BUILDING PERFORMANCE

QUICK GUIDE

Resilient homes – flooding

Strategies to improve flood resilience and ensure weathertightness

VERSION 1
FEBRUARY 2025

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Te Kāwanatanga o Aotearoa
New Zealand Government

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Ministry of Business, Innovation and Employment (MBIE)
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MBIE develops and delivers policy, services, advice, and regulation to support economic growth and the prosperity and wellbeing of New Zealanders.

The Resilient homes - flooding quick guide is produced by the Building System Performance branch.
It is intended to provide information to homeowners with practical tips to create a flood resilient home.

While MBIE has taken care in preparing the document it should not be relied upon as establishing compliance with all relevant sections or clauses of the Building Act or clauses of the Building Code in all cases that may arise. This document does not contain legal advice and should not be relied upon as such. The latest version is available on the Building Performance website www.building.govt.nz.

MORE INFORMATION

Information, examples and answers to your questions about the topics covered here can be found on our website: www.mbie.govt.nz.

ONLINE: ISBN 978-1-991316-04-2

FIRST PUBLISHED IN FEBRUARY 2025

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Preparing homes to be resilient to the effects of floods

A flood resilient home is one that is designed, built and used in a way to reduce the impacts of flooding and recovers fast from a flood. Flood resilient design measures should include the building, the immediate outdoor areas and the main access to the home from the street.

In recent years, large parts of Aotearoa New Zealand have been affected by floods from heavy rain and storms, causing rivers to rise and burst their banks. The frequency of large-scale damaging flood is expected to increase because of a changing climate.

Many towns and cities in Aotearoa New Zealand are close to rivers and coastal areas and are at risk from the impact of sea level rise. Cities and their suburbs are being densified, and land that was previously green space is being built on, leaving less space for water to dissipate naturally. As our climate changes we can expect to see more storms and cyclones which increases the risk of damaging floods.

There are areas of Aotearoa New Zealand that are at significant risk of flooding. In these areas, the risk can only be mitigated community-wide by large infrastructure developments and spatial planning decisions. However, for most homeowners, there are strategies that can increase flood resilience of homes and reduce the damage and disruption caused by floods and other potential weathertightness issues.

THE PURPOSE OF THIS GUIDE

The purpose of the guide is to provide practical and affordable strategies to homeowners and their designers who are planning to buy or build a new home.

If you are buying in an area that is prone to flooding, you might want to look at a home that has these features or think about making changes as suggested in this guide.

This guide may also be useful for those renovating, retrofitting, or repairing an existing home, and want to make their home more resilient to the impacts of future floods.

DAMAGING EFFECTS OF FLOODING ON HOMES AND COMMUNITIES

Floods can cause considerable damage to buildings and infrastructure and can have the potential to cause injuries and loss of life. Flooded homes and communities can result in trauma and inconvenience as people may have to leave their homes while repairs are taking place. Some may face higher insurance premiums, or in some cases, cover may not be provided at all.

After a damaging flood and when it is safe to return to your property, the first step is to take photos of any damage and contact your insurance company. There are resources available to help with the next steps which include assessing damage and removing damaged materials.

Flood resilient strategy

1. COLLABORATE – THE RIGHT PROFESSIONALS ARE INVOLVED EARLY IN THE DESIGN STAGE

Homeowners are responsible for managing risks to their property. The right professionals engaged early in the design phase can identify and propose solutions for reducing or minimising the effects of floods. Architects, landscape architects, engineers and other designers should work with their local council planning and building teams. Some councils also offer an eco-design advisor service.

2. UNDERSTAND THE RISK TO MAKE BETTER INFORMED DECISIONS

Knowing the flood risk is an important step in deciding what approach is taken to protect property. In some instances, where the risk is low, the information freely available online through your local council's hazard maps may be adequate. However, in higher risk areas a flood hazard assessment may be required.

Flood risk is the combination of the climate hazard (flooding), exposure, and vulnerability.

For example: a home is built close to the sea

Climate risk

Climate hazard
Rising sea levels that may cause floods

Exposure
The home is next to the shore, so its exposure is high

Vulnerability
The home and its occupants are vulnerable if it is not built to withstand the rising sea levels

During the initiation stage of any building project, the building owner or their designer should check to see if the land on which building work is taking place could be subject to floods or other natural hazards. Information on floods can be found in a number of places, including:

- councils' online hazard maps
- the Natural Hazards Commission's (Toka Tū Ake) natural hazards portal
- a land information memorandum (LIM), which is usually sought when buying a property
- a project information memorandum (PIM)
- the record of title, which may have a natural hazard entry if there has been a previous building consent for building work on land that is subject to a natural hazard.

If the property has been identified as at risk of flooding, then as a minimum, the following should be identified:

1. The source of the flood risk
    - Is it from a river or the sea?
    - Is the ground at risk of becoming saturated in a storm event, which will cause water to flow over the ground?
2. The probability of a flood happening
3. The potential depth and velocity of the flood water, and what damage it might cause.

When considering what measures to take in protecting property, consider both the short-term impacts, such as damage to property and personal belongings, and long-term impacts, such as having to relocate while repairs are underway.

3. UNDERSTAND THE RULES

THE BUILDING CODE

All building work needs to comply with the Building Code, even if a building consent is not required. This is the case for both new buildings and for some repairs and alterations to existing buildings. Building work to protect against flooding may also require a building consent in some cases. MBIE has published a guide on building work that does not require a building consent and has interactive resources like www.canibuildit.govt.nz.

> Building to the minimum requirements of the Building Code may not be sufficient to protect your home from flooding.

The Building Code sets the minimum performance requirements of buildings so that people who use buildings are safeguarded from injury or illness. The Building Code also aims to protect other property from damage.

It is important to note that even if building work for a new home complies with the Building Code, this does not guarantee that the home won't flood at some time in the future. The future flood levels projected for a specific property needs to be considered, with allowances made for climate change.

The Building Code clauses that relate to the performance of buildings for flooding

Buildings and the materials and components that they are made from can be damaged by flooding, which can affect the structural and weathertightness performance of a building, as well as the internal finishes and access to the building. The Building Code clauses work together to ensure that homes perform to a minimum standard.

WHAT THE LAW SAYS:

The Building Code clause that sets performance requirements relevant to flooding is E1 Surface water, which has the objective to:

- safeguard people from injury and illness
- safeguard other property from damage as a result of surface water
- protect drainage system outfalls.

***E1.3.1 Surface water,* resulting from an event having a 2% probability of occurring annually, shall not enter *buildings*.**

A 2% probability of occurring annually means that there is a 2% chance (or 1:50 chance) every year of a flooding event of that magnitude happening. This means that even if a building complies with the Building Code at the time the building consent is granted, this does not mean that the building will not flood sometime in its lifetime.

Other Building Code clauses that relate to the performance of buildings for flooding are:

- **Structure and stability (B1):** Building materials and components may be vulnerable during a flood due to the force of the water.
- **Durability (B2):** Flooding can affect the performance of building materials and components during and after a flood.
- **Access and accessibility (D1):** Access to the home from the street may be compromised during and after a flood.
- **External moisture (E2):** High rainfall events and floods may damage cladding systems.

THE NATURAL HAZARD PROVISIONS OF THE BUILDING ACT

In some cases, flooding could be a natural hazard as defined in the Building Act 2004. If there has been a previous building consent on the property, there may be a natural hazard entry on the property's record of title. If a natural hazard notice is recorded on the property's record of title, this may limit insurance and Natural Hazards Commission (NHC) cover.

MBIE has published Natural Hazard Provisions guidance for building consent authorities, which may also be useful to homeowners and designers.

If the land has been identified as being at risk of a natural hazard, it is important to explain in the building consent application, how the building work will affect the natural hazard, and detail the measures that will be taken to protect the land, building and other property.

See the Guide for applying for a building consent to help with understanding what is required.

4. INVEST IN GOOD DESIGN | WORK WITH NATURE | DESIGN TO THE CONDITIONS

The most effective way to protect a home from flooding is to choose a site, or a location on the site, that is not at risk of flooding.

In some cases, building in areas at risk of flooding is unavoidable – or the risk is acceptable. The following illustration shows some strategies that may result in improved flood resilience.

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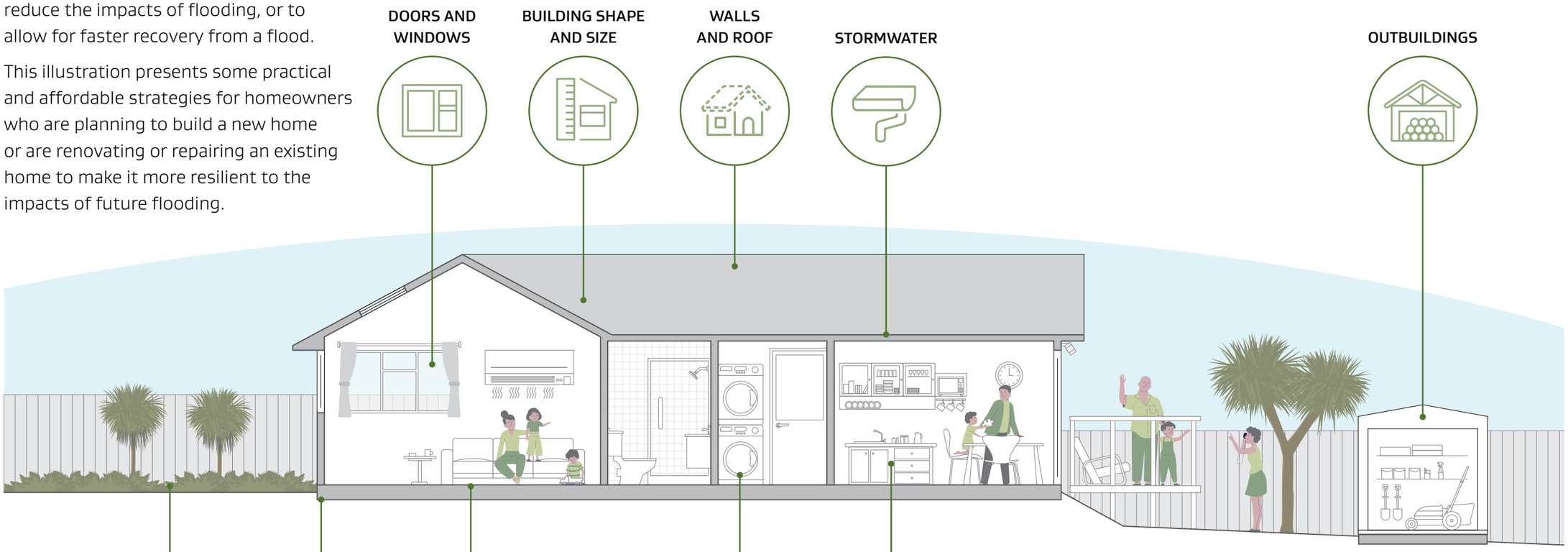
FLOOD RESILIENT HOME

A flood resilient home is a home that is designed, built and used in a way to reduce the impacts of flooding, or to allow for faster recovery from a flood.

This illustration presents some practical and affordable strategies for homeowners who are planning to build a new home or are renovating or repairing an existing home to make it more resilient to the impacts of future flooding.



CONTACT THE LOCAL COUNCIL AND YOUR INSURANCE COMPANY

It is important to speak with the local council and your insurance company as early as possible in the design stage.

SEEK INDEPENDENT PROFESSIONAL ADVICE

Before applying any of these strategies shown you should seek independent professional advice.

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FLOOD RESILIENT HOME

AN EXISTING HOME

When altering or repairing an existing home, it is a good time to think about including flood resilient design features.

Homes are altered for a number of reasons – it may be to add an extension, alter the internal layout, or to increase the performance of the house by adding insulation or upgrading windows. Homes may also need to be repaired after a flood, which can be a costly exercise. By including resilient design features, some of these costs may be reduced or avoided after the next flooding event.

A NEW HOME*

New homes need to comply with the Building Code. The Building Code sets the minimum performance requirements for buildings. Building better than the minimum that is required by the Building Code will result in a more resilient home.

APPLIES TO NEW HOMES ONLY
All other strategies apply to both new and existing homes

DOORS AND WINDOWS

- Limit skylights as they are vulnerable to wind-driven rain.

BUILDING SHAPE AND SIZE

- Use simple and compact building shapes with a single type of cladding. This reduces vulnerable junctions that may fail over time
- Build a smaller house or a house with a smaller footprint by building two-storeys. This allows more space for landscaping that can absorb flood water, reducing the load on stormwater infrastructure
- Use simple pitched roofs with fewer junctions which are less at-risk of wind driven rain during storms and high winds.

WALLS AND ROOF

- Use steel framing or timber-framed walls raised on plinths to avoid the framing getting wet and to maintain the durability of the timber
- Ensure that the wall and roof cladding is and continues to be maintained regularly
- Design the wall build up in a way that water does not easily enter the cavity, or can drain away easily
- Choose wall cladding that is suitable for the type, location and design of the building
- Ensure cladding is designed and installed in a way that will not trap water and debris behind the cladding
- Consider using rigid air barriers (RAB) on the outside of the wall structure, rather than a flexible wrap, to prevent water, silt and debris building up in the wall cavity
- Choose insulation that either doesn't retain moisture or is water repellent.

STORMWATER

- Connect to stormwater infrastructure where available
- Consider if stormwater detention and retention systems to control stormwater are required
- Ensure roof downpipes and gutters are easy to access and are regularly cleared of debris such as leaves
- Choose external gutters over hidden gutters, so they can be easily maintained and accessed for regular cleaning.

LANDSCAPING

- Ensure that there is adequate space for good landscape design, which can act like a 'sponge' that allows water to slowly absorb into the ground. This will decrease the impact and load on infrastructure during a storm or flooding event
- Design and locate fences so they do not divert water towards the home or other property, or cause water to build up or pond
- Ensure that there is space between planting and the side of the house for water to flow freely and drain away
- Choose permeable paving, porous concrete or gravel that will allow water to be absorbed or drained easily
- Reduce the load on the drainage system by planting vegetation to retain and reduce stormwater run off.

OUTBUILDINGS

- Ensure that access to and around the house and to important outbuildings are above flood levels.

FOUNDATIONS

- Ensure the house is securely attached to its foundations to withstand the force of potential flood waters.

FIXED FURNITURE AND FINISHES

- Choose durable or moisture resistant wall linings that are required for bracing, fire separation or acoustic performance
- Choose durable or moisture resistant floor coverings or those that are easy to remove and replace
- Raise kitchen cabinets and bathroom vanities off the floor
- Choose solid timber internal doors – avoid MDF or hollow core doors.

SERVICES

- Raise internal services such as data points, WIFI routers, meter boxes and electrical sockets above the predicted flood level
- Raise external services such as heat pump condensers, sockets, light fittings and meter boxes above predicted flood levels.

FLOOR LEVELS

- Raise the floor levels of the house higher than the predicted flood level and include a 'freeboard', or extra height, to allow for surges of water caused by wind and the movement of the water
- Raise the floor levels of outbuildings and the access routes to them
- Ensure that access routes are high enough to allow access during and immediately after a flood.

*While many of these strategies are to ensure weathertightness, they will also contribute to a flood resilient home.

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