

Planning for Natural Hazard Risk in the Built Environment



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Preface

The Centre for Advanced Engineering seeks to play a role in catalysing discussion around issues of importance to New Zealand. Its position of independence provides it with an opportunity to take a detached and perhaps wider view of issues. It does so with the intent of adding value through working with others.

This report presents an assessment of the many inputs CAE received from sponsors and contributors to its study on *Planning for Natural Hazard Risk in the Built Environment*. Contributions came from a wide cross-section of the natural hazard and planning fraternity and we acknowledge the significant effort made by many in preparing and reviewing material. However, the views expressed in this document are those of CAE and do not necessarily reflect those of the contributors.

An earlier working draft that formed the basis of this report and all contributed comments are held in CAE files and will serve as reference material for further CAE work on this topic.

This report does not provide an exhaustive assessment of all aspects of the topic, rather it brings forward the key factors and considerations believed to be important to good decision-making. As such it is an overview assessment that trolls for issues that may or may not require further attention. In such a complex topic with such distributed roles and responsibilities amongst those involved, this approach makes considerable sense as a first effort in redefining how natural hazard information might be better incorporated into planning for the built environment. The identification, acquisition, transfer and usage of knowledge is the key theme arising herein.

A CAE Commentary based on the general findings of this report, entitled *Natural Hazards - Managing for Improved Decision-making in the Built Environment* will also be produced as a basis for future discussion and feedback on the issues raised in this report.

RJ (George) Hooper
Executive Director

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Executive Summary

New Zealand has many examples of infrastructure and built environments located on sites exposed to natural hazards. Increasing pressures from urbanisation, the rising value of infrastructure and more intensive land use generally, can result in communities becoming even more vulnerable. New Zealand must manage its economic and social development accepting that natural hazards will always be part of the equation.

The objective of this study was to look at ways of strengthening future planning and decision-making to take better account of hazard information and science knowledge. The intention was to produce an agenda for encouraging improvements to planning and decision-making processes. This report outlines the main findings of the first phase of an assessment of how well natural hazard knowledge is being developed and utilised in an evolving climate of community and government expectations. The report does not provide an exhaustive assessment of all aspects of the topic, rather it brings forward the key factors and considerations believed to be important to good decision-making.

Reducing the impacts of natural hazard events on communities is a major function of regional and territorial local authorities, mainly through the Resource Management Act (1991) and the Building Act (1991). Soon after the far-reaching RMA was in place, central Government began a series of reforms to adopt comprehensive risk management approaches to reduce the vulnerability of New Zealand communities to the risks arising from natural hazard events, culminating in the Civil Defence Emergency Management Act (2002) and the development of CDEM groups, the Local Government Act (2002) and Long Term Council Community Plans, and the Programme for Action on Sustainable Development in New Zealand.

Through these mechanisms and responsibilities, New Zealand endeavours to apply its knowledge of natural hazard risk, itself a subject centred on uncertainty, to minimise the risks to the built environment and to communities from natural hazards.

This study recognised two routes by which decision-making occurs and final judgements arrived at: firstly, by the formal decision-making processes as established by regulation or legislative provision and, secondly, an informal process directed by personal experience, perceived personal consequence and voluntary responses to the hazard situation, determined as much by psychological, social and institutional processes as they are by scientific information or direct physical consequences. The final product of any land use planning decision is a combination of both processes. At any particular time, one route may dominate over the other, but ultimately they overlap and merge together into a single decision-making framework.

The key relationships in this process involve central and local government (on national expectations for emergency management, resource management, environmental effects and community-council interactions); local government and applicants (where local government sets out community expectations in the form of policies and plans, and their consenting and compliance regimes); property owners as applicants and local authorities (where owners seek consents, respond to compliance, and provide input for plan development); insurance companies and property owners; and science users and science providers.

Overlaid on all these relationships is the application of knowledge of natural hazards, their likelihood and their effects. Decisions on the uptake of natural hazard knowledge are taken by a range of people with a variety of backgrounds. All share a responsibility for making decisions that create an appropriate balance between the collective risk that results for natural hazards, and the individual freedom to occupy and use one's own property. All involved rely on access to sound information and knowledge. The key points in the natural hazard knowledge framework are knowledge acquisition and access, knowledge management, management of relationships within the organisational matrix, and risk management and communication. Perhaps the most critical point is the transfer of knowledge of natural hazards from scientific or expert advisers to decision makers.

However, a significant component of environmental decision-making is arrived at through political processes in which elected representatives in public authorities must consider a wide range of opinions and values; natural hazards science is just one of many components that potentially influence the choices made. To add to this amalgam of influences on the process, in the context of New Zealand's effects-based planning regimes, there is no explicit requirement to consider risk management issues unless specifically provided for within District or Regional plans.

A key finding of this study is that whilst New Zealand assumes an integrated model for land use planning, requiring interaction and co-operation across a spectrum of organisations and their various agendas and responsibilities, the reality is a huge variability in its practise and application. The land use decision-making process is a dynamic one and issues of knowledge transfer occur throughout. There are significant barriers to the uptake and transfer of technical information and understanding of hazard risk, and there is currently a high level of dependence on individual expertise, professionalism, vision and commitment to achieving an objective and holistic approach to land use decisions. Addressing the complex range of issues systematically, through promoting good practice and solving weaknesses, will improve the impact of natural hazard information, and hence provide more confidence for the community in decisions that are taken.

To optimise the incorporation of objective natural hazard knowledge into land use planning decisions, CAE believes that:

- the principles of integrated land use planning need to be better systematised and incorporated into a practitioners guide that will support the wide range of individuals and organisations (both specialist and non-specialist) that share responsibility for decision-making; and
- the specific requirements needed to free up the dissemination and exchange of information on New Zealand's natural hazards need to be addressed.

Within these two broad areas, this study identified a number of directions for exploring and developing strategies through which natural hazard risk might be reduced. Significant advance has been made in planning and efficiency in the institutional processes now in place, but effectiveness from a natural hazard risk perspective is still a distant goal. After a decade of institutional and legislative change, and advancement in practise and capacity building, there are still gaps in our understanding and application of the requirements for integrated land use planning in this country.

1 Objectives

1.1 Origins

New Zealand has many examples of infrastructure and built environments located on sites vulnerable to natural hazards. Situated astride the boundary of two tectonic plates and subject to energetic weather systems, New Zealand must manage its interests in economic development, conservation and good environmental practice, and the creation of social capital, accepting that natural hazards will always be part of the equation. Increasing pressures from urbanisation towards development on land more susceptible to natural hazard damage will result in communities becoming more vulnerable to natural hazard events. More intensive land use generally and the rising value of infrastructure increase the exposure to risk, and New Zealand may see increasing variability and intensity of weather patterns arising from global warming.

Governments and communities are becoming increasingly aware of the risks posed by these natural hazards. In the past, communities may have accepted the consequences of building in high risk areas, then more recently looked increasingly to local and central government to cover the risks and the costs, which can become financially unbearable to all. Communities now have expectations that both levels of government will prevent and continue to mitigate the impacts of natural hazards. Businesses have similar expectations in ensuring that their investments in services and infrastructure are as safe as possible from natural hazard risk. Increasing exposure to natural hazard-related risks has recently caused a rethink in traditional approaches to risk management.

Some of these increasing community expectations are reflected in the new Civil Defence Emergency Management Act (2002) through which local government is held more accountable for building appropriate management processes and for improving community understanding of natural hazards. The linkages between local authorities, emergency response agencies and central government have been strengthened as well, providing for better preparedness for and response to emergencies. A major thrust of the new Act is to challenge councils to take a broader and more preventative approach to integrated hazard management within the 4 Rs (Reduction, Readiness, Response and Recovery) through the development of CDEM groups.

Central government efforts to improve co-operation between local authorities are also evident in the new Local Government Act (2002) which encourages long-term integrated strategies for the provision of services and to guide development. The Long Term Council Community Plans will bring territorial and regional authorities together with central government departments to collectively shape the future of their respective jurisdictions.

Another central government initiative is the Programme for Action on Sustainable Development in New Zealand. Sustainable cities are one of the priorities and its overarching goal is that cities are healthy, safe and attractive places where business, social and cultural life can flourish. With 85% of New Zealanders living in towns and cities, this priority makes considerable sense. In setting this priority, central government understands that it can only be achieved through partnerships with local government and that innovative approaches are required to gain the necessary integration of effort, results and the consumption of resources. There is nothing directly stated about natural hazard management in the Programme for Action, although the references to safe and sustaining communities clearly infer that this be considered.

CAE and the sponsors of this project considered that an assessment of how well natural hazard knowledge is being developed and utilised was timely within the evolving context of:

- the history of community development without (what is now considered normal practice) due regard to natural hazard risks
- the decade-long experiences arising from the reshaping of central and local governments in the late 1980s (that spawned the RMA 1991, institutional changes and other initiatives)

- the ongoing development of community awareness (improved risk management) and central government expectations (on planning and emergency management).

This report outlines the main findings of this assessment.

1.2 Natural hazards defined

For the purposes of this report, natural hazards primarily include floods, earthquakes, liquefaction, landslides, volcanic eruptions and lahars, and coastal events (waves, wind and tsunami), while recognising that tornadoes, cyclones, rain, wind, electrical storm, hail, wildfire, debris flows, avalanches, droughts, and erosion/deposition events are also important hazard events.

Whatever the type and level of significance of any natural hazard, they have to be considered and managed within the same organisational and human context. The challenges are similar for all natural hazards. In a landscape evolving as rapidly and powerfully as that of New Zealand, attempts to modify or control natural processes cannot usually be maintained in anything but the short term.

1.3 Purpose and audience

The objective of this study was to look at ways of strengthening future planning to take better account of hazard information and science knowledge. The intention was to produce a report to be an agenda for encouraging improvements to planning and decision-making processes, using case studies to identify the scope of the problems and to provide evidence of the issues. This report focuses on delineating the issues so as to enable a generic discussion on how best to advance professional practice in this area.

When originally conceived, the project identified professionals and administrators involved in resource management, civil defence, and community planning as its main target; however, as the project developed, it became obvious that the many groups and organisations involved could all benefit from the messages arising from the analysis, and most certainly from seeing the overall framework.

1.4 Project framework

This study:

- examines and comments upon the processes, both formal and informal, by which natural hazard information is incorporated into planning decisions for the built environment; and
- seeks, firstly, to understand these processes and to examine the factors and institutional arrangements that influence decision-making in the built environment, and secondly, to offer new insights into optimising the incorporation of knowledge of natural hazard risk in built environment decisions.

A conceptual framework for the project is shown in Figure 1. This framework indicates the linkages within the formal and informal processes that characterise land use decisions, and emphasises the critical importance of including both in decision-making. The framework demonstrates that those responsible for decision-making, no matter where they contribute within the framework, must recognise that a final decision is best achieved through an appropriate mix of formal and informal processes.

Decisions on the uptake of natural hazard knowledge are taken by a range of people with a variety of backgrounds. They range from the non-specialist through to appointed specialists or authorities, and finally the judiciary. All share a responsibility for making decisions that create an appropriate balance between the collective risk that results from natural hazards, and the individual freedom to occupy and use one's own property. All involved rely on access to sound information and knowledge. Effective planning in the built environment requires an understanding of the way risk perceptions and knowledge shape risk analysis and decision-making. If these considerations are to be included in the planning process, that process demands integration of physical and social sciences to address the totality of the risk environment.

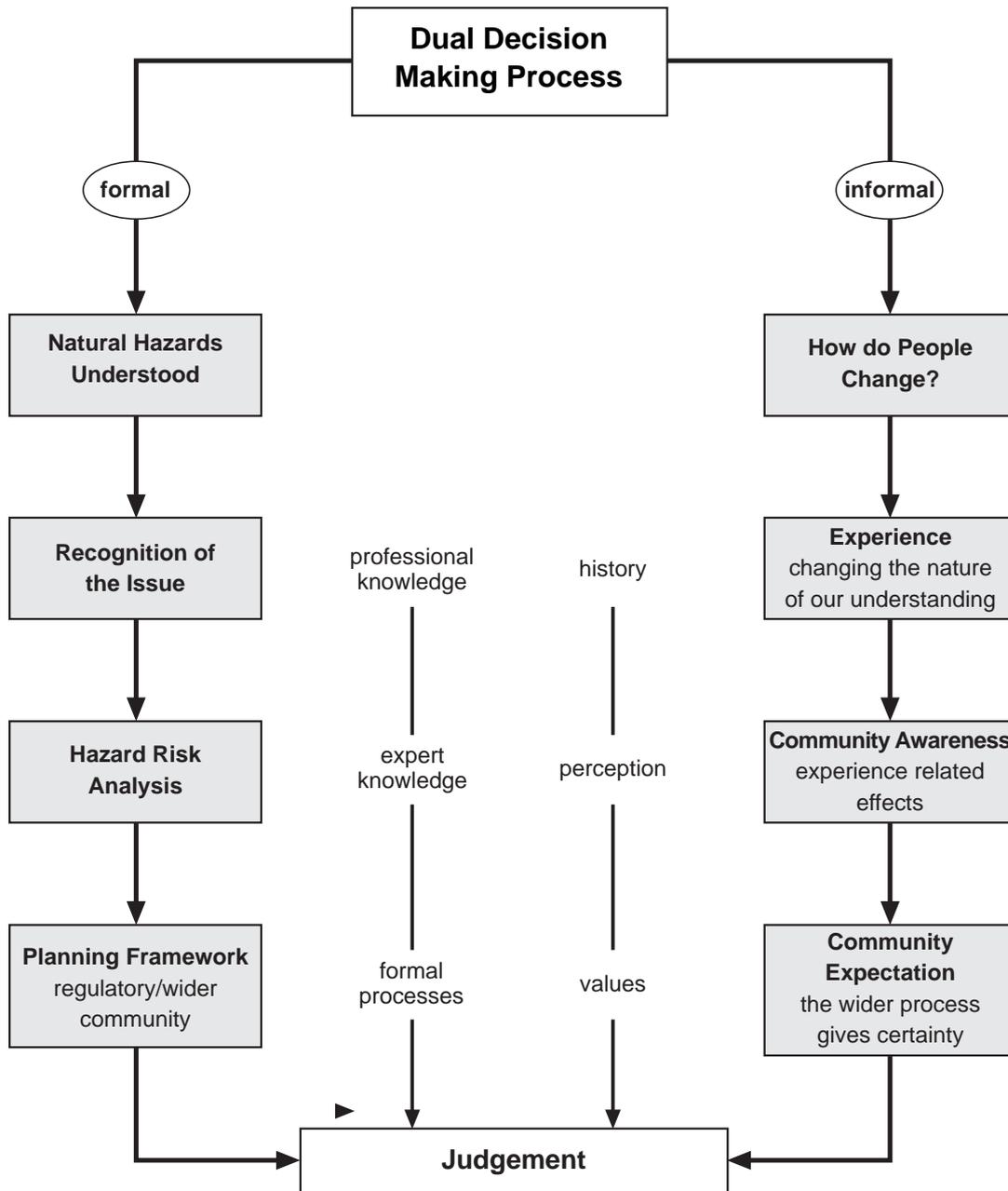


Figure 1 Project conceptual framework

2 Process

The information developed herein came from three primary sources:

1. The discussions of a study group established by CAE to set the focus for the project. Members of this group were:
 - AMI Insurance Ltd
 - Civic Insurance
 - Environment Canterbury
 - Environment Bay of Plenty
 - Hawke's Bay Regional Council
 - Northland Regional Council
 - Southland District Council
 - Ministry of Civil Defence and Emergency Management
2. Contributions from many individuals including those who prepared case studies of situations where natural hazard knowledge was used in decisions on the built environment.
3. Input from a workshop held in December 2003 to review progress and identify critical areas for action.

3 Context for Project

3.1 General context

In seeking to assure communities and individuals that planning decisions shaping their built environment are appropriate for providing their urban lifestyles and protecting their assets, local and central government authorities must, among other issues, deal with the unpredictability of natural hazard risks through a complex system of relational processes.

These processes are based on several pieces of legislation and various policies of central government, as well as on the policies and plans of local government that set the consenting and compliance regimes through which land development is managed. Many public and private organisations are involved in these processes, each bringing their own political, cultural, management, and operational perspectives. Their interests can be supportive or competing, or both.

Such complex processes, built as they are on both formal and informal relationships, are challenging to manage. Nowhere in the “overall” system is there an opportunity to place one finger on the pulse, for one person or entity to effect a coherent comprehensive approach. This is a generic circumstance with systemic effects conditioned by the structure of local and central government, and on how science knowledge and information is managed and transferred between and within them.

Understanding and influencing these processes is equally challenging for those participants (applicants and consultants) outside the local and central government sphere. Some of the issues these participants face include: dealing with several local government organisations; purchasing engineering, science and consent/compliance expertise from commercial sources; and variance amongst the plans and policies of councils and their differing organisational cultures as these affect client service.

In assessing the issue of planning for natural hazard risk in the built environment we need to consider if and how the overall system can be improved, and within that framework how individual relationships and processes can be strengthened. Some improvements will be more accessible than others of course, and small improvements will be more achievable than large ones. As some issues are systemic or generic, they most certainly will not change just to accommodate a specific interest in natural hazards.

In the end we can expect that individual and organisational behavioural change, rather than structural change, is a primary target. This important change is at the level of individuals within organisations, and will come through their improved understanding of problems and of the benefits arising from their resolution. The commitment of these individuals to make things better within the existing system is the key short-term outcome sought herein.

The process and nature of natural hazard management has changed dramatically in the last twenty years. This change can be attributed largely to a shift in natural hazard management philosophy from:

- single agency approach to partnerships with many and varied organisations
- reactive approach to proactive approach
- response management to risk management
- planning for communities to planning with communities
- protection to resilience
- communicating to communities to communicating with communities, and
- identifying hazards to quantifying vulnerability.

In 1994, Government began a series of steps to review and improve civil defence and emergency management mechanisms in New Zealand. Central to this process was the adoption of a comprehensive risk

management approach to reduce the vulnerability of New Zealand communities to the risks arising from natural hazard events.

Under this new environment the expectations of government agencies, business and the community have needed to be refocused, and responsibility for action reallocated. There is a growing awareness amongst key agencies of the need for integrated risk management that seeks to reduce risk by prevention and pre-emptive measures, mitigation, integrated responses and more effective recovery methods. Government's vision is for a New Zealand community resilient to all hazards and disasters.

The traditional approach, that to date has defined our responses to natural hazards, has been based upon the vulnerability of this country's physical networks: road, rail, power, telecom facilities and so forth. But the definition is changing quickly to include other infrastructure components that make up the fabric of our communities: hospital systems, school systems, local governance channels, computer and other network systems and, indeed, the communities themselves. Vulnerability extends also to include the social and economic impacts that are consequences of infrastructure damage.

What constitutes natural hazard management is thus open to debate and redefinition. It only requires one catastrophic event, such as the February 2004 floods in the lower North Island, to change the dominant 'world-view'. In addition, local government's role is now different from that of the utility and network operator who, in turn, has a different perception of likely risk elements than that of the manufacturer, primary producer or other businesses, or citizens.

The insurance sector brings its particular focus towards risk management as do the engineering profession, research personnel and academia. There is also the impact of competitive pressure on the insurance market and the increasing interdependence of regional loss markets.

The corporate restructuring of government at all levels (both national and territorial) has redefined roles and responsibilities. Moreover, amongst our network industries, successful organisations are themselves continually restructuring the ways in which they manage and operate New Zealand's infrastructure facilities. Spans of responsibility are continually changing and technology innovation is also impacting on normal asset replacement cycles.

A consistent national approach is required across all sectors if we are to enhance community awareness of natural hazards, reduce loss from any disaster event, and provide convincing arrangements for response and recovery.

3.2 Stakeholders and their interests

Table 1 identifies each of the main stakeholders involved in the process of natural hazard knowledge uptake. Brief statements of their roles and responsibilities are provided.

Discussions with stakeholders, and later with workshop participants, identified the critical importance of stakeholder competency and of their interrelationships to their individual and collective success in managing risks associated with natural hazards. These discussions also identified that stakeholder competency and institutional relationships were of variable quality, demonstrating that the accepted integrated model for land-use planning does not always work.

3.3 Institutional relationships

Institutional arrangements are an important consideration as they illustrate the various relationships, both formally and informally which define: the identification and explanation of needs, the transfer of knowledge, the delegation of authorities, the statements of organisational purpose and control, the interaction of applicants with local authorities and the legal system, and the feed back mechanisms.

The key relationships regarding the topic of natural hazard risk and the built environment are:

- Between science users and science providers for the identification, development and transfer of

knowledge of natural hazards (where, what, when, with what risk and consequence).

- Between central and local government on national expectations for emergency management, resource management, environmental effects and community-council interactions.
- Between local government and applicants, where local government sets out community expectations in the form of policies and plans, and their consenting and compliance regimes.
- Between property owners as applicants and local authorities, where owners seek consents, respond to compliance requirements, and provide input for plan development.
- Between insurance companies and property owners.
- Legal oversight for all to ensure due process and fair play.

These key relationships are schematised in Figure 2. The community interfaces across all of these relationships.

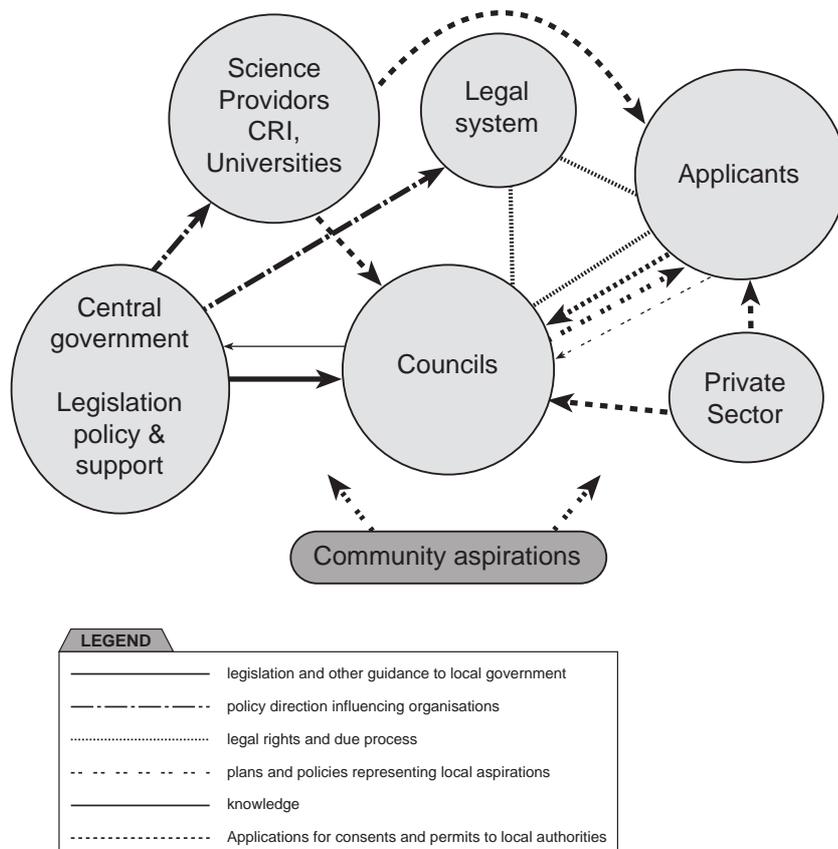


Figure 2: Institutional relationships

These relationships involve an array of institutions in central government (departments and agencies), in local government (87 councils), in the legal system, and in the private sector. The operating premises and management cultures of each of these entities play a role in how natural hazard information is utilised through the connecting relationships. For example, the time frames of different stakeholders may range from short-term (developer) to long-term (central government).

Applicants for resource consents present a mixed array of issues and competencies in their approach to local authorities for development permissions; similarly, consent authorities also present a mixed array of expertise and knowledge in the processing of these applications. Where specialist advice or peer review are required, these may be sourced either by applicant or consent authority from CRIs or other consultants on a commercial basis. As development is increasingly within environments exposed to risk, a key issue is to ensure that the advice sought is appropriate to the circumstances presented, and that the information obtained is linked to appropriate outcomes i.e. effective assessment of the risk environment

and effective mitigation of risk. There are obvious cost implications for obtaining specialist information and decision-making, which must be met either by the community as individuals and stakeholders, or collectively as ratepayers or taxpayers, or both.

The risk environment posed in respect of natural hazards will vary with population density or potential population density, degree of investment in buildings and type of hazard event. Key resource management planning considerations include:

- the type and location of the hazard
- the level of certainty about the location
- the probability of occurrence i.e. the return period
- the likely intensity of the event
- possible inter-related hazard events e.g. ground shaking and liquefaction upon earthquake
- the nature of the activity and/or structures in relationship to the particular natural hazard risk.

3.4 Legal framework

The Resource Management Act 1991 (RMA), the Building Act 1993 (BA) and the Civil Defence Emergency Management Act 2002 (CDEMA) are the three key pieces of legislation influencing and promoting integrated environmental management, including recognition of natural hazards. There is no hierarchy amongst these; rather they sit alongside each other and other pieces of legislation, although the CDEMA can only influence decisions, as opposed to the regulatory regimes of the other Acts. Where buildings are sited on land exposed to natural hazards, there is some overlap between the three pieces of legislation. The Local Government Act 2002 (LGA) also has some bearing here. Further brief details on these Acts are given in Table 2.

The provisions of the RMA address the sustainable management of natural and physical resources and manage via the provisions of district and regional plan documents, the environmental effects of land use and other activities. The Building Act also requires territorial authorities to consider natural hazards in granting or refusing building consents. A key aim of the CDEMA is to increase the role and functions of civil defence organisations, and make clear the responsibilities of government departments, lifeline utilities and emergency services in reducing hazard risk.

3.5 Key central government responsibilities

At central government level, the Governor General may require preparation of national environmental standards (regulations to be implemented by the Ministry for the Environment) and national policy statements for certain environmental issues. National environmental standards (technical standards, methods or requirements) may include standards for matters relating to restrictions on the use of land (Section 43 (1)(a)), a national policy statement (also to be administered by the Minister for the Environment) may state objectives and policies for matters of national significance relevant to RMA purposes: Section 45(1). Relevant considerations include the actual and potential effects of the use, development and protection of natural and physical resources, anything that affects or potentially affects more than one region or may be of a scale, nature or degree affecting wholesale community impact: Section 45(2) (a) and (f). A national policy statement could theoretically cover management of natural hazards. However, other than the mandatory New Zealand Coastal Policy Statement, no other national policy standards have been developed to date. The New Zealand Coastal Policy Statement, prepared by the Minister of Conservation, contains a number of policies relating to managing natural hazards within coastal environments.

Under the Resource Management Act, the focus has been on the Section 35 requirements of monitoring, research and gathering information, providing a useful impetus for studies on particular hazards and monitoring ongoing events.

Current government initiatives for resource management mechanisms on a national basis include guidelines for earthquake fault lines and the availability of information to assist councils and others through the Quality Planning web site set up by Ministry for the Environment.

Under the CDEM Act, not all responsibility for managing natural events has been passed to local government. The Ministry for Civil Defence & Emergency Management has a role in managing national level emergencies and is required to develop a National CDEM Plan. Extensive planning functions for risk avoidance, risk management and emergency response (reduction, readiness, response and recovery) are required of local authorities, among other agencies.

3.6 Local government responsibilities

Under RMA, both regional councils and territorial authorities have important functional roles in respect of natural hazards environments: regional councils in identifying significant environmental issues, policy provision and certain regulatory controls; territorial authorities as the principal consent authorities via district plan provision for subdivision and land use approvals. Both agencies may include provisions to plans and policy statements addressing natural hazards for resource management purposes as both are required to avoid or mitigate the effects of natural hazards and for this purpose may control the use of land.

RMA is enabling, not prescriptive, legislation. Therefore within an overall regulatory direction to promote the sustainable management of natural and physical resources, there is an intentional flexibility provided in the manner in which district and regional plans may address hazard management objectives. In addition to rules in plans, other mechanisms may include information gathering and monitoring of the environment.

Where provisions are included to plan and policy documents these are subject to the preparation of a regulatory impact statement (often referred to as a “Section 32 analysis”) and must enable reasonable use of land.

Some previous studies have indicated gaps in an integrated approach to hazards planning and expressed concerns for effective implementation. A recent report by the Parliamentary Commissioner for the Environment¹ concluded that practical guidelines were urgently needed to enable councils to discharge RMA responsibilities for the avoidance and mitigation of earthquake hazards. A number of issues identified for resource management in that analysis are common to natural hazards planning generally.

The Local Government Act 2002 sets new expectations of inter-council co-operation on identifying and achieving community outcomes, within the context of sustainable development, through Long Term Council Community Plans (LTCCP).

3.7 Policy and plan framework

The preparation of policies and plans is an extensive process, with various stages (on a successively more formalised basis) providing opportunity for input by jurisdictional and public sector agencies, iwi, stakeholders, special interest groups, property owners and individuals.

The plan preparation process typically commences with information review and assessment, including technical information and specialist reports, to assist in identifying resource management issues, scoping of environmental outcomes, and the consideration of mechanisms to promote these outcomes, aligned with the wider statutory objectives for sustainable management.

Not all mechanisms identified in a plan or policy statement relating to hazards need be of a regulatory nature. Other mechanisms for risk management may include ongoing research and information sharing; strategies effected through the Annual Plan processes; and use of risk reduction/management and

¹ Parliamentary Commissioner for the Environment 2001. “Building on the Edge – the Use and Development of Land Planning on or Close to Fault Lines”.

mitigation procedures under other legislation e.g. LTCCPs.

There is a range of consideration of means by which natural hazards may be addressed in plans and policy statements. These are outlined in Table 3.

3.8 Knowledge framework

Resource management policy analysts and decision makers rely on access to sound information and knowledge that supports optimal decision-making. Good information and appropriate measures are the key to effective plans and policy statements, particularly where these underscore matters of a technical nature.

There exists an extensive body of knowledge of natural hazards in New Zealand, both as a consequence of experience of their effects, and of the collection of information on natural hazards and research into their causes and effects. New knowledge of natural hazards is generated by ongoing experience, absorbed by communities and their representatives in various ways, and by ongoing research programmes.

Scientific information and research contributes in numerous ways to environmental policy and decision-making. It can assist at different spatial scales (local to international) and temporal scales (short-term to geologic periods). However, uncertainty is inherent in natural hazard and risk management, and so there will be differences of opinion about the level of risk posed, and what constitutes an appropriate resource management approach in any given situation. Some of that uncertainty comes from a lack of knowledge, purely because hazard processes tend to occur infrequently and significant historic events often pre-date European history or, more likely, pre-date times when local authorities were interested in, or required to document these events. Data on hazard events, much of which is historic and poorly recorded, can thus be sparse and scattered.

A critical point in environmental policy and decision-making processes is the transfer of information from scientific or expert advisers to decision makers. This frequently involves an intermediate step of policy analysis, as these decisions require a formal process of plan and policy development to add the necessary legitimacy.

However, a significant component of environmental decision-making is arrived at through political processes in which elected representatives in public authorities must consider a wide range of opinions and values; natural hazards science is just one of many components that potentially influence the choices made.

Critical factors² that determine the success of connecting science and expert advice with final decisions include:

- the initial interaction between client and advice provider where both information needs and objectives are agreed upon
- the integrity of the scientific process and expert analyses
- the skill of scientists and other professionals to take sometimes complex and highly technical data and convert it into information that contributes to environmental policy and decision-making
- the skill of policy analysts to critique, accurately interpret and use scientific and technical information for policy purposes, while being explicit about any limitations and uncertainties associated with that information
- the content of regional and district plans to allow natural hazards to be considered on a site by site basis
- the capacity of policy and decision makers to understand the scientific, policy and other information they receive – information needs to be in comprehensible

² Substantially taken from Parliamentary Commissioner for the Environment 2003: "Illuminated or Blinded by Science – a Discussion Paper on the Role of Science in Environmental Policy and Decision-making".

- the ability of policy and decision makers to make sound judgements, and to gain the public’s confidence in the decisions they make
- the willingness of policy and decision makers to monitor and review the effectiveness of their policies and decisions, and to engage the scientific and academic community in this process
- understanding the socio-cultural context within which all of this occurs, both within organisations and between organisations, society, and the environment.

A much-simplified knowledge management framework is shown in Figure 3. It encapsulates the many “questions” surrounding the engagement of natural hazard knowledge in decision-making.

3.9 Liability

Liability is an important issue with respect to natural hazard risk. It can be said that the law in respect of liability has not kept up with central government policy in respect of responsibility. Government encourages or promotes individual responsibility for risks (and promotes the provision of information to let people make informed decisions) but there is no parallel mechanism to ensure that people carry the liability that goes with their decisions and aspirations. If anything, the law still puts the onus on local authorities to make “responsible” decisions and determine the “acceptable level of risk” rather than the individual.

Property owners may be prepared to undertake development on land exposed to hazards and taking risks that Councils would not, but apart from Section 36(2) of the Building Act, there is no means of transferring liability. As long as Councils continue to carry the liability for land development decisions, they have to be cautious.

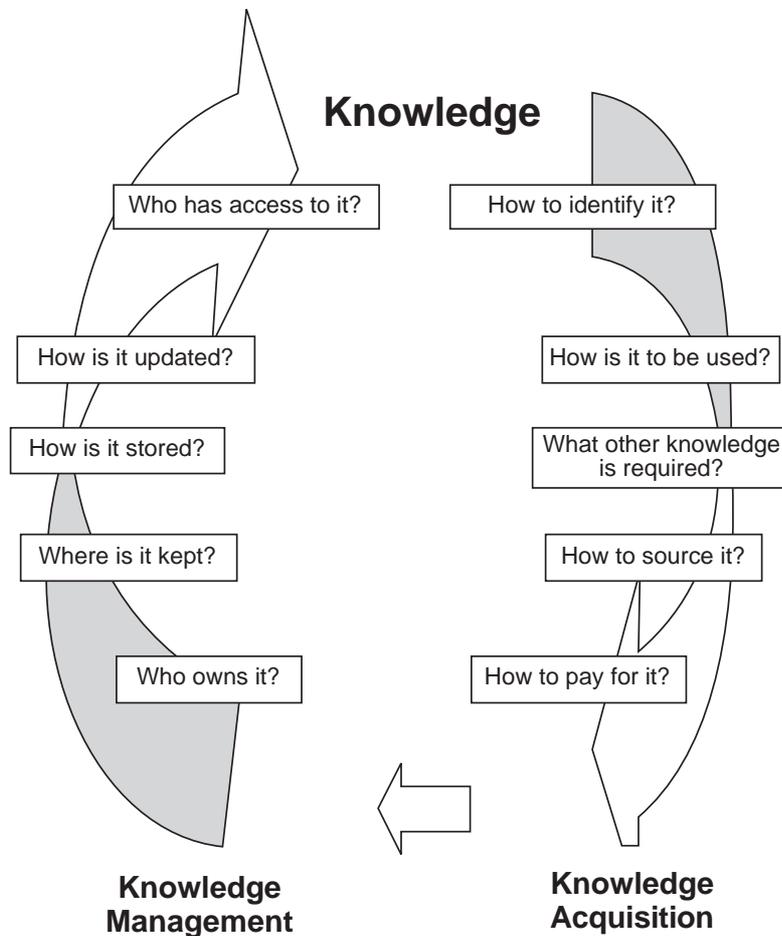


Figure 3: Knowledge management framework

Sec 36(2) notices are placed on property titles so that successive owners are aware of them and the ongoing liability of the owner. Sec 36(2) notices may be willingly accepted by some people, but others are concerned about how they may affect property values and insurance cover.

4 Outcomes

4.1 Perspective from the study analysis

Our analysis of recent New Zealand experience in planning for known risks shows that the inclusion and uptake of natural hazard knowledge is variable. Successes and failures are identifiable across the spectrum of applications, and throughout the supporting systems and relationships. Successes serve as important best practise lessons for all. The failures (or weaknesses) are understandable and certainly not endemic. Yet as these occur throughout the planning process, addressing them will systematically improve the impact of natural hazard information, and hence provide more security for community decisions.

The intent of the project was to look for where and how the uptake of natural hazard knowledge can be improved so as to add value to planning outcomes. The discussion below deals with the weaknesses and failures that have been identified. There are of course, many situations where these issues have been dealt with successfully. These successes become very much a yardstick for improvement.

4.2 Regulatory agency issues

Councils, with their regulatory responsibilities, are very much “in the middle”. They must act responsibly according to legislation while reflecting their community’s interests and managing the development intentions of applicants. Council management is responsible for steering the application process safely through the often competing demands of applicants, elected representatives and central government, to ensure that the optimum land use outcome arises.

Councils struggle with long-term planning, yet establishing strategic context should be a main responsibility for them. This struggle and the inadequacies that emerge continue to occur even after more than a decade of applying the RMA. Short-term political horizons are certainly one reason, but the real cause lies in the time it takes to re-establish organisations and their programmes. The shift from central to local responsibility has yet to lead to fully competent local government “on the ground”, yet as local government evolves to meet the expectations of the RMA, the CDEMA and the LGA, these are themselves evolving.

There is severe competition within councils amongst priorities for rates expenditure. Communities rightfully expect value for rates and will test any council that uses these unwisely or demands more and more. There surely is a limit to what communities can contribute in rates; some councils have better rating bases than others, while some smaller councils are barely financially viable. This variation of capacity and maturity amongst local authorities is aggravated (in the minds of applicants) by the sometimes unclear demarcation between regional and territorial authorities. While the intent of the RMA gives the regional council responsibility for setting the major strategic objectives for the region with respect to hazards, it is the territorials who must deal directly with day to day processing of land development and subdivision applicants (although regional councils deal with aspects of air, water and land disturbances). This is hardly an efficient process for applicants, especially if communications between the two authorities are not the best.

Along with the continuing issue of rates, council decision-making is conducted within the debate between those who seek development and those who seek conservation and preservation. This dialogue and the resulting decision-making can be made more intractable by the limited understanding of risk by professionals and the public. Mixed together with insufficient data bases and information on natural hazards, these ambiguities challenge councils and applicants alike.

The political realities of regulatory agencies are not going to change substantially. However, how decisions are made based on what input, and with what understanding of natural hazard risk, can be addressed. How these agencies work together to provide more clarity and certainty for their community and

the applicants can also be positively affected.

4.3 Planning process issues

Besides the issues surrounding the current limits of strategic planning and the distribution of planning responsibilities between regional and territorial authorities, this study identified a number of other planning issues. The interaction amongst the regulatory legislations (BA and RMA) and the CDEMA is limited and confusing. While all three impact on decisions their linkages are not clear and can be confusing to regulators, applicants and communities. There is a need for the various agencies to arrive at protocol and other processes for an integrated management approach that will draw the threads of these responsibilities together.

While dispute resolution processes are now more often used, consideration of technical matters within the court system may exacerbate differences of opinion instead of facilitating resolution. There is better opportunity for informed decision-making if all parties are able to competently work through the differences of opinions, and reach agreement through special conditions for example. In some circumstances, development approvals will need to be refused. Matters before the Environment Court are constrained by the detail of the appeal and are often contingent upon the detail of plan provision. While natural hazards may be a matter affecting a particular locality, it is not necessarily that issue that will be canvassed in examining development suitability.

The issue of cost to applicants for consents is well known in New Zealand, as should be the cost of these applications to communities, as not all costs are passed on. Putting district plans in place can also be extremely expensive to communities, as is the cost of developing the necessary information base for monitoring plan effectiveness. The time taken to draft, consult upon and defend plans is significant. Variations to these plans are not a simple, low-cost opportunity within the current RMA.

4.4 Knowledge issues

As might be expected of a study intended to examine the processes by which natural hazard information is incorporated into land planning decisions, a suite of knowledge issues has emerged.

Understanding natural hazard occurrences, their impacts and how communities should deal with this knowledge is an immense and ongoing task. The unpredictability of natural hazards is concern enough. It is even more challenging to understand how they might affect communities, and what might be done to reduce or mitigate their impacts, while most of our communities are historically sited in what are now known to be risk environments, and while some communities already struggle with basic infrastructure financing.

Risk reduction requires ongoing development of knowledge on natural hazards, their impacts and their social interpretations, and the transfer of this knowledge is a critical task in meeting this challenge. One consistent message from this study was that the development, transfer and application of natural hazard knowledge is fragmented.

Because the study of hazards tends to concentrate on physical processes without providing enough emphasis to the right people on consequences, attempts to engage with the community will continue to fail. Those who are expected to change their behaviour in response to those consequences must be able to identify with research results.

Barriers to the dissemination of information include:

- The propensity for New Zealand to disaggregate its institutions, producing few incentives to share information and resources.
- The fact that science outcomes have become a tradeable commodity, especially for the Crown Research Institutes (CRIs), resulting in high costs for information for local and regional authorities and constraints on its dissemination.

- A lack of information transfer mechanisms that provide adequate access to improved hazard information.
- A lack of capability in communicating science findings and detailed technical information to enable people to understand risks.
- A culture within local authorities and their ratepayer base which, in contrast to regional councils and central government, either do not regard themselves as research purchasers or are not prepared to pay for science information.
- A focus on understanding the physical processes of hazards, rather than the consequences of hazards for the communities affected.

4.5 Hazard research and knowledge availability

While local authorities are responsible for hazard management, it is the CRIs and the universities that undertake most of the hazard research through the public good science funding mechanisms administered by the Foundation for Research, Science and Technology. Arguably, the CRIs have the most important role to play in improving the availability of knowledge to decision-making on natural hazards in the built environment. When CRIs were established in 1992 they were specifically directed by the Crown Research Institutes Act 1992 to exhibit a sense of social responsibility and to undertake research for the benefit of New Zealand, amongst other operating principles.

Disturbingly, it appears that much of this science is not generally or freely disseminated to affected communities or to the wider public. It should also not be presumed that professionals and decision makers have ready and affordable access to CRI information. In addition, despite the efforts of FRST to ensure research relevance, there is a widely held view that science direction does not necessarily meet the priorities or requirements for integrated hazard management in respect of land use planning.

The commercial imperatives of the CRIs can act to create a significant tension between their dual roles as providers of research for the benefit of New Zealand and as science-based enterprises. A particular issue identified by the study was the perception that, in some instances, science providers act to withhold research knowledge for commercial benefit. This practice can result in information that is useful for environmental policy and decision-making being unavailable except on a commercial basis. Some research outputs, especially those contracted through FRST, are available in the form of published scientific papers and conference presentations, neither of which are readily accessible outside of the research community. Some generalised hazard information is available in other forms, such as published maps and on websites, but data (both basic and synthesised) are generally not in the public domain. The GEONET project is an exception, but this leaves a significant body of knowledge not generally available to a wide public and professional audience.

This is exacerbated by the reluctance of some central and (probably especially) local government bodies to purchase advice at the commercial rates often required by CRIs and other providers. Furthermore, the data and knowledge generated by this additional public funding is commonly itself not in the public domain, the consequence of contractual arrangements between the provider and purchaser, with the result that the knowledge may not be available to all parties in a land-use planning situation.

Mechanisms for providing better access to such information are thus seen as a critical process in improving natural hazard management in this country.

4.6 Private sector hazard knowledge

In addition to publicly funded research, the private sector also funds its own hazard research, much of which is undertaken by CRIs, universities or other research providers. Privately funded environmental research may be for the purpose of assessing effects on the environment as part of a resource consent application, in which case the information can become publicly available for scrutiny. It is possible that in other situations, where the research is privately funded but the results are not made public, information that is important for environmental policy and decision-making is not presently accessible.

Remaining current in natural hazard knowledge and therefore relevant to client needs is an important challenge for the private sector. There are many large and small consulting firms providing expertise on the various aspects of natural hazards and their planning imperatives. There are significant costs associated with remaining current, including the cost of accessing reliable information already developed through the science or tertiary funding mechanisms.

4.7 Hazard knowledge uptake

A key factor in the effectiveness of science knowledge uptake is that council planning, consent and compliance staff are not generally trained to translate hard science into meaningful planning statements and consent conditions, even if they had time. Nor can they track the evolution of natural hazard information so that applicants and communities are always up to date. Some councils address this challenge through hiring their own hazard expertise, or contracting research directly, but this is not an opportunity for all. Part of the problem is knowing what questions to ask from which sources in order to generate the information required.

Another significant problem faced by authorities is regular loss of organisational memory. There are cases where riverine and coastal hazards (natural and human systems) have been carefully researched followed by leading-edge, integrated planning being adopted by council. Within a decade, implementation had failed because council restructurings, among other factors, had removed personnel with knowledge of the hazard problems and plans.

A parallel issue is the effect of overlapping roles between local and regional authorities, where the former have responsibilities for hazards in relation to building and resource consents, but information on previous and potential hazards may be held by the latter.

Compounding the problem of knowledge availability are the severe limitations placed on local authorities and other agencies in respect of funding research or engineering evaluation of natural hazard risks, especially when this competes directly with funding for other high-priority requirements.

Overall, there is the significant problem of establishing fair and equitable processes for taking detailed technical and scientific information and translating that information into forms that are suitable for lay audience. This responsibility currently lies predominantly with the territorial authority or with the applicant in large consenting cases such as a subdivision or major infrastructure project. In these instances, the issue of information ownership or at least the responsibility for its management was highlighted by this study. Which agencies are best to hold what information and how this body of knowledge is maintained, made accessible and communicated to others needs to be addressed.

Concern over the competence of advice given to applicants and local authorities through their own staff, consultancies and other advisors will be difficult to address. Good practise is to ask for a peer review from a recognised expert. The problems herein are interesting because the limited availability of natural hazard expertise in this country means that independence can be compromised, or review simply not sought. New mechanisms for expert evaluation need to be considered.

The assessment above indicates again that risk management and risk communications are not yet integral management attitudes in organisations, much less appreciated by the community.

4.8 Addressing the issues

The land use decision-making process is a dynamic one and issues of knowledge transfer occur throughout the process. Addressing these systematically, through promoting good practice and solving weaknesses, will improve the impact of natural hazard information, and hence provide more confidence for the community in decisions that are taken.

Local authorities, as the agencies most charged with ensuring that decisions on the built environment are appropriate, need to consider the widest suite of issues, and most suitably these should be considered

systemically. Each issue has its own requirements but all are interlinked, certainly from a management perspective.

For local authorities to substantively address the need to include natural hazard information in decisions on the built environment, they must affect control and ensure quality of knowledge inputs, as some have clearly done. Those other agencies and individuals who interact with local authorities in this decision-making need to be cognisant of the quality of this interaction, and of the quality of knowledge being transferred into decision-making. As the strategic lead on such matters, central government most certainly needs to consider the complete framework and how it can best facilitate any change.

The key points in the natural hazard knowledge framework where interventions can generate greatest benefits are grouped below. These interventions are important considerations for all.

Knowledge acquisition

Careful consideration of what information is required, when and in what form is an essential starting point. Such considerations exist on all scales, from long-term regional monitoring of, for example earthquakes, to the specific requirements on an individual consent application.

Access to expertise on natural hazards and on community vulnerability is critical, again at all scales.

Knowledge management

Proper storage and reasonable access to publicly funded information is also essential. Who controls data and information management decisions (as separate from where these are physically stored) are important considerations.

Relationship management

No matter where one is within the institutional matrix (Figure 2, p17) surrounding the subject of natural hazard knowledge, it is important to understand these as a system and to ensure the critical relationships are being effectively managed.

For local authorities this means a capacity to interact with science providers and other experts, applicants, central government departments, and the legal system. The ability to translate knowledge, perspectives and policies is a challenging attribute to obtain.

Risk management and communication

Maximum benefit from natural hazard knowledge can only be achieved if it is applied in an environment where risks are understood by all in the community commensurate with acceptable risk horizons.

For local authorities in particular this means coupling physical science and social science, and in working with their communities on risk awareness and management. The solutions being sought are most effective where the community has a clear appreciation of what the hazards mean to them.

4.9 Summary of important messages

The important thinking that emerges from this project can be summarised as follows:

- 1 New Zealand assumes an integrated land use planning model, but its practice and application is variable. The model requires interaction and co-operation across a spectrum of organisations and their various agendas and responsibilities, but is highly sensitive to such intangibles as relationship management, knowledge and information management and organisational competency.
- 2 Organisational competency is a matter of significant importance, and many small organisations lack the required skills and expertise.
- 3 Relationships within and amongst organisations is critical to achieving best practice and a holistic approach to decision-making.

- 4 There is little understanding of liability issues amongst the public and elected representatives, and there needs to be improved education in this area.
- 5 Successful process incorporates technical and non-technical information such that all parties feel that their concerns have been adequately addressed.
- 6 Efforts to share best practice in recognising, acknowledging and responding to risk assessment and risk mitigation are likely to be beneficial to many sectors of the community.
- 7 Information is too commonly held in a way that does not allow it to be continually used by all interested parties. Information transfer, uptake and sharing are more imperative than more data.
- 8 Knowledge management is a responsibility shared across the integrated land use planning model.

5 Future Effort

5.1 Overview

This initial assessment has served to increase our understanding of the realities of land use planning in this country, and from this assessment look at ways by which New Zealand can strengthen its future planning capability by taking better account of hazard information and science knowledge.

Human responses to risk are largely governed by interpretive perceptual processes. These processes are typically informal and determined as much by psychological, social and institutional processes as they are by scientific information or direct physical consequences. This study thus recognises two routes by which decision-making occurs and final judgements arrived at: firstly, by what we have described as the formal decision-making processes as established by regulation or legislative provision and, secondly, an informal process which we have characterised as directed by personal experience, perceived personal consequence and voluntary responses to the hazard situation.

We argue that the final product of any land use planning decision is a combination of both processes. At any particular time, one route may dominate over the other, but ultimately they overlap and merge together into a single decision-making framework.

The study has thus been useful in beginning to define the key intervention points that will facilitate this transfer of information and knowledge. The most powerful form of intervention is that which supports voluntary action. Uninformed perceptions, based upon individual perceptions of risk and development interests for and in the community, can dominate the planning process and limit capacity and intent.

A key finding of this study is whilst New Zealand has an integrated model for land use planning, the reality is a huge variability in its practise and application. There are significant barriers to the uptake and transfer of technical information and understanding of hazard risk, and there is currently a high level of dependence on individual expertise, professionalism, vision and commitment to achieving an objective and holistic approach to land use planning decisions.

5.2 Directions for future effort

The study has also been useful in identifying a number of areas worth future effort towards the goal of reducing risk by optimising natural hazard knowledge in land use planning decisions. The strands of influence on this goal are complex, as are the institutional arrangements and legislative framework within which these stands operate.

To optimise the incorporation of objective natural hazard knowledge into planning decisions, CAE believes that:

- the principles of integrated land use planning need to be better systematised and incorporated into a practitioners guide that will support the wide range of individuals and organisations (both specialist and non-specialist) that share responsibility for decision-making; and
- the specific requirements needed to free up the dissemination and exchange of information on New Zealand's natural hazards need to be addressed.

Within these two broad areas, the study identified a number of directions for exploring and developing strategies through which natural hazard risk might be reduced:

- 1 The effectiveness by stakeholders of managing, disseminating and applying existing natural hazard information.
- 2 The extent to which natural hazards are considered by local authorities in relation to other issues, and how natural hazard expertise is valued.
- 3 The extent to which local authorities are developing their internal capacity to ensure the appropriate

- natural hazard information is obtained and disseminated to their communities.
- 4 The extent to which local authorities are co-operating effectively in determining their long-term hazard knowledge requirements and including these in the developing Long Term Council Community Plans.
 - 5 Whether there a need for a national approach or policy in respect to the acceptable level of risk and the value of objective indices of risk.
 - 6 The transparency of liability amongst central government, local government, developer and individual owner; and the effect of recent changes to s106 RMA on council liability.
 - 7 The requirements of local authorities for taxpayer- and ratepayer-funded natural hazard science.
 - 8 The success of the current FRST funding approach in developing the required natural hazard science knowledge to meet local authority needs as end users and funding partners.
 - 9 The influence of the commercial imperatives of the CRIs on access to natural hazard information for the public good.
 - 10 The extent to which the tertiary sector is developing the future expertise required by CRIs, local authorities and the private sector; is developing expertise that can communicate across the disciplines of science, policy, and planning decision-making; and whether there a consensus on what expertise is now required and on how best to develop it.
 - 11 How central and local government are recognising the importance of risk management and communications in ensuring that their jurisdictions are adequately prepared to make informed decisions, and whether there an audit role here for the Ministry of Civil Defence and Emergency Management or other government agency.
 - 12 How local authorities are briefing the newly formed CDEM Groups on the natural hazard knowledge issues and their management.
 - 13 The effectiveness of the joint oversight by MCDEM (monitoring role) and the Office of the Controller and Auditor-General (legislative compliance) on CDEM Groups and their members.
 - 14 Whether the various pieces of legislation impacting on how natural hazards are dealt with in considerations of built environment are sufficiently understood, and whether the gaps or confusions are sufficiently identified.
 - 15 How local authorities have committed to the inclusion of appropriate consent conditions to address the impacts of natural hazards and in bringing peer reviews to improve certainty of decisions.
 - 16 How the experience of hazard events and how best practice is being promulgated, and who is responsible.
 - 17 How the linkages amongst the new legislation (LGA, CDEMA) and the Sustainable Development priority for cities with respect to natural hazards are being developed and whether there is sufficient integration with government policy development.
 - 18 How organisations are profiling their liabilities associated with their participation in the use of natural hazard knowledge in planning for the built environment, and what risk treatment options are available to better facilitate optimum decision-making.
 - 19 Whether local authorities are ensuring that the appropriate natural hazard information is available and managed, and integrated into regional and district policy and plans, and whether this raises liability issues.
 - 20 Whether the use of a regulatory approach by Territorial Authorities is successfully implemented and monitored, and what happens to the monitoring data.
 - 21 How well risk information is communicated to all stakeholders.

5.3 Developing a guide for practitioners

In examining these issues, there no single, comprehensive reference or even set of references that can be used or recommended. But the issues are important and reflect more than anything else that, following a decade of institutional change, advancement in practise and capacity building, that there are still gaps in

our understanding of the requirements for integrated land use planning in this country.

Significant advance has been made in planning and efficiency in the institutional processes now in place, but effectiveness from a natural hazard risk perspective is still a distant goal.

One approach to improving effectiveness that emerged during development of this project was the need for a guiding document, or code of practice, for practitioners. While there is yet insufficient information, analysis and consensus to present a comprehensive reference text for practitioners, we have arrived at the view that practitioners best function in a working environment where there is:

- anticipatory development of natural hazard knowledge
- access to information in readily usable form
- access to expertise (internal and external) when required (physical, social, legal)
- access to robust, informal discussions with decision-makers
- access to and participation in best practise transfers
- recognition that physical and social aspects have to be integrated to maximise outcomes.

Many of the directions in the preceding list can be investigated to contribute to the development of such a guide within the broader context discussed in this report. To do so would require input and effort from the various stakeholders as before, but with more emphasis on how decisions are actually taken, implemented, monitored and managed to ensure good community outcomes, acceptable risk outcomes and reduced liabilities overall.

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Appendix 1: Stakeholders

Central Government

Provides legislation and policy directions to ministries, crown research institutes, and local government

Ministry of Civil Defence and Emergency Management

Since its establishment on 1 July 1999, the fundamental driver for the Ministry has been to work with its stakeholders to create a new way of thinking about civil defence and emergency management. The goal is to build on existing civil defence practice. New Zealand is acknowledged as a world leader in developing a risk-based approach that will increase the capability of communities and individuals to prepare for, respond to and recover from disasters.

The Ministry's role is to:

- provide strategic policy advice on New Zealand's capability to manage and be resilient to the social and economic costs of disasters
- ensure the establishment of structures to provide the capability to manage and respond to disasters in New Zealand
- provide support to sector stakeholders in their delivery of civil defence emergency management
- ensure a co-ordinated approach, at both national and community level to planning for reduction, readiness, response, and recovery;
- manage central government response and recovery functions for large scale events that are beyond the capacity of local authorities.

Ministry for the Environment

Responsible for advising the Government on all aspects of environmental legislation including policies for influencing the management of natural and physical hazards. Includes:

- administering the Resource Management Act 1991
- provision of advice on the application, operation and effectiveness of environmental legislation, the identification and likelihood of natural hazards and reduction of the effects of natural hazards, and the provision and dissemination of information to promote environmental policies including environmental education and promoting effective public participation in environmental planning
- provision of guidance for and promotes best practice for dealing with hazards in regional and district plans and policy documents (partly effected through the Quality Planning Project including the Quality Planning website)

Earthquake Commission

A Crown entity responsible for administering insurance against natural disaster provided under the Earthquake Commission Act 1993.

It is the main provider of natural disaster insurance to residential property owners and insures against earthquake, natural landslip, volcanic eruption, hydrothermal activity, and tsunamis. For residential land it insures against storm or flood, or fire caused by any of these. Administers the Natural Disaster Fund for the payment of claims.

Also has the function of facilitating research and education about matters relevant to natural disaster damage and methods of reducing or preventing natural disaster damage.

Department of Internal Affairs

Administers the Building Act 1993 and is responsible for implementation of government policy in respect to building.

Building Industry Authority

As an independent Crown entity under the Building Act its primary purpose is managing the building legislation.

Includes:

- approving documents for use in establishing compliance with the Building Code
- determining matters of doubt or dispute in relation to building control
- undertaking reviews of the operation of territorial authorities and building certifiers
- granting accreditations of building products and processes
- disseminating information and providing educational programmes on matters relating to building control

The Ministry of Economic Development is responsible for monitoring the Building Industry Authority.

Ministry of Research, Science and Technology

The Ministry of Research, Science & Technology (MoRST) develops research and innovation policies and manages the publicly funded part of the RS&T system on behalf of the Government.

MoRST works at the high level of policies, strategies and statistics. It contracts other agencies such as the Foundation for Research, Science and Technology (FRST) to manage the actual funding of research and innovation projects.

Its mission is “to inspire and assist New Zealanders to achieve a better future through research and innovation”.

MoRST was established by Cabinet on 1 October 1989, as part of the reforms of the New Zealand science system. A key element of the reforms was the organisational separation of the Government’s involvement in:

- science and technology policy (MoRST’s role)
- science funding (FRST’s role)
- carrying out research and development (Crown Research Institutes, etc.).

Foundation for Research, Science and Technology

The Foundation for Research, Science & Technology invests in research, science and technology (RS&T) on behalf of the New Zealand Government to enhance the wealth and well-being of New Zealanders. It is a Crown Entity with a board of directors appointed by the Government.

Its mission is to invest in innovation for New Zealand’s future and is achieved by:

- Investing nearly \$400 million annually in a wide range of RS&T initiatives with economic, environmental or social benefits
- Stimulating both research providers and the users of research (private industries and Government agencies) to innovate and create knowledge
- Working closely with other Government agencies such as New Zealand Trade & Enterprise to ensure there is a seamless approach to assisting industry

The Foundation has a key role in stimulating knowledge creation and innovation in New Zealand.

Environment Court

Constituted under the Resource Management Amendment Act 1996 and consists of Environment Judges and Environment Commissioners.

Its jurisdiction under the RMA includes references about the content of regional and district statements

and plans, and appeals arising out of applications for resource consent.

Local Government

Territorial Authorities (District and City Councils)

Responsible for issuing subdivision and land use consents, and building consents.

Controls in district plans include:

- declining subdivision and land use consents
- requiring special studies to be carried out or
- imposing special conditions in areas subject to natural hazards

Duty to gather information, undertake research, monitor and keep records, including records of natural hazards, to fulfil functions under the RMA Enforcement powers

Regional Councils

Responsible for issuing water permits, discharge permits, coastal permits and land use consents related to Regional Council functions under the RMA.

May have regional plans with rules addressing hazard environments including requiring land use consents for land disturbance and earthworks.

Duty to gather information, undertake research, monitor and keep records, including records of natural hazards, to fulfil functions under the RMA Enforcement powers.

Knowledge Providers

Crown Research Institutes

The two main CRIs are:

Institute of Geological & Nuclear Sciences Ltd.

The Institute of Geological & Nuclear Sciences (GNS) is a leading supplier of earth and isotope scientific research and consultancy services in New Zealand. The Hazards Group at GNS specialises in improving understanding of New Zealand's geologically active landscape and in assessing the impacts and consequences of hazard events.

GNS staff are engaged in the national monitoring of seismicity and volcanism; the assessment and mitigation of geological hazards (earthquake, volcano, landslide, tsunami) and the mitigation of the associated risk; geodesy, geological mapping; engineering geology, marine geology; marine and land-based geophysical surveys and investigations; assessment of groundwater quality and quantity; resource management services including analysis of contaminated sites; and several other fields.

GNS provides services in geological and hazard mapping within New Zealand utilising GIS and associated databases and has been responsible for developing hazard modelling systems using GIS and internet to deliver hazard information. GNS has been responsible for seismic hazard assessments, both probabilistic and deterministic, from national scales to large scales focussed on major developments, both for New Zealand as well as overseas.

National Institute of Water & Atmospheric Research

The National Institute of Water & Atmospheric Research (NIWA) mission is to provide a scientific basis for the sustainable management and development of New Zealand's atmospheric, marine and freshwater systems and associated resources.

NIWA's hazard programme includes contributions from over 30 scientists and covers the areas of meteorological hazards (wind, rain, flooding, inundation, and drought) and coastal hazards (waves, storm surge, coastal erosion, and tsunami).

The Institute of Geologic and Nuclear Sciences and the National Institute of Water and Atmospheric Research are the primary CRIs involved in natural hazard science. They have established the co-operative Natural Hazards Centre.

Funding for natural hazard research is through Public Good Science Fund administered through the Foundation for Research, Science and Technology. In applying for these funds CRIs must be cognisant of the evolving expectations for involvement with end users, knowledge transfer and capacity development for example.

The GeoNet Project is rather different. The project is a collaboration between the Earthquake Commission, the Institute of Geological & Nuclear Sciences and FRST to provide real-time monitoring and data collection for rapid response and research into earthquake, volcano, landslide and tsunami hazards. The GeoNet web site will provide public access to hazards information, including earthquake bulletins and volcano alerts. It will also allow the retrieval of fundamental data sets.

Universities

Natural hazard research is generally limited to individual staff who can also be funded through the PGSF directly or in association with a CRI.

Besides research contributions Universities also provide education and training on natural hazards with their graduates becoming employed by local authorities, consultancies, CRIs and other universities.

Regional Councils

With their RMA directed responsibilities with respect to natural hazard knowledge and with their need for applied rather than pure research, regional councils develop the required knowledge through contracts to consultants and CRIs, and through their own staff. With the need to advise compliance and consent staff on natural hazards many regional councils have developed a strong internal science capacity.

Private sector consulting firms

There is a considerable body of expert knowledge in private sector consulting firms which is accumulated through experience and client-funded research. Movement of people from the public sector into the private sector is a significant knowledge transfer pathway.

Business Sector

As applicants: Business interests are instrumental in the advancement of most applications for building activities in the built environment.

As knowledge providers: Many consulting firms exist to provide expertise and analyses to applicants and governments.

As insurance providers: The insurance sector has an interest in natural hazards where they perceive that there is a sufficiently high financial risk to their business.

The public

The public interface across all of these stakeholders, from being land owners through to exercising their rights as voters.

Appendix 2: Legal Framework

Resource Management Act 1991 (RMA)

Overview

The RMA is the core of the legislation intended to help achieve sustainability in New Zealand.

The purpose of the Act is to promote the sustainable management of natural and physical resources. The RMA sets out how we manage our environment, including land-use planning in general.

The RMA defines “natural hazard” to mean “any atmospheric or earth or water related occurrence (including earthquake, tsunami, erosion, volcanic and geothermal activity, landslip, subsidence, sedimentation, wind, drought, fire or flooding) the action of which adversely affects or may adversely affect human life, property, or other aspects of the environment.

Under the RMA, both regional councils and territorial authorities have responsibilities to provide for the avoidance or mitigation of natural hazards. However, the RMA is enabling, not prescriptive legislation. Therefore within an overall regulatory direction to promote the sustainable management of natural and physical resources, there is an intentional flexibility provided in the manner in which district and regional plans may address environmental objectives.

There is specific reference in the RMA to natural hazards as a factor for consideration in preparation of:

- regional policy statements
- regional plans including regional coastal plans
- district plans.

The provisions of these documents are subject to preparation of a regulatory impact statement (‘s32 analysis’) and must allow reasonable use of land. Both regional councils and territorial authorities have important functional roles in respect of natural hazard environments; regional councils in identifying significant environmental issues, policy provision and certain regulatory controls; territorial authorities as the principal consent authorities via district plan provision for subdivision and land use approvals. Territorial authorities and regional councils may impose requirements in relation to the siting of buildings in areas subject to natural hazards for resource management purposes. Natural hazards may also be a factor for consideration in the grant or refusal of subdivision consent, and in environmental documentation prepared in relation to resource consent applications.

Consideration of natural hazards may also be made in the context of:

- monitoring of the state of the environment (including monitoring of the effectiveness of plans and policy documents with respect to environmental outcomes sought, and in promoting the sustainable management of natural and physical resources).
- as part of the umbrella of considerations relevant to sustainable management and community well-being. Sustainable management includes, among other matters, the need to sustain the potential of resources to meet the reasonably foreseeable needs of future generations, and to avoid, remedy or mitigate adverse effects on the environment while enabling communities to provide for their social and economic well-being.

Specific functions of regional councils and territorial authorities

Section 30 sets out the functions of regional councils, and section 31 the functions of territorial authorities. Specifically, regional council responsibilities are:

30 (5)(c) (iv) The control of the use of land for the purpose of the avoidance or mitigation of natural hazards

(5) (d) (v) In respect of any coastal marine area in the region, the control of any actual or potential effects of the use, development, or protection of land, including the avoidance or mitigation of natural

hazards and territorial authorities are:

31 (b) The control of any actual or potential effects of the use, development, or protection of land, including for the purpose of the avoidance or mitigation of natural hazards

The mechanism for carrying out these functions by regional councils is through regional policy statements and regional plans, and for territorial authorities through district plans. Thus both territorial authorities and regional councils can make rules for the avoidance or mitigation of natural hazards, including earthquake hazard, in their plans. Although a majority of district plans already do contain policies about natural hazards, no regional councils have developed a regional hazard management plan to date. All policy for hazard management at a regional level is contained within broad regional policy statements and generally takes an “all hazards” approach, and does not seek to manage different hazards differently.

In addition, under section 35(5)(j), local authorities are required to keep records of natural hazards “to the extent that the local authority considers appropriate for the effective discharge of its functions.” Confusion over responsibilities for natural hazard management between regional councils and territorial authorities over interpretation of sections 30 and 31 has often arisen. A recent amendment of the RMA (RM Amendment Act 2003) has helped clarify these responsibilities somewhat by repealing section 62 to include section 62(1)(i) which requires that a regional policy statement must state “the local authority responsible in the whole for any part of the region for specifying the objectives, policies and methods for the control of the use of land to avoid or mitigate of natural hazards or any group of hazards”. If the regional policy statement is not clear on this, then these responsibilities fall to the regional council.

Natural hazards and planning documents under the RMA

The content of regional policy statements, regional plans and district plans in relation to natural hazards is covered by sections 62, 63, 65, 67, 68, 72, 73, 75 and 76 of the RMA. These sections provide for a hierarchy of resource management instruments which are also to have regard to national policies and standards. The natural hazards content of these documents are summarised below.

Regional policy statements

An overview of significant resource management issues for the region including resource management issues of significance to iwi authorities. To state objectives, policies and methods (excluding rules). At section 62(-) (l) “the RPS is to identify the local authority responsible in whole or in part of the region

for specifying objectives, policies and methods for the control of the use of land “(i) to avoid or mitigate natural hazards or any group of hazards...”.

Significantly, section 62 (2) states that if these responsibilities are not stated then the hazards planning role lies with the regional council.

Regional plans

A new section of the Act replacing the former section 67, and the repealed Second Schedule. Regional Plans may cover actual circumstances of “any significant conflict between the use, development or protection of natural and physical resources in the avoidance or mitigation of such conflict, any significant need or demand for the protection of any site, feature, place or area of regional significance [and] any threat from natural hazards...” section 65 (3)(a) (b) and (c). Regional Plans may include regulatory provisions in the form of rules addressing among other matters, natural hazard environments: section 65(1).

Regional Plans can also have rules to protect property from the effects of surface water to require building work to achieve performance criteria additional to or more restrictive than the Building Act (s 68(2A)).

District plans

The contents of district plans are noted at section 75 and are related to functions under section 31(b) as

“the control of any actual or potential effects of the use, development or protection of land, including for the purpose of – ‘(l) the avoidance or mitigation of natural hazards...” This may include the control of subdivision: section 31(2). District plan rules are to be based on consideration of actual and potential effects of activities on the environment of activities, particularly adverse effects: section 76(3).

Both district and regional plans may classify activities as ‘permitted’, ‘controlled’, ‘restricted discretionary’, ‘discretionary’, ‘non-complying’ or ‘prohibited’. It is this classification, together with any matters listed for the assessment of applications for resource consent, that determines the matters to be considered in any given instance, and may also establish whether an application for a resource consent will be considered on a non-notified basis.

Thus rules in district and regional plans are crucial to the manner in which activities and subdivision likely to be affected by natural hazards are considered. This is apparent from a number of case studies and from the analysis below of section 106 RMA matters which note criteria for the evaluation of subdivision proposals.

District Plans can also have rules to protect property from the effects of surface water to require building work to achieve performance criteria additional to or more restrictive than the Building Act (s76(2A)).

Plans, policy statements and section 32

In preparing plans and changes to them, section 32 of the RMA 1991 requires Councils to consider the alternative ways to achieve the environmental outcomes being sought. Essentially, section 32 tests the appropriateness of any selected methods, assists in reasoning why changes are needed and formalises a process for working out how best to deal with environmental issues. This may be through a variety of ways which includes regulation as just one option.

The requirements of section 32 apply to the preparation of regional and district plans, plan changes, variations, policy statements and reviews. In producing a record of section 32 assessment, the analysis should preferably result in the production of a section 32 report to accompany the actual amendments or new provisions to be inserted in a plan or developed as a plan.

Councils must:

- determine the environmental issue
- address the extent to which any new objectives, policies and methods are needed to deal with the issue
- explore different methods/ways of dealing with the issue
- provide reasons for and against the proposed method and the principal alternatives
- evaluate the benefits and costs of the proposed method and the principal alternatives
- decide which method or methods is the most appropriate to achieve the purpose of the RMA.

The implications for section 32 are discussed in more detail below.

Subdivision, resource consents and section 106

Under the RMA Amendment Act 2003, section 106 reads: “Consent authorities may refuse consent in certain circumstances:

- (1) Despite section 77B a consent authority may refuse to grant a subdivision consent, or may grant a resource subdivision consent subject to conditions if it considers that
 - (a) the land in respect of which a consent is sought, or any structure on the land, is or is likely to be subject to material damage, erosion, falling debris, subsidence, slippage or inundation from any source; or
 - (b) any subsequent use that is likely to accelerate, worsen, or result in material damage to the land,

or structure by erosion, falling debris, subsidence, slippage or inundation from any source; or

(c) sufficient provision has not been made for legal and physical access to each allotment to be created by subdivision.

- (2) Conditions under subsection 1 must be – a) for the purposes of avoiding, remedying or mitigating effects referred to in subsection (1)...”

The consideration of s106 may be applied irrespective of the activity classification given to subdivision consents in district plans.

Previously there was a mandatory obligation on territorial authorities to refuse consent for subdivision if land was subject to the hazards noted, unless satisfied that effects could be avoided, remedied or mitigated. The RMA Amendment Bill 1999 (clause 41) included a proposal that s106 be repealed, on the basis that land suitability was more appropriately a matter for district plans than a specific directive via the Act, and that s106 was unnecessarily restrictive, for example where a boundary adjustment was proposed. The discretion now available to territorial authorities provides flexibility in applying considerations not only as related to boundary adjustments, but far more significantly, to consideration of hazards occurrence and management.

Comment about the implications of the amended section is found at Brookers RMA Note A106.09 including the observation that “the new limitation in subs (2) relating to conditions should not result in a materially different situation, given the ability to impose conditions under s220 (1) (d). It is, however, conceivable that applicants will “offer up” measures to obtain consent, given that consent authorities will retain a discretion to decline consent if they are not able to impose suitable or valid conditions...’. The test under s106 is not ‘what is the best means of protecting land and structures {but rather} to determine if proposals {may be} sufficient to avoid, remedy or mitigate potential effects of hazards to the land in question...One option to {manage erosion effects} is to vest land as a reserve. It is legitimate for a council to seek to avoid liability in determining whether a proposal is satisfactory. However that cannot be its primary concern because it is not part of the statutory requirement.’

It will be of particular interest to planning practitioners, engineers and others involved in hazards management to see how the discretion now available via s106 is applied. It will also be of interest to see:

- if amendments to s32 affect the listing of hazards environments in district plans as matters for consideration in the context of applications for resource consent.
- how the amendments are interpreted from a public liability/ individual responsibility basis.

Monitoring and review of plans and policy statements

Monitoring and review of plan and policy statements is required under section 35 of the RMA on an ongoing basis - to assess the effectiveness and efficiency of provisions compared with the overriding objective of sustainable management. Results of monitoring are to be published at intervals of not less than five years.

Monitoring may cover state of the environment matters (quality and quantity of natural resources, conditions and trends), impact monitoring (measuring the effects of specific activities on the environment), compliance matters (conditions of resource consents) and performance monitoring (measures whether councils are achieving desired environmental outcomes). The type of monitoring, and the extent, to which it is carried out, may well be dependent on the priority afforded specific issues, including risk management.

Monitoring of the state of natural hazard environments, effects of activities and performance monitoring may assist in better understanding of risk posed by natural hazards across jurisdictional boundaries. The mandatory publication of the five year review provides an opportunity to assess the significance attributed to natural hazards and risk management in any given area, and for specialists and others to make their views known to administrative agencies.

Civil Defence Emergency Management Act 2002 (CDEMA)

Resilient Communities and the 4Rs

In 2002, the Civil Defence Emergency Management Act (CDEMA) was enacted to repeal and replace the Civil Defence Act 1983. The Act is supported by the vision “Resilient New Zealand – strong communities, understanding and managing their hazards”. The CDEMA places new responsibilities on local authorities to manage the impacts of all hazards – both natural and technological.

Formulation of the CDEMA was driven by concerns about the ability of local authorities and the Government to adequately manage a civil defence emergency. Proposed changes recommended that local authorities take more responsibility for managing local risk, alongside the need for improvement in central government capability to manage large-scale emergency events.

To administer this new approach, the Ministry of Civil Defence & Emergency Management (MCDEM) was established in 2000 to replace the existing Ministry of Civil Defence. A key role of MCDEM was to develop the CDEM Act. The Civil Defence and Emergency Act (CDEM Act) addresses the role and function of civil defence organisations, responsibilities of government departments, utility and emergency services in reducing hazard risk, and in emergency response. The traditional focus of civil defence activities (waiting for a disaster to happen) has been expanded to encompass the 4 Rs of Reduction, Readiness, Response, and Recovery. Among other matters the Act improves and promotes:

- the reduction of risks through partnerships with communities
- a culture, processes and structures that encourage people and communities to undertake risk management, build operational capabilities for response and recover from emergencies.
- improve and promote the sustainable management of hazards to contribute to well-being, the safety of the public and the protection of property
- encourage and enable communities to achieve acceptable levels of risk by applying risk management.

Civil Defence and Emergency Management Groups

The CDEM Act requires the formation of CDEM Groups by 1 June 2003. These Groups will replace the existing civil defence functions presently carried out by every local authority. Instead of 84 local civil defence organisations each with their own plans there will now only be 14-16 CDEM Groups. Within two years of forming, each CDEM Group is expected to produce a CDEM Group Plan. CDEM Groups are a core component of the Act. They comprise a regional consortium of local authorities and emergency services who are to identify and understand hazards and risks, and manage such matters on the basis of the 4Rs (reduction, readiness, response and recovery).

CDEM plans “will logically build upon and improve existing civil defence and emergency management arrangements, and will aid a risk management approach to addressing hazards...” A key benefit of CDEM Group Plans is that they will pull together existing knowledge and processes rather than duplicate existing plans and policies. A major focus of CDEM groups will be on identifying existing reduction (mitigation) activities and identifying gaps and inefficiencies in this area (that is the ‘reduction’ part of the 4Rs). It is expected that reduction requirements identified as part of this process will be implemented mostly through regional and district plans.

CDEM Groups will seek to coordinate the policies and plans of local authorities, emergency services, lifelines and other agencies in their areas that have a hazard risk component. In doing so, the Group will draw upon the planning, hazard, risk and emergency management expertise of these organisations.

The CDEM Act has the potential to significantly reduce risk with its requirements for CDEM Groups to identify hazards, assess and prioritise the risk posed by these hazards, and identify the means to address this risk through the 4 Rs. With RMA planners playing a key role in the Reduction element of the 4 Rs, planners and emergency managers will need to work closely together in the development and implementation of hazard policy.

Building Act 1993 (BA)

Scope

Whereas the RMA enables councils to impose controls related to activities, including within buildings, and the effect of activities on the environment, the Building Act enables councils to control building in the interests of ensuring the safety and integrity of the structure. The purposes of the Building Act (BA) are defined as the provision of necessary controls for building work, use and safety and the coordination of these controls with other resource management mechanisms. The Act introduced a performance code and replaced the by-law regime previously in existence via former provisions of the Local Government Act.

The BA covers the construction of buildings and performance to code. The Building Code includes performance criteria for both buildings, and other property from various hazards. The Act is concerned with the nature of the land on which a building is to be erected because this will affect the structural design of the building. Provided that a territorial authority is satisfied on reasonable grounds that a building complies with the Code, and the plans lodged in support of an application for building consent are followed, it must grant building consent. Project approved documents to Code cite various New Zealand Standards, among other methods, for achieving code compliance. Additional methods include provision for “special studies”, which enable site design to particular environments e.g. in situations where buildings are close to fault lines.

Clause B1 of the Building Code specifies structural performance criteria for buildings. The criteria include that buildings shall “have a low probability of rupturing, becoming unstable, losing equilibrium, or collapsing during construction or alteration and throughout their lives”. Account must be taken of “all physical conditions likely to affect the stability of buildings” including earthquake, and due allowance is to be made for ‘the characteristics of the site’ and ‘accuracy limitations inherent in the methods used to predict the stability of buildings’.

There is limited guidance for territorial authorities on how to evaluate whether a particular design complies with Clause B1. A lack of consistent approach in assessing and interpreting specialist/technical advice where special studies are requested are an implementation concern.

Section 26 imposes a duty on every territorial authority to gather information and undertake or commission research necessary to effectively carry out its functions.

Under section 27(2) there is a requirement for territorial authorities to keep records of information including on “any land or building received from a statutory authority which has the power to -classify land or building for any purpose...”. This enables correlation and cross reference between building/structures data and resource management data, including the existence of natural hazards. Information about site specific hazards known to a local authority must be provided when a Project Information Memorandum, or PIM, is issued for a building project: section 31(2) (a).

A territorial authority shall refuse to grant a building consent involving construction of a building or major alterations to a building if:

- 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
- 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 - unless the territorial authority is satisfied that adequate provision has been or will be made to-
 - Protect the land or building work or that other property concerned from erosion, avulsion, alluvion, falling debris, subsidence, inundation, or slippage; or
 - Restore any damage to the land or that other property concerned as a result of the building work

Land that is subject to or likely to be subject to ‘erosion, avulsion, alluvion, falling debris, inundation or

slippage' may be the subject of a notice under section 36(2) of the Act. Section 36 has its origin in s64 and s641A of the Local Government Act which together with s274 dealt with subdivision and building on hazard prone land. Part of the rationale for those controls appears to have been to limit the liability of public bodies for (especially flood related) damage at a time when the relevant controls were highly prescriptive.

Section 36 (2) provides for a notice where a building consent is applied for and the territorial authority considers that:

- (a) The building work itself will not accelerate, worsen, or result in erosion, avulsion, alluvion, falling debris, subsidence, inundation, or slippage of that land or any other property; but
- (b) The land on which the building work is to take place is subject to, or is likely to be subject, erosion, avulsion, alluvion, falling debris, subsidence, inundation, or slippage

A s36 (2) notice attaches to title and indicates that either or both land and buildings for which a building consent has been issued are considered not adequately protected from the type of natural hazards specified. Earthquakes and wind hazards are excluded from the s32 listings: thus it is considered that a territorial authority cannot issue a notice on the basis that land is vulnerable to earthquakes. "The effect of a s36 (2) notice is to protect a territorial authority from future liability for damage caused by hazards, and to require the Earthquake Commission and general insurers to consider declining claims."

The relationship of the Building Act to the Resource Management Act in natural hazard management

While the Building Act is mainly about the safety of buildings themselves and the safety and health of people in them, it also touches on the siting of those buildings and the hazardscape within which the building is located. As such, the Building Act is a useful land use planning tool for managing the effects of natural hazards. Indeed, an often overlooked purpose of the Building Act is to co-ordinate Building Act controls with other controls relating to building use and the management of natural and physical resources.

The BA is not concerned with land use; it is the provisions of the RMA that govern what activities can take place on a particular site. The BA and codes relate to how buildings are to be designed and constructed rather than where they are able to be located. However, the BA provides controls that require buildings to be safe and so is concerned with the nature of the land on which a building is to be erected because it will affect structural design. If a building does not meet the structural performance criteria of the BA then it cannot be constructed on a particular site; thus the BA can influence the location of buildings in relation to natural hazards.

The Building Code (and perhaps some New Zealand Standards) provide for certain wind, snow and earthquake loadings. These loadings change from time to time, but generally they have been around for years and they have wide acceptance so much so that their contribution to the management of the adverse effects of various natural hazards is often overlooked. However, the relationship of the loadings to the probability of the hazard events to which the Building Code standards relate is debateable in some instances.

Local Government Act 2002 (LGA)

Purpose of local government

The purpose of local government is:

- to enable democratic local decision-making and action by, and on behalf of, communities; and
- to promote the social, economic, environmental, and cultural well-being of communities, in the present and for the future.

Role of a local authority

The role of a local authority is:

- to give effect, in relation to its district or region, to the purpose of local government stated in section 10; and
- perform the duties, and exercise the rights, conferred on it by or under this Act and any other enactment.

Increased responsibility for councils to work collectively

Triennial agreements

- Not later than 1 March after each triennial general election of members, all local authorities within each region must enter into an agreement containing protocols for communication and co-ordination among them during the period until the next triennial general election of members.
- Each agreement must include a statement of the process for consultation on proposals for new regional council activities.
- Before the next triennial general election of members, all local authorities within each region may meet and agree to amendments to the protocols.
- An agreement remains in force until replaced by another agreement.

Process for identifying community outcomes

- A local authority must, not less than once every 6 years, carry out a process to identify community outcomes for the intermediate and long-term future of its district or region.
- The purposes of the identification of community outcomes are:
 - to provide opportunities for communities to discuss their desired outcomes in terms of the present and future social, economic, environmental, and cultural well-being of the community; and
 - to allow communities to discuss the relative importance and priorities of identified outcomes to the present and future social, economic, environmental, and cultural well-being of the community; and
 - to provide scope to measure progress towards the achievement of community outcomes; and to promote the better co-ordination and application of community resources; and
 - to inform and guide the setting of priorities in relation to the activities of the local authority and other organisations.

A local authority may decide for itself the process that it is to use to facilitate the identification of community outcomes under, but the local authority must, before finally deciding on that process, take steps:

- to identify, so far as practicable, other organisations and groups capable of influencing either the identification or the promotion of community outcomes; and
- to secure, if practicable, the agreement of those organisations and groups to the process and to the relationship of the process to any existing and related plans;

and must ensure that the process encourages the public to contribute to the identification of community outcomes.

A local authority must monitor and, not less than once every 3 years, report on the progress made by the community of its district or region in achieving the community outcomes for the district or region.

Long Term Council Community Plans

The purpose of a long-term council community plan is to

- describe the activities of the local authority; and
- describe the community outcomes of the local authority's district or region; and

- provide integrated decision-making and co-ordination of the resources of the local authority; and
- provide a long-term focus for the decisions and activities of the local authority; and
- provide a basis for accountability of the local authority to the community; and provide an opportunity for participation by the public in decision-making processes on activities to be undertaken by the local authority.

A long-term council community plan adopted under this section must

- cover a period of not less than 10 consecutive financial years; and
- include the information required by Part 1 of Schedule 10

Local Government Official Information and Meetings Act 1987 (LGOIMA)

Land Information Memoranda

The Local Government Official Information and Meetings Act 1987 section 44A provides for land information memoranda (LIMs) on specific sites to be issued by territorial authorities on request. A LIM is required to include any special features of the land concerned, including natural hazards, provided that it is known to the territorial authority but is not apparent from the district plan.

The Soil Conservation and River Control Act 1931 (SCRCA)

Erosion and floods

Local government bodies have statutory responsibilities under the Soil Conservation and River Control Act “to minimise and prevent damage within its district by floods and erosion”.

Appendix 3: Considerations of means by which natural hazards may be addressed in plans and policy statements

Consideration: Effects-based Planning

Comment: The fact that the regulatory environment is non-prescriptive enables a degree of specificity consistent with geographical variations to the hazard environment and/or the level of risk deemed acceptable to a community.

Consideration: Integrated Management

Comment: Policy provisions are intended to provide for integrated management. Under the RMA the hierarchy of plan documents is intended to promote a consistent approach to the sustainable management of natural and physical resources.

There are currently no national policy statements other than the New Zealand Coastal Policy Statement (currently under review). This provides some direction in respect of coastal hazards. National environmental standards may also be prepared, and if in effect, need also to be taken into account for district and regional plans. Under the RMA 2003 Amendment Act a national environmental standard may include technical standards, methods and requirements (either individually or collectively) including standards for section 9 (use of land) matters. In principle a national environmental standard could address avoidance and mitigation of natural hazards; however as currently defined under the Act this would not include subdivisions.

An alternative approach to integrated management of hazard environments is the preparation of best practice guidelines, for example the planning guidelines for development close to active faults recently developed by the Ministry for the Environment and the Institute of Geological and Nuclear Sciences.

Whether or not there are national, regional and district provisions in place there is presently considerable reliance placed on regional and district councils in implementing RMA matters relating to natural hazards. Further, if issues for hazards management to be addressed via resource management documents are not fully canvassed at regional level this discrepancy will also likely be apparent, particularly in light of s62.

Consideration: Non-regulatory

Comment: Decision as to the resource management methods appropriate may include non-regulatory methods. Some commentators have noted that under RMA, compared to its predecessor statutes, the focus of local authorities in hazards management has been on monitoring, research and gathering of information duties, imposed under section 35 of the Act (discussed below) with possibly a parallel decline in regulatory management. Arguments for a regulatory approach have a counter in that the cost of this approach may be considered to exceed the benefits. It does not appear to have been documented whether non-regulatory methods are more successful in mitigating losses than a non-regulatory approach. Where regulatory provision is made, e.g. in the context of subdivision consents, this will usually result in the transfer of risk from the consent holder to successors in title.

Consideration: Reasonable use

Comment: Within the context of sustainable management, provisions of regional and district plans must enable reasonable use of land (section 85). Reasonable use includes the use or potential use of the land for any activity whose actual or potential effects on any aspect of the environment or on any [other] person would not be significant. Hence any burden imposed on private landowners by regulatory provision is to be kept in proportion to the public benefit gained from restriction (compensation is not payable in respect of plan provisions). A relevant consideration is whether the land as a whole is incapable of reasonable use. Reasonable use may be met if activities are possible in part but not all of the site. Section 85 recognises 'the bundle of landowner rights' and in the context of natural hazards management, this provision, together with the parallel requirement for adequate rationale to Plan rules via sections 32, 68, 78 and 9, mean that the wholesale setting aside of risk environments (protection of land over use

and development) as a means to avoid or mitigate natural hazards is unlikely to be supportable unless all or some of the following are present:

- the size of the area involved is relatively insignificant
- only a portion of individual land holding were affected
- the natural hazard environment existed in a bundle of other characteristics such as significant habitat, landscape or cultural values, was affected by climate change
- the hazard environment correlates with land identified for management for scientific purposes such as bio-diversity management or regional significant geological features.

Much of the case law about s85 concerns restriction of development as related to amenity values, such as protection of views.

Consideration: Section 32 Analysis

Comment: Sections 32 and 32A of the RMA Amendment Act require consideration of the extent to which intervention by plan and policy provision is necessary to achieve the purposes of the Act, the costs and benefits of the means proposed, and alternatives. Significantly this evaluation must take into account “the risk of acting or not acting if there is uncertain or insufficient information about the subject matter of policies, rules or other methods s32(4) (b). Where applied to the use of land, considerations of efficiency and effectiveness need to acknowledge that most land held privately is allocated in a market where individuals are free to make investment decisions in light of the costs they face in obtaining access to the resource. The risk analysis now required could be considered an explicit recognition that environmental management is largely about risk management. For those involved in natural hazards planning, the manner in which s32 4(b) is interpreted and applied will be of particular interest, not only in the way in which costs and benefits are attributed, but also whether the requirement for risk assessment will in itself alter the role of plans and policy statements in promoting hazards avoidance or mitigation.

For natural hazards management, sections 32 and 32A may offer other challenges:

- Although avoidance or mitigation of natural hazards are a specifically identified environmental outcome sought by the Act there are few indicators to suggest a baseline for regulatory intervention over other methods such as Building Code compliance for foundation and structural design, section 62 Notices under the Building Act, early warning response monitoring etc.
- Risk analysis for natural hazards is complex, requiring modelling, damage and probability assessments. Rigorous risk assessments can be very expensive and may be difficult to justify on a proposal by proposal or location by location basis. Outcomes may be influenced by the information available.
- Cost benefit may be more easily established for those plans and policy statements already having rules and thereby a track record as to benefit.
- The application of risk analysis and weighing of s32 considerations will also be influenced by ‘duty of care’ matters. Councils have an obligation to use reasonable care and skill when making land-use decisions; failure to do so may result in adverse effects to landowners, and could result in council liability. Behind local authorities reluctance to accept risk are concerns about potential liability. In that broad fuzzy area between very real and minimal risk, an ability to transfer risk and liability to an applicant {for resource consent] or owner can facilitate cautious development. Such an approach is entirely consistent with the exercise of ‘duty of care’ and the principles of individual responsibility and self-reliance. If regulatory provision is attached to use of land the costs of compliance will generally be met by individual title holders: if attached to matters for subdivision the cost of compliance may lie either with the applicant for resource consent or successors in title.

There is also the political context. The level of risk that may be acceptable to councils as regulators is not always the same level of risk that may be acceptable to ratepayers, or even council as advocate on behalf of ratepayers who have been affected by a natural hazard. The other aspect of the political context is the liability cost of not protecting the community properly.

Consideration: Classification of Activities

Comment: Where rules in regional and district plans are included as measures for hazards management the activity classification applied to land use and subdivision, together with any matters stated to be relevant are the key determinants to the manner in which the natural hazard environment, and potential adverse effects of activities, is addressed.

For activities listed as ‘discretionary’ or ‘non-complying’, consideration of natural hazards may be factored into Assessment of Environmental Effects documents in accordance with the 4th Schedule RMA. For activities listed as “controlled” or ‘restricted discretionary” natural hazards will only be relevant if specifically noted. Aspects listed in a plan for assessment also carry through to matters to be addressed as consent conditions.

Where a proposal is considered for resource consent, including subdivision, a consent authority may disregard an adverse effect of the activity on the environment if the plan permits an activity with that effect: section 104 (2) RMA 2003. This encapsulates the “permitted baseline” argument. This in essence refers to assessing potential effects of a proposal based on an environment encapsulating activities permitted as of right in a plan, rather than an existing environment.

The Amendment Act made the application of the permitted baseline a matter for discretion. However a permissive regime for the use of land operates unless reversed by Plan rules. Thus if the risk posed by natural hazards in any given instance is to be a matter for consideration in the assessment of development of the built environment, then prior knowledge, and appropriate plan provision are prerequisites to this process. This indicates just some of the difficulties that resource consent applicants face. Where natural hazards are not specified as a matter for consideration, and the permitted baseline is applied, the permissive regime is likely to predominate. If there are areas of significant risk but also having an established history of development, a paradigm shift to a preventive philosophy rather than one of emergency response may be needed if measures for the avoidance or mitigation of effects of natural hazards are extended to land use controls generally (including but not limited to residential environments).

The activity status given to facets of development (buildings, land use, subdivision and other structures), will also influence whether a matter will be publicly notified. For permitted and controlled activities, and some restricted discretionary activities, there may be no opportunity for public comment – hence the significance of early involvement in plan content if there are issues for hazard management that need to be addressed. Provision for public utilities by way of permitted activity status is common to a number of District Plans. This enables infrastructure development on an ‘as of right’ basis where occupying existing utility corridors/ networks, or in new locations arrived at by way of prior designation process. The permitted activity status reflects the fundamental nature of infrastructure services to community health and well being, but unless a matter is specifically canvassed in the designation process, places reliance of risk assessment and risk management (both matters of the public interest) fully upon infrastructure designers, industry codes of practice and other initiatives, such as the Lifelines project. The content of plans and policy statements reflects both the nature of information available and the outcome of the submissions/decisions process. For specialist areas such as natural hazards the ‘profile’ of an issue for sustainable management can be raised by those with technical knowledge and advocacy actions. This has been demonstrated over a number of years by conservation interests. Potentially those with appropriate engineering and scientific knowledge, insurance industry representatives and civil defence/ emergency management agencies have a larger role to play than is apparently now the case.

