

Flood Risk Mitigation Plan

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Executive Summary

The Flood Risk Mitigation Plan has been written:

- a) To achieve the natural hazards objectives of the Waikato Regional Policy Statement. These are to define the management functions of Environment Waikato and the district councils and to minimise the adverse effects associated with natural hazards.
- b) In response to Environment Waikato's flood management responsibilities under the Resource Management Act 1991, the Soil Conservation and Rivers Control Act 1941, the Land Drainage Act 1908 and the Local Government Act 1974.
- c) To achieve Environment Waikato's responsibilities under the Civil Defence Act 1983. The three aims of civil defence are to prevent the loss of life, to help the injured and to relieve personal suffering and distress.
- d) To meet the International Decade for Natural Disaster Reduction requirements. These include the provision of mitigation plans involving long term prevention, preparedness and community awareness.
- e) To integrate Environment Waikato's activities with other organisations, and assist them to achieve their organisational and professional responsibilities.

The Plan confirms the principles accepted by Environment Waikato as the basis of the Flood Risk Mitigation Plan. These include integration of the various flood management statutes, while recognising the primacy of the Resource Management Act 1991. There is also an emphasis on working in partnership with district councils and communities to find acceptable solutions to flooding issues.

The first section of the Plan clarifies the roles and responsibilities of various agencies across the several pieces of legislation to remove the legal barriers to mitigation. This will promote more efficient and effective flood risk management.

The second section of the Mitigation Plan deals with adverse effects of flooding and the management options for minimising them. Special emphasis is placed on progressively reducing the vulnerability of the community to reflect the thrust of the Resource Management Act 1991 and the huge cost of further modifying the residual flood hazard in the Region. Planned management options include risk assessment, consultation and prioritisation, together with their implementation methods.

The third section focuses on planned response and recovery. The aim of this section is to reduce the adverse effects of floods by acknowledging that, no matter how effectively pre-event planning reduces the vulnerability of the community to flooding, there will always be a residual risk. The effects can be lessened by planning for response and recovery.

This planning will ensure agencies can carry out their response and recovery functions in an effective and co-ordinated way.

Individuals and community groups have an important role in reducing the adverse effects of floods by ensuring they know what to do when a flood occurs and that they have plans in place to assist their recovery.

The final section focuses on the value of monitoring and review. This is aimed both at reviewing information - to ensure the best information is being used for pre-event planning and on reviewing plans to ensure they are achieving their objective

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Background and explanation

Flooding is a significant hazard in the Waikato Region. There are two aspects of the flooding problem: the flood hazard and the communities vulnerability to the hazard. The first phase of Environment Waikato's flood management strategy was to undertake a flood hazard analysis for the Waikato Region. The Flood Hazard Analysis¹ identifies areas that are prone to flooding and those areas with significant assets at risk from flood waters. The Flood Risk Mitigation Plan is the second phase. This Plan outlines the overall strategy for flood management in the Waikato Region.

Historically flood risk management reduced flood risk by reducing the flood hazard. As a result, many of the Waikato Region's river systems have been modified. This has led to the use of land that would otherwise have been frequently flooded. The use of this land for farming has resulted in the economic prosperity of the Region. Modifying the hazard reduces the risk from flooding. It does not eliminate the risk. Modification can have significant adverse effects on natural and cultural values of the river systems and their associated wetlands and floodplains.

Future management of the risk from flooding will aim to reduce the risk of flooding by reducing community vulnerability. This approach will move people and their assets from the path of flood waters. This reduces the potential for loss when flooding occurs.

Environment Waikato is responsible under several statutes to manage the flood risk. Environment Waikato and district councils have responsibilities to avoid and lessen natural hazards under the Resource Management Act 1991. The emphasis for Environment Waikato is on regional risk management. The emphasis for district councils is on controlling the effects of the use of land. Environment Waikato has a responsibility to minimise and prevent damage from floods under the Soil Conservation and Rivers Control Act 1942. Environment Waikato and district councils have responsibilities for land drainage and river clearance under the Land Drainage Act 1908 and the Local Government Act 1974. Both Environment Waikato and district councils have responsibilities for pre-event planning, response and recovery under the Civil Defence Act 1983.

The purpose of this Plan is to define the roles of Environment Waikato, district councils and the public in managing the effects of floods. This document will outline the methods that will be used to reduce the adverse effects of floods as well the hazard response function of Environment Waikato and district councils.

¹ Environment Waikato 1996: Flood Hazard Report - draft.

Principles

a) Recognise the Primacy of the Resource Management Act 1991

The Resource Management Act 1991 repealed and amended much of the previous legislation relating to water courses. The legislation that remains is subject to the RMA. For example, Part 1 section 10A of the Soil Conservation and Rivers Control Act 1941 states 'nothing in this Act shall derogate from the Resource Management Act 1991'.

Environment Waikato considers it vital in the development of mitigation policy to recognise the primacy of the RMA, while promoting the integration of the various Acts in policy development:

- i) Resource Management Act 1991.
- ii) Soil Conservation and Rivers Control Act 1941.
- iii) Land drainage Act 1908.
- iv) Local Government Act 1974.
- v) Building Act 1991.

The advantages of integration are: clarity, responsibilities will be dealt with by the most appropriate and legally bound agency, issues will not be passed from one agency to another and administration will become more efficient. Integration will be given overall authority through the Regional Policy Statement (RPS)².

b) Promote a Strategy of Avoidance then Mitigation

The RMA and the RPS give a strong lead for avoidance and mitigation through the control of land use. Land known to be subject to natural hazards should be subject to clear land use controls. New development, in particular, should be analysed for potential exposure or risk from natural hazards.

Mitigation is a tool which can be used to deal with situations where a combination of the natural hazard and the vulnerability of the community create a risk. Mitigation can be used for existing or proposed development to ensure an acceptable level of risk is maintained.

c) Information Readily Available

High quality information on hazards and potential risks and the widespread dissemination of this information are vital for effective risk management and risk reduction.

d) Commitment to Existing Schemes

The Waikato Region has extensive flood protection schemes. These flood protection works reduce the impact of the flood hazard for many communities in the Waikato Region. Environment Waikato has an ongoing commitment to the maintenance of existing flood protection schemes. While many of the schemes were built with the aid of government subsidies, these subsidies are no longer in place. It is now the communities' responsibility to pay for the maintenance of schemes from which they benefit. The operation of maintenance programmes is outlined in the asset management plans that are being developed by Environment Waikato.

² Environment Waikato March 1996: Regional Policy Statement.

e) Sustainability

Flood mitigation options should be assessed in terms of their sustainability. It is important that flood mitigation options reduce the risk from floods to the community. However it is also important that this is not at the expense of the natural and physical resources or the social, economic and cultural well-being of communities.

Sustainability of response and recovery measures should also be assessed. While human safety is the priority, post flood recovery should not occur in way that is environmentally unsustainable.

f) Partnership with District Councils

Environment Waikato and district councils both have responsibilities for natural hazard management. This Plan clearly defines the respective responsibilities and promotes a partnership approach to management. The natural hazards section (3.8) of the Waikato Regional Policy Statement, addresses the uncertainty over the allocation of responsibilities of the regional and district councils. Section 3.8.3 Management of Natural Hazards, Policy One, acknowledges the role district councils have historically undertaken for the control of the use of land.

g) Beneficiaries of Mitigation will be Expected to Pay

Environment Waikato recognises that community-based solutions that result from a facilitation process have a better chance of acceptance and implementation by the community.

The Local Government Amendment Act 1996 establishes a framework for identifying the beneficiaries of services, and highlights a user-pays approach. This reinforces the difficulty of imposing solutions to natural hazard problems on to a community, especially expensive solutions. An approach that allows the community to choose the mitigation options that best meet its needs and financial resources will enable communities and commercial businesses to make sound decisions.

h) Community Safety

Environment Waikato recognises the value of community input in decision making. However individuals and communities may opt to increase their risk to floods in order to receive a short-term benefit, at the expense of wider community safety.

Environment Waikato and district councils have a responsibility to enable communities to provide for their health and safety under the RMA. Environment Waikato has responsibilities for community safety under the Civil Defence Act 1983. The Waikato Region Civil Defence Plan 1996 states the three aims of civil defence. These are:

- i) to prevent loss of life
- ii) to help the injured
- iii) to relieve personal suffering and distress.

Therefore when Environment Waikato assesses flood risk management options, community safety has overriding importance.

i) Equity Issues

Environment Waikato will assess equity issues when advocating flood risk management options. Some land use activities can result in an inequitable share of costs and benefits. For example, economic benefit that is felt directly by a small number of individuals in the present, may result in an environmental cost that may

affect many people over generations. A mitigation option that solves a flooding problem for one location may worsen the flooding problem for another location. Management methods that modify the flood can adversely affect amenity values or archaeological sites. These issues will be identified through consultation. Any adverse effect on equity will be addressed when Environment Waikato assists communities to chose between management options.

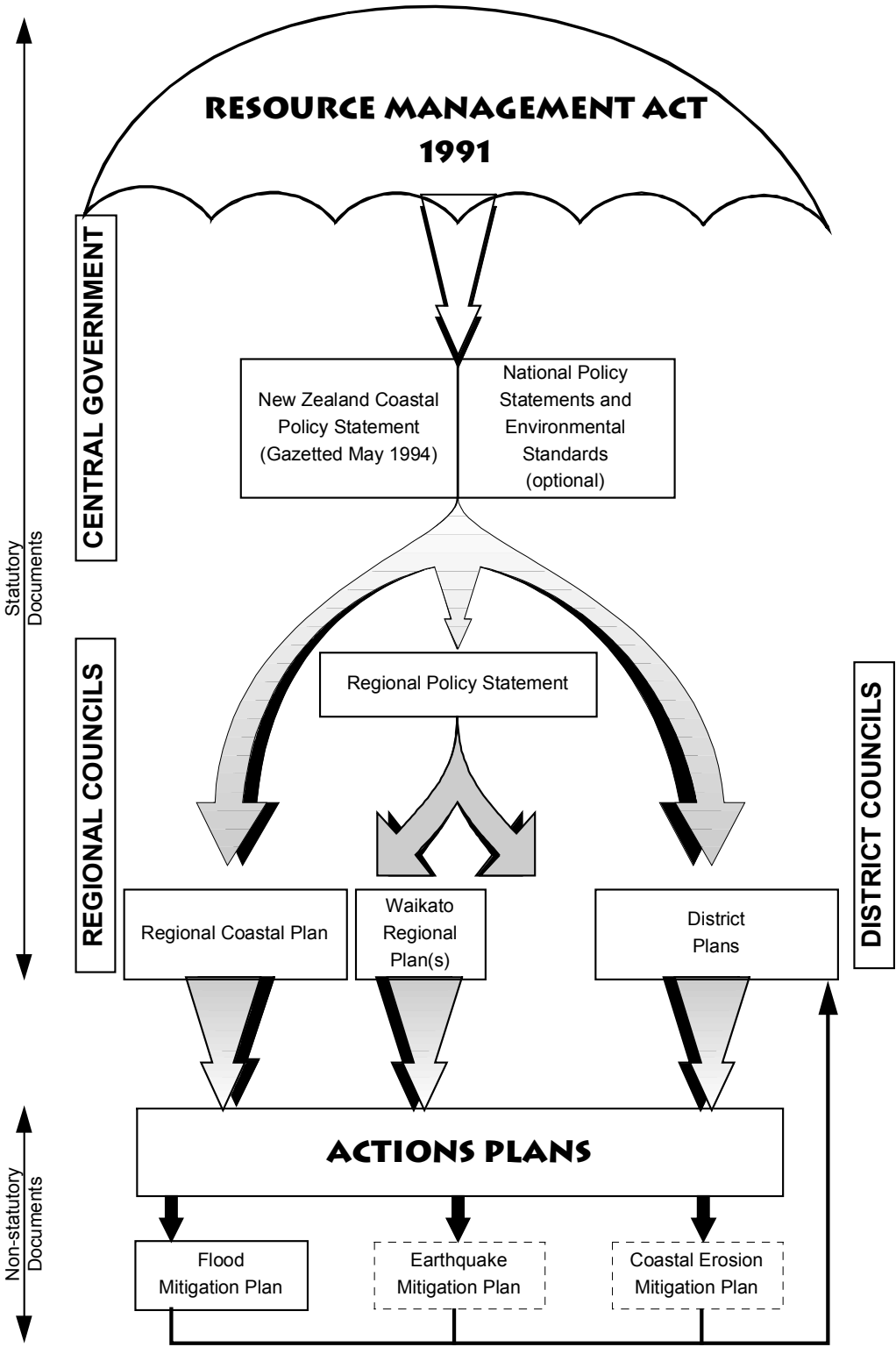


Figure 1: Planning Framework

1 Risk management

Issue: Ineffective and inefficient flood risk management may result if the flood risk management responsibilities of Environment Waikato, district councils and other groups are not clearly defined and accepted.

Objective: Manage the flood risk in a consistent and effective way throughout the Region.

Policy: The responsibilities of all relevant groups for the management of the flood risk in the Waikato Region are clearly defined and accepted.

Actions:

1. Define the roles for Environment Waikato, district councils and the public.
2. Ensure there is a commitment to the assigned roles through ongoing communication with district councils and the public.

Explanation and Principal Reasons for Adopting:

There are several Statutes that assign responsibilities to the regional and district councils for managing flooding. Environment Waikato has worked with the district councils in the formulation of this document to resolve any uncertainty regarding the legal roles and responsibilities of Environment Waikato and district councils.

Under the Local Government Act 1974 Environment Waikato has the responsibilities of former drainage and catchment boards. For areas covered by asset management plans, or separate rating areas of regional or district councils, the responsibility for flooding and erosion should be with the designated asset manager. For urban areas flooding caused by storm water can be dealt with by the district councils under Part XXVI and XXVII of the Local Government Act 1974.

Some areas do not have a designated asset manager, generally those areas outside of formally designated land drainage schemes or districts. For minor land drainage and river clearance issues that arise in these areas it is appropriate for the district council, using the provisions of Part XXIX of the Local Government Act 1974, to resolve these issues.

For obstructions in watercourses caused by debris becoming caught on bridges or bridge piers it is the legal responsibility of the bridge owner to remove the debris. Where an obstruction has a minor impact, district councils will enforce this responsibility.

For significant river flooding or erosion issues that arise outside of designated land drainage, catchment or river schemes it is appropriate for Environment Waikato to resolve the issues using the saved provisions of the Soil Conservation and Rivers Control Act 1941 as provided by section 37S of the Local Government Act 1974.

The hazard management emphasis for Environment Waikato is to have an overall view of the flood hazard in the Region. Environment Waikato's main function will be in the collection, analysis and communication of hazard and risk information and

information on how to reduce the risk from flooding. This will include the development of specific flood risk management plans.

District councils will have the responsibility for minor land drainage and flood issues and to implement the objectives of this plan through land use control and building standards. Environment Waikato and the district councils will work together following flood events to ensure speedy and effective response and recovery.

Environment Waikato will work co-operatively with district councils to integrate avoidance and mitigation options for flood risk through plans, and financial strategies. This plan encourages individuals and communities to take responsibility for their flooding risk. Environment Waikato will assist in this process by providing information, education and facilitating Care groups. The district councils will assist communities to take responsibility for their flooding risk by providing specific hazard information through LIM and PIM, implementing mitigation through land use and building restrictions and by educating the public about hazards and how to mitigate their effects and plan for their occurrence.

Case Law

The Resource Management Act 1991 establishes roles for both territorial and regional councils in consent applications for flood risk areas. Managing the flood hazard is a joint responsibility. The **Canterbury Regional Council V Banks Peninsula District Council 4/7/95** is an important case in defining the appropriate roles of the regional and district councils when their responsibilities overlap. This case allows regional councils to make specific policies on land-use management for the mitigation of natural hazards within district council boundaries. This role does not restrict the functions of district councils as stated in s31 of the RMA. The **Auckland Regional Council V North Shore City Council 4/7/95** puts limits on the regional councils' ability to include in its policy statement certain provisions that restrict district councils powers.

Under the RMA the district councils' responsibilities focus on the effects of land use. Environment Waikato is not confined to managing effects of natural hazards. The purpose of the legislative responsibilities is to achieve integrated management of the physical and natural resources of the Region. When large floods occur they cross district boundaries, so Environment Waikato will work with district councils to develop an integrated approach. In specific problem areas Environment Waikato will work with district councils and communities to determine the most effective option for reducing the flood risk. This may include additional or more restrictive land use or building standards.

Environmental Results Anticipated

1. Effective integrated management of the flood hazard.

Table 1: Roles and Responsibilities

Regional Council Functions

- Provide an overview of the flood risk management in the Region.
- Work with district councils to develop and implement the Flood Risk Mitigation Plan.
- Collect, analyse and communicate information to district councils and communities.
- Work with district councils to determine the priorities for specific flood risk management plans.
- Provide technical advice for specific flood risk management plans.
- Facilitate solutions for flooding problems in the Region where:
 - they are regionally significant,
 - flooding occurs on major rivers and streams that are contained within a district, where there is a significant community impact.
- Co-ordinate education programmes.
- Update, review and implement the Regional Civil Defence Plan.
- Review District Civil Defence Plans.
- Work in partnership with the districts for response and recovery following significant flooding events.

District Council Functions

- Provide input into the development of the Flood Risk Mitigation Plan.
- Implement the Flood Risk Mitigation Plan, specific flood risk management plans and district plans by determining appropriate:
 - land use
 - floor levels.
- Determine the type of development allowed in areas depending on the areas risk classification.
- Provide LIM and PIM information to the public.
- Take responsibility for managing minor land drainage and minor flooding issues.
- Deliver education programmes.
- Update, review and implement the district Civil Defence Plans.
- Implement efficient and effective response and recovery for flooding events. For significant flooding, districts will work in partnership with Environment Waikato for integrated response and recovery.

Iwi

- Provide input into risk assessment: for example archaeological sites, wahi tapu and taonga that are vulnerable to the flood hazard.

Public

- Provide input into risk assessment, particularly vulnerability information.
- Take action to reduce vulnerability of health and safety, property and businesses.
- Prepare for response and recovery.

Table 2: Integrating Flood Risk Management

Activity	Environment Waikato	District Council	Public	Environmental Outcome
Flood Risk Identification	Phase1: Broad hazard and risk information. Phase 2: Detailed hazard and risk identification based on regional priorities.	Collection and dissemination of site specific LIM and PIM information.	Collection of hazard information for the consent process. Input into risk assessment for specific risk management plans.	Awareness of risk.
Public Awareness and Education	Produce resources and co-ordinate education programmes in the Region.	Deliver education programmes.	Participate in education programmes.	Public support for mitigation of risk.
Mitigation Plan	Write the Flood Risk Mitigation Plan.	Provide input into the Plan.		Minimisation of risk.
Catchment Management	Soil conservation and landcare programmes.	Land use, planning, consent process, landcare.	Implementation of programmes, and participation in Landcare.	Secure headwaters and sustainable land use.
Care Groups	Integrated catchment management in partnership with district councils and communities.	Integrated catchment management in partnership with district councils and communities.	Integrated catchment management in partnership with district councils and communities.	Sustainable land management.
Control of Land Use		Provision in District Plans.		Reduce the vulnerability of the community.
Asset Management Plans	Development and implementation of Asset Management Plans	Provide input into the Asset Management plans.		Assets secure through their life cycle.
Specific Risk Management Plans	Identify the cause of risk and the flood risk and mitigation options. Work in partnership with district councils to produce the Plan.	Work in partnership with Environment Waikato to produce the Plan.		Identification of reason for hazard.

Activity	Environment Waikato	District Council	Public	Environmental Outcome
Facilitation of Solutions	Work with district councils and communities to implement the most appropriate mitigation option for priority issues.	Work with Environment Waikato and communities to implement the most appropriate mitigation option.	Work with Environment Waikato and district councils to implement the most appropriate mitigation option. Beneficiary pays.	Community objectives met.
Modify the Hazard	Identify options for new works. May work with district councils and communities to implement new works for priority issues.		Beneficiary pays.	Reduction of hazard.
Flood Warning	Continue to provide the flood warning service. Communicate flood warnings to the public and district councils.	Communicate flood warning to the public.	Respond to flood warnings.	Minimisation of risk.
Emergency Management and Civil Defence	Provide co-ordination. Review and implement the regional Civil Defence Plan. Review District Council Plans. Respond to Regional emergencies. Co-ordinate disaster preparedness education programmes.	Develop and implement District Civil Defence Plan. Respond to district emergencies. Deliver disaster preparedness education programmes.	Participate in education programmes. Emergency preparedness. Business continuance plans.	Reduction of damage and loss.

2 Reducing adverse effects

Issue: Communities may suffer property damage, economic disruption and risk injury or death if the flood risk is not identified and mitigated.

Objective: The vulnerability of the community to flooding is understood and reduced.

Policy: Environment Waikato and district councils will take a strategic approach to reduce the vulnerability of the community to the flood hazard.

Actions:

- 1 Natural hazards programme will undertake an overview assessment of flood risk in the Region including:
 - a Initial hazard assessment 1:250 000 (complete).
 - b Initial risk assessment 1:250,000 (complete).
- 2 Improve information availability to decision makers and the public through:
 - a Environment Waikato and district councils will exchange and integrate hazard and risk information.
 - b Electronic integration through GIS.
 - c District councils collect hazard information from consent applicants and will disseminate this information to the public through Land Information Memoranda (LIM) and Property Information Memoranda (PIM).
 - d Environment Waikato will regionally co-ordinate education programmes.
 - e District councils will have the primary role for delivering education programmes. Environment Waikato will provide support to district councils.
 - f Two-way flow of information between the community and Environment Waikato and district councils.
- 3 District councils will implement flood mitigation by including in their district plans:
 - a Restrictions for new development in hazard areas.
 - b Building standards that take account of the threat from floods.
- 4 Environment Waikato and district councils will use the broad risk information to prioritise the areas within the Region with an existing flood risk. Environment Waikato will work through the priorities to develop specific flood risk management plans for high-risk areas.
- 5 For those areas that require specific management plans, Environment Waikato will inform communities of a full range of risk management options:
 - a Avoid - land use.
 - b Mitigate - building standards, new works.
 - c Retreat - flood warning, re-location.
 - d Accept - education.
 - e Transfer - insurance.
- 6 Environment Waikato will use the care programme to encourage community ownership of the flood problem and empower communities to reduce their vulnerability to flooding.

Explanation and Principal Reasons for Adopting:

Flood risk is the chance of a flood occurring that will affect a community. Risk is measured in terms of consequences and likelihood. There are two components to the flood risk. These are the flood hazard - this is the physical event including the magnitude. The other component that makes up risk is community vulnerability including: personal values, economics, buildings and infrastructure.

Before the risk to communities can be assessed, accurate hazard and vulnerability information needs to be collected and assessed.

Environment Waikato has undertaken a broad regional flood hazard and risk assessment. The mapping is at a scale of 1:250,000. The hazard map provides a broad overview of the flood hazard in the Region and identifies areas of flood control, land drainage and areas that are prone to flooding. In the production of this map Environment Waikato collected information through surveys and discussions with the district councils, historical records and community knowledge. When developing the flood risk map Environment Waikato worked with the district councils to identify vulnerable areas. Of particular concern are areas that are prone to flooding, and are zoned as industrial, commercial or residential.

Environment Waikato has proposed to scope a Regional lifelines study as part of the earthquake mitigation plan during the 1997/98 financial year. The lifeline study will incorporate all the potential hazards in the Waikato Region, including flooding. Following the scoping exercise, study partners may undertake a lifelines study to identify the vulnerability of the Region's lifelines to the Region's hazards.

A lifeline study which involves a wide range of organisations has the advantage of raising the consciousness of utility providers to the effect of flooding on lifelines. The vulnerability of lifelines provides useful information for the public and businesses. When people have this information they can assess what mitigation and measures they can take to reduce the effect of the hazard on their lives.

Environment Waikato is progressively collecting, storing and disseminating information. The 1:250,000 map has been distributed to the district councils. The electronic integration of Regional and district councils information will enable more efficient information transfer and should ensure that the information that is provided to the community is of a consistent standard.

Environment Waikato has entered the flood hazard and risk map into the Council's Geographical Information System (GIS). District councils also have flooding information assembled in various forms including in some cases GIS. Environment Waikato will work with district councils to progressively integrate the GIS systems to aid the transfer of information.

District councils have a responsibility under the Building Act 1991 and the Local Government Information and Meetings Act 1987 to provide communities with LIM and PIM information. Much of this information is produced by consent applicants who are required to assess the risk from hazards for their proposed development. This site specific information is recorded in district hazard registers and is disseminated to Environment Waikato to contribute to the Regional hazard information data base. Integrated electronic information will assist in the management of natural hazards at a regional and district level. It will also make information more readily available to the public to assist in their decision making.

District councils make extensive use of hazard registers to flag potential hazards for people wishing to develop or purchase land. There is a reluctance to include hazard registers in District Plans because, once the register is included in the District Plan, a statutory document, changes to reflect better information would require a change to a

district plan. This is seen as undesirable because it may limit new information from being included in the registers.

Floods may have a significant and dramatic adverse effect on people's lives and lifestyle. This is an important adverse effect and has to be considered for effective flood risk management. Community perception of a hazard will determine the way individuals prepare for a potential hazard, the way they respond to warnings and the way they recover from an event. Community perception is linked to hazard awareness.

Ultimately individuals and communities have the ability to reduce their vulnerability to floods. Environment Waikato and district councils have a role in helping people understand the benefits they will receive from considering the risk floods pose and avoiding and mitigating these risks. Effective risk communication is a two-way process. Environment Waikato is committed to listening to community concerns. The public will be able to request information from Environment Waikato and district councils. This will allow them to make their own personal risk management decisions in an informed fashion.

Environment Waikato's role for education will involve information collection, co-ordination of education programmes and analysis of the success of education programmes in terms of community perception. District councils are the primary agency for the delivery of education programmes to the public and the provision of information for developers. Environment Waikato will provide support to district councils in this role.

Information for public education should be targeted and useful. Target groups may include schools, businesses, iwi and the public. Environment Waikato will provide information for the community in a form that is useful and written in plain English. This method is consistent with Environment Waikato's Environmental Education Strategy.

All the information that is collected by Environment Waikato and district councils will be available to communities. Communities and business people need to know the vulnerability of their locations to the flooding hazard so they can take precautions to reduce their risk when an event occurs.

District councils are responsible for establishing the appropriate land use and development standards in their districts. Environment Waikato communicates with all the district councils in the Region and can therefore enable the transfer of policy concepts between councils.

There are two ways that district councils can reduce the risk from flooding to new development. These are land use restrictions and building standards.

Generally intensive development will be best suited to zones of low hazard. In high hazard zones open space land use should predominate. However some development may occur, provided it can mitigate the risk to an acceptable level. The acceptable level of risk will be determined on a case by case basis. By controlling the use of land and building standards district councils can ensure no new flooding problems are created.

It follows that the intensification of development behind flood control works should be treated with caution. In the study 'Creating Flood Disasters', it was shown that the cost of flood damage in New Zealand had increased despite the construction of flood defences. The conclusive cause was the unwise intensification of development behind the defences which became swamped under floods greater than the design event. The intensification of development included residential, commercial, industrial and horticultural. Hence the risks of the intensification of development behind flood

defences needs to be carefully assessed in the planning process with appropriate provisions in district plans.

The risks associated with the intensification of development behind flood control works, subject to tidal influences, needs special consideration. Unlike river floods, tidal floods are also subject to natural diurnal fluctuations, elevated tides under low barometric pressure, tidal and wind generated surges and tsunamis. Hence the risk of overtopping is higher and more unpredictable. A general moratorium on intensification of development follows unless new development assets can be set above the worst scenario combination of tidal effects. Specific provisions should again be included in district plans.

Information Exchange and Dissemination

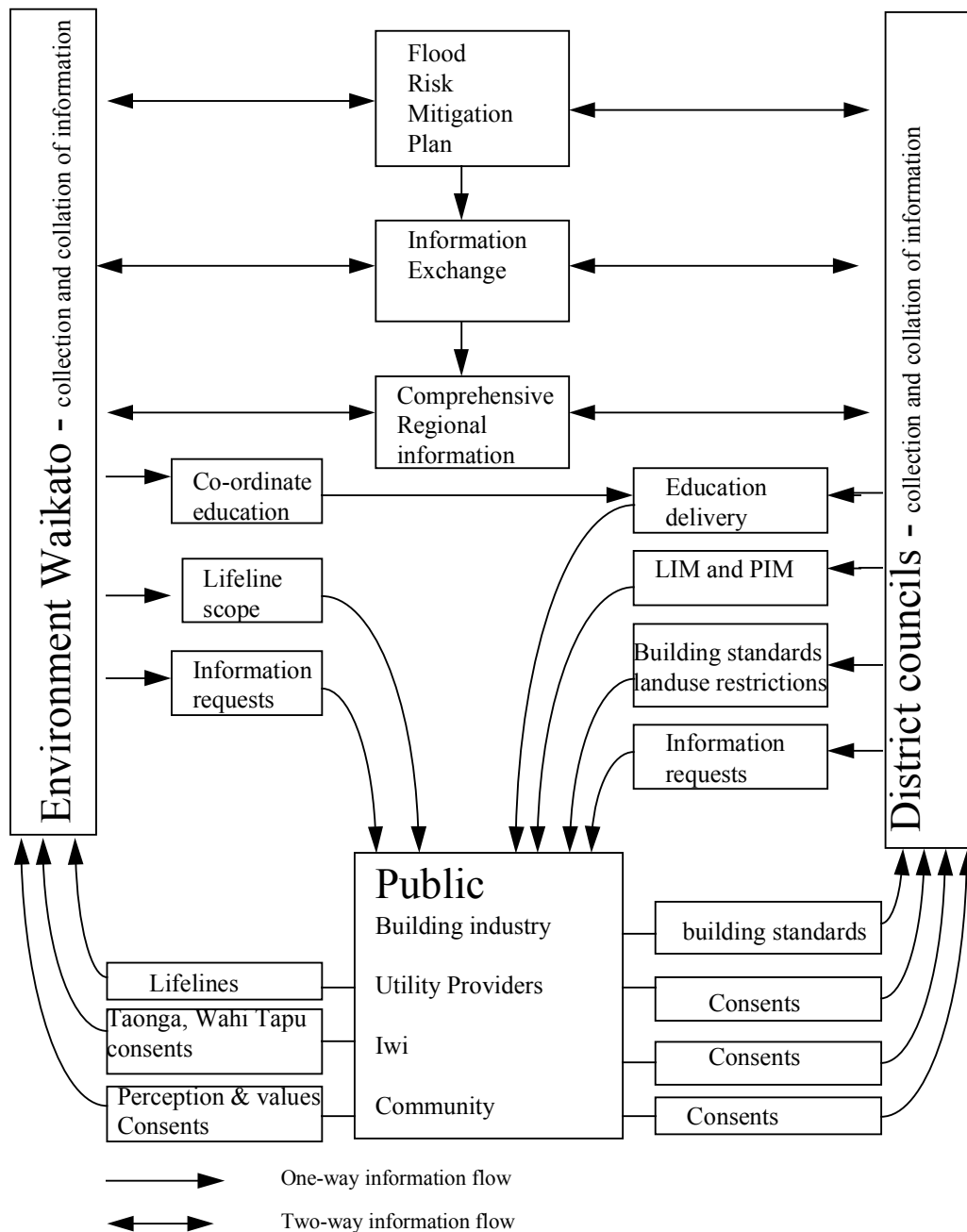


Figure 2: The Flow of Information Exchange and Dissemination

Another issue often raised is the filling of flood storage areas. The effect of filling a flood storage area may be to elevate flood levels in the balance of the storage area, to elevate flood levels in another storage area or to increase the velocity of the

floodwater as it compensates for the loss of storage. Any proposed filling of flood storage areas requires a full assessment of the environmental effects as part of a formal consent application if the filling is to proceed.

Where specific flood risk management plans have been prepared, some further refinement of the accuracy of flood design levels and flood storage levels may be possible. In these cases a greater level of precision can be made in the setting of floor levels to meet the design standard agreed in the management plan. As mitigation priorities are identified and new risk management plans are undertaken, more accurate information will become available for decision making.

Communities on vulnerable flood plains that are protected by flood control schemes should also use preventative planning methods to reduce the risk from flood events larger than the design flood. Preventative planning such as the raising of building floor levels above flood design level will ensure that flood mitigation remains effective under greater than design floods which either overtop the flood protection works or cause their failure.

District councils are obliged under the Building Code to keep stormwater out of buildings to at least a two percent flood event design standard. For communities protected by major flood control schemes to a higher design standard such as a one percent event, it is more appropriate to keep the higher design flows out of buildings. In all circumstances appropriate freeboards should be allowed in the setting of floor levels for buildings to cover uncertainties under actual flood conditions and statistical variations in the design assumptions.

Individual district councils have different needs. For example, district councils in headwaters tend to have fewer acute flood hazard problems and the level of detail required for management purposes are less than those district councils in lowland catchments. Another difference is that not all areas are subject to the same development pressures. The best method of managing the flood hazard is to prioritise areas that require specific flood risk management.

Risk management that does not have a system for prioritising risks and management options will work in an ad-hoc basis. This can result in vast effort and resources achieving minor results. Risk assessment ranks risks, risk reduction options and the reduction potential of risks. This method ensures a systematic approach to risk management. Prioritising risks will ensure that flood management does not just react to environmental pressure points. This should result in open, equitable and effective flood risk management.

The risk zones identified in the 1:250,000 map provide an indication of high-risk areas. The next phase of the flood risk assessment is to work with district councils to establish priority areas for further investigation. Environment Waikato will then undertake more detailed studies on flood risks to a scale no coarser than 1:50,000.

Environment Waikato will work with district councils and communities to implement the flood risk management option which best addresses the problem. Environment Waikato will provide technical advice, to an agreed scale, on:

- a) the nature of the hazard
- b) degree of risk
- c) the possible mitigation options.

Flooding is not a solely a physical phenomenon. The way that floods affect people's lives is an important adverse effect and has to be considered for effective flood risk management. The identification of community perception and community values will be undertaken by Environment Waikato as part of specific flood risk management

plans on a priority basis. This is an important process, to ensure that all the people who are effected by flooding are identified. It is also important to ensure all the values that are at risk are identified, including values at risk from the proposed flood mitigation options - these could include: non-target properties, eco-systems and archaeological sites.

The assessment of community perception and values are important steps in making flood mitigation programmes more effective. Values influence what risk communities consider acceptable. Community perception of the flood hazard will determine the way individuals prepare for a potential flood, the way they respond to warnings and the way they recover from an event. Environment Waikato will use value and perception information to assess the likely effectiveness of possible mitigation options and to target information to communities

Table 3: Flood Management Options

Avoid	District councils will include in their plans land use restrictions to avoid intensive development in high risk areas.
Mitigate	District councils will include in their plans - minimum floor levels. New works, such as land management or river control works, may be the most appropriate option. Environment Waikato's New Works Policy outlines guidelines for new works.
Retreat	Environment Waikato will continue to provide flood warning. Flood warning gives people time to retreat from flood waters. Environment Waikato is committed to maintaining the current flood warning network. The emphasis of Environment Waikato's flood warning service is for regionally significant flooding. It may be necessary for communities to retreat or to remove their assets from a flooded area. This may be the best option when flooding occurs regularly and mitigation has limited benefit in terms of its cost.
Accept	Education may be able to help communities accept the risk from flooding. Often flooding occurs because communities have chosen to settle on flood plains. In these situations people may have to accept that their property will flood in certain times of the year, that this is a natural process and it may be unsustainable to control flood flows.
Transfer	Individuals can use insurance as a method to transfer the cost of the flood risk. Insurance will reduce the financial impact when flooding occurs. Insurance also provides a market lead mitigation option. Insurance companies will charge higher premiums for regularly flooded land. This will create a value for flooding in the market.

For priority areas Environment Waikato will offer advice and expertise on a full range of options. Environment Waikato will apply cost and benefit analysis will be applied to all options. This will include the initial cost, the cost of ongoing maintenance, the benefits for health and safety, the environmental costs and benefits and the social costs and benefits. All this information will be made available to the community to assist it with its decision making.

Environment Waikato will encourage iwi, communities and individuals to participate in the decision making that effects them. Environment Waikato will work with the community to minimise the adverse effects of the flood hazard through the implementation of the risk management options determined through the consultation process. Through the implementation process Environment Waikato will aim to achieve the adoption of the objectives of this Plan by the community.

Environment Waikato will facilitate Care groups. Care groups have the potential to raise the awareness in the community of the effects of an individual's land use on the catchment as a whole. Hazard and risk information is most useful at a local scale. It is important to consider the whole catchment when identifying possible management options. The Care approach helps to identify the relationship between flooding and land use within the catchment, and to empower communities to reduce their vulnerability to flooding.

Environmental Results Anticipated

1. Clearly identified flood hazards and risk areas.
2. Flood risk management that addresses high-risk areas.
3. A well-educated community that understands the risk from flooding and the relationship that exists between people and natural events.

3 Response and recovery

Issue: Unplanned response and recovery could lead to increased trauma and economic loss.

Objective: The community returns to its normal routine as soon as possible following a flood.

Policy: Planned response and recovery.

Actions:

- | |
|--|
| <ol style="list-style-type: none">1 Environment Waikato will work with district councils and emergency services to co-ordinate response strategies:<ol style="list-style-type: none">a) Regular meetings with Environment Waikato, district councils and Emergency services.b) Environment Waikato will communicate flood warning to the public and to the district councils.c) Review district civil defence plans.d) Co-ordinate information release procedures.2 The natural hazards programme will implement a training plan, as part of its regional civil defence plan, to ensure all staff within Environment Waikato with civil defence responsibilities are trained and competent.3 District councils will have the primary role for raising public awareness about the appropriate response and recovery actions.4 Environment Waikato will encourage public and private sector organisations to produce business continuance plans. |
|--|

Explanation and Principal Reasons for Adopting:

Well-planned response and recovery plans that are co-ordinated with emergency service providers should ensure quick and effective response following a major flood.

Environment Waikato has Plans and procedures for flood emergencies. These procedures ensure the integration of flood warnings, rain warnings and river flow control. When a large flood event occurs the maintenance of flood warning and flow control is essential to manage the flood risk and provides for ongoing flood warning and management. Environment Waikato communicates flood warnings directly with the public. District councils are made aware of the flood warning information for their districts.

Environment Waikato and district councils have roles for the provision of civil defence response and recovery after flood emergencies. Civil Defence Plans establish the various roles and responsibilities when large floods occur³. There are standard operating procedures for these plans⁴ including the communication of information following an emergency. Environment Waikato is responsible for reviewing the district councils' civil defence plans.

³ Environment Waikato 1996: The Waikato Region Civil Defence Plan.

⁴ Environment Waikato 1996" Standard Operating Procedures for the Regional Civil Defence Plan.

Environment Waikato needs to ensure that staff that have civil defence responsibilities are trained and competent so response and recovery efforts operate as planned.

Planning for response and recovery is not just the responsibility of the local bodies who will co-ordinate the response effort. Individuals and businesses have an interest to ensure they are capable of responding to and recovering from major floods.

District councils have the primary role in communicating the need for individuals to prepare for a flood, to know what to do during a flood and to know where to seek help after a flood has occurred.

Environment Waikato and district councils also have a role in communicating the importance for businesses to plan for natural hazards and to have strategies to ensure their businesses can recover following a major flood

Planning for business continuation, in both public and private sectors, is a primary preparedness activity. Businesses which recognise the disruption a flood could cause and ensure they have plans to reduce the impact on their critical functions have a better chance of remaining in business. It is important for businesses to consider all potential impacts, including absent staff, destruction of stock or information and interruption of service links.

Environment Waikato will provide information to the businesses on the likely impact of a flood on lifelines, and the Region generally. District councils will be responsible for providing resources on how to develop a business continuance plan.

Planning will assist businesses to resume their functions quickly after flood. A serious flood could adversely effect the Regional economy. The development and implementation of business continuance plans will increase the resilience of the Regional economy.

The communication of preparedness, response and recovery information will occur before, during and after a flood event. Therefore it is important that Environment Waikato can ensure it has a communication network that is capable of operating effectively following a flood.

Environmental Results Anticipated

1. Minimal casualties and financial loss following flood events.
2. Reduced disruption and damage to communities and infrastructure following flood events.
3. Reduced cost of cleanup following a flood event

4 Monitoring and review

Issue: Information, technology and community needs and expectations are constantly changing. Plans and information which do not keep up with these changes will be ineffective in achieving their aims.

Objective: Policies and plans which keep abreast of changes in the environment, community vulnerability and community expectations.

Policy: Ongoing review and monitoring to identify the accuracy of information and whether policies, plans and procedures are achieving their objectives.

Actions:

1. The natural hazards programme will regularly review hazard information, vulnerability information, and the prioritisation of risk.
2. The natural hazards programme should develop and implement a system for ongoing consultation with district councils to assess the effectiveness of district council plans in achieving the objectives of this plan.
3. Work with district councils for the regular review of the effectiveness of plans in achieving their objectives.

Explanation and Principal Reasons for Adopting:

Monitoring and review is an ongoing process. It has two aspects: The monitoring and review of the hazard and vulnerability information to assess its accuracy and usefulness, and the monitoring and review of plans in achieving their objectives.

Monitoring and Review will occur at regular intervals to incorporate new information.

Monitoring and review will also occur after a major flood to determine how well plans have operated.

Environmental Results Anticipated

1. Flood risk information which is accurate and useful.
2. Plans which achieve effective flood risk management and meet community expectations.

Appendix I: Summary of actions - allocation of roles

Action	Who	When
1. Allocation and acceptance of roles and responsibilities.	Environment Waikato.	July 1997.
2. Assessment of the commitment to assigned roles.	District councils and Environment Waikato.	July 1997.

Appendix II: Summary of actions - reducing adverse effects

Action	Who	When
1. Initial overview assessment. a) 250,000 hazard. b) 250,000 risk. c) Lifeline scoping study.	Environment Waikato. Environment Waikato. Environment Waikato and consortium of Region's utility providers and district councils.	July 1997. 1995/96. 1996/97. Phase 1. Scope begins 97/98 year.
2. Information dissemination and exchange. a) Information exchange. b) GIS integration. c) Collection of LIM and PIM information. d) Co-ordination of education programmes. e) Delivery of education programmes. f) Twoway flow of information.	Environment Waikato, district councils. Environment Waikato and district councils. District councils. Environment Waikato. District councils. Environment Waikato, district councils and the public.	In place, ongoing, outlined in the RPS. 1997/98. In place - in district plans. 1997/98. In place - district plans. In RPS and district plans.
3. Implementation and enforcement. a) Land use and building. Land use restrictions. b) Building standards.	District councils. District plans.	Already in place, ongoing. Outlined in district plan. Already in place, ongoing. Outlined in district plans.
4. Specific management plans for prioritised existing problems.	Environment Waikato and district councils,	1997/98,
5. Mitigation options for existing prioritised problem areas. a) Avoid:	Environment Waikato, district councils and public.	Already in place - district plans, RPS.
b) Mitigation: i) Floor level. ii) New works.	District councils. Environment Waikato/ district councils (depending on the scale of the problem).	Already in place ongoing district plans. New Works Policy - draft, ongoing.
c) Retreat: i) Abandonment.	District councils.	Ongoing, cases by case.

Action	Who	When
ii) Flood warning.	Environment Waikato	Outlined flood warning review, ongoing.
d) Acceptance.	Environment Waikato.	Ongoing, outlined in the RPS.
e) Transfer.	Insurance companies and individuals.	Premiums are being adjusted according to risk.
6. Community ownership.	Environment Waikato.	In place through the landcare programme - ongoing.

Appendix III: Summary of actions - response and recovery

Action	Who	When
<p>1. Co-ordinate response strategies.</p> <p>a) Regular meetings with emergency services.</p> <p>b) Disseminate flood warning information to district councils.</p> <p>c) Review district councils civil Defence Plans.</p> <p>d) Co-ordinate information release procedures.</p>	<p>.</p> <p>Ministry of Civil Defence, Environment Waikato, district councils and emergency response services.</p> <p>Environment Waikato.</p> <p>Environment Waikato.</p> <p>Environment Waikato , district councils.</p>	<p>In place - outlined in the civil defence plan.</p> <p>In place - procedures in flood warning review.</p> <p>three yearly 7/8 reviewed for this cycle.</p> <p>In place - procedures in civil defence SOPs and flood warning SOPs.</p>
<p>2. Civil Defence training.</p>	<p>Environment Waikato.</p>	<p>In place - procedures outlined in Regional civil defence plan.</p>
<p>3. Community preparedness.</p>	<p>District councils (primary). Environment Waikato.</p>	<p>In place - outlined in the civil defence plan.</p>
<p>4. Business continuance plans.</p> <p>a) Public.</p> <p>b) Environment Waikato ensure can carry out response functions, e.g. power back ups for communication.</p>	<p>Environment Waikato (information). District councils (implementation advice). Environment Waikato.</p>	<p>1997/98 Ongoing.</p> <p>In place - requirements outlined in the civil defence plan.</p>

Appendix IV: Summary of actions - monitoring and review

Action	Who	When
1. Review of information.	Environment Waikato and district councils.	New information becomes available. Following a flood.
2. Review the effectiveness of the flood mitigation plan.	Environment Waikato and district councils.	New information becomes available. Following a flood.
3. Review of the effectiveness of district plans in achieving the objectives of the flood Risk Mitigation Plan.	Environment Waikato and district councils.	New information becomes available. Following a flood.

Appendix V: Responsibilities - Statutory

Statute	Duty	How does this plan achieve this duty?
Resource Management Act 1991		
Part III		
Section 30	Regional councils: the control of the use of land for avoidance or mitigation of natural hazards.	Environment Waikato will not directly define appropriate land use, but will work with district councils to establish acceptable levels of risk.
Section 31	District Councils: The control of actual or potential effects of use of land for avoidance or mitigation of natural hazards.	District councils control land use.
Section 32	Consider alternatives assess benefits and costs.	The management functions determined in the plan are the most effective and efficient. Cost and benefit analysis will be applied for any risk management option.
Section 35	To gather information, monitor and keep records.	Environment Waikato is information broker. Environment Waikato and district councils have an important role in conveying information to the public.
Soil Conservation and Rivers Control Act 1941		
Part I		
Section 10	c) The prevention of damage by floods. d) The utilisation of land to attain said objects.	The aim of the Plan is to reduce damage by floods. Control of land use is an important method of reducing damage by floods.
Section 10A	Nothing in this act shall derogate from the RMA.	This Plan recognises the primacy of the RMA in its principles.
Land Drainage Act 1908		
2a	Nothing should derogate from the RMA.	RMA has primacy in the principles.
Part 1	Duties and functions of drainage district and drainage boards.	Environment Waikato has the powers and functions of former drainage boards. How these functions are administered is defined by the Local Government Act 1974.
Part 1	Duties of drainage districts.	District councils have the powers and functions for drainage districts.

Statute	Duty	How does this plan achieve this duty?
17	Construct and maintain drains and water courses.	Environment Waikato will maintain drainage works under designated areas. The management of drainage issues is dealt with under the asset management plans.
Local Government Act 1974		
Part 1A		
Section 37s	<p>Environment Waikato has the responsibilities of former drainage and catchment boards.</p> <p>District councils have the responsibility for drainage districts.</p> <p>Shared responsibility for land outside designated drainage areas.</p>	<p>Environment Waikato will maintain its designated drainage networks through a designated asset manager.</p> <p>District councils will facilitate solutions for their designated drainage districts</p> <p>Environment Waikato will facilitate solutions for significant flooding. District councils will facilitate solutions for minor flooding problems.</p>
Part XXIX		
502	Nothing derogate from the RMA.	The principles support the primacy of the RMA.
511	Removal of obstructions in waterways enforced by Council. Responsibility of the asset manager. For areas without an asset manager both regional and district councils have responsibility.	<p>For minor drainage and flooding issues district councils will facilitate solutions.</p> <p>For regionally significant flooding, or issues on major rivers Environment Waikato will facilitate solutions.</p>
Part XXVI	Storm water and sewerage. Local authority to provide, cleanse, repair and maintain drains.	Minor urban flooding caused by storm water is a district council function.
Building Act 1991		
Part V		
Section 30	District councils to provide PIM.	PIM is a method for collection of detailed hazard and risk information and a method of disseminating information to the public - district council function.
Part IX		
Civil Defence Act 1983		
Part II	Planning responsibilities for regional and district councils.	Integration of regional and district councils response and recovery planning.
Part IV	Emergency response for Regional and district councils.	Integration of Environment Waikato, district council and emergency services response and recovery functions.

Statute	Duty	How does this plan achieve this duty?
Local Government Information and Meetings Act 1987		
Part VI		
Section 44	District councils provide LIM.	LIM is a method for collection of detailed hazard and risk information and a method of disseminating information to the public - district council function.

Appendix VI: Responsibilities - Environment Waikato documents

Environment Waikato Documents	Duty	How Does the Plan Achieve this Duty?
Waikato Regional Policy Statement		
Part 3.8	Management. Adverse Effects.	Clarifies management roles and responsibilities. Emphasis on reducing adverse effects by reducing community vulnerability. This is consistent with the RPS.
The Strategic Plan		
	Identifies the phases of natural hazard management.	Plan follows identification phase, outlines the steps the natural hazard programme will take to meet the strategic requirements.
Regional Civil Defence Plan		
	Response and Recovery.	Identifies a system for planned response and recovery.
Environmental Information Strategy		
	Monitor and review information.	Review of information. Review of plan.
Environmental Education Strategy		
	Raise public awareness about environmental issues through education.	Environmental education is an important method for achieving the plan's objectives.

Glossary

Acceptable Risk: An acceptable level of risk will be one that balances the benefits and costs of risk reduction measures, taking into account non-monetary costs, community aspirations and the statutory responsibilities. Public input is required to determine the level of acceptable risk.

Hazard: Natural events and the physical effects of the events, including probability and magnitude

Land Information Memorandum: District councils are required, under the Local Government Information and Meetings Act 1987, to provide information to anyone requesting it on matters affecting any land in the district. The information requirements are the same as those for PIM.

Lifelines: Networks for water, sewage, communications, electricity, gas, road and rail.

Mitigation: There are two meanings for mitigation. Both of these are used in the document:

- a) Those activities directed towards eliminating or reducing the probability of occurrence of a disaster producing event. This is the definition used by IDNDR, and is the meaning of mitigation in the title.
- b) Reducing the effects of those events that are unavoidable. This is the definition used in the RMA. This definition is used in the management options.

Preparedness: Those activities that prepare a framework for organised and immediate response to disaster situations which cannot be mitigated. The purpose is to save lives, minimise disaster damage and effects and to facilitate recovery.

Property Information Memorandum: District councils are required under the Building Act 1991 to provide this information to any one who requests it, with regard to proposed construction requiring a building consent. Information identifies the natural hazards of the land concerned, including, but not limited to: potential erosion, avulsion, falling debris, subsidence, slippage, alluvion or inundation, as well as other information.

Recovery: Those activities undertaken to return the community routine to an acceptable level whereby special measures are no longer required. A return to pre-disaster conditions is not always desirable; indeed many recovery operations incorporate mitigation measures so that the community does not suffer as badly in the next disaster.

Regional Significance: Means one or more of the following:

- a) Matters or values of national significance.
- b) Issues and/or effects that are of concern to substantial parts of the regional community.
- c) Values associated with natural and physical resources or any structure, place or feature which are rare or unique within the Region.
- d) The existence of significant cross administrative boundary issues and cumulative effects, where resources or effects cross administrative boundaries, and where co-ordination or integration of policies, actions or decision-making is required.

- e) Matters or effects which are of greater than local significance to tangata whenua.
- f) Core lifelines are adversely affected.

Response: Those activities that provide for temporary care and relief for victims of a disaster, and ensure that avoidable casualties and property damage do not occur. Outside assistance and support is frequently required.

Risk: The interaction of the hazard and the vulnerability of the community. The degree of risk is determined by the magnitude of the hazard and the level of importance placed on vulnerable community assets.

Significant Impact: Persistent flooding at regular intervals affecting a significant number of people.

Vulnerability: Community assets at risk from the hazard. Including personal values, infrastructure, buildings and the economy.

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This document was approved for issue by Environment Waikato on (June 1997). It is intended to review the document in 2003/2004. Note that the Civil Defence Act 1983 has now been replaced by the Civil Defence and Emergency Management Act 2002.