether or not the IBC should be further developed and presented to potential external funding agencies.

The options Council may wish to consider are:

1. Agree to formally engage with the BOPRC and central government early in 2017 to further develop the Draft IBC, particularly in relation to funding arrangements (preferred option);
2. Continue to develop the Draft IBC prior to formal engagement with the Bay of Plenty Regional Council and central government; or
3. Discontinue work on the Draft IBC.

The need to invest is compelling. Assuming the decision is to proceed, it is anticipated that formal engagement with BOPRC and other agencies, will occur in the first quarter of 2017. This will include discussions around funding arrangements. Once the level of commitment from external agencies is known, the Council will be in a position to determine the affordability of the project and decide whether or not the project should proceed.

4 ASSESSMENT OF SIGNIFICANCE

The decisions or matters of this report are part of a process to arrive at a decision that may be significant in accordance with section 3.3 of the Council's Significance and Engagement Policy. This states that a matter shall be determined to be significant if/when the impact or consequences of the proposal or decision on the affected persons (being a number of persons) will be substantial, or when the financial implications of the proposal or decision on the Council's overall resources are substantial. If funding arrangements with BOPRC and the government can be realised, an assessment will be required against the Significance Policy criteria to determine whether or not

public consultation will be required. The intention is for certainty to be reached on funding prior to the next LTP.

5 COMMUNITY INPUT AND PUBLICITY

There has been regular contact between staff and property owners through provision of update reports, phone conversations, and more recently, arrangements for valuations of properties. Face-to-face meetings have been carried out to present the Voluntary Retreat Proposals to property owners.

The Council also worked with a group of residents under the umbrella of a Consensus Development Group. An important point of agreement among the group was acceptance that a high risk of debris flow exists, while recognising that individual personal tolerance of this risk varies. The group also identified that a managed voluntary retreat was the best option for management of the debris flow hazard to Awatarariki fanhead properties.

6 CONSIDERATIONS

6.1 Financial/budget considerations

A managed voluntary retreat is not a risk management strategy that is affordable if it is to be funded solely by Whakatāne District ratepayers. A combined multi-agency funded voluntary retreat package taken up by property owners offers the best solution to managing risk from future debris flows within the Awatarariki catchment. This project is therefore heavily dependent on external funding.

6.2 Policy and planning implications

The decisions in this report are consistent with Council's policies and plans. A proposal to initiate a plan change to update the natural hazards provisions of the Proposed District Plan to comply with the BOPRC Regional Policy Statement natural hazard provisions will be developed for consideration by Council.

6.3 Risks

The key risk is that required levels of external funding are not secured. The other significant risk is that this project does not proceed and there is a repeat debris flow event, resulting in one or more fatalities.

6.4 Authority

The Council has the authority to make the decisions outlined in this report.

RECOMMENDATIONS

1. **THAT** the report "Draft Indicative Business Case: A way forward for Awatarariki Fanhead" be received;
2. **THAT** the Council notes the progress of the Awatarariki Fanhead Indicative Business Case;
3. **THAT** the Council agrees to the objectives and key concepts of the Draft Indicative Business Case as outlined in the report; and

4. **THAT** the Council agrees to formally engage with the Bay of Plenty Regional Council and central government to further develop the Draft Indicative Business Case, particularly in relation to funding arrangements with key partner agencies.

Report Authorisation

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