

8 MANAGING THE EFFECTS OF NATURAL HAZARDS

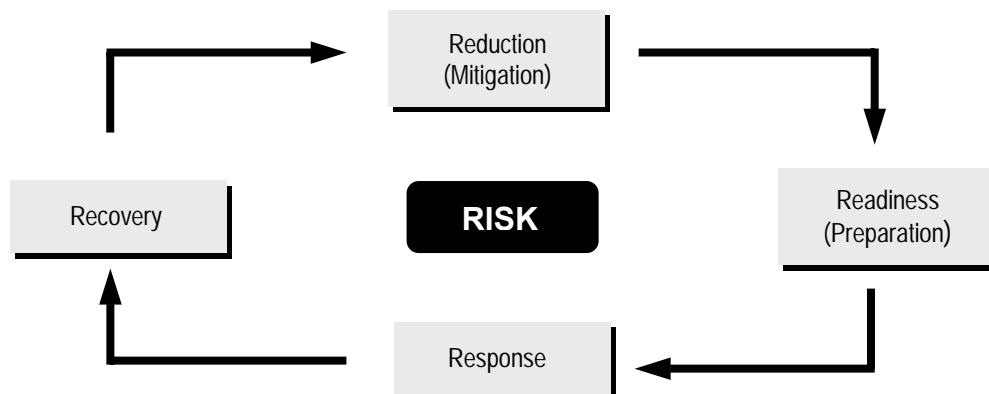
8.1 RESOURCE MANAGEMENT ACT OBLIGATIONS

- 8.1.1 A “natural hazard” is defined under Section 2 as being. “Any atmospheric or earth or water related occurrence (including earthquake, tsunami, erosion, volcanic and geothermal activity, landslip, subsidence, sedimentation, wind, drought, fire or flooding) the action of which adversely affects or may adversely affect human life, property or other aspects of the environment”.
- 8.1.2 District Councils have clear guidance in Section 31(b) to control any actual or potential effects of the use, development, or protection of land in order to avoid or mitigate the effects of natural hazards. This responsibility is shared with the Regional Council (Section 30(1)(d)(v) and 30(1)(g)(iv)). Therefore, both councils have an obligation to develop natural hazard policies that are complimentary.

8.2 DESCRIPTION OF NATURAL HAZARDS

OVERVIEW

- 8.2.1 Land management practices play an important role in avoiding and mitigating natural hazards. Inappropriate use and development of land can contribute to land instability, and can contribute to natural events becoming natural disasters with resulting loss of life, and damage to property and the environment.
- 8.2.2 The District Plan is one of a number of mechanisms available to the Council to manage risks the community faces from natural hazards. The combination of all the mechanisms can collectively be termed risk management. Risk management is an ongoing process explained by the following diagram:



- 8.2.3 The components of this continuum include a wide range of activities and agencies.
- 8.2.4 **Reduction (Mitigation)** – activities that result in risk being reduced, including:

Hazard and risk analysis undertaken by Regional and District Councils, District & Regional Plan land use and activity policies, standards and rules, vulnerability analysis undertaken by life line and utility operators, threat analysis undertaken by the various emergency services, building of stop-banks by Regional Councils, development and implementation of

contingency and civil defence plans by all agencies, including schools and families, awareness programmes conducted by Civil Defence, schools and emergency services, and building regulations and standards.

- 8.2.5 **Readiness (Preparation)** – activities that prepare communities to deal with hazard events resulting from that component of risk not able to be reduced, including:

Training civil defence staff and volunteers, practicing and testing school, family and local civil defence plans, public education to encourage planning, maintaining communications systems, meetings between response agencies and the emergency services and maintaining warning systems.

- 8.2.6 **Response** – activities that deal with emergency situations, including:

Civil Defence control and co-ordination, emergency service activities, evacuations, provision of community welfare, public information and inquiry, maintenance of public health, protection and restoration of infrastructure and lifelines and communications.

- 8.2.7 **Recovery** – activities that re-establish the community to the state it was prior to the hazard event, including:

Co-ordination of activities, damage and welfare surveys, physical restoration works, maintenance of public health, provision of emergency finance, civil defence, Regional & District Plan reviews, provision of emergency/temporary shelter, and economic planning based on survey findings.

- 8.2.8 The provisions of this part of the District Plan are designed to assist in the overall management of risk through mitigating (reducing) the effects of natural hazards.

- 8.2.9 Flooding and land instability, seismic hazards, sea level rise, storm surges and coastal erosion and inundation have been identified as potential natural hazards within the Wairoa District. Data mapping the vulnerable areas is not readily available for all the above, and the costs involved in gathering this information on a comprehensive basis is prohibitive.

- 8.2.10 Flooding is a major natural hazard within the District, particularly flooding associated with the Wairoa River, in and around Wairoa and Frasertown townships.

LAND INSTABILITY

- 8.2.11 Because of the underlying geology in the District the land in many places is relatively unstable. This results either in sudden slipping or slow creeping of the earth over time. In the past infrastructure such as roads have been damaged as a result of land instability.

- 8.2.12 Earthworks and land disturbance as a result of land use and development activities can adversely affect land stability. The potential for erosion can be increased on land that is steep, or where extensive vegetation cover is lost, soil structure is weakened and slumping may result.

FLOODING

- 8.2.13 Flooding is a major hazard in the District. Many lowland areas, including the Wairoa township area itself, are at risk from flooding. Wairoa Township and surrounding areas including Frasertown are at risk from flooding from the Wairoa River for events as frequent as 3.3% probability of occurring annually. Flooding from other sources such as the Awatere Stream and a closed, or practically closed, Wairoa River mouth is also a risk. There are few measures in place to protect the town. It is, however, very expensive to provide

effective protection. The settlement of Nuhaka is also vulnerable to high rainfall and flooding events. Public awareness of the flooding risk is, however, relatively high.

- 8.2.14 The planning maps only identify Wairoa township areas as being susceptible to flooding.
- 8.2.15 The Hawke's Bay Regional Council prepared a Wairoa Floodplain Management Plan in July 1994. This report identified the Wairoa River as being the single major cause of flooding over the valley floor forming the floodplain. The Wairoa River drains a total catchment area of 3670 km² and is made up of seven major sub-catchments.
- 8.2.16 A recommendation in the report was made that the community should determine what risks are acceptable, then agree on remedial works. There are significant costs to constructing "protection works", and this needs consideration and support from the community before the works can be funded.
- 8.2.17 The Hawke's Bay Regional Council monitors both rainfall and river levels via a telemetry system and keeps a regular watch on catchment conditions. When a heavy rainfall warning is received, a flood prediction model is used to estimate the likely peak discharges to enable appropriate warnings to be made. The Nuhaka River catchment is currently being investigated with a view to providing a similar early warning system.
- 8.2.18 Other parts of the district are susceptible to flooding, but as yet these areas are not well identified and flood hazard information is limited. If building development is proposed on sites that may be susceptible to flooding, the Building Act provides Council with methods to minimise risk.

COASTAL HAZARDS

- 8.2.19 The two main hazards in the coastal margins of the District are flooding and erosion. Coastal flooding can be caused in a number of ways:
- (1) during times of high rainfall when drainage to the sea is blocked by high seas;
 - (2) wave over-wash from storm events; and
 - (3) spring tides coinciding with storm events.
- 8.2.20 Erosion in coastal areas is generally a result of ongoing natural processes. Subdivision in inappropriate locations can increase the risk of adverse environmental, social and economic effects being placed on the community as a whole.
- 8.2.21 Options are being assessed for a permanent opening of the Wairoa River mouth to alleviate lower river flooding problems, and a study into the effects of tsunami has been completed.

SEISMIC ACTIVITY

- 8.2.22 The Hawke's Bay Region is one of the most earthquake prone areas in the country. Fault line maps have been prepared by the Hawke's Bay Regional Council and can be used to identify specific at-risk locations. The main mitigation measure to reduce seismic risk is a building code that specifies particular design standards.
- 8.2.23 The relative impact of seismic activity can depend on the susceptibility of the land to liquefaction and ground shaking amplification. The Hawke's Bay Regional Council has mapped the following:
- Liquefaction susceptibility maps for the Wairoa District
 - Earthquake ground shaking amplification hazard (susceptibility) maps

8.2.24 The susceptibility of a site to liquefaction is determined by the type of sediment on which it sits, the depth to groundwater, and sediment strength. Fine material is more susceptible to liquefaction than coarse sediment; wet sediment is more susceptible than dry sediment; and soft material is more susceptible than hard material.

8.2.25 The susceptibility of a site to earthquake ground shaking amplification is influenced by the strength and thickness of the geologic materials beneath the site. Loose materials are more susceptible to amplification than firm or hard materials.

VOLCANIC ACTIVITY

8.2.26 Although there are no volcanoes located in the District the area is exposed to volcanic activity from the Central Plateau and Bay of Plenty areas. Ash falls from potential volcanic events can pose a hazard, as was the case with the Ruapehu eruptions in 1995 and 1996.

8.3 RESOURCE MANAGEMENT ISSUES

8.3.1 An increase in the potential severity or damage resulting from natural hazard events as a result of inappropriate land use, development and subdivision.

8.3.2 Inadequate community awareness of potential risks – particularly risks of flooding, landslide, sea inundation and liquefaction.

8.3.3 Increased potential for land instability from earthworks and land disturbance activities.

8.4 OBJECTIVES

8.4.1 To minimise the vulnerability of the community to the effects of natural hazards on people, property, and community services and infrastructure.

8.4.2 To adequately inform the community of potential risks.

8.4.3 To ensure land use, development and subdivision does not increase the risk (probability and potential effect) from natural hazard events on communities and the environment, and where possible, reduces risk.

8.4.4 To protect the district's natural and physical resources from the adverse effects of earthworks and land disturbance.

8.5 POLICIES

8.5.1 Prevent land use, development, and subdivision activities in areas where the adverse effects of natural hazards cannot be avoided, remedied or mitigated.

8.5.2 Ensure the potential effects of natural hazards are taken into account when considering resource consents and require measures to mitigate the risk to land, property and residents.

8.5.3 Ensure that all activities requiring the approval of the Council, including building consent, are undertaken having regard to, and are in accordance with, the provisions of the District Plan.

- 8.5.4 Ensure that the adverse effects of earthworks and land disturbance activities are avoided, remedied or mitigated.
- 8.5.5 To recognise the limits of attempts to control natural processes by physical work.

8.6 METHODS AVAILABLE USING THE PROVISIONS OF THE DISTRICT PLAN

- 8.6.1 Require a resource consent from the District Council for activities that may increase the severity or damage caused by natural hazard events in areas identified as being susceptible to natural hazards.
- 8.6.2 Identify and monitor the occurrence and effects of natural hazard events in the District and develop and update a database that identifies areas at risk from natural hazards.
- 8.6.3 Create and maintain databases on hazard events to better understand actual risks to communities and the environment.
- 8.6.4 Identify areas susceptible to natural hazards on planning maps in the District Plan. Provide known hazard related information on LIM's and PIM's (Land Information Memorandums, Project Information Memorandums).
- 8.6.5 Set rules which avoid or control the adverse effects of earthworks and land disturbance activities.
- 8.6.6 Liaise with the Hawke's Bay Regional Council concerning applications in potential hazard areas and potential mitigation works, and to ensure earthworks and land disturbance activities are managed in an integrated and co-ordinated manner.
- 8.6.7 Prepare a Civil Defence Plan under the Civil Defence Act.
- 8.6.8 Participate in an "Emergency Management Group".
- 8.6.9 Inform the community of potential hazards and their associated risks and the alternative methods available to minimise the effects of such hazards.
- 8.6.10 Promote education programmes with the Hawke's Bay Regional Council to inform landowners and managers of the benefits of sustainable land management practices.

8.7 EXPLANATION AND REASONS

- 8.7.1 Council is obliged to control any actual or potential adverse effects of the use, development or protection of land in order to avoid or mitigate the effects of natural hazards. This responsibility is shared with the Hawke's Bay Regional Council. Flooding and land instability are the two main natural hazards to occur within the Wairoa District. The two major contributors to exacerbating flooding and land instability are buildings within flood-prone areas, and inappropriate earthworks and vegetation clearance. Other hazards include coastal hazards, seismic activity and potential effects from volcanic activity.
- 8.7.2 To minimise loss of life, damage to assets and disruption to the community, on-going research and data collection will be required to identify the extent and frequency of natural hazards and methods to mitigate 'risks' to the community. Council is not involved in primary research of this nature but is in a position to collate information and advise and inform the community of new findings, and to place such information on Council LIM and PIM records.

- 8.7.3 In many cases, construction of buildings in hazard prone areas is addressed through the Building Act 1991. However, subdivision is controlled by the Plan and conditions may be imposed on a subdivision consent to avoid, remedy or mitigate any potential adverse effects from known natural hazards.
- 8.7.4 The Hawke's Bay Regional Council has identified flood risk around Wairoa township and environs, from the Wairoa River. This area has been well researched and the planning maps show the area susceptible to flooding in a 1:50 year event, and the extent of flooding that resulted during Cyclone Bola. The Regional Council is continuing investigations to determine the degree and extent of flood risk to land in the District.
- 8.7.5 Council involvement in emergency preparedness and emergency response programmes is also critical to minimising the effects of natural hazards.

8.8 ANTICIPATED ENVIRONMENTAL RESULTS

- 8.8.1 Avoidance or mitigation of potential effects from natural hazard events on people, property and the environment.
- 8.8.2 Increased public awareness of risks from natural hazard events.
- 8.8.3 Greater awareness of areas prone to natural hazards.
- 8.8.4 Greater awareness of the effects of land management practices and activities on the severity of natural hazards.
- 8.8.5 Inappropriate development is avoided in areas vulnerable to natural hazard events.
- 8.8.6 Increased awareness of sustainable land management practices.
- 8.8.7 Inappropriate earthworks and land disturbance activities are avoided in areas susceptible to erosion.

Cross References:

[Part C – Land Management Zones and Rules](#)
Schedules
Planning Maps