

# Wairau Blue-Green Network – Ngā Wairau Stage 1 AF Thomas Park

Update to cost benefit analysis for Fast-Track Referral  
Application  
Final Report



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# Preface

This report has been prepared for Te Kaunihera o Tāmaki Makaurau | Auckland Council by Nick Carlaw and Ana Rodriguez from MartinJenkins (Martin, Jenkins & Associates Ltd).

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# Key findings

Auckland Council's Healthy Waters and Flood Resilience Department is preparing to lodge a referral application under the Fast-track Approvals Act 2024 for Ngā Wairau – Stage 1.

In support of the referral application, Healthy Waters has asked MartinJenkins to consider whether any new information has come to light that would materially change the benefit cost ratio (BCR) that we presented in our August 2025 report.<sup>1</sup>

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## Independent review of our August 2025 report

Auckland Council in its regulatory capacity commissioned Formative, an economic consulting firm, to carry out a pre-application review of the August report.

The review supported the use of a cost benefit analysis and the Annual Average Damage method. The reviewers noted that certain assumptions may have led to underestimating

the BCR. Formative concluded that some additional work would be beneficial, but they also concluded that this further analysis would be unlikely to change the overall findings of the report.

## Identifying a "reasonable" BCR as a single value

In the August report, we considered whether to present the benefit cost ratio as a single figure or a range. Given the project was in the early design and consenting stage, and also the number of alternative scenarios that could influence the BCR, we opted for a range to reflect the inherent uncertainty. This approach ensured that the analysis did not overstate the level of precision that was possible at this stage.

Following feedback from Formative, we have replicated one of the scenarios that we used to develop the BCR range in our August report. This scenario resulted in a BCR of just over 1.0, meaning the benefits are expected to outweigh the costs.

## The impact of climate change happening earlier

We used the scenario that resulted in a BCR of just over 1.0 to assess the impact of earlier climate change effects.

Our analysis showed that the earlier that climate change effects occur, the greater the avoided property damages – and the stronger the case for investing in flood mitigation.

## New information that has come to light since the August report

### New flood modelling data

Since the August report, WSP has updated the flood modelling that underpins the assessment of avoided property damage – the largest benefit in the cost benefit analysis.

The revised flood modelling, which now better reflects the January 2023 flood event, indicates that the flood storage at AF Thomas Park will be used more frequently and will protect a greater number of properties. This means that, all else

<sup>1</sup> <https://new.aucklandcouncil.govt.nz/content/dam/ac/docs/plans-projects-policies-reports-bylaws/a-f-thomas-park-concept-feasibility-report-appendices-c-to-g.pdf>



being equal, the avoided property damage benefit will be higher than previously estimated.

### **New housing development**

The August report assumes that no new housing development will occur over the next 100 years within the catchment. This assumption is likely to lead to underestimating the benefits: additional buildings will be developed and existing properties in the catchment will be upgraded – meaning the avoided property damage will be greater.

However, quantifying the amount of development is complicated. Auckland Council has notified Plan Change 120: Housing Intensification and Resilience to the Auckland Unitary Plan. The implications of this plan change on future development in the catchment are not fully understood and may change because of the submissions and subsequent hearing process. This will require further analysis before it can be incorporated into the BCR.

### **Further analysis**

A comprehensive update to the benefit cost ratio will require the Council's engineers to do additional flood modelling across a range of flood events of differing severity. This analysis is planned to accompany Auckland Council's substantive fast-track application in mid-2026.

## **Why flood protection matters for the region**

The severe weather events of early 2023 – the Auckland Anniversary floods and Cyclone Gabrielle – highlight the critical importance of flood protection for the Auckland region, and particularly for the Wairau catchment.

These events brought record rainfall, resulting in widespread damage, loss of life, and significant disruption to communities and businesses. They were the largest insurance-related weather events in New Zealand's history.

The human impact was substantial, with six fatalities across Auckland (including two in the Wairau catchment) and thousands of injuries. The financial cost of lost lives in the catchment alone is estimated at between \$16.6 million and \$25 million, based on the Value of a Statistical Life.

Many families were displaced for months, and wellbeing support services were required for storm-affected residents.

Infrastructure and property damage was extensive. More than 250 homes in the Wairau area were severely or moderately damaged, and key roads, power substations, water and wastewater systems, and schools were all affected.

Businesses in the catchment, which accounts for around 2% of Auckland's employment, suffered

major losses, with large-format retailers, automotive dealerships, and sporting facilities all experiencing significant damage and disruption.

These impacts underscore the need for effective flood protection measures to safeguard people, property, and the wider economy in Auckland.



# Introduction

In January 2023, the Wairau catchment was severely flooded during the Auckland Anniversary storm, causing widespread damage and some loss of life. Auckland Council has since prioritised the catchment as part of its Blue-Green Network under the Making Space for Water programme.<sup>2</sup>

In July 2025, to inform its Concept Feasibility report for Ngā Wairau – Stage 1, Auckland Council asked MartinJenkins to peer-review and augment a cost benefit analysis (CBA) done by engineering firm WSP.

MartinJenkins provided a report to the Council on 1 August 2025 that presented a benefit cost ratio (BCR) in the form of a range, along with the assumptions and methodology used to calculate the BCR.<sup>3</sup>

Auckland Council's Healthy Waters and Flood Resilience Department (Healthy Waters) is now preparing to lodge a referral application under the Fast-track Approvals Act 2024 for the project.

In support of the referral application, Healthy Waters has asked MartinJenkins to consider whether any new information has come to light

that would materially change the BCR range that was presented in the August report.

If the Council is successful in its referral application, it may decide to lodge a substantive application in mid-2026. It would provide a comprehensive CBA in support of that application.

## Approach

Our approach has involved the following steps:

- We talked to members of the Healthy Waters project team about the design and consenting activities that have been done since we provided our August report.
- We talked to WSP about updates they had made to their flood modelling projections.
- We considered the findings of an independent review of our August report. The review was commissioned by the Council in its regulatory capacity and carried out by Formative – an economic consulting firm.
- We assessed whether new information that had become available since our August report was sufficiently certain and complete to enable us to update the BCR.
- We carried out additional analysis, including scenario testing to understand the impact of the timing of climate change on the BCR.
- Where new information was available but not sufficiently certain and complete to include in our analysis, we assessed what the qualitative impact on the BCR was likely to be.
- We identified evidence that demonstrated the significant benefits that the Stage 1 flood protection works would have for Auckland.

<sup>2</sup> <https://www.aucklandcouncil.govt.nz/environment/looking-after-aucklands-water/Pages/making-space-for-water.aspx>

<sup>3</sup> <https://new.aucklandcouncil.govt.nz/content/dam/ac/docs/plans-projects-policies-reports-bylaws/a-f-thomas-park-concept-feasibility-report-appendices-c-to-g.pdf>



# Key findings from MartinJenkins' August 2025 report

To inform its Concept Feasibility report for Ngā Wairau – Stage 1, Auckland Council asked us to peer-review and augment a cost benefit analysis done by engineering firm WSP. We reported back to the Council on 1 August 2025.

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## Scope and approach

For our August report we calculated the benefit cost ratio by comparing two scenarios: one where AF Thomas Park included flood-protection wetlands, dry detention areas, and related amenities, and one where no flood mitigation was carried out.

Our analysis adopted a societal perspective, taking into account the impacts both on individuals and on wider society, and it used a 100-year timeframe to capture long-term flood and climate resilience benefits.

Sensitivity testing was done across key variables such as:

- discount rates of 1.5%, 2%, 4%, and 8%, following Auckland Council and Treasury guidance

- shorter timeframes of 25, 50, and 75 years
- construction costs based on P50 and P95 values, and
- the growth of future construction prices.

The analysis explored alternative scenarios involving Takapuna Golf Course to gain an understanding of the impact on the BCR.

The main inputs to the analysis were flood modelling from WSP, damage costs from Auckland Council's Flood Damage Assessment (FDA) tool, and project cost estimates from Alta Consulting.

## Benefit cost ratio

The BCR presented in our August report ranged from 0.5 to 1.4. It was presented using a range to avoid overstating the level of certainty because the design of the flood protection was at concept stage.

This BCR range was:

- different from the 0.72 – 1.59 in the Concept Feasibility report on 4 July 2025 because, after completing our analysis, we concluded it was prudent to extend the lower end of the range and use more conservative design

and build costs to estimate the upper end of the range

- marginally higher than the upper end of the BCR range of 0.5 – 1.36 in the business case approval paper that was presented to TRIC on 3 April 2025.

Avoided property damage was the largest benefit, comprising up to 87% of total benefits, estimated using flood modelling and Auckland Council's FDA tool.

The biggest cost was the design and build, which made up 62% to 80% of total costs depending on the assumptions used.

Several benefits were not monetised, including:

- urban density impacts
- avoided damage to public infrastructure and utilities
- recreational benefits from future park uses
- flood-protection benefits from future stages of the project.

The August report noted that a comprehensive CBA would be developed and that this should result in a narrower BCR range because of greater certainty about the inputs.



# The independent review of our August 2025 report

This section summarises the findings and suggestions made by the consulting firm Formative in their review of our August report.

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Auckland Council in its regulatory capacity commissioned Formative, an economic consulting firm, to carry out a pre-application review of MartinJenkins' August report.

The purpose of the independent review, dated 14 October 2025, was to provide preliminary economic guidance on the pre-application material submitted by Healthy Waters for the fast-track process.

## Formative's key findings

### **The review supported the use of a CBA analysis and the Annual Average Damage method**

Formative supported the use of cost benefit analysis, recognising that this approach would enable decision-makers in the fast-track approval process to assess both the costs and benefits of the proposed infrastructure.

Formative endorsed the use of the Annual Average Damage (AAD) method to account for uncertainty in flood events, and agreed that changes to the golf course, whether through closure or downsizing, would shift costs and demand to other courses.

### **The reviewers noted that certain assumptions may have led to underestimating the BCR**

They noted that certain assumptions we had used – such as no future development within the catchment and a linear approach to climate change impacts – were likely to lead to understating the BCR. They also expected that quantifying currently unmeasured impacts would be likely to result in a higher BCR.

### **Formative concluded that some additional work would be beneficial, as we summarise below**

However, they also concluded that this further analysis would be unlikely to change the overall findings of the MartinJenkins report.

The reviewers said further that the net positive benefits from the CBA could in fact be higher than assessed in our report, with the BCR range likely to be mostly above 1.0.

## The further analysis recommended by Formative

- Formative noted that the BCR range (0.5 to 1.4) is wide, and suggested a “baseline run” to provide an indication of the expected BCR of the proposal.
- They suggested testing other alternatives to the proposed flood protection works at AF Thomas Park to ensure that the chosen option is optimal – for example, other engineering solutions, managed retreat, planning controls, or retaining the full golf course with mitigation.
- Formative supported using a 100-year timeframe. They noted that while the impact of shorter timeframes had been tested, our analysis had not included a timeframe greater than 100 years (for example 125 years), meaning that the range of benefits we presented was likely to err on the lower side.
- Formative recommended assessing the impact of future development in the catchment. This includes: factors that will increase the impact of flood events (such as new housing in the catchment); the impact



of PC 120; and the impact of requirements for new houses to have stormwater mitigation like retention tanks.

- Formative suggested assessing the impact on the BCR if climate change occurs earlier in the analysis period.
- Formative proposed a more specific discussion on whether the project delivers significant benefits at the regional or national level, which is a requirement under the Fast-track Approvals Act 2024.



# Update to August report

In this section we consider, first, the impact of climate change occurring earlier than was assumed for our August 2025 report, and second, the impact of some new information that has become available concerning flood modelling and housing development in the Wairau catchment area.

As a starting point for those assessments, we identify, as a single value rather than a range, a BCR that could be reasonably expected.

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## Identifying a "reasonable" BCR as a single value

In our August report, we thought carefully about whether to present the BCR as a single value or as a range. We decided to use a range to convey the uncertainty that exists because of the project still being in its design and consenting phase. There were (and still are) many alternative

scenarios that could play out – each of which will impact the BCR in a different way.

In response to Formative's suggestion of a "baseline run" to provide an indication of an expected BCR as a single value, we have replicated one of the scenarios that we used to develop the BCR range in our August report.

This scenario resulted in a BCR of just over 1.0 (in other words, the point at which the benefits are greater than the cost). Appendix 1 sets out the assumptions that were used to develop the scenario and compares it to the BCR range provided in the August report.

We use this "reasonable" BCR as the basis for showing the impact of climate change effects occurring earlier in the 100-year analysis period.

We also assess the impact of new information that has emerged since our August report on the BCR. We have concluded that, all else being equal, the benefits would be likely to increase. However, as we explain below, that new information is currently not sufficiently certain

and complete to enable us to include it in an updated BCR calculation at this time.

## The impact of climate change happening earlier

To estimate the avoided property damage benefits in the August report, we used rainfall modelling from WSP.

This modelling calculated the annual avoided damages for two scenarios: one based on current climate and urban development (the existing scenario); and one based on future climate and development allowed under the current planning rules (the future scenario).<sup>4</sup>

We then interpolated between these two AAD (Annual Average Damage) values across the 100-year timeframe of the CBA. This meant that the future scenario (which is based on the impacts of climate change) was gradually introduced from year 50 and reached its full impact by year 100 (this is represented by the red column labelled "Year 100" in the graph below).

<sup>4</sup> These scenarios assume land use based on the existing Auckland Unitary Plan (not PC 120) and the associated maximum impervious land cover which will increase the predicted runoff across the catchment area. The scenarios do not include any additional buildings being built in the catchment area in the future, meaning the avoided property cost is based on the current building footprints.



We have since assessed the impact on the BCR if climate change impacts occur earlier. To do this, we looked at four new climate scenarios:

- **Future scenario from year 1** – Full climate change impacts begin from year 1. This scenario has the biggest positive impact on the BCR (as shown by the "Year 1" column in the graph).
- **Transition at year 25** – Starts with the existing scenario and shifts to the climate change scenario from year 25 onwards (see the "Year 25" column in the graph).
- **Transition at year 50** – Starts with the existing scenario and shifts to the climate change scenario from year 50 onwards (see the "Year 50" column).
- **Transition at year 75** – Starts with the existing scenario and shifts to the climate change scenario from year 75 onwards (see the "Year 75" column).

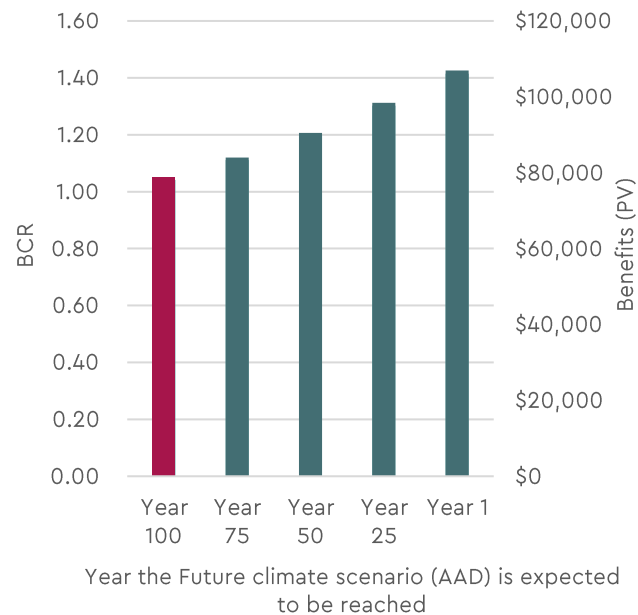
## Model results

The graph shows that the earlier that climate change effects occur, the greater the avoided property damages – and the stronger the case for investing in flood mitigation.

If climate change impacts start in year 75, the benefits are 50% higher than the "reasonable" BCR identified at the start of this section; in year 50, they're 30% higher.

If climate change impacts start in year 1 of the assessment, the present value cost of avoided property damage is 72% higher than the "reasonable" BCR.

**Figure 1: Reasonable scenario benefits and BCR with accelerated climate effects**



## New information

### Updated flood modelling data

Since our August report, WSP has updated the flood modelling data that feeds into the avoided property damages benefits – the largest benefit of the CBA.

WSP has run the updated model for the most extreme event assessed in the CBA – the 1-in-100-year flood.

The flood modelling updates show that the flood storage at AF Thomas Park is expected to be used more often and will protect more houses – meaning the avoided property damage benefit will be higher than that presented in our August report (all else being equal).

### The changes to WSP's flood modelling

- **A model calibration update** – WSP adjusted the hydraulic flood model to better match the January 2023 flood. The model more accurately takes into account the roughness of the creek bed area, which has the effect of raising the simulated flood levels.
- **Design improvements** – The design of the flood storage at AF Thomas Park was improved to hold more water. This change reduces peak flows in the creek by about 4% and lowers flood levels by roughly 100 mm,



increasing the overall flood protection benefits.

- **Rainfall revision** – WSP updated the rainfall data using NIWA's revision of the TP108 rainfall depths.<sup>5</sup> The new estimates suggest a 10% increase in rainfall for major flood events, which means higher and more frequent peak flows, and therefore greater benefits from the flood mitigation at AF Thomas Park.
- **More properties protected** – The new data increases by 14% the number of dwellings that would be impacted by a severe weather event (from 191 dwellings to 218).

### Update for the comprehensive BCR

Although WSP has revised the flood modelling data for the most extreme flooding event, this single data point does not allow us to update the flood damage assessment and re-calculate the BCR.

To do this, we need flood modelling data for at least three other types of flood events of differing severity.

This additional flood modelling and the updated BCR will accompany Auckland Council's substantive fast-track application in mid-2026.

## Housing density

The August report assumes that no new development will occur within the catchment in the future. This assumption is likely to lead to underestimating the benefits: additional buildings will be developed over the next 100 years and existing properties in the catchment will be upgraded – meaning the avoided property damage will be greater.

However, quantifying the amount of development is complicated. Auckland Council is proposing significant changes to the Auckland Unitary Plan under PC 120: Housing Intensification and Resilience.

These changes respond to a government requirement to enable more opportunities for housing and development, including allowing for significant increases in building heights. They would also strengthen the rules that relate to building in areas prone to natural hazards – meaning the Council would have the ability to “downzone” areas of the city that are vulnerable to natural hazards like floods.

### Update for the comprehensive BCR

Auckland Council notified PC 120 on 3 November and the plan change is currently open for submissions, from 3 November to 19 December

2025. The Council must notify its decisions on PC 120 before the end of June 2027.

This means that the implications of the plan change for future development potential in the catchment area are not yet understood. The Council will need to do more detailed analysis before housing intensification can be quantified in the context of the plan change and factored into the AF Thomas Park BCR.

## Infrastructure damages

### Utilities

In the August report, we identified benefits that were not quantified in the BCR but that should still be considered as part of the investment decision-making process.

This included avoided damage to utilities, including critical infrastructure like power substations and wastewater systems.

WSP have since confirmed that both Watercare's Alma Road wastewater pump station and the Vector / Transpower Wairau Zone Substation would benefit from the flood protection at AF Thomas Park.

Vector's flood resilience consultation document highlights the Blue-Green initiative as an example

<sup>5</sup> Technical Publication 108 (TP108) was published by Auckland Regional Council in 1999 and is the primary flow estimation tool for the Auckland region.



of measures that could defer Vector's climate adaptation investment.<sup>6</sup>

### **State Highway**

The New Zealand Transport Agency have provided support to the flood mitigation at AF Thomas Park on the basis that it reduces flood risk on State Highway 1, particularly for an extreme flood event.

The work at AF Thomas Park will also improve walking and cycling access to the Smales Farm busway station.

### **Update for the comprehensive BCR**

WSP's updated flood modelling for a 1-in-100-year event shows that flood levels will reduce by 180 mm at the wastewater pump station and 700 mm at the substation due to the protection at AF Thomas Park.

Before we can recalculate the BCR using this new information about utilities and highways, we would need flood modelling data for the other, less severe types of flood events. This analysis will be completed in time to accompany the Council's substantive fast-track application in mid-2026.

### **Cost increases**

There is no update to the cost estimate to do the flood works at AF Thomas Park.<sup>7</sup> Any cost increase will reduce the benefit cost ratio (all else being equal).

<sup>6</sup> Vector's approach to climate change resilience, August 2025.

<sup>7</sup> In the August 2025 report, we relied on cost estimates provided by Alta Consulting.



# Why flood protection matters for the region

This section compiles public information on the extensive damage and loss inflicted in the Wairau catchment area by the two major weather events of early 2023, the Auckland Anniversary floods and Cyclone Gabrielle.

We also summarise the impact at the regional level, where there is better information about the cost of the damage.

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The impacts of past flooding events demonstrate how important flood protection is to the Auckland region, especially within the Wairau catchment.

In early 2023, the Auckland region experienced two major weather events. The first was the Auckland Anniversary floods in January, which brought the city's worst flooding on record. A 1-in-200-year rainfall event dropped around 265 mm in just 24 hours<sup>8</sup> – more than the average rainfall for an entire summer.

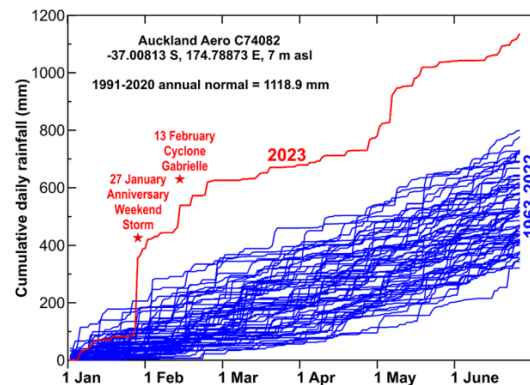
<sup>8</sup> [Brief report of fatal rainfall-triggered landslides from record-breaking 2023 storms in Auckland, New Zealand](#)

<sup>9</sup> [Brief report of fatal rainfall-triggered landslides from record-breaking 2023 storms in Auckland, New Zealand](#)

<sup>10</sup> [Inquest examines Auckland deaths in 2023 twin flooding events | RNZ News](#)

The second event followed just weeks later. While Auckland was still under a state of emergency, Tropical Cyclone Gabrielle crossed the region on 13–14 February. The cyclone delivered extreme rainfall and strong winds across the North Island. Auckland recorded up to 248 mm of rain and wind gusts exceeding 115 km/h.<sup>9</sup>

**Figure 2: Daily rainfall in Auckland (1963–2023)**



Source: [Brief report of fatal rainfall-triggered landslides from record-breaking 2023 storms in Auckland, New Zealand](#)

This section compiles public information to outline how these two major events affected the Wairau catchment causing extensive damage and losses. We also summarise the impact at the Auckland-region level, where there is better information about the cost of the damage.

## The impact on the Wairau catchment

### The human toll

#### Loss of life and injuries

The two major weather events resulted in six fatalities in the Auckland region and thousands of injuries.<sup>10</sup> The Auckland Anniversary event alone caused two deaths in the Wairau catchment.

However, the toll could have been higher. During the floods, Surf Life Saving volunteers rescued



69 people,<sup>11</sup> and by February ACC had accepted over 1,000 injury claims from Aucklanders who had been harmed in the floods.<sup>12</sup>

### **Assigning a monetary value to human life**

The Value of a Statistical Life (VoSL) is estimated at a minimum of \$8.1 million<sup>13</sup> and with a midpoint of \$12.5<sup>14</sup> million.

Based on these figures, the cost of the loss of life in the catchment during the event ranges between \$16.6 million and \$25 million.

## **Loss of infrastructure and property**

### **Housing**

The lasting effect on people's lives was significant. Immediately after the floods, dozens of displaced families from Milford and Wairau Valley were accommodated in hotels or emergency housing.

Several families from areas such as Sunnynook only began leaving their motel accommodation and returning home more than six months after the January 2023 floods.<sup>15</sup> Wellbeing support services were made available to storm-affected residents.<sup>16</sup>

At the Parklane Retirement Village in Forrest Hill, several units near the Wairau Stream were flooded. To reduce future flood risk, Parklane permanently closed the low-lying units, recognising the vulnerability of its elderly residents.<sup>17</sup>

More than 250 homes in Milford, the Wairau Valley, and surrounding suburbs were issued with red (severely damaged) or yellow (moderately damaged) placards.<sup>18</sup>

### **Roads**

Flooding tore up roads and undermined infrastructure in low-lying parts of Takapuna and Milford. Wairau Valley Road, a major arterial route through the industrial estate, turned into a river.

Local streets such as Nile Road, Alma Road, and Shakespeare Road – which connect to North Shore Hospital and local schools – were flooded and impassable.<sup>19</sup>

### **Electricity**

Transpower reported that during the Auckland Anniversary downpour, about 1.5 metres of water inundated the Wairau Road substation, which provides power to approximately 500,000 customers on Auckland's North Shore<sup>20</sup> and the North Shore Hospital.

### **Water and wastewater systems**

The Wairau Pump Station was heavily affected during the Auckland Anniversary floods. Two

<sup>11</sup> [Shaping Milford's future through major change - OurAuckland](#)

<sup>12</sup> [More than 360 Cyclone Gabrielle injury claims accepted so far, number likely to grow | Stuff](#)

<sup>13</sup> <https://www.nzta.govt.nz/assets/resources/research/reports/698/698-monetised-benefits-and-costs-manual-mbcm-parameter-values.pdf>

<sup>14</sup> <https://www.transport.govt.nz/area-of-interest/safety/social-cost-of-road-crashes-and-injuries/>

<sup>15</sup> [Flood frustration flows months down track - Issuu](#)

<sup>16</sup> <https://www.publicnow.com/view/64DC612BD26D208D0AD713328D0208B3D87EA944?1752817610>

<sup>17</sup> [Focus goes on flood risk to lives of vulnerable Milford, Forrest Hill village residents - Rangitoto Observer](#)

<sup>18</sup> [Shaping Milford's future through major change - OurAuckland](#)

<sup>19</sup> [Next steps to improve flood resilience for the Wairau community - OurAuckland](#)

<sup>20</sup> [Transpower identifies 12 substations for additional resilience work | Transpower](#)



pumps were destroyed and temporary pumps were installed to get the station partially running.

The damage prompted a major upgrade: in mid-2023 Watercare bought adjacent land on Wairau Road for \$6.9 million to expand and fortify the pump station, aiming to improve resilience.<sup>21</sup>

### Schools

Access to Westlake Boys' and Girls' High Schools was blocked at the flood peak because Wairau Road and Shakespeare Road were impassable. Fields and some ground-level facilities were inundated, forcing the schools to carry out significant repairs.<sup>22</sup>

## Impact on businesses

Around 14,650 people work in businesses located within the Wairau catchment.<sup>23</sup> This represents around 2% of Auckland's total employment.

The Wairau catchment, and particularly the Wairau Valley, is a major retail and trade hub on Auckland's North Shore. It includes large-format

retail stores, automotive services, warehousing, and light industrial businesses.

Below are examples of the impact of the 2023 extreme weather events on businesses in the area, along with some of the associated costs.

- **Pak'nSave Wairau Road**, which is one of the North Shore's biggest supermarkets, was inundated with about two metres of floodwater, destroying stock and equipment.<sup>24</sup>
- **Auto dealerships on Wairau Road**, including Archibald & Shorter (Jaguar/Land Rover) and Continental Cars BMW, had showrooms flooded and vehicles damaged by fast-moving water.<sup>25</sup>
- **Milford Cruising Club** was hit by a surge of floodwater. The club's commodore reported that boats broke free from their moorings and pontoon floats were torn loose. Some of the marina's infrastructure also suffered major damage.<sup>26</sup>

- **Other retailers and businesses** in the Wairau Valley commercial area were flooded at ground level, and some were targeted by looters.<sup>27</sup> The Government announced small business recovery grants of up to NZ\$40,000 for those affected by cyclone and flood damage or cashflow issues.<sup>28</sup>

## Damage to sporting facilities

Several sports facilities were damaged in Forrest Hill and the surrounding areas.

**North Harbour Badminton Centre**, located on Bond Crescent in Forrest Hill, was severely damaged by floodwater up to two metres high, destroying the lower level and warping the sprung flooring of all 11 courts. The structure required a complete rebuild costing around NZ\$4 million, including replacing 500 piles and

<sup>21</sup> [Sale of flood-hit Wairau Valley site opens way for pumping facilities upgrade](#)

<sup>22</sup> [Westlake Girls High School Case Study | TigerTurf Sports](#)

<sup>23</sup> [New Zealand business demography statistics: At February 2025 | Stats NZ](#)

<sup>24</sup> [Auckland flooding: Wairau Pak'nSave and Mt Albert New World Fresh Collective remain closed | RNZ News](#)

<sup>25</sup> [Autofile - News / Flooding swamps dealerships](#)

<sup>26</sup> [Auckland Anniversary floods: Scars still linger two years on from storm | RNZ News](#)

<sup>27</sup> [Auckland floods: One arrested, police increase patrols after looting | RNZ News](#)

<sup>28</sup> [Grants for Businesses affected by Cyclone Gabrielle & Flooding - Kiwi Tax](#)



joists and installing new sports flooring.<sup>29</sup> The centre was out of action for well over a year.<sup>30</sup>

**Eventfinda Stadium**, a large indoor arena in Wairau Valley, was badly flooded during the storm. Repairs and flood-resilience upgrades cost over NZ\$4 million. The venue was closed for about eight weeks.<sup>31</sup>

**Forrest Hill Tennis Centre** – Water rose to shoulder height at the Tennis Centre clubrooms. The estimated replacement cost for the centre was \$1.3 million, including replacing floodlights.<sup>32</sup>

**Becroft Park Tennis Club** – Water rose 1.7 metres inside the Club, damaging the clubrooms and lifting the surface of one court.<sup>33</sup>

**Netball North Harbour** required new timber flooring on two indoor courts.

## The cost at an Auckland-level

### Housing damage and buy-outs

As of June 2023, 6,266 houses in the Auckland region had been marked as red or yellow.<sup>34</sup> A total of \$772 million has been committed by local and central government (50% each) to buy out up to 700 unliveable Category 3 houses affected by the events.<sup>35</sup>

### Insurance claims

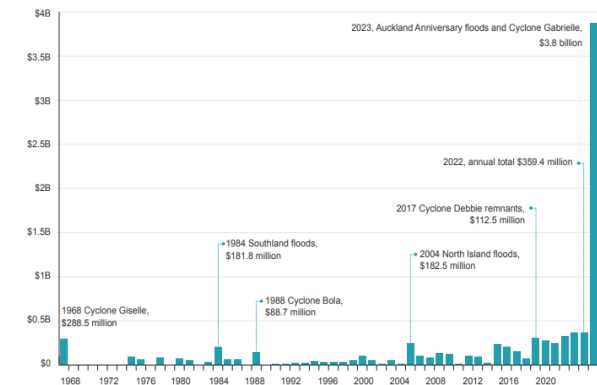
As of June 2023, insurers had paid out \$1.08 billion of an estimated \$3.18 billion across 107,569 claims arising from the weather events.<sup>36</sup>

These were the two largest insurance-related weather events in New Zealand's history.

Over half of the insurance claims were for residential homes, totalling more than \$500 million as at March 2023.

Commercial claims made up only 8% of the total number of claims, but accounted for the second-largest value category, with approximately \$355 million in claims as at March 2023 (shown in the graph on the next page).

**Figure 3: Insurance-related cost of weather events (1968–2022), adjusted for inflation**



<sup>29</sup> [Badminton bounces back from floods with \\$4m rebuild – Rangitoto Observer](#)

<sup>30</sup> [Rebuilding Badminton North Harbour after 2023 Auckland Anniversary weekend floods - Badminton Oceania](#)

<sup>31</sup> [Eventfinda Stadium - DMP](#)

<sup>32</sup> [Indoor sports venues hit hard by flood damage - Issuu](#)

<sup>33</sup> [Indoor sports venues hit hard by flood damage - Issuu](#)

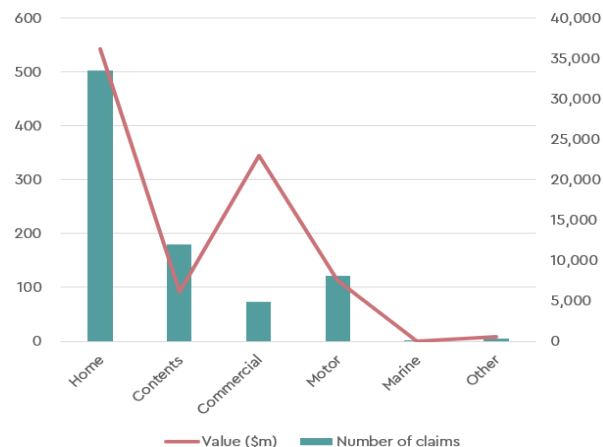
<sup>34</sup> <https://www.phcc.org.nz/briefing/cyclone-gabrielle-numbers-review-six-months>

<sup>35</sup> [Category 3 property buy-out information between Auckland Council and the government](#)

<sup>36</sup> <https://www.icnz.org.nz/industry/media-releases/2023-climate-disaster-payouts-top-1-billion/>



**Figure 4: Auckland claims from 2023 weather events**



Source: ICNZ data as at March 2023. The data for the Auckland Anniversary event may include claims from other North Island regions, as regional breakdowns are not available. However, because the event was concentrated in Auckland, the figures are expected to be broadly representative of the region.

## Infrastructure damage

Over \$300 million has been allocated to repair Auckland's transport network. Central government committed \$110 million for local road repairs<sup>37</sup> and Waka Kotahi allocated \$200 million to help restore the transport network.<sup>38</sup>

Watercare's initial estimate to repair widespread pipeline breaks, treatment plant damage, and landslide impacts ranges from \$250 million to \$460 million.<sup>39</sup>

More than 20 schools sustained significant damage during the Auckland Anniversary event.<sup>40</sup>

About a third of flood losses were uninsured.<sup>41</sup>

## Disruption costs

Power outages affected approximately 15,000–20,000 customers in Auckland region.<sup>42</sup>

Rail freight between Auckland and Whangārei stopped for nearly 20 months following the events.<sup>43</sup>

In the first quarter of 2023, New Zealand's GDP contracted by 0.1%. The estimated impact on the New Zealand economy and exports ranges between \$500 million and \$1 billion, according to the Ministry of Foreign Affairs and Trade.<sup>44</sup>

<sup>37</sup> <https://www.beehive.govt.nz/release/government-and-auckland-council-agree-cost-sharing-arrangements>

<sup>38</sup> <https://www.beehive.govt.nz/release/government-and-auckland-council-agree-cost-sharing-arrangements>

<sup>39</sup> <https://www.rnz.co.nz/news/ldr/487409/cost-of-damage-to-watercare-s-broken-auckland-network-could-now-hit-460-million>

<sup>40</sup> [the-2023-auckland-anniversary-weekend-storm.pdf](https://www.rnz.co.nz/news/ldr/487409/cost-of-damage-to-watercare-s-broken-auckland-network-could-now-hit-460-million)

<sup>41</sup> [One-third of flood losses in New Zealand not insured, study finds | Insurance Business New Zealand](https://www.insurancebusiness.co.nz/news/13111/one-third-of-flood-losses-in-new-zealand-not-insured-study-finds)

<sup>42</sup> [Cyclone Gabrielle: Flooding and land slips isolate some Auckland regions | RNZ News](https://www.rnz.co.nz/news/ldr/487409/cost-of-damage-to-watercare-s-broken-auckland-network-could-now-hit-460-million)

<sup>43</sup> [Northland railway line reopens after 20 month closure for rebuild | RNZ News](https://www.rnz.co.nz/news/ldr/487409/cost-of-damage-to-watercare-s-broken-auckland-network-could-now-hit-460-million)

<sup>44</sup> [A Third Of NZ Flood Damages Not Insured | Scoop News](https://www.scoop.co.nz/story/2023/04/a-third-of-nz-flood-damages-not-insured)



# Appendix 1: Assumptions used to calculate the "reasonable" BCR

This scenario results in a BCR of just over 1 (in other words, the point at which the benefits are greater than the cost).

The assumptions used in the scenario reasonably represent the current situation as we know it, however these assumptions are expected to change as the Council completes the design and consenting phase – resulting in a different BCR.

## Assumptions used

- The analysis is conducted over a 100-year timeframe.
- A "social rate of time preference" (SRTP)<sup>45</sup> discount rate is used. That is, 2% for the first 30 years, then 1.5% from years 31 to 100.
- Construction costs increase in line with general inflation.

If, under an alternative scenario, the construction costs increased 1.5% above the rate of inflation for the first 20 years (with no other changes to assumptions), the BCR would increase to 1.2.

- Takapuna Golf Course stops operating before the construction begins. 80% of golfers shift to other courses (a 20% net reduction in overall golfing activity), and a 50% increase in operating costs at those courses (overall, a net decrease in golf course operating expenditure across the region).
- No other recreational costs or benefits are included (this is a decision for the Kaipātiki Local Board which is scheduled to occur in March 2026).
- The construction cost for flood mitigation is based on P50 estimates.  
If, under an alternative scenario, the P95 cost estimates are used (with no other changes to assumptions), the BCR would reduce to 0.81.
- A 20% deadweight cost of taxation is applied to Crown funding, and 10% for local funding.

- The future climate change scenario is gradually introduced from year 50 and reaches its full impact by year 100.

## How the scenario compares

The box and whisker graph shows the range of costs and benefits used to calculate the upper and lower bounds of the BCR in the original report.

The red circles highlight the specific cost and benefit values that result in the "reasonable BCR" of 1.04.

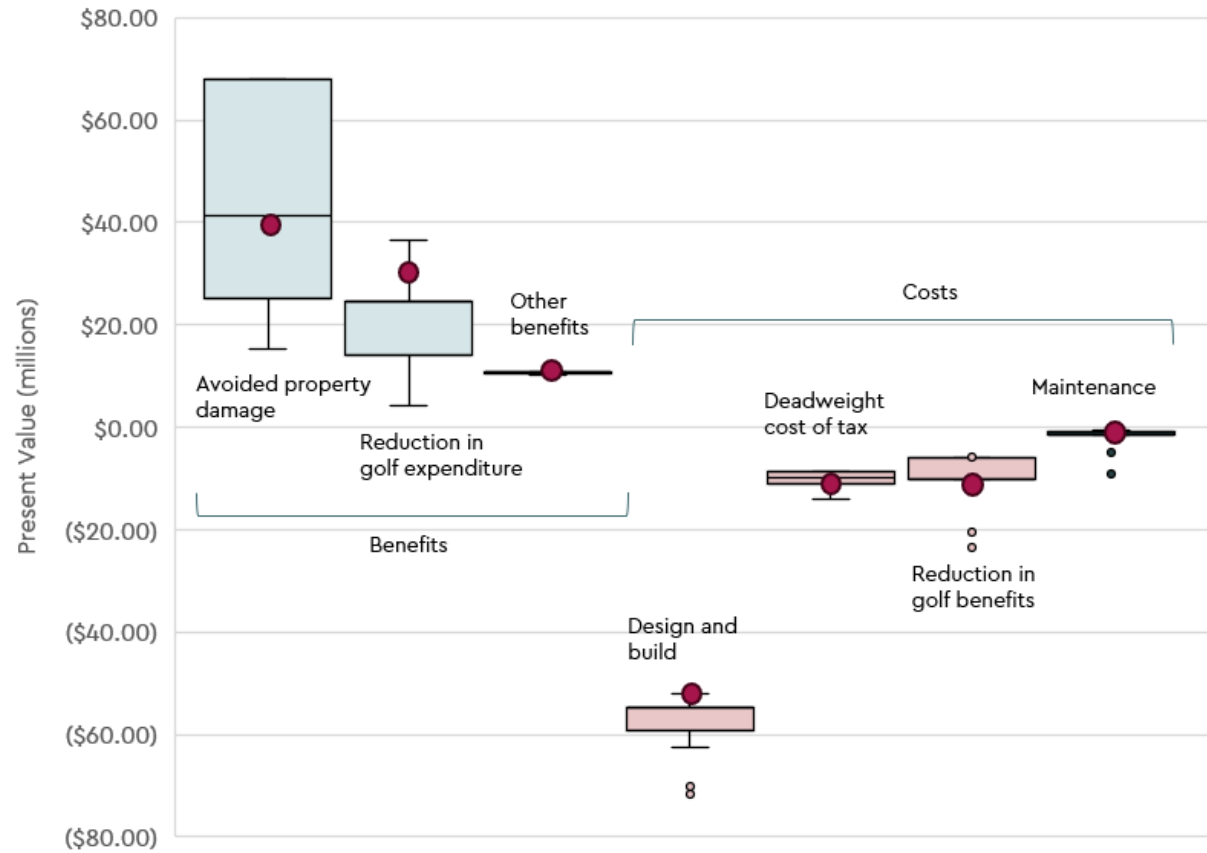
Compared to the median values in the BCR range, the inputs for the "reasonable" BCR are:

- just over \$2 million lower for avoided property damage benefits
- around \$3.8 million higher for reduced golf expenditure benefits
- \$0.196 million higher for other benefits

<sup>45</sup> <https://www.treasury.govt.nz/information-and-services/public-sector-leadership/guidance/reporting-financial/discount-rates>



- just over \$1.2 million lower for design and build costs
- \$1.35 million lower for the deadweight cost of tax
- just over \$1.6 million higher for the cost of reduced golf benefits.



Reading this graph: The line within the box represents the median. The box goes from the first quartile to the third quartile. Whiskers extend from the box to the minimum and maximum values (1.5 times the height of the box). Any data points beyond the whiskers are considered to be outliers and plotted as individual dots. The red circles show the cost and benefits that determine the 1.04 "reasonable BCR".



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