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Leadership in hazards and
emergency management

Land-use planning and hazard management in the Hawke's Bay region

Prepared for:

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Background

In June 2009, the Hawke's Bay Regional Council (HBRC) hosted an "Integrating Civil Defence Emergency Management (CDEM), Long-term Council Community Planning [sic] and Resource Management Act (RMA)" planning workshop, that was attended by about 30 representatives from local authorities in Hawke's Bay. Attendees included policy managers, planners, asset managers, engineers and emergency management officers.

When considering improvement for the future, attendees suggested consideration of developing a joint regional/district strategy to help achieve integration. Meeting attendees felt that a strategy should give guidance and direction to local authorities in Hawke's Bay about how and where particular hazards should be included in the land use planning framework - thus ensuring community risk reduction is achieved.

In March 2011, the Hawke's Bay Planners Forum met to discuss the findings of the first draft joint hazards strategy. One outcome of this meeting was to support a proposal for the development of a brief summary strategy to be underpinned by a detailed support document on land-use planning and hazard management in the Hawke's Bay region.

Purpose and objectives

The purpose of this report is to provide the background, context and analysis of land-use planning and hazard management in the Hawke's Bay region to underpin the "*Hawke's Bay joint hazard strategy for local authority land-use planning*".

In order to fulfil the above purpose, this report:

- Provides an overview of hazard risks and research within the Hawke's Bay region
- Outlines the context of land-use planning and hazard management in New Zealand, including best practice guidance and tools/methods for hazard risk reduction
- Provides an overview of how Hawke's Bay local authorities have addressed land-use planning in their policies and plans, including an outline of the methods used
- Summarises feedback from Hawke's Bay planners on their perceptions of effectiveness, barriers to policy implementation, policy improvements and local authority collaboration in hazard management
- Summarises the position of land-use planning for hazard management and conclusions reached
- Develops recommendations for how land-use planning can be better integrated into hazard management – both generally, and for specific hazards within the Hawke's Bay region.

Why develop a joint strategy?

Collective feedback from planners in the Hawke's Bay region suggests that the reasons why a joint strategy is needed and benefits are as follows:

Why it is needed:

- To provide guidance on what to consider in hazard management, and how to improve policies
- To provide an opportunity to develop collective direction for hazard management, and get some real backing behind it
- In the longer term, to work towards a greater level of consistency in regional hazard management policies (regional hazards don't have artificial boundaries)
- To help clarify where regional variability is okay, and where regional benefits in consistency could be gained
- To help clarify roles of local authorities – particularly with respect to public education and awareness on hazards, which needs to become more “professional”

Likely benefits – it will:

- Help get Councils on the same page and working towards the same goal
- Help to reinforce the need for more and better research
- Help to increase collective understanding of hazards and gain agreement on different management methods for different hazards
- Help to increase hazard management consistency (such as for coastal and river flooding hazards) across the region, while accommodating regional variation
- Provide advice and guidance on where local authorities should head collectively
- Identify issues and barriers to successful hazard management
- Promote efficiencies between Councils and less duplication
- Identify duplication of processes, such as the need for two consents for coastal protection works
- Help to increase awareness and importance of hazard management politically, and promote more activity/support for hazard management
- Identify best practice approaches to hazard management
- Help to spread information and promote coordinated information usage.

The feedback from regional planners also suggests that the joint strategy presents more of an opportunity to improve collective hazard management, rather than a response to specific problems with managing hazards in Hawke's Bay.

Hazards and risks in Hawke's Bay

Introduction

The Hawke's Bay region is subject to a wide variety of hazards.

In 1931 parts of Hawke's Bay were devastated by an earthquake, which caused the loss of 256 lives and damage to property. The community showed its resilience at that time by rebuilding itself, along with assistance from outside the region. Later events, such as

Cyclone Bola and the Ruapehu eruptions have also highlighted the vulnerability to a range of geological and meteorological hazards. The Hawke's Bay region also faces risks from biological and technological hazards, such as fire involving hazardous substances.¹

Priority hazards and risks

The hazards in the Hawke's Bay region are well documented. The Hawke's Bay CDEM Group Plan (2005) provides a summary of hazards², and lists the following hazards as "Priority 1":

- Earthquake (includes liquefaction)
- Human pandemic/infectious diseases
- Flooding/heavy rainfall
- Fire involving hazardous substances 1
- Electricity failure
- Pests or diseases affecting agriculture, forestry, or horticultural
- Local Tsunami
- Rural Wildfire
- Hazardous chemical incident (release of fumes)

"Priority 1" hazards are the main focus of the CDEM Group Plan, as they have the highest probability of causing a significant impact on Hawke's Bay. The major immediate consequences of the impacts of Priority 1 hazards on Hawke's Bay are:

- The potential loss of life or serious injury to people,
- The destruction or damage to property — buildings, infrastructure, crops etc; and
- The need to evacuate people to safety at short notice and the general distress of the public caused by the event.³

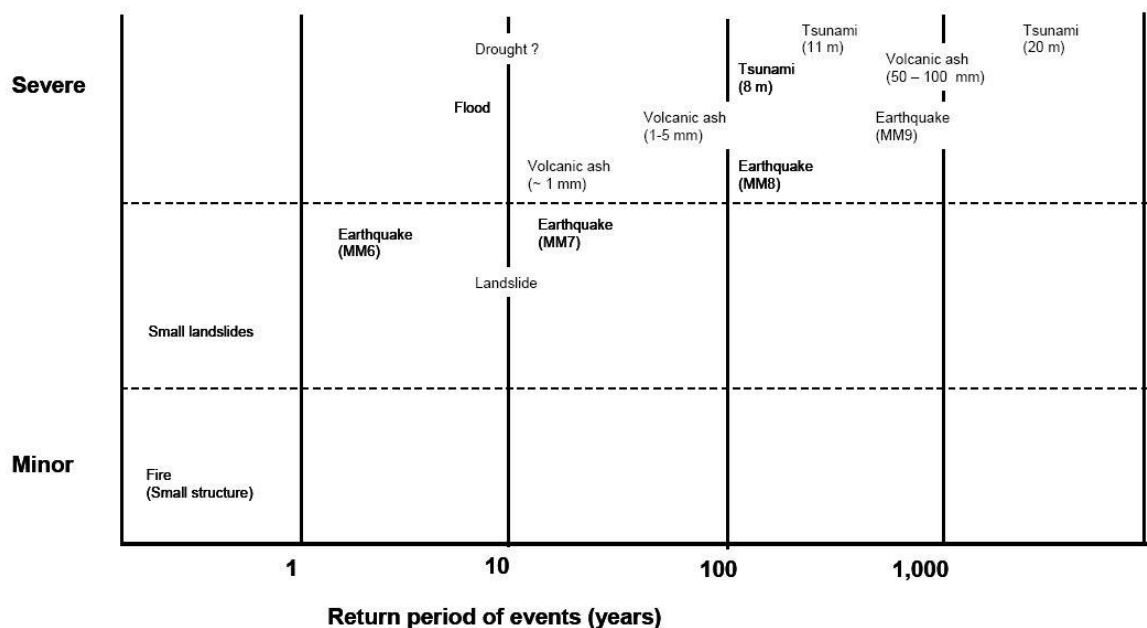
The CDEM Group Plan draws upon the GNS Science report "*A review of natural hazard probability in the Hawke's bay and Gisborne regions*" (2001). This report provides a useful comparison of the relative impacts of hazards of similar return periods (refer to Figure 1 below).

¹ Adapted from <http://www.hbrc.govt.nz/ReadAboutIt/NaturalHazardResourcesDatabase/tabid/840/Default.aspx>

² Hawke's Bay CDEM Group Plan (2005), pp. 79-99.

³ Hawke's Bay CDEM Group Plan, p. 27.

Figure 1: The relative impacts of hazards of similar return periods in Hawke's Bay⁴



The GNS (2010) report provides an updated consequence ranking. While the hazards are not directly comparable to those contained within the Hawke's Bay CDEM Group Plan, the report reconfirms the importance of earthquake, river flood, tsunami and human pandemic hazards. While not considered a "Priority 1" hazard for CDEM purposes, coastal erosion and coastal flooding hazards have been a key focus area for HBRC, Napier City Council (NCC), Hastings District Council (HDC) and Wairoa District Council (WDC).

For the purposes of this report, the following hazards are considered "significant":

- River flood
- Earthquake
- Coastal erosion/inundation
- Tsunami
- Landslide
- Volcanic
- Hazardous substances.

While electricity failure, rural wildfire, animal epidemic and human pandemic are identified within the CDEM Group Plan as Priority 1 hazards, they are not considered within this report for the following reasons:

- Electricity failure is almost always a consequence of other hazards
- Rural wildfire is not considered to be significant enough to be included within the GNS report (2010)
- Human pandemic and animal epidemic hazards have no relationship to land-use planning.

⁴ Drawn from Figure 7, Hawke's Bay CDEM Group Plan (2005), p. 25.

Hazard research

Overview

Most hazard research in Hawke's Bay has been focussed the four primary natural hazards - earthquake, river flood, coastal erosion and tsunami. Key research areas that have been addressed for each of these hazards include:

- **Earthquake:** historical impact assessments (primarily 1931 earthquake), numerical assessment, lifelines impacts, community understanding, liquefaction potential and fault trace surveys
- **River flood:** flood event reports, site-specific flood risk assessments, flood hazard areas, research supporting HBRC river flood management role
- **Coastal erosion:** region-wide coastal hazard assessments and hazard zone determination, numerous site-specific reports for Haumoana and Westshore erosion zones, other supporting technical reports
- **Tsunami:** regional tsunami hazard assessments, including probabilistic and paleo-tsunami reports, local source report and inundation modelling.

There has also been a significant amount of research undertaken on volcanic, landslide and severe wind/storm hazards at the regional level, while more generalised information is used for climate change and sea-level rise. Some high-level regional information is also available for other hazards, including regional lifelines risks, human pandemic and hazardous substances.

In addition to hazard-specific information, there is also region-specific general information on the "hazardscape" within the region, and some information on social and resilience aspects of hazard management. HBRC maintains a centralised web-based natural hazard resources database, which is the key repository of both general hazard information and research within the region.

Current research priorities

The current hazard research priorities are outlined within the GNS report "*Update of the Hawke's Bay Regional Council 10-year Hazards Research Plan*" (2008).

Research completed within the past two years since the research plan was developed includes:

- Assessment of the risk from hazardous substances
- Formation of the regional planning forum, including engagement with district planners on hazard management aspects of planning
- Update of the 2001 10-year Hazards Research Plan.

The most significant current research projects are:

- Tsunami inundation modelling: HBRC is undertaking modelling in sections, starting with the Clifton to Haumoana/Te Awanga section, which is currently in draft. The remainder of the coast will be completed over the next 18 months

- Fault trace surveys for Napier City Council and Wairoa District Council: surveys for both local authorities were originally planned for 2010/11, but are likely to be completed during 2011/12
- Integrating hazards information and high consequence/low probability events into planning: the purpose of the “*Hawke’s Bay joint hazard strategy for local authority land-use planning*”, supported by this report
- Hazards and consequences modelling via Riskscape: some progress has been made at the national level during 2010/11, and further development for Hawke’s Bay is anticipated in the next 2-3 years.

Future projects identified by the research plan include:

- Hazard information acquisition, storage, and access, and effective hazard risk communication to staff and the public
- System for geotechnical properties collection
- Overview of local source tsunami risk
- Geological properties of Hawke’s Bay geological units updated
- Landslide data collection system for national database
- Wave inundation forecasting
- Assessment of joint occurrence of high sea levels and high river flows
- Establishing a tephra database
- Tephra fall magnitude frequency refined
- Extension of the severe weather database.

Land-use planning and hazard management in New Zealand

The purpose of this section is to provide an overview of the context for land-use planning and hazard management within New Zealand, including:

- The legislative context
- How land-use planning fits with the framework for hazard risk reduction
- An outline of best practice guidance for hazard management
- An explanation of the tools and mechanisms available for land-use planning related to hazard management.

Legislative context

There are five key pieces of legislation which contribute to natural hazard management in New Zealand: the Resource Management Act 1991 (RMA), Building Act 2004, Civil Defence Emergency Management Act 2002 (CDEM Act), Local Government Act 2002 (LGA), and the Local Government Official Information and Meetings Act 1987.⁵

Table 1 summarises the purpose, responsibilities and legal mechanisms of the key pieces of legislation above.

⁵ Saunders et al (in prep), p. 8.

Table 1: Summary of purpose, responsibilities and legal mechanisms affecting natural hazards planning (Based on Tonkin and Taylor 2006; ODESC 2007)⁶

Legislation and Purpose	Responsibilities and mechanisms for natural hazards planning by government Agencies
<p>Resource Management Act (1991 with amendments) <i>Purpose:</i> Sustainable management of natural and physical resources, including natural hazards management and climate change. Requires Regional Councils and Territorial Authorities to avoid or mitigate hazards</p>	<p>Ministry for the Environment/Dept. of Conservation <i>Responsibilities:</i> National policy statements; standards; guidance <i>Mechanisms:</i> NZ Coastal Policy Statement; other national policy statements; National Environmental Standards, including future hazards-related standards</p> <p>Regional Councils <i>Responsibilities:</i> Control use of land for avoidance of hazards; monitor and keep records of hazards <i>Mechanisms:</i> Regional Policy Statements; Regional Coastal Plans; Other Regional Plans; Process resource consent applications</p> <p>Territorial Authorities <i>Responsibilities:</i> Control effects of use of land for avoidance of hazards; monitor and keep records of hazards <i>Mechanisms:</i> District plans; process resource consent applications; exceptions for emergencies</p>
<p>Building Act (2004) <i>Purpose:</i> Regulate building work to ensure safety and integrity of structures, especially against earthquake risk. Land to be built upon and subject to hazards may be notified to inform interested parties</p>	<p>Dept. of Building and Housing <i>Responsibilities:</i> Establish licensing regime; Set performance standards for buildings <i>Mechanisms:</i> Building regulations (building code)</p> <p>Territorial authorities <i>Responsibilities:</i> Identify and inform re hazard-prone land; Restrict construction on hazard-prone land; Control earthquake prone buildings <i>Mechanisms:</i> Earthquake Prone Buildings policies and controls; Project Information Memoranda; Building consents and conditions on consents</p>
<p>Civil Defence Emergency Management Act (2002) <i>Purpose:</i> Sustainable management of all hazards by encouraging communities to achieve acceptable risk levels. Aims to build community resilience. Adopts all</p>	<p>Ministry of Civil Defence Emergency Management/ Dept. of Internal Affairs <i>Responsibilities:</i> Sustainable management of hazards; Identify hazards of national significance; Planning and preparation for Readiness, Response and Recovery (Note: Reduction mainly by RMA and LGA02) <i>Mechanisms:</i> National Emergency Management Strategy; CDEM Group Plans (with CDEM Group input); Directors Guidelines</p>

⁶ Glavovic et al (2010), p. 688-689.

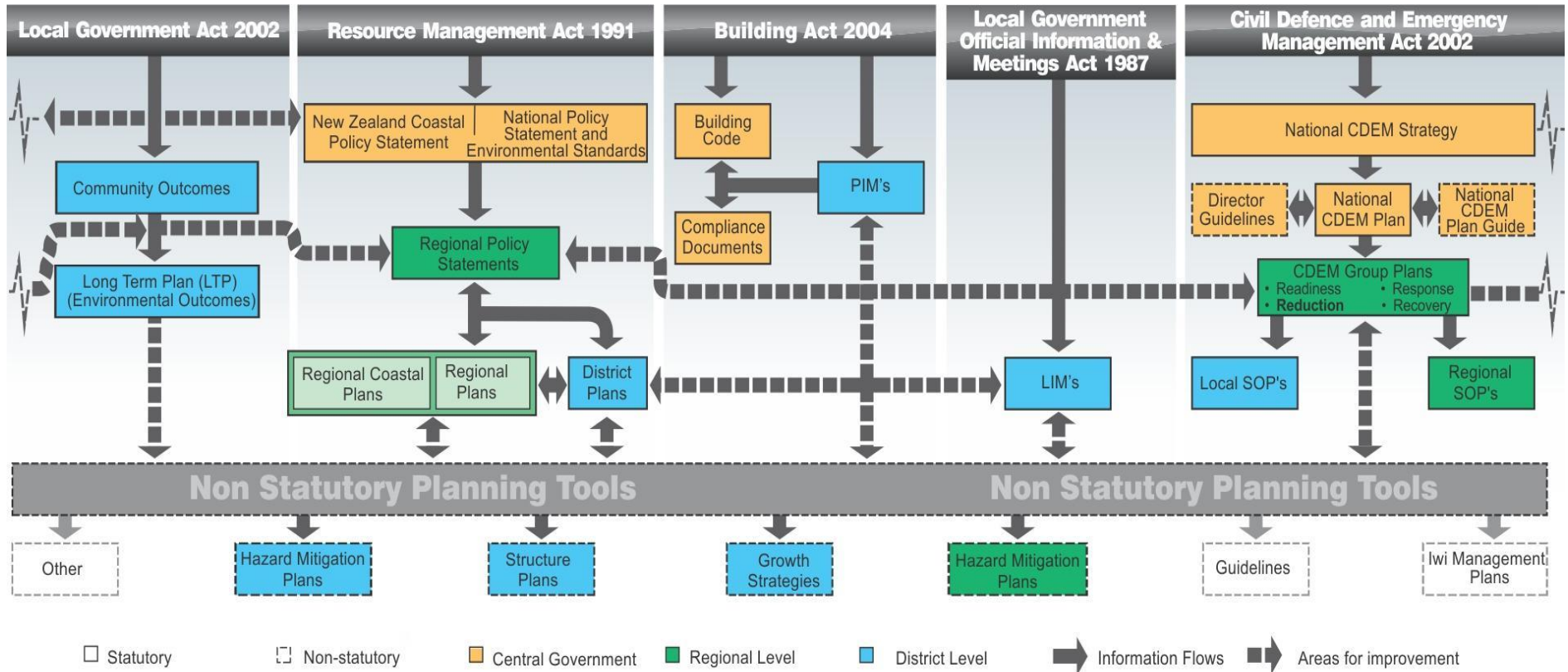
Legislation and Purpose	Responsibilities and mechanisms for natural hazards planning by government Agencies
hazards approach. Emphasises '4Rs'— reduction, readiness, response and recovery. CDEM Groups encourage collaboration	Local Authorities <i>Responsibilities:</i> Form a CDEM Group; Identify and manage hazards and risks; Consult and communicate about risks; Implement risk reduction; Respond to emergencies; Carry out recovery activities; Plan and prepare for emergencies and for response and recovery <i>Mechanisms:</i> CDEM Group plans; Maintain organisational structure; Recruit and train volunteers; Conduct Training Exercises; Provide warning systems; Provide communications, equipment, accommodation; Participate in MCDEM Strategy/ Plans
Local Government Act (2002) <i>Purpose:</i> Facilitate democratic and effective local government, including defining community vision	Territorial authorities <i>Responsibilities:</i> Set strategic direction and actions of local authorities (including hazard management); flood protection and control works <i>Mechanisms:</i> Long-term Plans; Bylaws
Local Government Official Information Management Act (1987) <i>Purpose:</i> To make local authority information available to public, incl. information about land prone to hazards	Local authorities <i>Responsibilities:</i> Make local authority information publicly available (incl. identifying hazards) <i>Mechanisms:</i> Land Information Memoranda

Figure 2 shows the five main statutes that govern natural hazards planning at different levels of government, namely central (orange), regional (green) and district/city (blue) levels. The hierarchy of plans established under each law provide various statutory and non-statutory tools for natural hazards planning (see solid and hashed boxes). The solid arrows show established relationships in the hierarchy of provisions. The hashed arrows highlight relationships between existing provisions that ought to be improved. These relationships may be one- or two-way (Saunders et al, *in prep*).

The legislative provisions in Figure 2 and the array of tools they provide constitute a robust 'toolkit' for natural hazards planning. However, many of these tools are not well known or used to their full potential to reduce hazard risk and build community resilience (Glavovic et al, 2010).

The legislation shown in Figure 2 has been designed to be integrated, as reflected in commonalities in their purposes, such as sustainable management or development. They also share the common well-beings of social, economic, environmental, cultural, and health and safety (Saunders et al, *in prep*).

Figure 2: Legislative context for hazard management in New Zealand (Glavovic, Saunders et al 2010)



Glavovic et al, 2010⁷ provide a useful summary of the institutional and legal state of natural hazards planning in New Zealand:

“The institutional and legal regime for natural hazards planning in New Zealand has a solid policy, legal and institutional foundation. The framework established by the RMA and LGA recognises interrelationships between community sustainability and natural hazard risk reduction. It devolves responsibilities to local authorities through a cooperative governance approach. Planning provisions in terms of the LGA require the preparation of a 10-year Long-Term Council Community Plan (LTCCP) [sic] that includes a community vision and a complementary Annual Plan to translate this vision into practical reality. The RMA requires Regional Councils and Territorial Authorities to identify and avoid or mitigate natural hazards through a system of policies, plans and consent approval processes.

These planning provisions are supported by the CDEMA which aims to build community resilience through an all-hazards approach that is based on a ‘4R’ (namely Reduction, Readiness, Response and Recovery) emergency management approach. These legislative provisions for natural hazards planning need to be viewed as a whole. Together, they provide a legal foundation for building sustainable, hazard-resilient communities and provide planners with a range of tools to avoid and mitigate hazard risks.”

Hazard risk reduction framework

Land-use planning is one important part of hazard risk reduction. Saunders (2010) provides a good summary of how land-use planning fits in the wider risk reduction framework, and this summary is outlined below.

“The management of natural hazard risk relies on balancing three key risk reduction strategies:

- 1. Land-use planning and building codes;*
- 2. Effective early warning systems; and*
- 3. Natural process modification (e.g. engineering solutions such as stopbanks) (Leonard et al., 2008).*

A framework has been developed which incorporates the elements leading to risk reduction. Holistic in nature, the framework (see Figure 3) includes the requirements of the Building Act 2004, Resource Management Act 1991, and Civil Defence Emergency Management Act 2002. As Leonard et al. (2008) outlined, often land use change and building codes are the last to be implemented in the suite of tools due to perceived difficulties of process. The framework shown in Figure 3 provides a tool for integrating land use planning, building regulation/construction, and emergency management. The framework has been guided by the risk reduction principles from the 1994 World Conference on Natural Disaster Reduction in Yokohama (cited in ISDR, 2004, p10)”⁸.

⁷ p. 687.

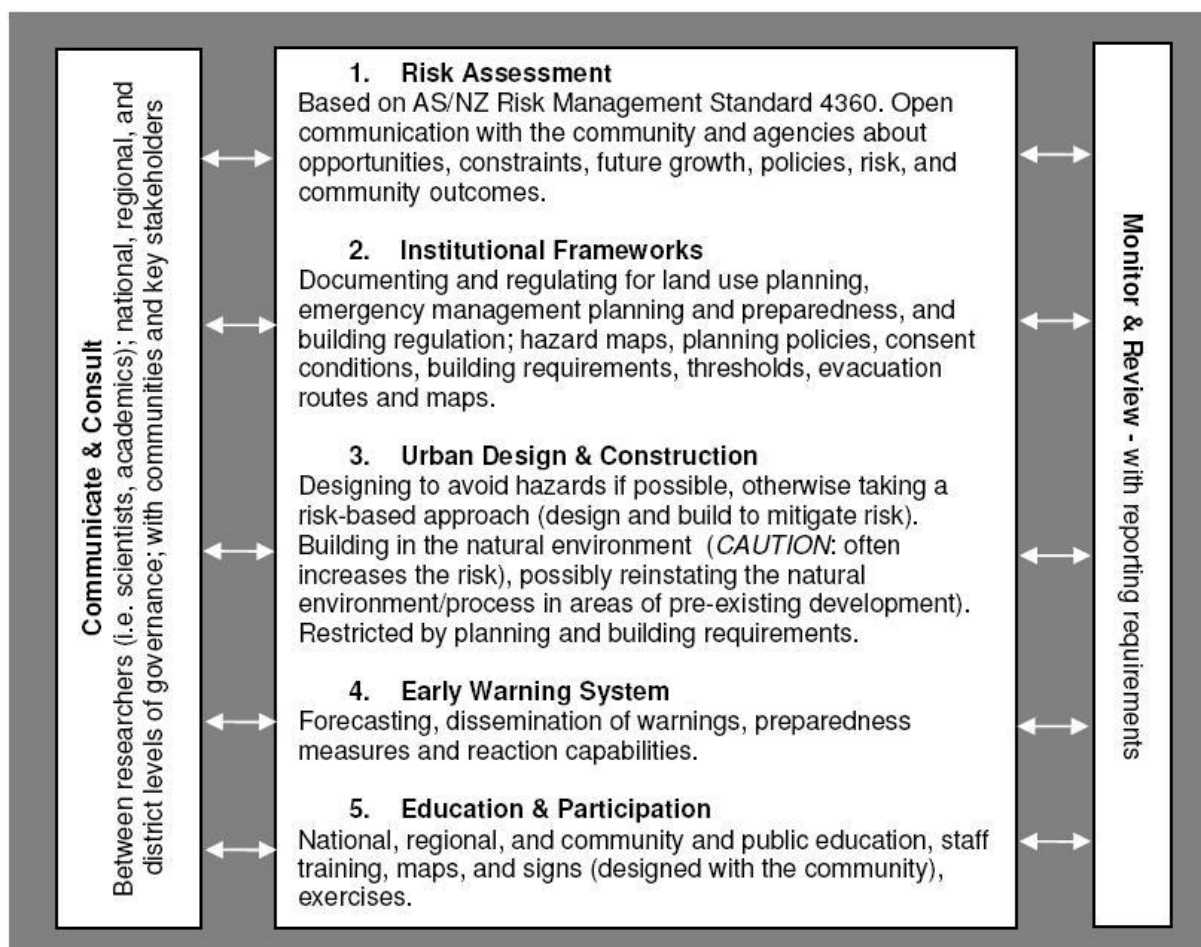
⁸ Adapted from Saunders (2010), p. 2.

The framework helps to clarify the role of land-use planning, by showing the relationship between the five key components:

1. risk assessment
2. institutional frameworks
3. urban design and construction
4. early warning system
5. education and participation

The framework includes two additional steps based on the Australian/New Zealand Risk Management Standard 31000:2009 - communicate and consult, and monitor and review.

Figure 3: Factors that contribute to innovative natural hazard risk reduction (ISDR, 2004; Standards Australia/New Zealand, 2009; Saunders, 2010).



Note: reference to AS/NZS 4360 above now replaced by ISO 31000.

Land-use planning and hazards – best practice guidance

There is considerable guidance available on “best practice” management of hazards, despite the absence of a single definitive source. This is unsurprising however, given the range of key statutes, and the large number of non-statutory guidance resources available.

High level statutory guidance on hazards and land-use planning is contained within the purposes of the five main statutes that govern land-use planning – refer to Table 1.

Guidance specifically related to best practice land-use planning for hazard management falls into two main categories – general and hazard-specific:

General Guidance

The main sources of general guidance are:

Quality planning website⁹ natural hazards guidance note: the purpose of this guidance note is to promote best practice by sharing knowledge about all aspects of practice under the RMA, including hazard management. The guidance on natural hazard management promotes a risk-based approach to planning for hazards, based on four key principles:

1. Gathering accurate natural hazard information
2. Planning to avoid natural hazards before development and subdivision
3. Taking a risk-based approach in areas already developed or subdivided
4. Communicating the risk of hazards in built-up areas.

The Quality Planning website guidance is underpinned by the Tonkin & Taylor Natural Hazard Management Research Report (2006). This report provides an overview and assessment of RMA provisions to address natural hazards within local authorities across New Zealand, and suggests that:

- There are numerous examples of best practice management for earthquake, river flood and coastal erosion/flooding hazards
- There are some examples of best practice management for geothermal and landslide hazards
- There is very limited guidance on meteorological, tsunami and volcanic hazards.¹⁰

AS/NZS ISO 31000:2009 Risk Management – Principles and Guidelines: this Standard provides principles and generic guidelines on risk management. The generic guidelines include seeking mandate and commitment, establishing and maintaining a risk management framework and a risk management process comprising:

- Communication and consultation
- Establishing the context
- Risk assessment, including risk identification, analysis and evaluation
- Risk treatment
- Monitoring and review.

The standard underpins the concept of a risk-based approach within the Quality Planning guidance, and many of the hazard-specific guidelines.

GNS Report: Pre-event recovery planning for land-use in New Zealand (2008): this report addresses the issue of recovery after a disaster, and presents an updated

⁹ <http://www.qualityplanning.org.nz/plan-topics/natural-hazards.php>

¹⁰ Note that the report was produced prior to recent MFE guidelines on climate change

methodology for pre-event recovery planning for land-use in New Zealand. It presents a risk-based methodology aimed primarily at local authority land-use planners. The report suggests various planning measures that would assist with pre-event land-use recovery planning, and the frameworks that could incorporate these measures.

Climate change: while not a hazard per se, climate change is expected to exacerbate meteorological, river flood and coastal hazards. The primary sources of general guidance for local authorities on climate change are:

Quality planning website¹¹ climate change guidance note: the purpose of this guidance note is to:

- Promote understanding about the effects of climate change; and
- Provide best practice information on how to assess the significance of, and respond where necessary to, the effects of climate change. A particular focus is how this can be done within local authorities' existing risk assessment, policy-making and decision-making processes.

The Guidance Note provides:

- An outline of the Resource Management (Energy and Climate Change) Amendment Act 2004.
- An overview of how particular regard may be given to the effects of climate change.
- Information on expected climate change effects in New Zealand.
- Advice on methods for considering and addressing climate change effects under the RMA.
- Good practice examples of how local authorities have incorporated consideration of the effects of climate change into existing council decisions, activities and plans.
- Current challenges in considering climate change effects.

MFE Guide: Preparing for climate change: A guide for local government in New Zealand (2008): this guide is a summary of the updated Climate Change Effects and Impacts Assessment (2008). The guide provides a general overview of likely climate change impacts, local government obligations to address climate change and guidance on integrating climate change obligations into Council activities. The guide outlines some key principles for responding to climate change – these relate to:

- sustainability
- consideration of the foreseeable needs of future generations
- avoidance, remedy or mitigation of adverse effects
- adoption of a precautionary / cautious approach
- the ethic of stewardship / kaitiakitanga
- consultation and participation
- financial responsibility
- liability.

¹¹ <http://www.qualityplanning.org.nz/plan-topics/climate-change.php>

The climate change guide is supported by two additional MFE guides designed to assist local government in preparing for the effects of climate change - Climate Change and Long-term Council Community Planning (2008) and Climate Change Adaptation and Second Generation RMA Plans (2008).

Hazard-specific guidance

Hazard-specific best practice guidance is available on river flood hazards, coastal erosion and flooding, landslide hazards, hazards associated with active faults, tsunami hazards, hazardous substances and volcanic hazards. A brief summary of the key best practice guidance documents is provided below.

River flood hazards

NZS 9401:2008 Managing Flood Risk – A Process Standard: this Standard is designed to guide decision-making on flood risk, and takes a risk-based approach to incorporate the wider contexts of both natural and social systems to more effectively manage flood risk. The Standard provides an agreed best practice framework for central government, councils, professionals (planners, engineers, hydrologists, scientists, risk managers, lawyers, and so on), developers, utility suppliers, property owners, and communities to ensure that proper consideration is given to all aspects of flood risk when making decisions, so that over the longer term, the risk of flood damage decreases.

The Standard proposes a flood risk management framework based on the following elements and principles and outcomes:

- Elements:
 - Catchment-based management
 - Sustainable management
 - Adaptive management
 - Risk management
 - Comprehensive risk treatment strategies
- Principles and outcomes:
 - Engaging communities and stakeholders
 - Understanding natural systems and catchment processes
 - Understanding the interaction of natural and social systems, in a catchment-based management context
 - Decision-making at the local level
 - All possible forms and levels of management
 - Residual risk.

MFE Guide: Preparing for future flooding: A guide for local government in New Zealand (2010): this guide provides an overview of the expected impacts of climate change on flooding such as changes in rainfall, temperature, sea-level, storminess and sediment transport processes. It provides good practice information and guidance to help local authorities incorporate climate change impacts into flood risk management planning through providing examples of approaches local government has taken. The guide draws upon both

the ISO 31000 and AS/NZS 9401:2008 Standards, and is supported by the guidance manual.

MFE Guidance Manual: Tools for estimating the effects of climate change on flood flow: A guidance manual for local government in New Zealand (2010): the purpose of this manual is to help local authority staff – including river managers, engineering staff and asset managers – to manage and minimise the risks posed by increased flood risk due to climate change. The manual provides good practice guidance for incorporating climate change impacts into flow estimation by providing:

- information on the key effects of climate change on flood risk
- methods for estimating changes in the frequency and/or magnitude of rainfall
- methods for converting changes in rainfall to changes in flow rate
- methods for converting changes in flow rate to changes in inundation
- some case studies to illustrate these methods.

Coastal erosion and flooding hazards

New Zealand Coastal Policy Statement (2010): the purpose of the NZCPS is to state policies in order to achieve the purpose of the RMA in relation to the coastal environment. The NZCPS recognises the special challenges associated with achieving sustainable management in relation to the coast – including the management of coastal hazards. The primary objectives for management of coastal hazards is contained in Objective 5:

“To ensure that coastal hazard risks taking account of climate change, are managed by:

- *locating new development away from areas prone to such risks;*
- *considering responses, including managed retreat, for existing development in this situation; and*
- *protecting or restoring natural defences to coastal hazards.”*

Objective 5 is supported by four policies, which provide details related to coastal hazards, and have a long-term, avoidance and “soft solutions” focus:

- Policy 24: Identification of coastal hazards
- Policy 25: Subdivision, use, and development in areas of coastal hazard risk
- Policy 26: Natural defences against coastal hazards
- Policy 27: Strategies for protecting significant existing development from coastal hazard risk

MFE Guideline: Preparing for coastal change: A guide for local government in New Zealand (2009): this guide highlights the impacts that climate change is expected to have on coastal hazards. It details the climate change impacts that are expected not only through sea-level rise, but also through storm surge, wind and waves. The publication also discusses a risk management framework in which to consider the consequences of these hazards.

The guide puts forward the following principles for planning and decision-making:

- **Precautionary approach:** Decision-making takes account of the level of risk, uses existing knowledge and accounts for uncertainties. A precautionary approach should

be used when making planning decisions that relate to new development as well as to changes to existing development within coastal margins.

- **Progressive risk reduction:** New developments should not be exposed to, nor increase, the levels of coastal hazard risks over their intended serviceable lifetime. For existing developments the level of risk should be progressively reduced.
- **Importance of natural coastal margins:** The dual role of natural coastal margins as the fundamental form of coastal defence and as an environmental, social and cultural resource must be recognised in the decision-making processes. Consequently, natural coastal margins should be secured and promoted.
- **Integrated, sustainable approach:** An integrated and sustainable approach to the management of development and coastal hazard risk should be adopted. This approach aims to contribute to the environmental, cultural, social and economic well-being of people and communities.

Landslide hazards and Active Faults

MFE/GNS Guidelines: “Planning for development of land on or close to active faults” (2003) and “Guidelines for assessing planning policy and consent requirements for landslide prone land” (2006): the purpose of both guidelines is to assist land use planners and other interested parties in determining whether planning documents and development applications at regional and local government levels incorporate appropriate information on fault rupture, landslide and land instability hazards.

The guidelines provide suggestions that could be used to assess hazards related to risk at the consent stage, and examples of issues, objectives, policies, rules and assessment criteria. Basic underpinning scientific and engineering concepts related to active fault and landslides are outlined in the guidelines to assist planners in understanding hazard processes, triggers, and hazard and risk assessment.

Both guidelines are based on four overarching planning principles:

1. Gather accurate hazard information
2. Take a risk-based approach in areas likely to be developed or subdivided
3. If the risk is unacceptable, plan to avoid or mitigate hazards before development and subdivision occurs
4. Communicate the risk of hazards in built-up areas.

A risk-based planning approach incorporating risk analysis, evaluation, and management is presented, followed by resource consent tables which can assist planners in categorising consent activity status.¹²

Tsunami hazards

GNS Guideline: New Zealand’s Next Top Model: Integrating tsunami inundation modelling into land use planning (in prep): the purpose is to provide guidance to land use

¹² From Saunders, Becker and Glassey (2008) <http://www.earoph.info/pdf/2008papers/4-1.pdf>

planners and decision makers on how tsunami inundation modelling can be included into land use planning. A decision tree for including tsunami risk into land use planning is presented, and forms the basis for the guideline. The purpose of the decision tree is to lead the decision maker through a process of tsunami modelling, risk assessment, review of data quality and inclusion into LIM's, emergency management, and land use planning.

The guideline provides options on how "Level 3 and 4" modelling can be incorporated into land use planning. A discussion is provided on managing uncertainty, including one potential solution for mapping tsunami inundation zones that acknowledges scientific uncertainty. Three planning approaches are discussed - the risk-based approach, precautionary approach, and participatory approach.

A three-step risk-based approach is outlined, which involves quantifying and/or qualifying consequences to an event; selecting a land use importance category based on consequences; then the resource consent activity status is determined on the land use importance category. Resource consents become more restrictive as the consequences increase. Regulatory and non-regulatory options for including tsunami into land use planning are outlined. Pre-event recovery planning for land use is also recommended for areas already developed.

Hazardous substances

MFE Guideline: Land Use Planning Guide for Hazardous Facilities (2002): this guideline provides comprehensive planning guidance for hazardous facilities under the RMA. The guideline sets out methods for determining the resource consent status of hazardous facilities under the RMA and discusses one particular method, the Hazardous Facility Screening Procedure (HFSP), in greater detail as well as presenting information on using this method in district plans.

Volcanic hazards

Journal paper: A synthesis of challenges and opportunities for reducing risk through land use planning in New Zealand (2010): this paper considers the challenges and opportunities for land-use planning for volcanic hazards in New Zealand, and presents case studies from the USA, Japan and New Zealand.

Tools and mechanisms for hazard risk reduction

There are various statutory and non-statutory tools and mechanisms available to planners and decision-makers for hazard risk reduction. Table 2 provides an overview of the various mechanisms¹³, and provides a brief assessment of the advantages and disadvantages of each mechanism.

It is important to note that while these tools are separated into statutory and non-statutory categories, some tools such as growth strategies and structure plans can be implemented

¹³ Adapted from Tonkin and Taylor (2006), Chapter 8.3 and Glavovic et al. (2010), p. 689.

via both statutory and non-statutory mechanisms, and that there is a lot of cross-over between statutory and non-statutory mechanisms.

Table 2: Advantages and disadvantages of hazard risk reduction tools and mechanisms

Tool/Mechanism	Advantages	Disadvantages
Statutory		
<p>RMA regulatory planning tools:</p> <ul style="list-style-type: none"> • National Policy Statement (NZCPS) • Regional Policy Statements – hazard zones • District Plans – hazard zones, minimum floor levels etc. • Resource consent processes • Reserves, vesting of land through subdivision • Hazard registers 	<p>Policies, plans and consents: Provides for certainty and consistency of decision-making; flexible for dealing with different natural hazards; allows for variance in approaches across Districts; provides opportunity to ensure best practice, such as avoidance in preference to mitigation for new developments</p> <p>Reserves: avoids new development; assists hazard setbacks</p> <p>Hazard registers: provides for capture of all hazards information on an ongoing basis</p>	<p>Policies and plans: considerable expense, policy lag time, significant consultation requirements; subject to multiple appeals; difficult to change once in place, may negatively impact on value of real estate</p> <p>Hazard registers: does not necessarily translate into effective policies or risk reduction actions</p>
<p>Building Act and related tools:</p> <ul style="list-style-type: none"> • PIM's • Building code and related provisions 	<p>Practical; focussed on site-specific conditions; promotes sustainability; considerable benefits to reducing lives risk and reconstruction following events</p>	<p>Adds to cost of design and building; does not prevent development within hazard areas; expensive to retrofit existing development</p>
<p>LGOIMA:</p> <ul style="list-style-type: none"> • LIM's 	<p>Provides essential information on known hazards</p>	<p>Voluntary – may not be obtained</p>
<p>LGA:</p> <ul style="list-style-type: none"> • Easements • Long-term Plans 	<p>Easements: help avoid new development or assist setback for existing development</p> <p>LTP: links long-term community outcomes to hazard management</p>	<p>Easements: difficulties funding and purchasing land</p>

Tool/Mechanism	Advantages	Disadvantages
Statutory (cont.)		
CDEM Act: <ul style="list-style-type: none"> Emergency warning systems and evacuation planning 	Vital to any strategy that aims to reduce risks to life; provides assurances to community; practical; identifies best possible routes and safe areas in advance; engages local community in owning the response plans; visible reminder of hazards	Difficult to cover all potentially affected people; level of community understanding of warnings systems can be hard to maintain over time;
Iwi management plans	Recognised status under RMA; opportunity to engage all community sectors	Limited statutory impact on hazard management
Bylaws	Provides certainty and consistency in decision-making	Time and expense in developing
Non-statutory (primarily)		
National standards and guidelines	Provide consistent best practice guidance	May not be used; subject to interpretation
Growth strategies	Provides long-term directions for communities; assists pre-event recovery planning; useful tool for incorporating hazards as an important consideration in long-term development	Lengthy timeframe for development; significant consultation required; considerable expense
Structure plans	Provides long-term certainty to communities; encourages integrated management; promotes better understanding of inter-relatedness of issues	Lengthy timeframe for development; significant consultation required; considerable expense
Works and engineering solutions	Modify hazards prior to impacting infrastructure or people, structures beneficial for slowing and re-directing water flows	High costs associated with construction and maintenance; often incompatible with other uses such as natural character; may promote intensification of development; not guaranteed to work as designed in all events

Tool/Mechanism	Advantages	Disadvantages
Non-statutory (primarily) (cont.)		
Education	Critical link between community and Councils/emergency response organisations; critical component of warning systems and evacuation planning; engages community in knowledge of hazards, risks and decision-making	Time-consuming; may lead to “saturation” of public messaging.
Research	Essential to underpinning all forms of risk reduction	Costly, scale and accuracy issues; long timeframe for development; subject to legal challenge
Advice and advocacy	Assists awareness and understanding of hazards	May not translate into risk reduction
Insurance provisions	Moves burden of losses away from local community; simple method	Does not reduce damage over time; no benefits to saving human lives; does not lower overall risk - simply spreads it wider; no guarantees of ongoing coverage through time; applies to individuals.
Financial incentives and disincentives	Fits with deregulated market-driven economy; allows targeting of high risk areas	Burden upon central Government or local government to fund (taxpayers/ratepayers)

Local authority land-use planning and hazard management

Introduction

The local authorities within the Hawke’s Bay region utilise a variety of methods for land-use planning to manage hazards. This section provides:

- A summary of how each local authority is addressing land use planning for significant hazards
- An overview of the general management of land use planning and hazards within the region including:
 - A summary of the methods used for land-use planning
 - Planners perceptions on the effectiveness of methods
 - Barriers to successful implementation of policies/plans

- Feedback from planners on how policies could be improved
- Planner perceptions about the level of Council interaction and collaboration in hazard management

How local authorities have addressed land use planning for hazards

Various statutory and non-statutory methods for land-use planning for hazards are used by local authorities within the Hawke's Bay region. The primary mechanisms used are RMA policies and plans at both regional and district levels, namely the Regional Resource Management Plan 2006 (RRMP), proposed Regional Coastal Environment Plan (RCEP) and District Plans (DP's).

While they are RMA statutory plans, the RRMP and DP's provide a good summary of all the methods used in land-use planning for hazard management within the region. For this reason it is important to understand the provisions contained within these plans, as they provide a good summary of how each local authority is addressing land use planning for significant hazards.

Regional Policy and Plan provisions

The primary policies for land-use planning are the RRMP and the proposed RCEP. The RRMP is a combined Regional Policy Statement and Regional Plan, while the RCEP is a regional plan. The RCEP therefore sits under the framework of the RRMP within the coastal environment.

This section contains a summary of the approaches of both the RRMP and RCEP. Appendix 1 contains the key text related to hazard management within the RRMP and RCEP.

Regional Resource Management Plan 2006

General approach

Picks up on fundamental approach to hazard management within RMA – avoidance or mitigation, and relies on non-regulatory methods for implementation.

Hazards identified by the plan

River flooding; droughts; earthquakes; volcanic ash fall; tsunami; coastal erosion/inundation.

Issues

Region is susceptible to the above hazards, and the potential impact of these on people, property and economy.

Objectives

Avoidance or mitigation of adverse effects of natural hazards on people, property and economy (s 3.12); avoidance of further permanent development in areas prone to coastal erosion and inundation (s 3.2).

Policies

Use of non-regulatory methods as the principle means of addressing avoidance and mitigation - particularly liaison with Territorial Authorities, provision of works and services and focussing priorities on areas of high human population density.

Methods¹⁴

Liaison with TA's (hazard planning protocols, planners forum); focus on high population density areas; research, investigation and hazard information provision for river flood, earthquake, tsunami and volcanic ash hazards; maintaining emergency management capability; provision of expertise and advice on lifelines project; river flood monitoring; river flood forecasting and modelling; works and services provision (river flood protection scheme); identification of river flood hazards on the Heretaunga Plains.

Explanation and reasons

Recognition of the need for an integrated response to hazards; works and services provided where benefits outweigh costs; hazards in high population density areas have most impact on safety and economy (s 3.12); avoiding permanent development in areas prone to coastal erosion/inundation is necessary to achieve the purpose of the RMA (s 3.2.12).

Anticipated environmental results

Measures are in place to minimise risk; indicator is loss of life and property.

Natural hazards responsibilities

The current Chapter 8.4.4.5.1 and 8.4.4.5.2 defines core responsibilities as:

- Both HBRC and TA's responsible for developing objectives and policies for controlling use of land for avoiding and mitigating hazards
- TA's are responsible for developing methods
- HBRC will be the key information provider.

Note that the proposed RCEP will change the above within the coastal environment to allow HBRC to also develop methods.

Proposed Regional Coastal Environment Plan (RCEP)

The proposed RCEP is an update of the Regional Coastal Plan 1999 that extends the coverage inland across a newly defined "coastal margin". The RCEP represents a change to the management of hazards within the coastal margin by recognising that natural hazards and other resource management issues need to be managed in an integrated way. The RCEP also recognises the management difficulties associated with resource management issues in the coastal marine area, when managed in isolation from those existing above mean high water springs.

The key change proposed is that HBRC will develop methods to manage coastal hazards. The key objectives, policies and anticipated environmental effects are summarised below.

¹⁴ Partially captured within Administrative Matters, Chapter 8.4.4.5.

Objectives

Risks posed by coastal hazard are avoided or mitigated; avoidance of new and further development in coastal hazard risk zones.

Policies

To manage coastal erosion and inundation risks in accordance with the environmental guidelines¹⁵; to implement the guidelines using resource consents; regional rules and non-regulatory methods.

Anticipated environmental effects

Avoidance and mitigation of the risk of coastal hazards to property and other values; coastal protection structures only constructed where they do not exacerbate the coastal hazards and where potential adverse effects can be avoided, remedied or mitigated.

Observations related to regional policy/plans and hazard management

- The RRMP largely picks up on the provisions within the RMA – it does not add a lot to the provisions with the Act
- The RRMP identifies the significant natural hazards identified within the CDEM Group Plan (2005) and confirmed by the recent GNS hazard risk report (2010)
- There are some linkages to the CDEM Act via noting emergency response and research (GNS hazard risk report 2010) as methods
- The key methods used by HBRC under the RRMP are as information provider and leading flood management.
- The RRMP identifies the importance of linkages between the flood management and regional policy roles of HBRC
- The role of HBRC as information provider is generally perceived to be successful by regional planners
- The RRMP has a strong reliance on non-regulatory methods - particularly information provision and liaison with TA's
- The proposed RCEP represents a significant change to the approach within the RRMP by:
 - Taking a more regional, rules-based approach
 - Focussing on avoidance in preference to mitigation
 - Giving “teeth” to avoidance provisions
 - Shifting the focus towards soft solutions in the coastal area, with hard structures as a last resort option.

¹⁵ Refer to Appendix 1 for an overview of guideline contents

District Plan provisions

This section contains a summary of the approaches of the four District Plans within the region. Appendix 2 contains the key text references of each of the District Plans.

Central Hawke's Bay District Plan

General approach

Recognises that communities are at risk from a variety of hazards, and that two important considerations in management are nature of the hazard and community vulnerability.

Hazards identified by the plan

River flooding; earthquakes; erosion; volcanic and geothermal; landslip; subsidence; sedimentation; wind; drought; fire; hazardous substances.

Issue

Natural hazards are a potential threat to people and property.

Objective

Avoiding loss of life; minimising damage to infrastructure and disruption to the community from hazards; avoidance of subdivision where there are significant natural hazards.

Policies

Related to advising/informing the community; monitoring land use trends in relation to hazards; ensuring appropriate construction standards and consideration of hazards in consents; requiring land-use consent for building near to fault lines; permitting coastal structures only where they are best practicable option and avoid adverse effects; restrict, mitigate or avoid new subdivision in areas subject to river flooding, subsidence, slippage, earthquake liquefaction and fault movement.

Methods

Provision of rules on subdivision for fault lines and in areas at risk from river flooding and coastal erosion/inundation; advising/informing the community; collecting information during the consent process; liaising with HBRC; ensuring Council staff take earthquake and fire hazards into account in building consents.

Explanation and reasons

Ongoing research is needed; linking to use of the Building Act; coordination with HBRC needed; links to emergency management needed; Council has obligations under the RMA.

Anticipated environmental results

Collation and provision of clear information; implementation of emergency management response procedures; location of new subdivision away from areas at high risk from natural hazards; loss of life avoided and effects on communities minimised; new coastal hazard protection works only if best practicable option; protection of coastal dunes and natural features.

Rules

The plan contains rules for setback from fault lines within each of its zones. This is a “standard” provision through the plan:

“Setback from faultlines: no building for an activity shall be located within 20m of an earthquake fault line identified on the Planning Maps.”

The planning maps identify both river flood hazard areas and active fault lines, though there are no specific rules for river flooding.

Observations related to Central Hawke’s Bay DP and hazards management

- The plan contains few rules for managing hazards
- The plan does not control building construction in areas vulnerable to flooding, erosion, earthquakes and fire, except where the building is located over a fault line. The plan refers these matters to the provisions of the Building Act. Subdivision however is controlled by the general plan conditions
- The plan is in the early stages of a rolling review
- There is a significant reliance on HBRC as the key information provider
- The current planning maps are used to provide an indication of active fault lines, but are not part of consent decisions due to their scale (not accurate enough down to property level)
- The general approach to determining minimum floor levels for river flood hazards is 1-in-50 year level plus 300mm freeboard.

Hastings District Plan

General approach

Recognises need to manage hazards, and that mitigation of effects not always possible; District Plan rules do not attempt to address issues where more appropriate controls already exist (such as the Building Act); Council will liaise with HBRC to ensure an integrated approach to managing hazards; implementation via resource management units (RMU’s); information will be produced, distributed to the public and stored in a database

Hazards identified by the plan

River flooding; coastal; earthquake; fire; land instability; hazardous substances.

Issues

Parts of the District are susceptible to effects of natural hazards; certain land use activities can avoid or mitigate effects; land use activities can increase risk from hazards; future land use development options may need to consider existence of natural hazards.

Objectives

Identify and minimise the effects of natural hazards on the community and natural and physical resources; ensure that land use activities avoid or mitigate adverse effects.

Policies

Control land use activities where communities/resources at risk; develop a hazard and risk database; ensure activities intended for human inhabitation avoid or mitigate effects of hazards; public bodies allowed to carry out mitigation works; land use activities should not exacerbate effects of hazards, monitor occurrence and effect of natural hazards; build upon hazard database to encourage informed decision-making; provisions of District Plan to reflect reduced risks due to mitigation.

Methods

District Plan resource management units; Building Act; subdivision consents; Engineering code of practice for subdivision; HDC consolidated bylaws; LIMs/PIM/s; HBRC policy/plans; information and monitoring exchange; information gathering; guidelines; performance standards; CDEM Act; LGA; Forest and Rural Fires Act.

Explanation and reasons

Controls needed in areas where hazards exist – controlled via resource management units (river flood, earthquake, volcanic, coastal, fire, land instability); recognition and identification of hazards and information provision is important; risk to life needs to be minimised in hazard areas where subdivision is allowed; public bodies need to fulfil obligations for mitigation; risks for community and environment should not be increased by land use activities; District Plan needs to reflect growing knowledge of hazards; information provision can lead to better understanding – information needs to be updated, easily accessible and simple to use; rules in District Plan may become obsolete due to mitigation works.

Anticipated environmental results

Avoidance, mitigation or minimisation of the potential effects of natural hazards on land uses; promotion of public awareness; reduction of risks to people and the community.

Rules and specific performance standards/terms

The plan contains the following rules and performance standards/terms:

Rules:

- Flooding RMU: coastal protection works are discretionary
- River hazard RMU: works associated with natural hazard mitigation, water intakes, bridges and river management are permitted
- Land instability RMU: any building within the identified area is restricted discretionary.

Standards/terms

- Flooding and Haumoana inundation RMU's: minimum floor levels are RL 11.5 or 0.5m above ground (note: Haumoana inundation levels must be 0.5m above ground level); wastewater treatment systems must not mix with floodwaters in a 1-in-50 year event

The planning maps identify the following hazard RMU's: coastal; river; river flooding (Clive, Southland, Te Awanga, Karamu); Haumoana inundation; land instability.

Observations related to Hastings DP and hazards management

- Use of the Building Act and Building Code for earthquake mitigation. Active fault guidelines were used to try and get rules into the plan, but Council decided not to do this in light of the fact that similar rules already existed for restricting density in the rural zone
- Climate change and sea-level rise guidelines used for Haumoana and Te Awanga inundation assessments
- Faultline mapping, liquefaction and ground shaking information sits outside the plan, and is used as a heads-up for consents, and to inform LIMS
- River flood levels and rules are outdated
- General approach is to apply rules of the RMU first, then other relevant underlying District-wide rules
- Flood RMU levels of RL 11.5 are all based on 1-in-50 year event, with different methods for determining the level in each of the following areas:
 - Clive: based on 1974 flood level of RL 11.2 plus 300mm freeboard
 - Karamu/Southland: based on modelled 1-in-50 year events
 - Te Awanga/Haumoana: based on flood investigations of 1-in-50 year events.

Napier District Plan

General approach

Recognises that communities are at risk from a variety of hazards; states Council has taken a proactive approach to identification of hazards; states that new land uses can be managed to avoid, remedy or mitigate hazards; effects can be controlled for existing land uses.

Hazards identified by the plan

River flooding; earthquakes; coastal; slippage/hill erosion; hazardous substances.

Issues

Land uses can increase potential risk from natural hazards; land uses are already established in areas at risk from natural hazards.

Objectives

Manage the effects of natural hazards (62.3); control the effects of land uses and development on areas subject to natural hazards (62.4).

Policies

Manage the effects of natural hazards (62.3): identification of hazards; collect and collate information and make it publicly available; monitor effects of natural hazards; control subdivision, use and development of land; ensure practical protection methods considered. Control the effects of land uses and development (62.4): direct development away from natural hazard areas; control existing development; monitor natural hazards.

Methods

Manage the effects of natural hazards (62.3): District Plan rules; establishment of a hazard register and provision of LIMS/PIMS; identification of hazards via GIS; physical works (beach renourishment, flood pumps).

Control the effects of land uses and development (62.4): District Plan rules; District and regional SOE reporting; urban growth strategies; powers and responsibilities under other legislation such as the Building Act.

Explanation and reasons

Manage the effects of natural hazards (62.3): need to identify hazards and assess possible risk first; Council will ensure development will not occur in areas at high risk from hazards, and where existing development has occurred in hazard areas, a managed approach is taken to ensure risk is not increased; consideration given to appropriate means to avoid, remedy or mitigate, including physical works.

Control the effects of land uses and development (62.4): principal aim of Council is to ensure landowners are aware of hazards, and that risk is avoided, remedied or mitigated; identification of hazards is in progress; LIMs and PIMs can be brought to attention of owners; rules developed to avoid, remedy or mitigate effects; physical works may be undertaken.

Anticipated environmental results

Risk to life and property from natural hazards is reduced; community is better informed of natural hazards.

Rules

The plan contains a range of rules for development within known hazard areas, including:

- Prohibited activities: any new building or structure, other than network utility operations, fences and coastal protection works
- Discretionary activities: land development and coastal protection works
- Controlled activities: new network utility operations
- Permitted activities: repair, maintenance and minor alterations to structures and network utility operations, beach renourishment.

The planning maps currently identify coastal hazard areas only.

Observations related to Napier DP and hazards management

- Rules currently limited to hazard areas shown on plan maps – these are largely related to coastal erosion and inundation hazards
- The plan has a significant focus on coastal hazards
- River flood paths and ponding areas have been identified as part of the HPUDS.
- The plan refers to the Building Regulations to mitigate river flood hazards, where minimum requirements are specified
- Plan policies and rules supported by use of RMA s 106
- Known hazards are shown on District Plan maps. Potential hazards are listed on the hazard register
- Code of practice for subdivision and land development has additional objectives and policy as follows:

- Objectives: maintenance of acceptable levels of risk posed by natural hazards; avoidance or mitigation of natural hazards is an important element of sustainable management
- Policy 6: to identify natural hazard areas, and where appropriate, to control the use and development of land to avoid, remedy or mitigate the impacts of natural hazards

The code of practice also has a requirement to take into consideration any hazard mapping prepared by HBRC or Napier City Council

Wairoa District Plan

General approach

Recognises that the District Plan is one of a number of mechanisms, and states a risk management approach to planning via reduction, readiness, response and recovery.

Hazards identified by the plan

River flooding; land instability; seismic; volcanic; sea level rise; storm surges; coastal erosion; inundation, hazardous substances.

Issues

Primarily related to a lack of community awareness; increased land instability from land disturbance and inappropriate development

Objectives

Inform community and minimise their vulnerability; ensure appropriate development and subdivision

Policies

Related to minimising effects of hazards, preventing development where effects cannot be avoided, remedied or mitigated and ensuring effects taken into account

Methods

Consents; identification and monitoring of hazards; hazards database; identifying hazard areas; using LIMS/PIMS; use of rules to avoid or control adverse effects; work with HBRC; emergency management; inform community of Hazards; promote education programmes.

Explanation and reasons

Related to fulfilling Council statutory obligations; minimising loss of life and damage; linking to use of the Building Act; river flood risk to Wairoa; Council involvement in emergency management.

Anticipated environmental results

Primarily focussed on avoidance or mitigation of potential effects; increasing public awareness; avoidance of inappropriate development and land disturbance

Rules

District Plan currently has rules for river flooding hazards only. A “standard” rule applies within each of the development zones within the plan:

“Freeboard of not less than 300mm above the 50 year flood level (2% AEP).”

Currently the District Plan maps identify river flood hazard areas for Wairoa only. Coastal hazard zones are identified as a part of Variation 1B, but are not yet operative.

Proposed Variation 1B - Coastal Protection to the Wairoa District Plan¹⁶

Key points to note are as follows

- Policies: adds new policies on
 - Managing erosion and inundation hazards by avoidance for new subdivision
 - Not allowing new lots to be created within the Current Erosion Risk Zone (CERZ) if they are wholly within that zone
- Methods:
 - Establishing coastal zones
 - Implementation by rules
 - Requiring provision of esplanade reserves upon subdivision
 - Supporting HBRC review; working with HBRC; programming additional research as required
- Anticipated environmental results:
 - Reduction in the net physical risk from coastal erosion and inundation hazards over time
- Rules:
 - Discretionary status for any subdivision or building on land potentially subject to flood hazard
 - Discretionary status for subdivision of land partially in the CERZ

Observations related to Wairoa DP and hazards management

- The plan contains few rules for managing hazards
- Hazards are identified as they arise, normally as part of the consent process for new development
- There is a significant reliance on HBRC as the key information provider – especially for river flood and coastal hazards
- The proposed coastal variation is in progress, and has strong alignment with the proposed RCEP. The variation represents a change in approach towards avoidance compared to the approach within the current DP.

¹⁶ Plan Change 1 Final, August 2007.

Management of land use planning and hazards in Hawke's Bay

This section considers the current management of land use planning for hazards with the HB region by summarising the land use planning methods used by local authorities, and feedback on management arrangements from planners in Hawke's Bay.

Land use planning methods for hazards

Methods fall into two main categories – statutory and non-statutory.

Statutory methods

All Councils use the following statutory methods as the primary means for land-use planning:

- RMA:
 - National Policy Statement (NZCPS): particularly HBRC and WDC with respect to the proposed RCEP and Wairoa Variation 1B
 - RRMP/Proposed RCEP/District Plans
 - Resource consent processes
 - Hazard registers: primary regional source of hazard information is the HBRC online database, NCC and WDC maintain Council registers
- Building Act and related tools: primarily the Building Code and PIMS
- LGOIMA: LIMS
- CDEM Act: Emergency preparedness and response
- LGA: links to LTP

Non-statutory methods

All Councils use the following non-statutory methods in support of the statutory methods:

- Hazard investigation, research and information provision:
 - HBRC has core role of in natural hazard management research. HBRC manages the 10-year regional hazards research programme and on-line natural hazards resources database
 - TA's utilise research coordinated by HBRC – such as the fault-line mapping (2007), coastal erosion and flooding information and river flood information. WDC and CHBDC have strong research/information provision reliance on HBRC
 - NCC and HDC research is generally undertaken in response to site-specific issues such as coastal erosion (Haumoana and Westshore), or in response to issues raised by HBRC such as flooding and storm water issues for new subdivisions
- Liaison and information sharing between local authorities – particularly between HBRC and TA's, and related to above points
- Monitoring of hazard trends
- Use of national standards and codes of practice.

The following non-statutory methods are also used by some Councils:

- Growth strategies: HPUDS provides long-term context for growth taking into consideration river flood and coastal hazards (HBRC, HDC, NCC)
- Structure plans, such as Mahia Beach (WDC) and Te Awa (NCC)

- Hazard management guidelines, such as the active fault guidelines (HDC)
- Works and engineering: primary function contributing to hazard management is river management and flood protection (HBRC), also maintenance of flood pumping stations (NCC)
- River flood monitoring, forecasting and modelling, and flood hazard identification (HBRC)
- Public advice and advocacy.

Planner perceptions on policy and plan effectiveness

Feedback on policy and plan effectiveness from Hawke's Bay planners is as follows¹⁷:

Regional policies/plans (HBRC perception): perception of mixed effectiveness. Role of HBRC in information provision has been effective. Regional coastal policy effectiveness should improve as a result of a consistent approach to determining hazard zones via of RRMP Variation 1. HBRC now has fundamental hazard information, but uptake into DP's has been slow. Current regional policies do not add a lot to the RMA, and haven't pushed avoidance as a better long-term option. The outcome of this is an emphasis on mitigation rather than avoidance for some developments such as Clive and Te Awa.

District Plans (TA perception): overall perception that policies are effective. Most objectives of policies are being met, despite recognition of the need to update policies. Effectiveness tied to implementation of Building Act requirements (particularly for river flooding), and the fact that no major disasters have occurred. Feedback indicates that issues are dealt with as they arise – normally when development pressures rise, such as the WDC plan change.

Feedback from planners suggests policy/plan success is measured by:

- Perception of whether hazard management outcomes are meeting objectives in policies (largely a perception from TA's that they are)
- Hazards being mitigated or avoided when development takes place – does a development meet the required standards within policies/plans?
- S.32 analyses and DP review processes
- State of the Environment reporting
- Level of community agitation and concern, and level of litigation threatened or in progress.

Barriers to successful implementation of policies/plans

Interview feedback from planners highlights the following regarding barriers to implementation of policies/plans:

- The most common barriers identified are:
 - Funding/resourcing: cost of funding hazards research and information gathering is high
 - Hazard information: issues relate to lack of it, keeping it up to date and information being available at a scale that is fit for purpose

¹⁷ Based on notes collated from interviews with Hawke's Bay planners in December 2010

- Politics: short election cycles, drive to minimise costs and desire for growth/economic development.
- Other barriers identified are:
 - High TA staff turnover
 - Inconsistent implementation of hazard information across the region
 - Policy lag and appeal processes
 - Lack of national standards
 - Lack of willingness to put hazard restrictions in place
 - Private property rights
 - Dealing with hazards of low probability/high impact and lack of clarity about cumulative effects of development
 - Policies being too restrictive and not encouraging growth.

The barriers identified above are related to the issues with hazard management also identified during interviews with planners:

- At times, a lack of emphasis on working together prior to plan changes – such as RRMP Variation 1 (RCEP). There is a need to build a case for change with communities and Councils prior to undertaking significant policy changes
- Not enough community awareness of regional hazards and their potential consequences
- At times, a disconnect between the HBRC hazard work programmes and hazard management needs of TA's
- Lack of clarity of some information provided and issues arising from it – such as contaminated sites information
- Timely provision of new information – it is not always provided as it is developed

This feedback on barriers and issues is reinforced by the recent work of Glavovic et al. (2010) and Saunders (in prep). Glavovic et al.¹⁸ identify four main barriers to realising the potential of natural hazards planning:

1. Hazard risks are secondary to short-term public concerns
2. Well intentioned policies and laws encourage local communities to discount hazard risks
3. Coordinated hazard risk reduction is difficult to achieve given diverse and divergent stakeholder interests
4. Economic growth, including development in at-risk areas, is prioritised over community safety and sustainability.

Saunders (in prep) identifies cost and potential liability as key barriers, and skills/experience/resources and awareness and understanding of hazards as both barriers and opportunities to successful land use planning for natural hazard risk reduction.

¹⁸ p. 693.

Feedback from planners on how policies/plans could be improved

Feedback collated from interviews with planners suggests that policies/plans could be improved by:

- Having clarity around best practice for management of various hazards
- Achieving consistency in the:
 - methodology for assessment of hazards
 - approach to regional management of hazards such as coastal erosion and flooding
 - regional policy (such as the RRMP Variation 1)
- Placing more onus on applicants to provide information
- Recognising the differences in scale and consequences of different hazards, and addressing those at an appropriate policy level
- Increased resources for site-specific hazard studies
- Having more new, continually updated hazard information such as river flood hazard areas, while working towards a complete regional hazards database
- Better dialogue with communities prior to policy development
- Updating policies via DP reviews.

Planner perceptions about interaction and collaboration in hazard management among local authorities

The following perceptions on interaction and collaboration were noted from interviews with planners:

- Overall, a reasonable level of interaction between Councils was reported
- Most interaction occurs between individual TA's and HBRC. This is generally on research/hazard information issues, consent applications and plan changes. The type of interaction and level of collaboration between HBRC and TA's varies widely between TA's and issues (Lifelines Project vs. RRMP Variation 1)
- Little interaction between TA's was reported
- The planners forum is useful in facilitating interaction and collaboration, and has worked well for a range of regional policy issues, including hazard management. The planners forum has improved interaction and collaboration
- The level of integration and collaboration suffers from the inevitable differences of opinion about risk avoidance and mitigation, and differences in staff and community views on acceptable risk.

Planners also noted the following opportunities to help overcome barriers and issues, and help to improve interaction and collaboration:

- Increased level of interaction and dialogue between planners/hazard management staff regarding hazard management information requirements and priorities
- More marketing/public education about hazard risks and consequences – to make the issues more community understood and owned

- More consistency in hazard management policy provisions
- Greater collaboration between HBRC and TA's in advance of plan changes, and more recognition of the statutory functions and obligations of TA's, and the implications of regional policy changes
- A consistent and accessible hazard information database.

Summary and conclusions

This section summarises the current state of land-use planning and hazard management within the region, and draws conclusions about land-use planning and related methods to address hazards.

This section draws upon the framework for innovative natural hazard risk reduction presented in Figure 3 (refer to p. 14). This framework recognises the fact that land-use planning is one key component of hazard risk reduction, but relies on other methods in order to be successful.

It is acknowledged that the framework in Figure 3 and its key components are not a perfect fit to the methods used for hazard risk reduction in Hawke's Bay. In addition, the descriptions within each of the five key components only partially reflect the range of methods used. Despite this, it is possible to broadly map the methods used by local authorities to the Figure 3 framework, and this structure is used to summarise and draw conclusions on land-use planning and related methods below.

Risk Assessment

Summary

Hazard investigation, research and information provision/sharing

- Base regional information has been collected on hazards, with an emphasis on natural hazards – particularly river flood, coastal erosion and earthquake, with less on tsunami, landslide, volcanic and other hazards. However, hazard investigations are ongoing for active fault trace mapping and tsunami inundation mapping. HBRC river flood monitoring, forecasting and modelling, and flood hazard identification are significant ongoing activities.
- Responsibility is largely HBRC's for regional level information, while TA's have a significant interest in local site-specific hazards, particularly coastal erosion where considerable research has been done
- The primary source of regional information for Councils is the on-line natural hazards resources database
- Issues with information include a lack of it at times, information being up-to-date and at an appropriate scale
- All DP's recognise the importance of good information to support hazard management
- The HBRC information provision role is perceived by planners to be working well. There is a high level of dependence on HBRC for river flood hazard information by all

TA's, and a strong reliance on HBRC for information provision for all hazards by CHBDC and WDC.

- Information developed at the regional level is driven by the 10-year research strategy, which has a strong natural hazards and science focus. Despite having had input from TA's, it is unclear how much the research programme aligns with TA priorities, but feedback from planners indicates that this could be improved.
- The HBRC hazard research survey (2010) confirmed that most requests for hazard information were for significant natural hazards, and that this information was used primarily for policy making, strategic planning and land-use planning.

Monitoring of hazards

- All DP's recognise the need to monitor hazards
- There does not appear to be regional monitoring of hazard risk trends other than the results of the GNS risk assessment update (2010), which will inform the second generation CDEM Group Plan. The results of the GNS report are at the broad regional level.

Hazard registers

- NCC and WDC report use of Council hazard register, while HDC and CHBDC rely on the HBRC database
- The identification and use of hazard registers is predominantly reactive – they are normally populated retrospectively alongside development proposals and consent processes

LGA: LTP's

- At the regional level, the HBRC LTP recognises the need for
 - improved accessibility to and application of hazard information for land-use planning to TA's
 - coordination of regional hazard information on hazards from industrial facilities
 - liaison between local authorities in hazard management
 - public education and awareness, and the role of CDEM.
- The LTP's of TA's wrap hazard management into emergency management, and highlight the need for public education and awareness of hazards.

Growth strategies

- The HPUDS has identified coastal erosion/inundation and river flood hazards, and incorporated these hazards into its constraints when considering future development. Avoidance of exposure to these hazards are one of the drivers behind the areas identified for future development

Conclusions

The summary above suggests that:

- The role of information is vital to land-use planning, with HBRC playing a pivotal role. Despite the issues with information provision, there is a strong ongoing need for information provision. There are opportunities to improve how information priorities are developed and aligned with TA land-use planning activities
- Monitoring hazard trends is of high importance, but the methods used do not reflect the level of importance
- Long-term plans at the TA level do not reflect a strong direction on hazard management
- HPUDS has picked up on hazards as a key driver for future development, and this approach has elements of best practice.

Institutional Frameworks

Summary

RMA: National Policy Statement (NZCPS); RRMP/Proposed RCEP/District Plans; Resource consent processes

- The NZCPS is the only strong legislative driver for hazard management at the national level
- The RRMP:
 - Has few specific provisions to promote avoidance other than coastal erosion and inundation, and relies heavily on non-statutory mechanisms to achieve outcomes
 - Is focussed on information provision and flood management works and services
 - Places emphasis on production of natural hazard information, rather than implementation of hazard information into land-use planning
 - Other than coastal erosion and inundation, has a mitigation outcomes focus
- The RCEP:
 - Takes a regional rules-based approach to coastal erosion and inundation hazards, focuses on avoidance, and shifts towards soft solutions in the coastal environment in preference to hard solutions
- District Plans:
 - Recognise the importance of hazard management, and the importance of information provision, liaison between local authorities, public awareness and emergency management
 - Identify risk to life and the need for public awareness as key drivers for policies and objectives
 - Refer to the importance of linking with growth strategies
 - Collectively contain few specific hazard management rules
 - Are not consistent in their approach to hazard management
 - Focus primarily on river flood and coastal hazards
 - Are primarily mitigation-focussed for natural hazards, despite all recognising the importance of avoidance

- Contain extensive provisions for the management of hazardous substances, which are based on best practice guidance such as the Hazardous Facilities Screening Procedure
- Link to the hazard management provisions of the Building Act and related documents for management of earthquake and river flood hazards. For river flood hazards, DP's default to Building Code standards – prevention of inundation from 1-in-50 year event, with a freeboard of between 300mm-500mm
- Feedback from planners indicates that DP's are in various stages of review, and that in some cases, objectives policies and methods will need to be updated.

Hazard management guidelines¹⁹

- There has been limited usage of best practice guidelines for hazard management as a guide for land-use planning among local authorities²⁰
- Feedback from planners indicates some usage of hazard-specific best practice guidance when seeking policy changes, such as the GNS active fault guidelines.

Conclusions

The summary above suggests that:

- The framework for hazard management in New Zealand is clear, and there is no need to develop a new regional framework
- A national driver such as the NZCPS provides a strong foundation for regional and District policy development
- The RRMP could be improved to place more emphasis on avoidance in preference to mitigation, to provide guidance for significant hazards and focus on policy implementation as well as information provision. The RRMP as it stands does not provide strong guidance on best practice or a strong driver for hazard risk avoidance
- The RCEP and Wairoa Variation 1B approach aligns with best practice guidance for managing coastal erosion and inundation hazards
- DP provisions could benefit from a consistent regional approach to hazard management that picks up on best practice guidance
- There are opportunities to improve DP provisions as part of the ongoing review processes, and pick up on best practice guidance in land-use planning to a greater extent than policies and plans do at present.

¹⁹ Note that guidelines cover all key components of hazard risk management

²⁰ It is noted that other parts of Councils employ the use of guidelines as part of infrastructure and engineering works programmes.

Urban Design and Construction

Summary

Building Act: Building Code

- Use of the Building Act and code are critical tools for underpinning the DP's, and there is a heavy reliance on these tools
- The Building Act and Code specify some standards for hazards such as river flooding, but specifically exclude some hazards such as tsunami
- Standards contained within the Building Code are based on long-standing assumptions, such as the 1-in-50 year flood standard, which is based on the minimum statutory timeframe for the life of a building. Many buildings are expected to last for more than that timeframe
- There is an implied reliance within some DP's on these tools as mitigation mechanisms in preference to RMA mechanisms to avoid hazards.

Use of national standards and codes of practice.

- DP's reference the use of both standards and codes of practice as methods, and these are used widely within Councils, primarily to underpin the delivery of works and services

Structure plans

- While not specifically mentioned as methods within DP's, structure plans are used to mitigate the effects of hazards, such as at Mahia Beach (WDC) and Te Awa (NCC)

Works and engineering: river flood management

- River flood management activities form a major component of the mitigation of flood hazard risks within the region – from design, construction and maintenance of stopbanks and river management to ongoing maintenance and operation of flood pumps
- Best practice guidance related to climate change and flood management is utilised in flood profiling and design
- Flood warning and management plays an important role in helping to achieve protection of human life and safety
- Issues with flood management include level of certainty in mapping flood hazard areas, uncertainty around sediment transport and natural systems, protection of natural ponding areas for flood retention and management purposes, and dealing with residual risk from super-design events. There is little agreement on dealing with these issues collectively at present.

Conclusions

- The Building Act and related tools are critical to the successful delivery of hazard management outcomes
- There is potential for avoidance methods to be strengthened in support of Building Act/Building Code provisions
- There is an opportunity to improve the collective approach to river flood risk management.

Early Warning System

Summary

CDEM Act: Emergency preparedness and response

- RMA policies and plans have strong linkages to emergency management as a means of protecting human life and property
- Apart from the regional hazard risk assessment, there are few linkages between RMA policies and plans and emergency management

Conclusion

- There are potential opportunities to strengthen the linkages between RMA policies and plans and emergency management, at both the political and staff levels.

Education and Participation

Summary

Public advice and advocacy

- DP's place a strong reliance on improving levels of awareness via public education as part of achieving policy outcomes
- There are some direct linkages between RMA policies and plans and public awareness and education activities on site-specific hazards – predominantly coastal erosion and inundation, and some linkages as part of RMA policy and plan reviews
- There are few linkages between RMA policies and plans and broader public and awareness activities, which are generally in the emergency management programmes

Building Act: PIMS/LGOIMA: LIMS

- Feedback from planners indicates that LIMS and PIMS are widely used to identify known hazards, and are a useful tool for informing land and property owners
- It is unclear whether the information provided by LIMS and PIMS is comprehensive, provided at an appropriate scale or is an effective awareness-raising mechanism that influences land and property purchases.

Conclusions

- There are opportunities to improve public education and awareness given its stated level of importance within RMA plans, and improve linkages to existing emergency management programmes
- There are opportunities to improve understanding about the effectiveness of LIMS and PIMS.

Communicate and Consult

Summary

Liaison between local authorities/communication and liaison with communities

- Feedback from planners indicates that:
 - There is a good level of liaison between HBRC and TA's on hazard management – primarily related to information provision
 - There is little liaison between TA's
 - The planners forum is useful for information sharing
- There is significant communication and liaison between TA's and communities when dealing with site-specific hazard issues
- General communication with communities on hazard management is normally done as a part of DP reviews and variations.

Conclusion

- Maintaining and improving liaison between local authorities is critical to effective land-use planning, and there are opportunities to improve the interaction between TA's.

Monitor and Review

Summary

SOE reporting, DP review processes

- Feedback from planners suggests that TA monitoring methods are limited to SOE reporting, whether development meets the standards required by plans, DP review processes and levels of community concern.
- The primary monitoring methods used by HBRC are related to river flood hazard management, and satisfaction of key stakeholders with research

Conclusion

- There is a lack of ongoing evaluation of policy effectiveness.

Land-use planning best practice and current practice for significant hazards in Hawke's Bay

Table 3 provides a brief summary of best practice versus current practice. Best practice is based on the summary provided within the "Land-use planning and hazard management in New Zealand" section (pp. 14-20), while current practice is based on assessment of the policy and plan provisions, and interviews with planners.

Table 3: Land-use planning - best practice versus current practice in Hawke's Bay

Hazard	Best practice	Current practice	Comments
River flood	MFE guidance (climate change, flood guide/manual), AS/NZS 9401:2008. Key concepts include avoidance, risk-based approach, precautionary approach, catchment-based and adaptive management, understanding natural systems, considering all forms and levels of management, management of residual risk	Use of MFE guidance to inform flood management (HBRC), no avoidance focus in RRMP and mitigation focus in DP's, little consideration of whole of catchment management, natural systems and residual risks, default to minimum BA standard.	Most widespread and frequent hazard risk, elements of best practice adopted (guidance, HPUDS), significant opportunity for improvement exists
Coastal erosion /inundation	MFE guidance (climate change, coastal change), NZCPS. Key concepts include avoidance, precautionary approach, progressive risk reduction, preservation of coastal margins, preference for soft solutions.	Development of RCEP and Wairoa Variation 1B pick up on best practice guidance approaches.	Clear national direction, alignment of CHBDC, HDC and NCC plans should follow RCEP approach over time.
Earthquake	MFE active fault guidelines. Key concepts include identification of faults and issues with accuracy, avoidance, risk-based approach, consideration of building type, consent categories and implementation advice	Hazard identification complete for CHBDC and HDC, CHBDC has rule and DP maps, HDC advice provided outside DP as part of consent	Completion of information needed, opportunity for improvement exists
Tsunami	GNS tsunami guidelines: Key concepts include managing uncertainty, risk-based approach including quantifying consequences, selecting land use importance category and consent activity status. Pre-event recovery also recommended.	No inclusion of tsunami considerations in land use planning	Significant opportunity for improvement, and considerable uncertainty in implications.
Landslide	GNS landslide guidelines. Key concepts include identification of areas at risk and issues with accuracy, avoidance, risk-based approach, consideration of building type, consent categories and	Some hazard identification prior to development, no specific rules in DP's, existing information used to flag development proposals requiring further information	Some opportunity for improvement.

Hazard	Best practice	Current practice	Comments
	implementation advice		
Volcanic	Absence of formal guidance. Journal paper recommends avoidance of development in high risk areas, and pre-event land use recovery	No inclusion of volcanic ash fall considerations in land use planning	Limited opportunity for improvement.

Recommendations

The recommendations have two parts:

1. General recommendations for activities in support of land-use planning for hazard management, related to the summaries and conclusions in the previous section
2. Hazard-specific directions for improvements to land-use planning provisions, in light of the current approach of policies and plans within the Hawke's Bay region.

General Recommendations

Research and information²¹

It is recommended that:

- The 10-year research programme priorities are re-evaluated in terms of their alignment to TA hazard requirements and direct application to land-use planning. It is also recommended that the priorities be driven by local authority requirements rather than natural hazard science priorities, as this appears to be the current focus.
- The monitoring of hazard trends and the changing risks associated with them be afforded a high priority within the research and information programme. Without such a tool, it will not be possible to determine policy effectiveness over time.
- Hazard management be afforded a higher priority in TA LTP's, and that the management of hazards be linked to growth strategies whenever possible.

Policy and plans²²

It is recommended that:

- Both the RRMP and DP's incorporate best practice concepts for land-use planning as a part of their review processes, including a preference for avoidance, and where this is not achievable, appropriate standards for mitigation
- Local authorities encourage the development of national statutory guidance for significant hazards in order to provide greater management clarity at regional and District levels.

Other recommendations²³

It is recommended that local authorities:

²¹ Refer to "Risk Assessment" summary and conclusions in previous section.

²² Refer to "Institutional Frameworks" summary and conclusion in previous section.

²³ Refer to "Urban Design and Construction", "Early Warning System", "Education and Participation", "Communicate and Consult" and "Monitor and Review" summary and conclusions in previous section.

- Seek to improve collective management of river flood risks by developing a practical and manageable regional approach that picks up on best practice guidance
- Seek greater linkages between RMA policies and plans and emergency management activities by:
 - Harnessing the potential of the CDEM Group Joint Committee in hazard management
 - Seeking opportunities to improve the coordination of public education and awareness activities
- Continue to promote regular liaison between local authority planners, and initiatives to improve collective hazard management
- Develop and implement a policy effectiveness monitoring and evaluation programme (at both regional and district levels).

Hazard-specific recommendations

The following hazard-specific recommendations are made based on:

- Table 3 - the gaps identified between best practice and current practice, per the previous section
- Summaries and conclusions from the previous section
- General recommendations
- What is considered to be realistic and achievable for land-use planning and hazard management within the Hawke's Bay context, based on research and discussions with local authority planners in Hawke's Bay.

The recommendations in Table 4 are supported by reasons and key tools and mechanisms that are required in support of the recommendations.

Table 4: Hazard-specific recommendations on the approach to land-use planning

Hazard	Land-use planning recommendation	Reasons	Key risk reduction tools and mechanisms
River flood	<p>Move to a regional approach via the Regional Resource Management Plan (RRMP) to focus on whole of catchment management supported by District Plans (DP's), Building Act provisions and growth strategies such as the Heretaunga Plains Urban Development Strategy (HPUDS). Adopt an approach that:</p> <ul style="list-style-type: none"> • Connects to key best practice considerations (refer to Table 3) • Moves towards community-driven and owned standards, and away from a default 1-in-50 year plus freeboard standard as a starting point • Considers scale of development in context of the long-term catchment trends and ongoing need for works and services to support development (such as pumping stations) • Recognises the potential impacts of low probability, high consequence events, and considers response to these events • Recognises and plans for the long-term trends in climate change, and has mechanisms to adjust plan provisions accordingly 	<p>River flood hazards are the most widespread and frequent hazards within the region. There is ongoing development pressure within flood prone areas – especially on the Heretaunga Plains.</p> <p>There is a significant gap between best practice and current practice, with little apparent consideration of and connection to whole of catchment management.</p>	<ul style="list-style-type: none"> • RRMP and DP's: take a whole-of-catchment focus with preference for avoidance (management of water and land-use) • National standard: use of NZS 9401:2008 Managing Flood Risk – A Process Standard • Research: understanding natural systems, sediment transport and long-term catchment trends • Risk management: consideration of all forms of management, and explicit identification and management of residual risks.
Coastal erosion /inundation	<p>Regional approach is best approach. Continue with proposed Regional Coastal Environment Plan (RCEP) approach, and align DP's over time.</p>	<p>RCEP and Wairoa Variation 1B incorporate best practice approach, and NCC and HDC have existing coastal zones (similar mechanisms). Region is moving towards a consistent management approach.</p>	<ul style="list-style-type: none"> • District Plans: review, update and alignment of Napier City, Hastings District and Central Hawke's Bay District Plans to the RCEP over time • Research: alignment of methodologies and coastal hazard research programmes over time.

Hazard	Land-use planning recommendation	Reasons	Key risk reduction tools and mechanisms
Earthquake	<p>Assuming completion of active fault trace mapping, adopt an approach that:</p> <ul style="list-style-type: none"> • Incorporates fault traces within DP maps where politically possible, or within Council GIS databases and made available where not politically possible • Sets rules for setback distances from active faults where politically possible, or requires proof of consideration of active fault guidelines where not politically possible • Requires further site-specific information as part of consent process • Uses LIMS/PIMS to identify hazards. <p>A similar approach should be taken for liquefaction and ground shaking hazards where this information is known.</p>	<p>Opportunity exists for improvement. Simple “heads-up” mechanisms probably most appropriate, rather than region-wide policies and rules.</p> <p>Issues with existing development difficult to overcome, so focus should be on greenfields sites where there are good opportunities for avoidance.</p> <p>Despite the above approach, it is noted that changes to building standards for ground shaking and liquefaction are likely as a result of the Darfield and Christchurch earthquakes.</p>	<ul style="list-style-type: none"> • Building Act and Code: possible changes in building standards at the national level – ongoing attention should be paid to this • Active fault guidelines: broaden usage of these • Non-regulatory methods for large greenfields development: especially greater development rights for land retirement around active faults, reserves contributions and consideration of building type and usage.
Tsunami	<p>Assuming the availability of Level 3 inundation maps, adopt a focus on land use planning provisions that support minimising risk to human lives including:</p> <ul style="list-style-type: none"> • Rules restricting location of critical facilities²⁴ within areas identified as tsunami zones within DP’s – restriction of new development and retrofit of existing where practicable per the guidelines • Design, enhancement and protection of evacuation routes taken into account during new development or redesign – such as roading infrastructure in coastal areas • Consider setbacks and design of new coastal subdivisions to minimise focussing of tsunami impacts, improve road 	<p>Very difficult to economically mitigate the risk of tsunami for existing buildings. However, it is possible to do this in a greenfields situation, as simple design modifications up front can limit damage to buildings and risk to human life. Existing work on coastal erosion and inundation zones will assist in mitigating tsunami risk.</p> <p>There is political and financial risk for</p>	<ul style="list-style-type: none"> • RRMP: focus on avoidance for greenfields areas, and planning measures to protect human life • DP’s: development of rules to restrict critical facilities, protect evacuation routes, restrict intensification of development in high risk areas • Structure plans and growth

²⁴ Based on Land Use Importance Category (LUIC) 4 (buildings that are essential to post-disaster recovery or associated with hazardous facilities) and LUIC 5 (buildings whose failure poses catastrophic risk to a large area, such as large scale dams or hazardous facilities).

Hazard	Land-use planning recommendation	Reasons	Key risk reduction tools and mechanisms
	<p>layout to support evacuation and possibly increased building design standards (reinforcement of seaward walls, vertical evacuation)</p> <p>Development of regional principles makes sense, supported by implementation options at the District level.</p>	<p>Councils in implementing large scale retrospective standards for existing development.</p>	<p>strategies: take account of tsunami hazards</p> <ul style="list-style-type: none"> • Research: complete Level 3 inundation modelling • Emergency management: improve links to CDEM and focus on public education and awareness.
Landslide	<p>Focus on identification of potential areas at risk and identify these on DP maps. Provide simple rules requiring geotechnical investigation of instability as part of consent process</p>	<p>Not a widespread and significant hazard in high density population areas. Current heads-up approach requiring further investigation appears to be effective.</p>	<ul style="list-style-type: none"> • Building Act: continue to push requirements for mitigation • Structure plans: incorporate landslide hazards • Guidelines: broaden usage of these
Volcanic	<p>Little or no scope for inclusion. One possible inclusion could be for protection of public water supply facilities.</p>	<p>Distance from volcanoes, lack of predictability in ash fall, lack of guidance and lack of implementation of land-use rules in other areas more vulnerable are key issues to consider for Hawke's Bay. 1-in-50 year event from Tongariro volcanic centre (most likely source) produced 1-2mm ash fall within the region, with minimal consequences.</p>	<ul style="list-style-type: none"> • Research: keep up to date with new research and modelling of ash fall scenarios
Hazardous substances	<p>Continue with current approach in DP's. There may be some opportunity to tighten rules within known hazard zones over time as these become available (such as tsunami inundation for coastal area industries).</p>	<p>The current approach appears to be comprehensive and based on best practice guidance.</p>	<ul style="list-style-type: none"> • Guidelines: continued use of MFE guidelines

References

Becker, J., Saunders, W.S.A., Leonard, G.S., Robertson, C.M., Johnston, D.M. (2010): "A synthesis of challenges and opportunities for reducing risk through land use planning in New Zealand". The Australian Journal of Disaster and Trauma Studies,

Becker, J., W. S. A. Saunders, et al. (2008). "Pre-event recovery planning for land use in New Zealand: an updated methodology". Lower Hutt, GNS Science: 38.

Department of Conservation (2010): "New Zealand Coastal Policy Statement". New Zealand Department of Conservation, Wellington.

Glavovic, B.C., Saunders, W.S.A., Becker, J.S. (2010): "Land-use planning for natural hazards in New Zealand: the setting, barriers, 'burning issues' and priority actions". *Natural Hazards* 54:679-706.

Hawke's Bay Civil Defence Emergency Management Group (2005): "Hawke's Bay Civil Defence Emergency Management Group Plan March 2005 – 30 June 2010, Amended 3 May 2010". Napier.

Hawke's Bay Regional Council (2010): "Hawke's Bay Hazard Research Survey". Survey of planners and hazard professionals within Hawke's Bay region. HBRC, Napier.

ISDR (2004). "Living with risk: a global review of disaster reduction initiatives". United Nations International Strategy for Disaster Reduction.

Johnston, D.M., Becker, J., Smith, W.D. (2001): "A review of natural hazard probability in the Hawke's bay and Gisborne regions." (Vol. 2001/04) GNS Science, Lower Hutt.

Kerr, J., Nathan, S., Van Dissen, R., Webb, P., Brunnsden, D., King, A. (2003). "Planning for development of land on or close to active faults". Ministry for the Environment, Wellington.

Leonard, G., Johnston, D. M., Paton, D., Christianson, A., Becker, J. & Keys, H. (2008): "Developing effective warning systems: ongoing research at Ruapehu volcano, New Zealand". *Journal of Volcanology and Geothermal Research*, 172, 199-215.

Ministry for the Environment (2010): "Preparing for future flooding: A guide for local government in New Zealand". Ministry for the Environment, Wellington.

Ministry for the Environment (2010): "Tools for estimating the effects of climate change on flood flow: A guidance manual for local government in New Zealand". Woods R., Mullan A.B., Smart G., Rouse H., Hollis M., McKerchar A., Ibbitt R., Dean S., and Collins D. (NIWA). Prepared for Ministry for the Environment.

Ministry for the Environment (2008): "Climate Change and Long-term Council Community Planning". Ministry for the Environment, Wellington.

Ministry for the Environment (2008): "*Climate Change Adaptation and Second Generation RMA Plans*". Ministry for the Environment, Wellington.

Ministry for the Environment (2008): "*Preparing for climate change: A guide for local government in New Zealand*". Ministry for the Environment, Wellington.

Ministry for the Environment (2002): "*Land Use Planning Guide for Hazardous Facilities A resource for local authorities and hazardous facility operators A report prepared by the Hazardous Facilities Screening Procedure Review Group in conjunction with the Ministry for the Environment*". Ministry for the Environment, Wellington.

Saunders, W.S.A. (in prep): "*Innovative land use planning for natural hazard risk reduction*". Thesis for fulfilment of the requirements for PhD in Planning, Massey University, Palmerston North.

Saunders, W.S.A., Prasetya, G., Leonard, G.S. (2011): "*New Zealand's Next Top Model: Integrating tsunami inundation modelling into land use planning*". Institute of Geological and Nuclear Sciences Limited, Lower Hutt.

Saunders, W.S.A.: (2010) "*Sustainable urban design for natural hazard risk reduction*". 11 p. (stream 2C) IN: SB10, innovation and transformation : New Zealand Sustainable Building Conference, 26-28 May 2010, Te Papa, Wellington, New Zealand : conference proceedings. Wellington: SB10

Saunders, W., Becker, J., Glassey, P. (2008): "*Active fault and landslide guidelines for planners*". Paper prepared for 2008 Eastern Regional Organisation for Planning and Housing Conference, Japan.

Saunders, W., Glassey, P. (compilers) (2007): "*Guidelines for assessing planning policy and consent requirements for landslide prone land*". GNS Science Miscellaneous Series 7, Lower Hutt.

Standards Australia/New Zealand (2009). AS/NZS ISO 31000: "*Risk management - principles and guidelines*". Sydney and Wellington, Standards Australia/New Zealand.

Tonkin & Taylor (2006): "*Natural hazard management research report*". Wellington, Tonkin & Taylor Ltd. Available online at <http://www.qualityplanning.org.nz/qp-research/natural-hazards-aug06/html/index.php>

Wright, K.C., Berryman, K. R., King, A.B., Dellow, G. D., Ramsay, D., Bell, R.G., Reese, R. (2008): "*Update of the Hawke's Bay Regional Council 10-year Hazards Research Plan*". GNS Science Consultancy Report 2008/304 23p.

Wright, K.C., Johnston, D.M., Dellow, G. D. (2010): "*Hazard risk in the Hawke's Bay; an update of the 2001 assessment*". GNS Science Report 2010/06 46p.

Appendix 1: Regional policy and plan provisions for natural hazard management

Regional Resource Management Plan 2006 (RRMP)

Issue (3.12.1): The susceptibility of the region to flooding, droughts, earthquakes, volcanic ash falls, and tsunamis, and the potential impact of these on people's safety, property, and economic livelihood.

Objective (OBJ 31): The avoidance or mitigation of the adverse effects of natural hazards on people's safety, property, and economic livelihood.

Hazards identified within the plan include:

- River flooding
- Droughts
- Earthquakes
- Volcanic ash
- Tsunami

Policies (POL 55) Role of non-regulatory methods (3.12.10): To use non-regulatory methods set out in Chapter 4, as the principal means of addressing hazard avoidance and mitigation, in particular:

- a. Liaison with territorial authorities¹² - To provide information on natural hazard risk to territorial authorities, and advocate that future development is managed in such a way that the risk of exposure to natural hazards is avoided, remedied or mitigated.
- b. Works and services - To provide hazard mitigation measures, in particular flood mitigation measures, where the benefits can be shown to outweigh the costs and the identified beneficiaries can meet the costs.
- c. Natural hazard priorities - To focus both hazard avoidance and mitigation on areas of high human population density as a first priority.

Anticipated environmental results:

Anticipated Environmental Result	Indicator	Data Source
Natural hazard mitigation measures in place to minimise the risk to human safety and the environment from natural hazards	Loss of life and property in a natural hazard event	Emergency services records

In addition to the non-regulatory methods identified above, the HBRC also uses research and investigation and monitoring (particularly related to river flood hazards), outlined within sub-Chapters 4.6 and 4.7.6 (“Other Monitoring”) respectively.

The roles of local authorities in hazard management is clarified within Chapter 8 as follows:

8.4.4.5 Natural hazards

8.4.4.5.1²⁵ Both the HBRC and the territorial authorities within the Hawke's Bay region will be responsible for developing objectives and policies for controlling managing the use of land for the purpose of avoiding and mitigating natural hazards. However, the territorial authorities will be responsible for developing methods controlling the use of land for the purposes of avoiding or mitigating natural hazards, except in relation to coastal hazards. In relation to coastal hazards, both the HBRC and territorial authorities may be responsible for developing methods controlling the use of land for the purpose of the avoidance or mitigation of coastal hazards.

8.4.4.5.2 To support the territorial authorities in developing and implementing their plan provisions in relation to natural hazards, the HBRC will be the key information provider. The HBRC will provide relevant, up to date and accurate data in an appropriate form for the territorial authorities to use. The HBRC will also use this information itself for natural hazard management and planning purposes, and for Civil Defence management in accordance with the Civil Defence Act 1983.

8.4.4.5.3 The information and assistance to be provided by the HBRC will include the following, as it becomes available:

- a) Identification and distribution of information on those parts of the region at risk from flooding, earthquakes, tsunami, and volcanic eruptions. At the time of writing this Plan, this work had largely been completed. The main remaining tasks were the identification of flood hazard areas throughout the Heretaunga Plains and investigations into the flood risk to Wairoa township from movement of the Wairoa River mouth.
- b) Ongoing provision of expertise and assistance to the regional engineering lifelines project through assistance to the Lifelines Steering Committee.
- c) Ongoing maintenance and improvement of flood forecasting and assessment data, together with the provision of models of flood and storm events for emergency management purposes.
- d) An ongoing commitment to a programme of work for identifying flood hazard areas throughout the Heretaunga Plains, and
- e) Maintenance of the regional civil defence and emergency management capability, and a sharing of related information and expertise with the territorial authorities.

²⁵ Proposed changes to RRMP as amended by Council decisions issued 19 July 2008 are underlined.

Proposed Regional Coastal Environment Plan (RCEP)

Objectives

- **Obj 15-1:** Risks posed by coastal hazards to people and property are avoided or mitigated.
- **Obj 15-1A:** The avoidance of new and further development in areas identified as being currently at risk of coastal erosion or inundation (ie: those areas within Coastal Hazard Zone 1).
- **Obj 15-2:** The avoidance of new and further inappropriate development in areas identified as being at risk of coastal erosion or inundation during the next 100 years (ie: those areas within Coastal Hazard Zone 2 or Coastal Hazard Zone 3), taking into account the risk associated with global sea level rise and the level of any protection afforded by natural coastal features and lawfully established coastal protection structures.

Policies

Policy 15-1 To manage coastal erosion and inundation risks in accordance with the environmental guidelines set out in Table 9. Table 9 contains detailed guidelines on each of the following issues:

- Proactive management approach
- Identification of coastal hazard areas
- Use of the precautionary approach
- Use of up-to-date information
- Regular review of coastal hazard zones
- Protection and enhancement of natural foreshore features
- Existing subdivision, use and development
- New use and development
- New subdivision and district plan rezoning
- Deposition and removal of sediment (and other earthworks)
- Hazard mitigation works
- Coastal protection structures
- Network utility operations
- Temporary activities
- Decision making

Policy 15-2 To implement the environmental guidelines for coastal hazards set out in Policy 15-1 predominantly in the following manner:

- a) Resource consents - The environmental guidelines will be used in the process of making decisions on resource consents, in accordance with the RMA.

- b) Regional rules - The environmental guidelines have been incorporated into rules, (including conditions, standards and terms) set out in Part E of this Plan and provide a basis for the level of regulation used.
- c) Non-regulatory methods - The environmental guidelines for coastal hazards may also be implemented through non-regulatory methods where appropriate, including the provision of information, advocacy on district plans and resource consent applications (including joint hearing proceedings), environmental monitoring and reporting, financial incentives, and liaison/consultation with territorial authorities.

Anticipated environmental results

Anticipated Environmental Result	Indicator	Data Source
Avoidance and mitigation of the risk to property and other values from the effects of natural coastal hazards, in particular storm erosion and storm surge inundation.	Position of shoreline and upper beach crest Volumetric change in beach profile	HBRC Coastal Profile Monitoring Compliance monitoring Incident reports
Coastal protection structures are only constructed where such structures will not exacerbate the coastal hazard and where potential adverse effects on public and private land, amenity values, ecosystems and natural coastal processes can be avoided, remedied or mitigated.	Position of shoreline and upper beach crest Volumetric change in beach profile Number of incident reports / complaints received Physical and biological parameters	HBRC Coastal Profile Monitoring Compliance monitoring Incident reports

Appendix 2: District Plan provisions for natural hazard management

	Central Hawke's Bay District Council	Hastings District Council	Napier City Council	Wairoa District Council
Hazards identified within the District Plan	Most at risk from earthquakes or flooding. Other natural hazards include erosion, volcanic and geothermal activity, landslip, subsidence, sedimentation, wind, drought and fire. There is also a potential for erosion and/or inundation from high seas or from a tsunami along the coast.	In the District there is an identified risk from flooding, coastal erosion, seismic activities, land instability, climatic conditions, volcanic fallout and fire.	The natural hazard types that have been identified within the City include coastal, earthquake, river flood and slippage/hill erosion.	River flooding, land instability, seismic hazards, volcanic hazards, sea level rise, storm surges and coastal erosion and inundation have been identified as potential natural hazards within the Wairoa District.
Issues	<ul style="list-style-type: none"> Threat to People and Property <p>Natural hazards, particularly flooding and earthquakes, are a potential threat to people and property within the District.</p>	<ul style="list-style-type: none"> Parts of the Hastings District are susceptible to the effects of natural hazards. Certain Land Use Activities can avoid or mitigate the effects of Natural Hazards. Land Use Activities have a potential to increase the risk from Natural Hazards. Future land use development options may need to consider the existence of natural hazards. 	62.2.1 Land uses can increase the potential risk from natural hazards. Some land uses can exacerbate hazards and this is particularly evident for erosion prone land. The effects of the hazards could significantly increase following additional land use and/or development of the land. It is important that the Council identify the types of land use that could lead to an increase in the risk from natural hazards and control those land uses accordingly.	8.3 Resource Management Issues <p>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.</p> <p>8.3.2 Inadequate community awareness of potential risks – particularly</p>

	Central Hawke's Bay District Council	Hastings District Council	Napier City Council	Wairoa District Council
			<p>62.2.2 Land uses are already established in areas at risk from natural hazards.</p> <p>The Council may be able to avoid the effects of hazards where development has not already occurred. However there are instances where the potential risks from natural hazards are likely to have impacts on existing development. The liquefaction areas that affect substantial areas of residential Napier most easily illustrate this scenario.</p>	<p>risks of flooding, landslide, sea inundation and liquefaction.</p> <p>8.3.3 Increased potential for land instability from earthworks and land disturbance activities.</p>
Objectives	<p>Avoid loss of life, and minimise damage to assets or infrastructure, or disruption to the community of the District, from natural hazards.</p>	<p>NHO1 To identify and minimise the effects of natural hazards on the community and natural and physical resources.</p> <p>NHO2 To ensure that land use activities avoid or mitigate adverse effects arising from natural hazards.</p>	<p>Objective 62.3 To manage the effects of natural hazards on land uses throughout the City. This objective relates to Issues 62.2.1 and 62.2.2.</p> <p>Objective 62.4 To control the effects of land uses and development on areas subject to natural hazards throughout the City. This objective relates to Issues 62.2.1 and 62.2.2.</p>	<p>8.4.1 To minimise the vulnerability of the community to the effects of natural hazards on people, property, and community services and infrastructure.</p> <p>8.4.2 To adequately inform the community of potential risks.</p> <p>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</p>

	Central Hawke's Bay District Council	Hastings District Council	Napier City Council	Wairoa District Council
				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.
Policies	<p>1. To advise and inform the community of the potential risk of natural hazards.</p> <p>2. To monitor in association with the Regional Council the degree to which the long term trends in land use practices and patterns, and natural processes that may increase the vulnerability of communities to natural hazards.</p> <p>3. To ensure buildings are constructed appropriately to avoid or mitigate the risks associated with flooding, earthquake and fire, and hazards at the</p>	<p>NHP1 Control land use activities in identified natural hazard areas where communities and resources are at risk.</p> <p>This is done via Resource Management Units (RMU) for river flooding, earthquake, volcanic activity, coastal, fire and land instability</p> <p>NHP2 Develop a database that identifies areas at risk from natural hazards and the level of the risk in the Hastings District.</p> <p>NHP3 Ensure that activities intended for human habitation in an identified hazard RMU, either avoid the hazard, or are undertaken in a manner that ensures that the effects of the hazard on the activity are mitigated.</p>	<p>Policies relating to Objective 62.3 In order to achieve this objective, the Council will:</p> <p>62.3.1 Identify the natural hazards that may have a potential impact on the City.</p> <p>62.3.2 Collect and collate information on natural hazards that have the potential to impact upon the natural and physical resources of the City and make such information publicly available.</p> <p>62.3.3 Monitor the effects of the natural hazards on the City's environment.</p> <p>62.3.4 Control the subdivision, use and development of land to ensure that risks to the community are avoided,</p>	<p>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.</p> <p>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.</p> <p>8.5.3 Ensure that all activities requiring the approval of the Council, including building consent,</p>

	Central Hawke's Bay District Council	Hastings District Council	Napier City Council	Wairoa District Council
	<p>coast.</p> <p>4. To ensure that through the consent process any proposed developments have an adequate assessment completed to identify any natural hazards and the methods used to avoid or mitigate a hazard risk.</p> <p>5. To require the Council's consent for subdivision within any area identified in the Plan as being at risk from a natural hazard including the coast and to require a land use consent for buildings located near faultlines identified in the Plan, so as to minimise the likelihood of damage to future assets.</p> <p>6. To permit coastal protection works in areas threatened by coastal hazards, only where they are the best practicable option for the future and avoid adverse</p>	<p>NHP4 Allow Public Bodies exercising their statutory powers to carry out natural hazard mitigation works.</p> <p>•NHP5 Ensure that land use activities do not exacerbate the adverse effects of natural hazards.</p> <p>NHP6 Monitor the occurrence and effects of natural hazards on the natural and physical environment, to ensure that the Hastings District Plan adequately addresses natural hazards that are likely to occur in the District.</p> <p>NHP7 Provide and build upon an information database to encourage more informed decision making in terms of natural hazards.</p> <p>NHP8 When hazard mitigation techniques are undertaken that reduce the risks of natural hazards the provisions of the Hastings District Plan should reflect this.</p>	<p>remedied, or mitigated.</p> <p>62.3.5 Ensure that practical protection methods are considered.</p> <p>Policies relating to Objective 62.4 In order to achieve this objective, the Council will:</p> <p>62.4.1 Direct development away from areas known to be subject to natural hazards.</p> <p>62.4.2 Control existing development in areas subject to natural hazards.</p> <p>62.4.3 Monitor the state of the natural hazard.</p>	<p>are undertaken having regard to, and are in accordance with, the provisions of the District Plan.</p> <p>8.5.4 Ensure that the adverse effects of earthworks and land disturbance activities are avoided, remedied or mitigated.</p> <p>8.5.5 To recognise the limits of attempts to control natural processes by physical work.</p>

	Central Hawke's Bay District Council	Hastings District Council	Napier City Council	Wairoa District Council
	environmental effects as far as practicable.			
Implementation methods	<p>To achieve policies 1 - 5 through:</p> <ol style="list-style-type: none"> 1. the provision of rules on subdivision to control development on or near faultlines and in areas at risk from flooding, coastal erosion, and inundation from the sea; 2. advising and informing the community of potential natural hazards and how to be prepared for civil defence emergencies; and in conjunction with the Hawke's Bay Regional Council, ensuring that emergency response procedures are in place to mitigate the effects of a natural hazard; 3. collecting information 	<p>These Objectives and Policies will be implemented through the following Methods:</p> <p>Hastings District Plan <u>Natural Hazard Resource Management Units</u>: All Natural Hazards RMUs (apart from the Fire Hazard RMU; See Policy NHP1) will be identified on the Planning Maps according to the natural hazard event identified in a particular area. The Natural Hazard Resource Management Units, will introduce rules to address the effects of land use activities on natural hazards.</p> <p><u>Rural Zone (Section 5.0)</u>: Contains Rules relating to the Fire Hazard RMU to control land use activities in identified Fire Hazard areas where communities and resources are at risk.</p> <p>Building Act 1991 The administration of the Building Act in</p>	<p>Implementation methods relating to Objective 62.4</p> <ol style="list-style-type: none"> (1) District Plan Rules. (2) Establishment of a Hazard Register and provision of known hazard risk information collected and collated by the Council in all LIM's and PIM's. (3) Identification of known hazards on the Council's GIS database. (4) Physical works such as the beach renourishment scheme, or the provision of pumps to mitigate floodwaters. <p>Implementation methods relating to Objective 62.4</p> <ol style="list-style-type: none"> (1) District Plan Rules. (2) Local Authority and Regional Level 	<p>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.</p> <p>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.</p> <p>8.6.3 Create and maintain databases on hazard events to better understand actual risks to communities and the environment.</p> <p>8.6.4 Identify areas</p>

	Central Hawke's Bay District Council	Hastings District Council	Napier City Council	Wairoa District Council
	<p>during the resource or building consent process, and any other information obtained through research, is included on the Council's natural hazards register;</p> <p>4. liaising with the Hawke's Bay Regional Council so that a co-ordinated monitoring approach measures long term trends in land use practices and patterns and how this may increase the vulnerability of communities to natural hazards such as flooding, coastal erosion and inundation from the sea, fire, tsunami, and earthquakes; and,</p> <p>5. ensuring Council staff take adequate consideration of appropriate earthquake and fire hazard standards during the building</p>	<p>the Hastings District will take into account (but not be limited to), the natural hazard RMUs identified in the District Plan. This will mean that the Hastings District Council may refuse to grant a building consent involving construction of a building or major alterations to a building if:</p> <p>(a) The land on which the building work is to take place is subject to, or is likely to be subject to erosion, avulsion, alluvion, falling debris, subsidence, inundation or slippage, or</p> <p>(b) The building work itself is likely to accelerate, worsen, or result in; erosion, avulsion, alluvion, falling debris, subsidence, inundation or slippage of that land or any other property.</p> <p>Subdivision Consents Subdivision consent may be refused Under Section 106 of the Resource Management Act 1991, where land is subject to a natural hazard (erosion, falling debris, subsidence, slippage, or inundation). Refer to Section 15.1 on Subdivision and Land Development.</p> <p>Engineering Code of Practice for Subdivision and Land Development</p>	<p>State of the Environment Reporting.</p> <p>(3) Urban Growth Strategies which direct the future growth of the City.</p> <p>(4) Powers and responsibilities under other legislation, eg: Building Act 1991.</p>	<p>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).</p> <p>8.6.5 Set rules which avoid or control the adverse effects of earthworks and land disturbance activities.</p> <p>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.</p> <p>8.6.7 Prepare a Civil Defence Plan under the Civil Defence Act.</p>

	Central Hawke's Bay District Council	Hastings District Council	Napier City Council	Wairoa District Council
	consent process.	<p>(November 1997) To ensure that subdivisions and developments recognise and avoid, remedy or mitigate potential effects from natural hazards.</p> <p>Hastings District Council Consolidated Bylaws 1995 Part 14: Public Places: "Beaches" - includes the ability for the Hastings District Council by resolution, to define such areas prohibited to vehicles unless required for access to a property.</p> <p>Land Information Memorandum/Project Information Memorandum Within an identified natural hazard zone, LIMs and PIMs that are issued, will indicate that the area is a known natural hazard area, and that the property owner should take this into account when considering future development on the site. In addition, LIMs and PIMs that are issued to those sites located within a High to Very High Liquefaction</p>		<p>8.6.8 Participate in an "Emergency Management Group".</p> <p>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.</p> <p>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.</p>

	Central Hawke's Bay District Council	Hastings District Council	Napier City Council	Wairoa District Council
		<p>Susceptibility area, as shown in Appendix 12.3-1, or areas with a rating of 3 or 4 for Ground Shaking Potential, as shown in Appendix 12.3-2, will indicate that the site is located within an identified seismic area, and that site-specific investigations should be conducted to determine actual soil properties for liquefaction susceptibility and ground shaking potential, where protection greater than that provided under the New Zealand Building Code is desired.</p> <p>Hawke's Bay Regional Policy Statement and Plans</p> <p>Information and Monitoring Exchange To occur between the Hawke's Bay Regional Council and other experts in Natural Hazard planning.</p> <p>Information Gathering from relevant sources Establishment of a Natural Hazard Database on Council's GIS system. Natural Hazards Historical Database-information concerning past natural hazard events, including: photographic records, data descriptions.</p>		

	Central Hawke's Bay District Council	Hastings District Council	Napier City Council	Wairoa District Council
		<p>Guidelines Guidelines that are relevant to address the effects of natural hazards will be referred to applicants. For example, on landscaping techniques and non flammable vegetation planting (including trees), in locations that are prone to fire hazard to ensure "defensible spaces" are created between forestry and residential units.</p> <p>Performance Standards The adoption of Performance Standards for the Hastings District Council's Natural Hazard mitigation works and the progressive upgrading and maintenance of these works to achieve these Standards. For example; The Hastings Target Stormwater Performance Standard.</p> <p>Civil Defence Act 1983</p> <p>Local Government Act 1974</p> <p>Forest and Rural Fires Act 1977</p>		
Explanation and	To minimise loss of life, damage to assets and	NHP1: Areas where it is considered that there is a high degree of risk from	Objectives and policies explanation and reasons relating to Objective	8.7.1 Council is obliged to control any actual or

	Central Hawke's Bay District Council	Hastings District Council	Napier City Council	Wairoa District Council
reasons	<p>disruption to the community, on-going research will be required to identify the extent and frequency of natural hazards and methods to mitigate risk 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. A natural hazards register is continually updated informing the community of the known hazard potentials of a given area. This is used both in the consent processes under the Resource Management Act 1991 and the Building Act 1991.</p> <p>A co-ordinated approach with the Regional Council is needed to monitor how the long term trends in land use practices and</p>	<p>natural hazards have controls to ensure that the effects of natural hazards are avoided or mitigated. These areas will be identified in accordance with the type of natural hazard and the degree of risk to people and communities. The controls will determine which activities are appropriate in these areas. Where activities are provided for, standards may apply to ensure that activities and their effects avoid, remedy or mitigate the risk of the natural hazard.</p> <p>The following hazards are identified as being significant issues in Hastings District: flooding, earthquake, volcanic activity, adverse climatic events, erosion and fire. These hazards will be addressed in separate sub-sections of the District Plan as Resource Management Unit's (RMUs) addressing the natural hazard issue according to the nature of the hazard.</p> <p>NHP2: The recognition and identification of the effects of natural hazards will help to ensure that decisions concerning present and future activities are made with knowledge of the risks of natural hazards and take account of these. An</p>	<p>62.3</p> <p>Principal Reasons for Adopting Objective and Policies</p> <p>Before the Council can establish a successful management regime for the natural hazards within its area the primary responsibility is to accurately identify the hazards that potentially put the community at risk and to assess the possible impact of the hazards. The task of gathering data on the hazards that affect Napier City has been on-going. It is an area where further information is being added following events that occur throughout New Zealand and when further research is undertaken.</p> <p>Some of the identified hazards could have an impact on the built environment. Where development has not occurred the Council can ensure that it will not occur in areas at high risk from natural hazards. Where development is in existence, a managed approach to development is necessary, so that the level of risk is not increased.</p>	<p>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 floodprone areas, and inappropriate earthworks and vegetation clearance. Other hazards include coastal hazards, seismic activity and potential effects from volcanic activity.</p> <p>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</p>

	Central Hawke's Bay District Council	Hastings District Council	Napier City Council	Wairoa District Council
	<p>patterns may increase the vulnerability of communities to natural hazards. Emergency response plans need to be refined to help the community in times of a disaster.</p> <p>The Plan does not control building construction in areas vulnerable to flooding, erosion, earthquakes and fire unless the building is located over a faultline. The Building Act 1991 addresses such matters. However, subdivision is controlled by the Plan generally and conditions may be imposed on a subdivision consent to avoid, remedy or mitigate any potential adverse effects from known natural hazards.</p>	<p>integrated approach to natural hazard identification will help the District Council and Regional Council and other organisations with expertise in this field, to recognise the effects of natural hazards. Information provision will be used as a non regulatory method to promote public awareness of natural hazards.</p> <p>NHP3: Some activities located in areas subject to natural hazard events can be managed to avoid adverse environmental effects. However in certain areas the effects caused by the natural hazards mean that it is unsuitable for people to live permanently in these areas. Where the District Plan allows for subdivision, use or development that results in human occupation or activity in hazard areas, the District Plan will seek to minimise the risk of loss and injury to human life.</p> <p>NHP4: The Hastings District Council, Hawke's Bay Regional Council, and other public bodies have, a statutory obligation as part of their functions and powers to carry out mitigation work for some hazards. The District Plan enables</p>	<p>The Council will give consideration to the appropriate means to avoid, remedy or mitigate the effects from the natural hazards, In some instances physical works may not be a practical option because of the cost, long term viability or the low probability of the hazard occurring.</p> <p>Objectives and policies explanation and reasons relating to Objective 62.4</p> <p>Principal Reasons for Adopting Objective and Policies</p> <p>It is not only the natural hazards that have effects but consideration also needs to be given to the effects that land uses can have on the hazards themselves and any increasing risk to the environment that may result.</p> <p>The risk to life and property from some natural hazards can be avoided .It is the Council's intention to do this where possible. In such cases the Council can direct development away from the hazard areas.</p>	<p>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.</p> <p>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.</p> <p>8.7.4 The Hawke's Bay Regional Council has identified flood risk around Wairoa township and</p>

	Central Hawke's Bay District Council	Hastings District Council	Napier City Council	Wairoa District Council
		<p>these Authorities to carry out these functions where they follow the provisions of the relevant statute and they have expertise in this field.</p> <p>NHP5: The District Plan recognises that certain land use activities can take place in areas subject to natural hazards. Some land use activities may worsen or create further adverse effects than those expected from the natural hazard. The community and environment should not be placed at greater risk from a natural hazard event by the effects of a land use activity.</p> <p>NHP6: The occurrence and effects of natural hazards are currently being studied, however the community's knowledge is incomplete due to the relatively short period of time over which records have been available, the infrequency of natural hazards occurring and the complexity of predicting effects. As the knowledge base improves, the District Plan will need to reflect this greater understanding of natural hazards. Monitoring will therefore take place to examine the continuing need for natural hazard regulations.</p>	<p>Where the scale of the hazard is relatively small, such as for areas prone to slips, this may be achieved. However where the magnitude/extent of the hazard is largely unknown, such as earthquakes, this is not practicable and it must be recognised that land uses will not affect or worsen these hazards. Building Code requirements can mitigate some of the effects of such hazards.</p> <p>Implementation methods explanation and reasons relating to Objective 62.3</p> <p>Reasons for Methods</p> <p>The principal aim of the Council with regard to natural hazards is to ensure that potentially affected landowners are aware of the actual or potential hazard and that any risk is avoided remedied or mitigated.</p> <p>The Council is therefore in the process of identifying known potential risks and ensuring that they are included on the GIS system. A hazard register is being compiled that identifies sites where the potential for a hazard is greater. When</p>	<p>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.</p> <p>8.7.5 Council involvement in emergency preparedness and emergency response programmes is also critical to minimising the effects of natural hazards.</p>

	Central Hawke's Bay District Council	Hastings District Council	Napier City Council	Wairoa District Council
		<p>NHP7: Natural hazards have a tendency to occur infrequently, therefore the number of people who can provide information from a first hand experience of a natural hazard occurrence is small. Information provision can provide a better understanding of the potential threats from natural hazards. It is anticipated that more informed decision making will occur if information is provided. The information database, in order to be effective and useful, will need to be updated over time, be easily accessible and simple to use.</p> <p>NHP8: Natural hazard mitigation measures, for example the building or improvements of river stopbanks to address flooding, are proposed to be undertaken in the life of the District Plan. This may reduce the area of land that may be potentially at risk from flooding. In order to ensure that only those regulations that are absolutely necessary are imposed, the District Plan recognises that these mitigation measures are taking place and that regulations to protect natural hazard prone areas may become obsolete.</p>	<p>applications, LIMs or PIMs are lodged, this information can be brought to the attention of owners or potential owners. In order to avoid, remedy or mitigate effects of known hazards, the Council has developed rules. In some instances physical works may be undertaken.</p> <p>Implementation methods explanation and reasons relating to Objective 62.4</p> <p>Reasons for Methods</p> <p>Monitoring the effects of land uses on the hazard is particularly important and this can influence whether rules need to be applied. Rather than imposing rules it is preferable to avoid the hazards in the first instance and the Urban Growth Strategy has taken all of the known hazards into account in the process of directing future growth. Where land uses are already in existence rules are necessary to safeguard the land use and also to reduce the level of effect on the hazard itself.</p>	

	Central Hawke's Bay District Council	Hastings District Council	Napier City Council	Wairoa District Council
		Further knowledge of natural hazards may be obtained, requiring the modification of existing rules or the formulation of new rules.		
Environmental results anticipated	<p>The collation and provision of clear information outlining the natural hazards risks to all sites with potential to be adversely affected by natural hazard occurrences in the District.</p> <p>The implementation of emergency response procedures, in conjunction with the Regional Council, whenever there is a significant risk to people and property from natural hazards in the District.</p> <p>The location of new subdivision and subsequent development away from areas at high risk from natural hazards, including hazards at the coast.</p>	<p>It is anticipated that the following specific outcomes will be achieved:</p> <p>Avoidance or mitigation or minimisation of the potential effects of natural hazards on land uses.</p> <p>Promotion of public awareness of the risk from natural hazards.</p> <p>Reduction of risks to people and the community from natural hazards.</p>	<p>(1) An environment where the risk to life and property from natural hazards is reduced.</p> <p>(2) A community which is better informed / prepared for natural hazards.</p>	<p>8.8.1 Avoidance or mitigation of potential effects from natural hazard events on people, property and the environment.</p> <p>8.8.2 Increased public awareness of risks from natural hazard events.</p> <p>8.8.3 Greater awareness of areas prone to natural hazards.</p> <p>8.8.4 Greater awareness of the effects of land management practices and activities on the severity of natural hazards.</p> <p>8.8.5 Inappropriate development is avoided in areas vulnerable to natural hazard events.</p> <p>8.8.6 Increased awareness</p>

	Central Hawke's Bay District Council	Hastings District Council	Napier City Council	Wairoa District Council
	<ul style="list-style-type: none"> • Adverse effects on communities are minimised and loss of life avoided for any natural hazard event. • New coastal hazard protection works are only built if they are the best practicable option providing adverse effects are avoided. • The protection or management of dunes or other natural features as a means of avoiding or mitigating the risk of coastal erosion or inundation from the sea. 			<p>of sustainable land management practices.</p> <p>8.8.7 Inappropriate earthworks and land disturbance activities are avoided in areas susceptible to erosion.</p>