Section 32 report: natural hazards

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Section 32 Report

Natural Hazards

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Contents

1. Introduction

This report presents the Section 32 evaluation in accordance with the Resource Management Act 1991, "Consideration of alternatives benefits and costs" for the proposed Regional Policy Statement on natural hazards. Section 32 states:

32 Consideration of alternatives, benefits, and costs

(1) In achieving the purpose of this Act, before a proposed plan, proposed policy statement, change, or variation is publicly notified, a national policy statement or New Zealand coastal policy statement is notified under section 48, or a regulation is made, an evaluation must be carried out by—

.....

(c) the local authority, for a policy statement or a plan (except for plan changes that have been requested and the request accepted under clause 25(2)(b) of Part 2 of Schedule 1); or

(3) An evaluation must examine—

(a) the extent to which each objective is the most appropriate way to achieve the purpose of this Act; and

(b) whether, having regard to their efficiency and effectiveness, the policies, rules, or other methods are the most appropriate for achieving the objectives.

...

(4) For the purposes of [[the examinations referred to in subsections (3) and (3A)]], an evaluation must take into account—

(a) the benefits and costs of policies, rules, or other methods; and

(b) the risk of acting or not acting if there is uncertain or insufficient information about the subject matter of the policies, rules, or other methods.

(5) The person required to carry out an evaluation under subsection (1) must prepare a report summarising the evaluation and giving reasons for that evaluation.

(6) The report must be available for public inspection at the same time as the document to which the report relates is publicly notified or the regulation is made.

1.1 Structure of this report

Section 2 of this report outlines the regionally significant issues identified and the process of identification.

Section 3 outlines the objectives proposed in response to each issue and evaluates the appropriateness of each objective in accordance with the Resource Management Act.

Sections 4 to 6 evaluate the appropriateness of the policy and method options proposed to achieve each objective. When evaluating the policy and method options, the range of options available is outlined first, and then each option is evaluated. There are four types of options discussed in each instance. These are:

(a) Regulatory direction to district and/or regional plans

This is where a regional policy directs matters that must be provided for within district and/or regional plans. The method sets out when the provisions are to be included.

(b) Regulatory direction as to matters to be given particular regard in resource management decision making

This is where a regional policy sets out specific matters that are to be given "particular regard" when making resource management decisions. The method sets out when these matters are to be considered. This may include resource consent decisions, decisions on notices of requirements or when making decisions about reviewing, varying, replacing or otherwise changing district and/or regional plans.

(c) Non-regulatory options

This is where a regional policy and a method specifies non-regulatory programmes or action that will be put in place. The non regulatory methods include:

- provision of information or guidance
- integrating management
- identification or investigation
- providing support.

(d) Doing nothing

This is where no intervention, either regulatory or non-regulatory will occur.

Determining the most appropriate policies and methods is based on an assessment of the *effectiveness* and *efficiency* of the policy and method options, and the risks of acting or not acting when there is uncertain or insufficient information.

Effectiveness is a measure of how much influence a resource management intervention has or how successful it is in addressing the issues, in terms of achieving the desired environmental outcome. Effectiveness is a cumulative value, derived from the range of types and scope of influences or impacts of an intervention, towards achieving intended results and environmental outcomes. The effectiveness of an option is not able to be assessed as an absolute value. Rather, options are appraised as to whether they exhibit the qualities which contribute to 'effectiveness' and to what degree, and a determination is made as to the cumulative effect of the pertinent attributes in terms of high, medium or low 'effectiveness'.

When evaluating the *efficiency* of the policy and method options both the benefits (social, economic and environmental) and costs (social, economic and environmental) are outlined. Each option is then deemed to be either efficient or inefficient. The following diagram outlines how this assessment is undertaken.

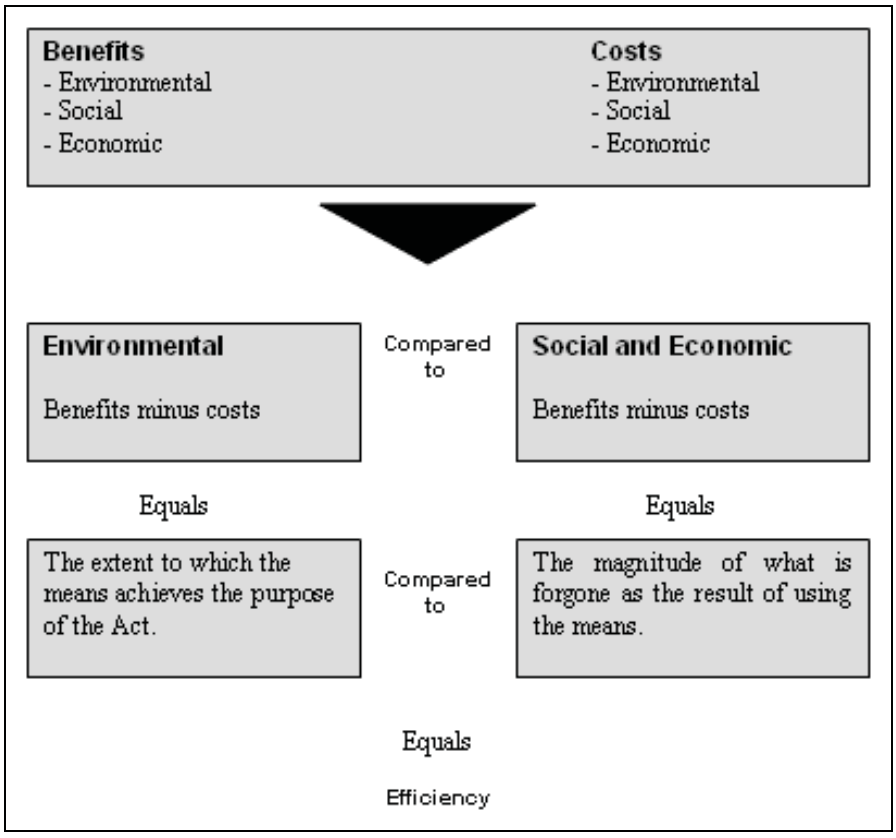

Figure 1: Deriving efficiency from benefits and costs

The evaluation of 'efficiency' will result in either a positive or negative result in terms of efficiency. Alternatively, if efficiency is expressed as a cost/benefit ratio, it will be either greater than or less than 1. In the event the ratio is considered to be less than 1, the option can be considered efficient, in that the sum of the benefits outweigh the sum of the costs. In the event the ratio is deemed to be greater than 1, the option can be considered to be inefficient, in that the sum of the costs outweigh the sum of the benefits. It is important to note that in this evaluation of 'efficiency', absolute values for each of the variables considered pertinent (i.e. identified as either a cost or a benefit within

the evaluation of the options) are not available. Rather, the analysis has endeavoured to present an accurate appraisal of the relative costs and benefits between the options, in order to determine which are efficient and which are not. A simple yes or no is used to differentiate the options as efficient or inefficient.

2. Regionally significant issues

As part of the review of the natural hazards chapter, in the Regional Policy Statement for the Wellington Region 1995, the issues were evaluated and reviewed using:

- Measuring up: The state of the environment report for the Wellington region (2005) and the Natural hazards background report (2005)
- Regional Policy Statement Evaluation Report for Natural hazards (2006)
- Our region – their future: A discussion document on the review of the Regional Policy Statement for the Wellington Region (2006)
- Updated Hazard and Risk Analysis for the Wellington CDEM Group Plan (2007)
- Wellington Region Civil Defence Emergency Management Group Plan (2005)
- Criteria to ensure the issues were regionally significant, were 'resource management' matters and appropriate for inclusion in the Regional Policy Statement (see Appendix 1 for a copy of the criteria).

The resulting issues recommended for inclusion in the proposed Regional Policy Statement on natural hazards are:

1. Effects of natural hazards

Natural hazard events in the Wellington region have an adverse impact on people and communities, businesses, property and infrastructure.

2. Human actions can increase hazard risk and consequences

People's actions including mitigation measures and ongoing development in hazard prone areas can cause, or increase, the risk and consequences from natural hazards.

3. Climate change will increase natural hazard events

Climate change will increase the risks from natural hazard events that already occur within the region, particularly:

(a) sea level rise: exacerbating the effects of coastal erosion and inundation and river flooding in low lying areas, especially during storm surge;

(b) increased frequency and intensity of storm events: adding to the risk from floods, landslides, severe wind, storm surge, coastal erosion and inundation; and

(c) increased frequency of drought: placing pressure on water resources and increasing the wild fire risk.

3. Extent to which the objectives are the most appropriate

The proposed natural hazards objectives are:

Objective 18: The risks and consequences to people, communities, their businesses, property and infrastructure from natural hazards and climate change effects are reduced.

Objective 19: Hazard mitigation measures, structural works and other activities do not increase the risk and consequences of natural hazard events.

Objective 20: Communities are more resilient to natural hazards, including the impacts of climate change, and people are better prepared for the consequences of natural hazard events.

To following is an outline of the extent to which each of the natural hazard objectives are the most appropriate way to achieve the purpose of the Resource Management Act.

3.1 Objective 18

Objective 18: The risks and consequences to people, communities, their businesses, property and infrastructure from natural hazards and climate change effects are reduced.

- The sustainability of communities, businesses, property and infrastructure involves balancing many interacting factors. One of these factors is natural hazards. The impacts from flooding, earthquakes, landslides, coastal erosion and wildfires can be devastating and costs of rebuilding after a natural disaster are very high; lives can be lost, economic activity impaired, people's livelihoods destroyed and valuable assets and infrastructure can be severely damaged.

- To meet the needs of Part II of the Resource Management Act, it is critical to manage the impacts from natural hazards for the health and safety of the community in order to enable people and communities to provide for their social, economic and cultural wellbeing. One of most efficient and sustainable way to minimise the risks from natural hazards is to avoid developing high risk areas.

- Objective 18 addresses significant aspects of both Issue 1 and 3, by providing a directive to avoid development and subdivision in areas identified as having a high risk from natural hazards.

- The state of the environment report 'Measuring up' (2005), found that there had been a number of regional investigations to identify areas affected by natural hazards. However, it went on to say that there is inadequate information that explains who and what exactly is at risk. Furthermore, land use decisions and consents do not always fully consider the risks from natural hazards. It was recognised in the report that the

effects of climate change may increase the frequency and magnitude of natural hazard events in the region.

- One of the issues arising from Regional Policy Statement Evaluation Report for Natural Hazards (2006) that assessed the effectiveness of the Regional Policy Statement was that the Regional Policy Statement listed only one natural hazards objective: "Any adverse effects of natural hazards on the environment of the Wellington region are reduced to an acceptable level". Feedback received in response to this objective raised two major problems. The first was that a single objective was not sufficient to capture all the major issues arising from natural hazards impacts. Secondly, it is not clear exactly what the term 'acceptable level' means, which resulted in considerable uncertainty when it was applied in consenting and planning cases.

- The 'Updated Hazard and Risk Analysis for the Wellington CDEM Group Plan' (2007), provides a complete assessment of the natural hazards that can and do affect the Wellington region. It shows that the region is susceptible to all the natural hazards that occur in New Zealand, with the exception of volcanic hazards.

- The Resource Management Act provides a mandate for regional councils to manage natural hazards, climate change effects and the effects of mitigation measures on the environment.

- Particular principles (within Part II of the Resource Management Act) of relevance include:

  7(b) the efficient use and development of natural and physical resources

  7(i) – the effects of climate change.

- Relevant subsections of Section 30 "Functions of regional councils" for Objective 18 include:

  30(1)(a) the establishment, implementation, and review of objectives, policies, and methods to achieve integrated management of the natural and physical resources of the region.

  30(1)(b) the preparation of objectives and policies in relation to any actual or potential effects of the use, development, or protection of land which are of regional significance.

  30(1)(c)(iv) the avoidance or mitigation of natural hazards

  30(1)(d)(v) & (g)(iv) in respect of any coastal marine area or bed water body in the region, the control (in conjunction with the Minister of Conservation) of any actual or potential effects of the use, development, or protection of land, including the avoidance or mitigation of natural hazards.

- Policies in the New Zealand Coastal Policy Statement (1994) that are relevant to achieving Objective 18 include:

  Policy 3.3.1 - Because there is a relative lack of understanding about coastal processes and the effects of activities on coastal processes, a precautionary approach should be adopted towards proposed activities, particularly those whose effects are as yet unknown or little understood. The provisions of the Act which authorise the classification of activities into those that are permitted, controlled, discretionary, non-complying or prohibited allow for that approach.

  Policy 3.3.2 - Local authorities should share information and knowledge gained by them about the coastal environment, particularly where it relates to coastal processes and/or to activities with previously unknown or little known effects.

  Policy 3.4.1 - Local authority policy statements and plans should identify areas in the coastal environment where natural hazards exist.:

  Policy 3.4.2 - Policy statements and plans should recognise the possibility of a rise in sea level, and should identify areas which would as a consequence be subject to erosion or inundation. Natural systems which are a natural defence to erosion and/or inundation should be identified and their integrity protected.

  Policy 3.4.5 - New subdivision, use and development should be so located and designed that the need for hazard protection works is avoided.

On the basis of the above, objective 18 is the most appropriate for achieving the purpose of the Resource Management Act.

3.2 Objective 19

Objective 19: Hazard mitigation measures, structural works and other activities do not increase the risk and consequences of natural hazard events.

- Objective 19 addresses significant aspects of Issue 2 by recognising that human activities can have an adverse effect on the natural environment. Such activity can increase the risk from natural hazards by interfering with the functioning of natural processes, that either directly increases the risk or reduces the buffering capacity of natural systems. For example, slope modification can lead to increased runoff and over-steepening of a hillslope, leading to soil erosion and increasing the risk from landslide. Mining sand from a dune or beach or building houses in a sand dune system, effectively removes sand from a beach system and reduces its buffering capacity for coastal erosion and storm events.

- Human life and the communities we built are inseparably linked with the natural environment. Sustainable management is a cornerstone of the Resource Management Act. Part II of the Resource Management Act

outlines the purpose and principles of the Act. It states that sustainable management means managing the use, development and protection of natural and physical resources in a way or at a rate which enables people and communities to provide for their social, economic and cultural wellbeing and for their health and safety while – (a) sustaining the potential of natural and physical resources to meet the reasonably foreseeable needs of future generations; and (b) safeguarding the life supporting capacity of air, water, soil and ecosystems; and (c) avoiding remedying or mitigating any adverse effects of activities on the environment.

- Hazard mitigation measures, structural works and other activities often interfere with natural processes and increase the risk and consequences of natural hazard events.

- Many of the issues arising from the management of natural hazards relate to Section 5 principles. To meet the needs of Section 5, it is important to manage the effects that hazard mitigation measures have on the environment to both, ensure the health and safety of the community; and to safeguard the natural environment for the future. This necessarily involves the avoidance, remediation or mitigation of any adverse effects of hazard management activities on the natural environment.

- Objective 19 recognises that natural events and hazards are a part of the natural environment in which we live, but that it is necessary to reduce the adverse impacts that often arise from mitigation measures.

- The state of the environment report, Measuring up (2005), found that development around the region often exacerbated the effects from natural hazards. It also found that development in hazard prone areas was sometimes directly responsible for triggering or pre-disposing disaster events, such as landslides.

- It was noted in Regional Policy Statement Evaluation Report for Natural Hazards (2006), that effective hazard management plans can deal simultaneously with the effects from natural hazards and hazard mitigation works. A good example of this is the Hutt River Floodplain Management Plan (2001). The report also notes that in some places, hazard mitigation works are unavoidable and necessary.

- The Resource Management Act provides a mandate for Regional Councils to manage natural hazards, and the effects of mitigation measures on the environment. Particular principles (within Part II of the Resource Management Act) of relevance include:

  7(b) the efficient use and development of natural and physical resources

  7(g) any finite characteristics of natural and physical resources

- Relevant sub sections to Section 30 "Function of regional councils" for Objective 19 include:

  30(1)(a) the establishment, implementation, and review of objectives, policies, and methods to achieve integrated management of the natural and physical resources of the region.

  30(1)(b) the preparation of objectives and policies in relation to any actual or potential effects of the use, development, or protection of land which are of regional significance.

  30(1)(c)(iv) the avoidance or mitigation of natural hazards.

  30(1)(d)(i) in respect of any coastal marine area in the region, the control (in conjunction with the Minister of Conservation) of land and associated natural and physical resources.

  30(1)(d)(v) & (g)(iv) in respect of any coastal marine area or bed water body in the region, the control (in conjunction with the Minister of Conservation) of any actual or potential effects of the use, development, or protection of land, including the avoidance or mitigation of natural hazards.

- Policies in the New Zealand Coastal Policy Statement (1994) are relevant to Objective 19 include:

  Policy 3.4.1 - Local authority policy statements and plans should identify areas in the coastal environment where natural hazards exist.:

  3.4.2 - Policy statements and plans should recognise the possibility of a rise in sea level, and should identify areas which would as a consequence be subject to erosion or inundation. Natural systems which are a natural defence to erosion and/or inundation should be identified and their integrity protected.

  Policy 3.4.3 - The ability of natural features such as beaches, sand dunes, mangroves, wetlands and barrier islands, to protect subdivision, use, or development should be recognised and maintained, and where appropriate, steps should be required to enhance that ability.

  Policy 3.4.4 - In relation to future subdivision, use and development, policy statements and plans should recognise that some natural features may migrate inland as the result of dynamic coastal processes (including sea level rise).

  Policy 3.4.5 - New subdivision, use and development should be so located and designed that the need for hazard protection works is avoided.

  Policy 3.4.6 - Where existing subdivision, use or development is threatened by a coastal hazard, coastal protection works should be

permitted only where they are the best practicable option for the future. The abandonment or relocation of existing structures should be considered among the options. Where coastal protection works are the best practicable option, they should be located and designed so as to avoid adverse environmental effects to the extent practicable.

On the basis of the above, objective 19 is the most appropriate for achieving the purpose of the Resource Management Act.

3.3 Objective 20

Objective 20: Communities are more resilient to natural hazard, including the impacts of climate change, and people are better prepared for the consequences of natural hazard events.

- Objective 20 addresses significant aspects of Issues 1 and 3 by recognising that, whilst natural hazard events are unavoidable, people and communities can be prepared for them through sound management, planning and community awareness and preparation. There are many aspects to hazard management that involve the principles of hazard reduction, readiness, response and recovery. Together, all these aspects help build communities that are more resilient and less vulnerable to the impacts from natural hazards. If people and developments are prepared for natural hazard events, they are better able to deal with the consequences from natural disasters.

- Whilst there may still be some debate around the degree to which human activity has caused climate change, there is an almost universal acceptance that there are significant changes occurring in the global climate, and these changes are being felt at a local level. Regardless of the causes of climate change, its effects are felt by people and the community. The changes in the climate that are currently being experienced have a major influence on natural hazard events. Sea levels have been rising around New Zealand at mean rates of 1.8 mm/yr for over 100 years and temperatures have risen almost 1.0oC. Rising sea levels increase the height of high tides, enhance the effects of coastal flooding and can cause shoreline changes, including erosion and sedimentation as they adjust to new water levels. A warmer climate increases the risk from storminess and drought. Increases in the magnitude or frequency of storm events can lead to greater incidences of extreme rainfall, severe wind events, flooding and landslides. Drought conditions exacerbate the wildfire risk.

- Objective 20 relates to Section 5 principles of the Resource Management Act; to ensure the health and safety of the community; and to provide for their social, economic and cultural wellbeing. Whilst s 7(i) makes explicit, the need to take the effects of climate change into account in the management and use and development of natural resources.

- In the discussion document Our region – their future (2006), there was strong recognition of the need to quantify and manage the effects of climate change.

- One of the themes in the state of the environment report Measuring up (2005) was that being prepared for natural hazards goes a long way toward mitigating their impacts on the community. This includes preparation by both regional authorities and individuals. The aim is to reduce vulnerability to hazard events and build resilient communities able cope with them when they do occur.

- The Resource Management Act provides a mandate for Regional Councils to manage natural hazards, and climate change effects as it relates to sustainable management and the health and well being of the community.

- Particular principles (within Part II of the Resource Management Act) of relevance include:

  7(b) the efficient use and development of natural and physical resources

  7(i) – the effects of climate change.

- Relevant sub sections to Section 30 "Function of regional councils" for Objective 20 include:

  30(1)(a) the establishment, implementation, and review of objectives, policies, and methods to achieve integrated management of the natural and physical resources of the region.

  30(1)(b) the preparation of objectives and policies in relation to any actual or potential effects of the use, development, or protection of land which are of regional significance.

  30(1)(c)(iv) the avoidance or mitigation of natural hazards.

- Policies in the New Zealand Coastal Policy Statement (1994) are relevant to Objective 20 include:

  Policy 3.3.1 - Because there is a relative lack of understanding about coastal processes and the effects of activities on coastal processes, a precautionary approach should be adopted towards proposed activities, particularly those whose effects are as yet unknown or little understood. The provisions of the Act which authorise the classification of activities into those that are permitted, controlled, discretionary, non-complying or prohibited allow for that approach.

  Policy 3.3.2 - Local authorities should share information and knowledge gained by them about the coastal environment, particularly where it relates to coastal processes and/or to activities with previously unknown or little known effects.

  Policy 3.4.1 - Local authority policy statements and plans should identify areas in the coastal environment where natural hazards exist.:

Policy 3.4.2 - Policy statements and plans should recognise the possibility of a rise in sea level, and should identify areas which would as a consequence be subject to erosion or inundation. Natural systems which are a natural defence to erosion and/or inundation should be identified and their integrity protected.

Policy 3.4.3 - The ability of natural features such as beaches, sand dunes, mangroves, wetlands and barrier islands, to protect subdivision, use, or development should be recognised and maintained, and where appropriate, steps should be required to enhance that ability.

Policy 3.4.4 - In relation to future subdivision, use and development, policy statements and plans should recognise that some natural features may migrate inland as the result of dynamic coastal processes (including sea level rise).

Policy 3.4.5 - New subdivision, use and development should be so located and designed that the need for hazard protection works is avoided.

Policy 3.4.6 - Where existing subdivision, use or development is threatened by a coastal hazard, coastal protection works should be permitted only where they are the best practicable option for the future. The abandonment or relocation of existing structures should be considered among the options. Where coastal protection works are the best practicable option, they should be located and designed so as to avoid adverse environmental effects to the extent practicable.

On the basis of the above, objective 20 is the most appropriate for achieving the purpose of the Resource Management Act.

3.4 Analysis of the most appropriate objectives

Final chosen objective	Other alternatives?	Why not most appropriate to achieve the Resource Management Act
Objective 18: The risks and consequences to people, communities, their businesses, property and infrastructure from natural hazards and climate change effects are reduced.	Alternative 1. Risk reduced to an acceptable level. Alternative 2. No inappropriate development. Alternative 3. Retain the objective in the existing 1995 Regional Policy Statement on natural hazards.	Alternative 1. Term 'acceptable level' not clearly defined and will vary from location to location and through time. Alternative 2. Term 'inappropriate development' is highly contestable and would be too permissive of development in high risk areas. Alternative 3: Measuring up (2005) and the Regional Policy Statement Evaluation Report on Energy (2006) assessed that there had been poor performance towards achieving the existing objectives in the Regional Policy Statement. The poor achievement of these objectives is attributed to the fact that the objectives address a range of matters that could not be managed or achieved through a regional policy statement. The re-use of the existing objectives (Alternative 3), is therefore, not appropriate.
Objective 19: Hazard mitigation measures, structural works and other activities do not increase the risk and consequences of natural hazard events.	Alternative 1: Use and development activities to reduce risk. Alternative 2. Retain the objective in the existing 1995 Regional Policy Statement on natural hazards.	Alternative 1: This alternative is unrealistic in order to reduce risk in areas already developed. The mere act of building in some areas, can increases the risk. Better to keep objective manageable and realistic. Alternative 2: Measuring up (2005) and the Regional Policy Statement Evaluation Report on Energy (2006) assessed that there had been poor performance towards achieving the existing objectives in the Regional Policy Statement. The poor achievement of these objectives is attributed to the fact that the objectives address a range of matters that could not be managed or achieved through a regional policy statement. The re-use of the existing objectives (Alternative 3), is therefore, not appropriate.
Objective 20: Communities are more resilient to natural hazard, including the impacts of climate change, and people are better prepared for the consequences of natural hazard events.	Alternative 1: No objective – laisse fare – people to manage and cope on their own. Alternative 2. Retain the objective in the existing 1995 Regional Policy Statement on natural hazards.	Alternative 1: This alternative is an untenable position when regional authorities have resources and mandate to help communities prepare for natural hazards. Alternative 2: Measuring up (2005) and the Regional Policy Statement Evaluation Report on Energy (2006) assessed that there had been poor performance towards achieving

Final chosen objective	Other alternatives?	Why <u>not</u> most appropriate to achieve the Resource Management Act
		the existing objectives in the Regional Policy Statement. The poor achievement of these objectives is attributed to the fact that the objectives address a range of matters that could not be managed or achieved through a regional policy statement. The re-use of the existing objectives (Alternative 3), is therefore, not appropriate.

Table 1: Analysis of the most appropriate objectives

4. Evaluation of policies and methods to achieve objective 18

The appropriateness of the policies and methods to achieve Objective 18 are evaluated by looking at the effectiveness and the efficiency of the policy and method options, and the risks of acting or not acting if there is uncertain or insufficient information.

4.1 The range of policy and method options considered

Objective 18 seeks to avoid or minimise natural hazard risks to people communities, businesses, property and infrastructure.

4.1.1 Regulatory direction to district and/or regional plans

Option 1 – Direction to district plans to identify and avoid subdivision and development in high risk areas

This approach requires policies and rules to be included in district plans to identify areas at high risk from natural hazards and to have policies to avoid subdivision and development in high risk areas.

Option 2 – Direction to district plans to ensure no inappropriate development in high risk areas

This option requires policies and rules to be included in district plans that do not allow inappropriate development in areas at high risk from natural hazards.

Option 3 – Direction to district plans to require no building in identified hazard areas

This option requires policies and rules to be included in district plans that do not allow development to proceed in areas that are identified as having a hazard risk.

4.1.2 Regulatory direction as to matters to be given particular regard in resource management decision making

Option 4 – Direction to consider minimising the adverse effects of natural hazards

This option requires local authorities to have particular regard to specified matters in order to minimise the adverse effects of natural hazards when making resource management decisions, including a requirement to avoid development if the hazard risk is assessed as high.

4.1.3 Non-regulatory options

Option 5 – Provision of information about areas at high risk from natural hazards

This approach is to conduct or commission research into specific hazards affecting the region and the risks they pose, in order to aid the development of risk management strategies and planning and decision making, including the development of policies for regional and district plans.

Option 6 – Provisions of information about natural hazard and climate change effects

This approach is to develop and distribute information about natural hazard and climate change effects, including how development may exacerbate those effects, and to suggest ways of mitigating any adverse effects. For example, design guidelines on how to locate dwellings on the coast to minimise the effects of natural hazards, hazard maps and reports on specific hazards and/or reports in specific areas of interest.

Option 7 – Integrated management, a memoranda of understanding

This approach is to formulate a flood management memoranda to establish responsibilities between authorities for flood management around the region.

4.1.4 Doing nothing

Option 8 – No intervention

This option offers no intervention in the management of natural hazards.

4.2 Evaluation of the effectiveness and efficiency of the policy and method options to achieve objective 18

Policy and method options	Analysis of Effectiveness	Effectiveness Rating	BENEFITS (social, economic and environmental)	COSTS (social, economic and environmental)	Efficient?
Regulatory direction to district and/or regional plans					
Option 1 Direction to district plans to identify and avoid subdivision and development in high risk areas	Provides specific information about natural hazard areas. Rules will invoke consents for development to ensure safety for new developments. Simplifies the process of identifying safe areas to develop and reduces litigation. The extent and location of the hazard areas will have been identified. Does not address the risk, only identifies the hazard areas. Requires district & regional plans to consistently promote certain actions. Changes to district & regional plans however, would not need to be made until a plan or the strategy was next reviewed, so effectiveness would be delayed. Will provide certainty and clarity to local authorities, developers and individuals when applying for resource consent. Provides a consistent framework for development of policies, rules and methods across the region. Sets out the principles to be applied, but specific decisions would still be determined at the local level.	High	Provides certainty and protection for people and the community, subdivision and development. Through the plan making process, public buy-in and acceptance of natural hazard areas and the necessary restrictions for avoiding these areas. Raised awareness of the natural hazard risk, leading to the building of more resilient communities. Positive environmental outcome, as many high hazard areas also have highly sensitive environmental values (e.g. sand dunes). Positive outcomes for community safety as hazards risk is lowered. Lowers the psychological and emotional impact that occurs to people after a disaster destroys property and livelihood. Economic benefits from less damage to property and businesses in disaster events. Less damage lead to quicker recovery times allow and local economies to get up and running faster. Lower insurance costs after a hazard event/natural disaster if development is located out of high hazard areas.	Social cost for engaging the community to include hazard areas in district plan. May lead to litigation in some areas if hazard zones are applied to pre-existing development. Economic costs to commission research into natural hazards to identify and map high hazard areas Costs associated with policy development and implementation, including costs of region/district wide studies and investigations, and the costs of the plan change process itself. The costs do not need to be incurred until a plan is reviewed. Making changes at this time would reduce costs.	Yes

Policy and method options	Analysis of Effectiveness	Effectiveness Rating	BENEFITS (social, economic and environmental)	COSTS (social, economic and environmental)	Efficient?
			Environmentally and economically efficient if leads to avoidance of adverse impacts from natural hazards. Leads to well planned and designed development. Increased clarity and certainty for everyone. The community as a whole agrees to various protection or restrictions through the plan making process. Discourages ad-hoc development. Provides a consistent framework for assessing development across the region. Efficient because provision is applied district/region wide and less information is required for individual consent applications.		
Option 2 Direction to district plans to ensure no inappropriate development in high risk areas	Will lead to uncertainty around the term 'inappropriate'. Not as effective as avoiding development altogether, because every development will need to be assessed as to whether it is appropriate or not, leading to some developments being allowed and others being declined. This uncertainty may lead to ad hoc decision making. A residual risk always remains to developments build in high hazards areas.	Med	May reduce costs of litigation in developments that are clearly seen as being appropriate, that would otherwise end up in the environment court Raised awareness of the natural hazard risk, leading to the building of more resilient communities.	Increased uncertainty around what development is allowed Potential increased litigation around the definition of what is appropriate. Higher costs to decide what is appropriate. Potential for development to occur in high hazard areas. Potential for severe damage to developments that are allowed to build in high hazard areas. Potential increased environmental costs as more extensive mitigation measures are built to protect developments in high	No

Policy and method options	Analysis of Effectiveness	Effectiveness Rating	BENEFITS (social, economic and environmental)	COSTS (social, economic and environmental)	Efficient?
				hazard areas. Social cost for engaging the community to include hazard areas in district plan. May lead to litigation in some areas if hazard zones are applied to pre-existing development. Economic costs to commission research into natural hazards to identify and map high hazard areas.	
Option 3 Direction to district plans to require no building in identified hazard areas	Will lead to no development in any hazard areas.	High	Will lead to extremely safe communities with very low risks from natural hazards.	Heavy financial burden on community to avoid all hazard areas. Unacceptably high coasts to avoid development. Severely limits development and will curtail growth. Will lead to a requirement to identify areas with no hazards risks. High Social cost for engaging the community to include hazard areas in district plan. Will lead to litigation when hazard zones are applied to pre-existing development. Extremely high economic costs to commission research into natural hazards to identify and map hazard areas. Maps will need to be extremely accurate.	No

Policy and method options	Analysis of Effectiveness	Effectiveness Rating	BENEFITS (social, economic and environmental)	COSTS (social, economic and environmental)	Efficient?
Regulatory direction as to the matters to be given particular regard in resource management decision making					
Option 4 Direction to consider minimising the adverse effects of natural hazards	Hazards can be considered at a site specific level, rather than relying on broader scale maps and more generalised knowledge. Considerations of risk and potential mitigation measures can be tailored to a particular proposal, rather than relying on generic solutions that may not be effective. Can include more hazards & risk considerations than those identified in general mapping. Provides interim protection until rules or policies are built into regional and district plans for high risk areas. Matters would be given "particular regard" when considering resource consents and notices of requirements. Particular regard however could only be given where "activity status" and/or "discretion" for a proposal relates to relevant topic. Provides clear direction on how the region wants to see the region's resources managed. Provides a consistent framework for assessing development across the region. Specific decisions would still be determined at the local level. Unlikely to be effective by itself when considering applications as matters are	High	Hazard impacts can be assessed at a site specific level, leading to a greater understanding of the hazards and risk facing the development or subdivision. Provides informed decision making and allows targeted responses to manage the risks. May allow development to proceed in areas that would otherwise be declined due to uncertainty in the risk. Proposals have the opportunity to work with or around the hazard issues. Better understanding of hazards can lead to more environmentally sound mitigation measures. Because the focus is on a particular, often limited, site, it is efficient to examine many specified risks for that site. Environmentally, it allows more varied hazard impacts to be assessed and greater protection for a development. Positive outcomes for individual safety as hazards risk is lowered. Lowers the psychological and emotional impact that occurs to people after a disaster destroys property and livelihood. Economic benefits from less damage to property and businesses in disaster events.	Costs are borne by both local authorities and the applicant. Local authorities in identifying and flagging hazard areas and applicants in more site specific assessments. Broader hazards assessment may require more identification and analysis, and potentially more resources in redesign to accommodate those hazards. Cost would be born more by some proposals due to the activity status of applications and the matters discretion and control is reserved over. Costs of investigations, justifications and addressing particular matters which are site specific are borne by the applicant. Costs lie more with the developer as applications have to address matters specifically on a case by case basis.	Yes

Policy and method options	Analysis of Effectiveness	Effectiveness Rating	BENEFITS (social, economic and environmental)	COSTS (social, economic and environmental)	Efficient?
	broad and generic.		Lower insurance costs after a hazard event/natural disaster if development is well designed to deal with natural hazards. Economically efficient if leads to minimising the adverse impacts from natural hazards. Leads to well planned and designed development and to the building of more resilient communities. Increased clarity and certainty for everyone. Requires development to address specified matters. Provides a consistent framework for assessing development across the region. The benefits are unlikely to be as high as for plans as the requirement is not as strong. I.e. the requirement to "consider" and only in certain circumstances.		
Non regulatory options					
Option 5 Provisions of information about areas at high risk from natural hazards	Identifies high risk areas that can be included in district plans. Cost efficient to conduct district or regional scale hazard identification studies, rather than one off, small scale studies. Provides clarity and certainty for developers and councils. Raises awareness of hazards and allows	High	Provides information that allows better informed decision making regarding natural hazards. Flags high risk areas that should be avoided. Identifies difference between areas with high risk and low to moderate risk, thereby defining which areas can be developed with appropriate mitigating	Economic costs to commission and conduct research to identify hazard areas. Organisational cost to analyse and decide on most appropriate ways to manage information. The application of relevant works in local authority developments may increase public spending on public developments,	Yes

Policy and method options	Analysis of Effectiveness	Effectiveness Rating	BENEFITS (social, economic and environmental)	COSTS (social, economic and environmental)	Efficient?
	developments to be sited in low risk areas. Not certain that the actions will be appropriately resourced by all local authorities and that the action will be achieved. May not be effective in influencing private developments.		measures. Removes uncertainties around location of hazard areas. Leads to safer more hazard resilient communities. Saves money in the medium to longer term by reducing damages and insurance costs from hazard events, due to developments and subdivisions being located in lower risk areas. Allows for flexibility of approach rather than imposition of regulatory policies. Recognises that people can "do the right thing" without compulsion. Economically efficient of financial support stimulates private effort and commitment.	activities and infrastructure. Could lead to protracted negotiations and potentially poor results. Potential environmental costs because of a lesser commitment to get things done.	
Option 6 Provision of information about natural hazard and climate change effects	Saves individuals and businesses from conducting personal research. Gets information to wide audience and raises awareness of hazard issues. Helps the community and developers understand natural hazards issues, and assist s in formulating proposals that avoid, remedy or mitigate impacts on them. However, there is no obligation to follow through using this approach alone, so needs to be combined with regulatory tools.	Med	Free advice in the form of literature to developers which could beneficially influence design of proposals which avoid, remedy or mitigate adverse effects. An example is the provision of fault locations derived from studies such as the Wairarapa Fault Trace study 2006. Information increases community awareness of hazard issues and the need to prepare and plan developments to take account of natural hazards. Public understanding and memory of hazards declines quickly if information is not made readily available. Could engender a more	Relatively cheap to do because it does not require specific identification of values, but there is the cost of preparing, printing and distribution of material. Costs to the environment (as an option on its own) include lack of enforceability and no certainty of compliance and enforcement; particular values are still not identified; principles could be incorrectly applied; and the values could be targeted for damage or destruction.	Yes

Policy and method options	Analysis of Effectiveness	Effectiveness Rating	BENEFITS (social, economic and environmental)	COSTS (social, economic and environmental)	Efficient?
			positive/cooperative response from developers because it is non-regulatory.		
Option 7 Integrated management – a memoranda of understanding	Agreements are non-statutory and rely on the voluntary actions of parties to see management plans through. Duplicates agreement processes already in place, e.g. flood management memoranda. Only effective for very specific locations and types of hazards e.g. certain rivers or hillsides.	Low	Clarifies roles and responsibility of each organisation or group involved in the agreement.	Potential to alienate some groups not included in memoranda. Organisational costs of liaising with interest groups and setting up agreements. Costs to monitor and review effectiveness of agreements.	No
Doing nothing					
Option 8 No intervention	This is not effective in resource management terms. Nor could it be argued to be efficient, given the issue continues unabated, and presumably would get worse.	Low	Local authorities are able to work with their communities to identify on a case-by-case basis what types of intervention is required – without a predetermined regional policy direction.	The issues will continue in the same trend or pattern, and the objective will not be achieved. Doing nothing will not achieve the purpose of the Resource Management Act. This is not effective resource management given the issue continues without regional direction. It would lead to continued unsustainable environmental outcomes, including economic, social and cultural outcomes.	No

Table 2: Evaluation of the effectiveness and efficiency of policy and method options to achieve Objective 18

4.3 Results from evaluation of the most appropriate policy and method options to achieve objective 18

Policy and method options	Effectiveness	Efficiency	Selected (most appropriate) option(s)	Proposed policies and methods
Regulatory direction to district and/or regional plans				
Option 1 Direction to district plans to identify and avoid subdivision and development in high risk areas	High	Yes	✓	Policy 28 and method 1
Option 2 Direction to district plans to ensure no inappropriate development in high risk areas	Med	No	×	
Option 3 Direction to district plans to require no building in identified hazard areas	High	No	×	
Direction as to matters to be given particular regard in resource management decision making				
Option 4 Direction to consider minimising the adverse effects of natural hazards	High	Yes	✓	Policy 50 and method 4
Non-regulatory options				
Option 5 Provision of information about areas at high risk from natural hazards	High	Yes	✓	Method 22
Option 6 Provision of information about natural hazard and climate change effects	Med	Yes	✓	Method 14
Option 7 Integrated management – a memoranda of understanding	Low	No	×	
Do nothing				
Option 8 No intervention	Low	No	×	

Table 3: Evaluation of the most appropriate of polices and methods to achieve Objective 18

4.4 Discussion of options

The Wellington region has one of the most physically diverse environments in New Zealand. It is also one of the most populous regions and consequently our communities are affected by a wide range of natural hazards. There is a long history, stretching back to the earliest European settlements and oral histories of local iwi of the Wellington region being affected by tsunami, earthquakes, landslides and floods. With development, came increased risk to property and lives from these hazard events. Ongoing development and population growth means it is important to take natural hazards into consideration when planning for subdivision and development. Such considerations will become even more critical in the future, due to the impacts that will be felt from climate change and sea level rise.

Despite this long history of natural hazard impacts, development has continued to occur in high risk areas. Some areas that have been devastated by natural disasters have been rebuilt and hard engineering works have been put in place to try and control the hazard and reduce the risk. This has left a residual risk in these places and when these defences have failed, the costs have been even greater. Good examples include the Hutt River Valley and beach locations of the southern Kapiti Coast. This is partly due to the lack of suitable land in the Wellington region on which to grow, forcing development in higher risk areas. It is also partly due to a lack of statutory requirements and weak regulations to take hazards considerations into account and to decline development in high risk areas.

Because of the serious effects that hazard events and natural disasters have on a community and the economy, a planning response that leans heavily to regulatory options is the most appropriate to address the issues and achieve the objective, but supported by a number of non-regulatory methods. This leads to a response that includes:

- Option 1 (policy 28, method 1) to avoid development and subdivision in high hazard areas and;

- Option 4 (policy 50, method 4) to have a range of considerations when assessing the risks in areas with moderate-low impacts from natural hazards which may be able to be effectively managed (avoided, remedied or mitigated in Resource Management Act terms). The option of considering specific matters within resource consents and other resource management decision making processes offers the opportunity to include additional hazards that have not been specifically identified during the implementation of option 1 (policy 28, method 1) and allows development to occur in areas with a low to moderate risk, providing certain conditions are met to minimise the risk.

And supported by two non-regulatory methods:

- Option 5 (method 22) to identify areas at high risk from natural hazards. This research and investigation can result in the production of maps that can be included in regional and district plans, and is the most cost effective

means of achieving this work, rather than requiring studies for each individual development. It is critical that any decision to avoid development in certain areas is backed up with sound scientific research.

- Option 6 (method 14) to provide this advice and other knowledge of natural hazards to the community and developers to raise awareness of natural hazards, and provide information to aid planning and decision making.

Whilst there are costs associated with implementing Options 1, 4, 5 & 6, the costs from natural disasters are exponentially higher, making their selection of effective and efficient over the longer term.

Other options were considered and rejected for a number of reasons. Option 2 is not appropriate because of the lack of certainty associated with the term 'inappropriate'. If areas are identified as no go development zones, planning becomes simpler and less vexatious. Developers and authorities all know the areas to avoid and this provides a level of certainty to all parties. Using the word inappropriate opens the process up to litigation and the ongoing legal costs of contesting every development. In other words, Option 2 is also considered too permissive of development in high hazard areas.

Option 3 is rejected for the opposite reasons to Option 2. It would be overly restrictive of development. Because the Wellington region is subject to such a wide range of natural hazards, it would be unrealistic to take such a prohibitive stance. Not all areas subject to natural hazards have the same types and levels of risk. The risks vary depending on the type of natural hazard and the frequency and magnitude of the events. Some areas have a high risk and others have a low or moderate risk. In areas with a low or moderate risk, it may be possible to avoid, remedy or mitigate the risk with zoning restrictions, good building design or hazard mitigation measures.

Option 7 is rejected because it is considered duplicitous. The Regional Policy Statement is not the appropriate place to mandate these agreements, which already occur under other management plans and guidelines.

Doing nothing is assessed as being inappropriate to achieve objective 18. Thus, option 8 was rejected because it would allow development to proceed without a proper risk assessment. Because hazards are often localised, it is important to have the flexibility to enable site specific assessments. Not allowing this would create one size fits all rules through which site specific hazards would be missed. This would invariably lead to developments in high risk areas, making developments vulnerable to natural hazards and placing lives at risk. This is contrary to the aims of Part II of the Resource Management Act. Wellington is subject to a wide range of natural hazards, it is very important to be aware of these to plan and build developments in order to minimise the risks.

4.5 Risk of acting or not acting if information is uncertain or insufficient

Section 32(4)(b) of the Resource Management Act requires the evaluation of appropriateness to take into account the risk of acting or not acting if there is uncertain or insufficient information about the subject matter of the policies or methods.

With regard to natural hazards, there is neither uncertain nor insufficient information by which to analyse the appropriateness of acting or not acting upon the issues.

If no action is taken, there will be no intervention in the management of natural hazards. The risk of not acting in the way proposed is that, when there is insufficient information, organisations and individuals would be free to develop without any requirement to take natural hazards into consideration, or without any understanding of the risk and consequences from natural hazards.

Increasing development is putting pressure on local authorities to allow development in areas about which there is limited understanding of the natural hazard risk. Changing patterns of lifestyle subdivision and development means that there are increasing demands to develop land in peri-urban and rural areas and in remote coastal locations where there is often a higher risk from natural hazards. Areas that in the past were avoided because of higher risk, have become desirable due to increasing demands for rural living and rural land owners have released land to meet these demands.

If there are no hazard management policies in place to deal with development in areas where the risks are uncertain, development and lives could be placed at risk and be vulnerable to serious damage from a hazard event. For example, there is increasing pressure to develop in low lying coastal areas in areas at risk from tsunami, storm surge and sea level rise. It is critical to take a precautionary approach to developing these areas to ensure the safety of people and property, especially in light of climate change impacts.

Where hazards exist, their impacts and risks will remain unclear or unnoticed. The pressures of subdivision, use and development will continue and probably increase. There is a very high risk that the safety of developments and lives will be compromised intentionally or inadvertently with no protection. The objective will not be achieved.

The risk of acting in the way proposed is that there may be some unforeseen costs, in time and money, in order to implement the policies and methods properly. There may be some situations, where a development is constrained by the requirements to avoid high risk areas or by the need to modify the plans in order to minimise the risk.

It is also possible that a lack of certainty about natural hazards in some areas, may curtail development. Available information may indicate a general hazard risk, but being non-specific, it may lead to an overly precautionary approach, thereby constraining or preventing development unnecessarily.

It is clear to Greater Wellington that the risk of acting is much less than the risk of not acting.

5. Evaluation of policies and methods to achieve objective 19

The appropriateness of the policies and methods to achieve Objective 19 are evaluated by looking at the effectiveness and the efficiency of the policy and method options, and the risks or acting or not acting if there is uncertain or insufficient information.

5.1 The range of policy and method options considered

Objective 19 seeks to not increase the risks and consequences of natural hazard events from hazard mitigation measures, structural works and other activities.

5.1.1 Regulatory direction to district and/or regional plans

Option 1 – Direction to plans to prohibit structural mitigation measures

This approach involves district and regional plans to have rules prohibiting the construction of hazard mitigation measures.

5.1.2 Regulatory direction as to matters to be given particular regard when making resource management decisions

Option 2 – Direction to consider minimising the adverse effects of hazard mitigation measures

This option is to require local authorities to have particular regard to specified matters in order to minimise the effects from hazard mitigation measures when making resource management decisions, with a preference for soft engineered options.

5.1.3 Non-regulatory options

Option 3 – Information about natural features to protect property from natural hazards

This option uses non-regulatory actions such as research and historical record gathering to identify natural features in the region that have the ability to provide natural protection from natural hazards.

Option 4 – Information in the form of hazard mitigation guidelines

This option is to develop a best practice guidance manual that outlines the various hazard mitigation measures available to minimise the risk from natural hazards and the impacts that these measures have on the natural environment.

5.1.4 Doing nothing

Option 5 – No intervention

This option offers no intervention in the management of hazard mitigation measures.

5.2 Evaluation as to the effectiveness and efficiency of the policy and method options to achieve objective 19

Policy and method options	Analysis of Effectiveness	Effectiveness Rating	BENEFITS (social, economic and environmental)	COSTS (social, economic and environmental)	Efficient?
Regulatory direction to district and/or regional plans					
Option 1 Direction to plans to prohibit structural mitigation measures	Requires district & regional plans to consistently promote certain actions. Changes to district & regional plans however, would not need to be made until a plan or the strategy was next reviewed, so effectiveness would be delayed. Would provide certainty and clarity. Provides a consistent framework for development of policies, rules and methods across the region. Sets out the principles to be applied, but specific decisions would still be determined at the local level. Minimises the impacts of hard engineering mitigation measures on the environment. Not effective where a natural feature of the environment (e.g. sand dunes) may otherwise have been restored as part of the natural mitigation measures to protect a development. Eliminates the residual risk. Not effective in protecting development in hazard prone areas due to variations in applying pre-cautionary approach. May be effective in preventing development in any areas at risk from natural hazards if they are not allowed to	Med	Increased clarity and certainty for everyone. The community as a whole agrees to various protection or restrictions through the plan making process. Discourages ad-hoc development. Provides a consistent framework for assessing development across the region. Efficient because provision is applied district/region wide and less information is required for individual consent applications. Eliminates risk from natural hazards if precautionary approach is taken and development is not allowed without mitigation measures. No impacts on natural environment from hard engineered structures.	Costs associated with policy development and implementation, including costs of region/district wide studies and investigations, and the costs of the plan change process itself. The costs do not need to be incurred until a plan is reviewed. Making changes at this time would reduce costs. Unnecessarily prohibitive of development. High economic cost to communities in restricting growth and development if developments are not allowed to proceed if precautionary approach is applied. High economic cost from natural disasters if development is allowed to proceed in hazard areas without any structural mitigation measures.	No

Policy and method options	Analysis of Effectiveness	Effectiveness Rating	BENEFITS (social, economic and environmental)	COSTS (social, economic and environmental)	Efficient?
	proceed with structural mitigation measures to reduce the risk.				
Regulatory direction as to the matters to be given particular regard in resource management decision making					
Option 2 Direction to consider minimising the adverse effects of hazard mitigation measures	Matters would be given "particular regard" when considering resource consents and notices of requirements. Particular regard however could only be given where "activity status" and/or "discretion" for a proposal relates to relevant topic. Provides interim direction prior to plan changes being made-. Would provide direction on how the region wants to see the region's resources managed. Provides a consistent framework for assessing development across the region. Specific decisions would still be determined at the local level. Unlikely to be effective by itself when considering applications as matters are broad and generic. Effective because various hazard mitigation measures (hard and soft engineering) and their impacts and benefits can be assessed at a site specific level. Allows the best choice to be made that provides protection for both the development and environment, rather than an inflexible one- size-fits-all approach.	High	Increased clarity and certainty for everyone. Requires development to address specified matters. Provides a consistent framework for assessing development across the region. The benefits are unlikely to be as high as for plans as the requirement is not as strong. I.e. the requirement to "consider" and only in certain circumstances. Proposals have the opportunity to work with the natural environment with a potential win-win outcome. Impacts and benefits of mitigation measures can be assessed at a site specific level, leading to a greater understanding of the benefits and costs of the proposed measures. Provides informed decision making and allows targeted responses to manage the risks. May allow development to proceed in areas that would otherwise be declined due to uncertainty in the risk. Better understanding of various hard and soft options can lead to more environmentally sound mitigation	Cost would be born more by some proposals due to the activity status of applications and the matters discretion and control is reserved over. Costs of investigations, justifications and addressing particular matters which are site specific are borne by the applicant. Costs lie more with the developer as applications have to address matters specifically on a case by case basis. Assessment costs are borne mostly by the applicant. More considerations of the costs and benefits of a design means potentially greater costs to benefit both the development and the environment i.e. no cheap and dirty solutions, such as dumping car bodies and building hard fill to protect developments on an eroding coastline. Some environmental impacts may occur if structural engineering works proceed in areas at high risk from natural hazards and they represent the last practicable option. Some soft engineering measures require more regular maintenance than hard engineering structures, but some solutions have a virtually infinite design life e.g. sand dunes.	Yes

Policy and method options	Analysis of Effectiveness	Effectiveness Rating	BENEFITS (social, economic and environmental)	COSTS (social, economic and environmental)	Efficient?
	Recognises the many localised variables that can affect a site and need to be taken into consideration for the best decision. Considerations of risk and potential mitigation measures can be tailored to each individual proposal, rather than relying on generic solutions that may not be effective. May result in projects that restore or enhance natural features in the environment that can act to protect development.		measures. Because the focus is on a particular, often limited, site, it is efficient to examine many specified risks for that site. Increases individual safety as risk from hazards is lowered. Lowers the psychological and emotional impact that occurs to people after a disaster destroys property and livelihood. Economic benefit from less damage to property and businesses in disaster events. Lower insurance costs after a hazard event/natural disaster if development is well designed to deal with natural hazards. Potentially cheaper to implement softer engineering measures, especially when costs are spread over the design life of the structure or measures. Can lead to restoration or enhancement of valuable natural features the environment such as sand dunes or wetlands. Economically efficient if leads to minimising the adverse impacts from natural hazards. Leads to well planned and designed development and to the building of more resilient communities.		

Policy and method options	Analysis of Effectiveness	Effectiveness Rating	BENEFITS (social, economic and environmental)	COSTS (social, economic and environmental)	Efficient?
Non regulatory options					
Option 3 Information about natural features to protect property from natural hazards	Not certain that the actions will be appropriately resourced by all local authorities and the actions will be achieved. May not be influence private developments. Allows identification of features in the natural environment that can be used as natural mitigation and protection measures. Supports option 2. Cost efficient to conduct district or regional scale identification studies, rather than one off, small scale studies. Raises awareness of environmental considerations in hazard mitigation measures and allows more environmentally sustainable options to be chosen.	High	Allows for flexibility of approach rather than imposition of regulatory policies. Recognises that people can "do the right thing" without compulsion. Economically efficient of financial support stimulates private effort and commitment. Provides information that allows better informed decision making regarding hazard mitigation options. Flags features that can be enhanced or restored to provide protection, without individuals having to shoulder the costs. Leads to safer more hazard resilient communities. Saves money by providing environmentally sustainable options that have a very long design life. May reduce damages and insurance costs from hazard events, due to developments and subdivisions being located in lower risk areas.	The application of relevant works in local authority developments may increase public spending on public developments, activities and infrastructure. Could lead to protracted negotiations and potentially poor results. Potential environmental costs because of a lesser commitment to get things done. Economic costs to commission and conduct research to identify natural buffering features. Organisational cost to analyse and decide on most appropriate ways to manage information.	Yes
Option 4 Information in the form of hazard mitigation guidelines	Not certain that the actions will be appropriately resourced by local authorities and actions achieved. May not influence private developments. Provides an outline of options to local authorities, developers and individuals. Partially duplicates method 14 Arguable that this is not a Regional Policy	Med	Allows for flexibility of approach rather than imposition of regulatory policies. Recognises that people can "do the right thing" without compulsion. Economically efficient of financial support stimulates private effort and commitment. Provides free guidelines to developers	The application of relevant works in local authority developments may increase public spending on public developments, activities and infrastructure. Could lead to protracted negotiations and potentially poor results. Potential environmental costs because of a lesser commitment to get things done. Cost to councils for preparation of the	No

Policy and method options	Analysis of Effectiveness	Effectiveness Rating	BENEFITS (social, economic and environmental)	COSTS (social, economic and environmental)	Efficient?
	Statement function.		and individuals.	guidelines. Potential indemnity costs to councils if implemented measures fail.	
Doing nothing					
Option 5 No intervention	This is not effective in resource management terms. Nor could it be argued to be efficient, given the issue continues unabated, and presumably would get worse.	Low	Local authorities are able to work with their communities to identify on a case-by-case basis what types of intervention is required – without a predetermined regional policy direction.	The issues will continue in the same trend or pattern, and the objective will not be achieved. Doing nothing will not achieve the purpose of the Resource Management Act. This is not effective resource management given the issue continues without regional direction. It would lead to continued unsustainable environmental outcomes, including economic, social and cultural outcomes.	No

Table 4: Evaluation of the effectiveness and efficiency of policy and method options to achieve objective 19

5.3 Results from evaluation of the most appropriate policy and method options to achieve objective 19

Policy and method options	Effectiveness	Efficient?	Selected option(s)	Proposed policies and methods
Regulatory direction to district and regional plans				
Option 1 Direction to plans to prohibit structural mitigation measures			Med	No
Regulatory direction as to matters to be given particular regard in resource management decision making				
Option 2 Consider minimising the adverse effects of hazard mitigation measures	High	Yes	✓	Policy 51 and method 4
Non-regulatory options				
Option 3 Information about natural features to protect property from natural hazards	High	Yes	✓	Method 50
Option 4 Information in the form of hazard mitigation guidelines	Med	No	×	
Do nothing				
Option 5 No intervention	Low	No	×	

Table 5: Results from evaluation of the most appropriate policy and method options to achieve objective 19

5.4 Discussion of options

The Wellington region has one of the most physically diverse environments in New Zealand. It is also one of the most populous regions and consequently our communities are affected by a wide range of natural hazards. Despite the long history of natural hazard impacts, development has occurred in areas affected by natural hazards. Some areas that have been devastated by natural disasters have been rebuild and hard engineering works have been put in place to try and control the hazard and reduce the risk. This has left a residual risk in these places and when these defences have failed, the costs have been even greater. Good examples include the Hutt River Valley and beach locations of the southern Kapiti Coast. This is partly due to the lack of suitable land in the Wellington region on which to grow, forcing development in higher risk areas. It is also partly due to a lack of statutory requirements and weak regulations to take hazards considerations into account and to decline development in high risk areas.

People's actions, including mitigation measures and ongoing development, can cause or increase the risk from natural hazards. Examples are: seawalls or groynes that can cause localised erosion of the adjacent shoreline and; building on landslip prone slopes. Stopbanks and seawalls can also create a sense of security and encourage further development, increasing the extent and value of the assets at risk. The risk that remains after protection works are put in place is known as the residual risk. Engineered protection works can create a sense of security and encourage further development. In turn, this increases the extent and value of assets that could be damaged if the protection works fail or an extreme event exceeds the structural design parameters. Structural measures or hard engineering methods can have significant environmental effects and should be considered as the least desirable option for natural hazard control. Where there is an unacceptable risk to development or property, there may be a place for structural measures or hard engineering methods, if they are part of a long-term hazard management strategy that includes other measures.

- Because of the serious effects that hazard events and natural disasters have on a community and the economy, a planning response that leans heavily to regulatory options is the most appropriate to address the issues and achieve the objective, but supported by a number of non-regulatory methods. This leads to a response that includes: Option 2 (policy 51, method 4), to have a range of considerations when assessing the risk to a development and any proposed hazard mitigation measures. The option of considering specific matters in resource consents and other resource management decision making offers the opportunity to include a range of local and site specific matters that cannot be specifically identified in plan policies. This allows development to occur in areas with a low to moderate risk, providing certain conditions are met to minimise the risk.

There is 1 non-regulatory method to support option 2:

- Option 3 (Method 23), to identify natural features in the region that may provide natural protection from natural hazards. This research can be used to produce maps that can be used in the provision of information. It is important that the identification of these areas is backed by sound scientific reasoning.

While there are costs associated with implementing Options 2 & 3, the costs from natural disasters are exponentially higher, making the selection of these options effective and efficient over the longer term.

Other policies and methods were also considered but are rejected for a number of reasons. Option 1 is not selected because it would be overly restrictive of development. Because the Wellington region is subject to such a wide range of natural hazards, it would be unrealistic to take such a prohibitive stance. Not all areas subject to natural hazards have the same risks. The risks vary depending on the type of natural hazard and the frequency and magnitude of the events. Some areas have a high risk and others have a low or moderate risk. In areas with a low or moderate risk, it may be possible to avoid, remedy or mitigate the risk with sensible structural mitigation measures.

Option 4 is rejected because the Regional Policy Statement is not the most appropriate place to mandate or necessitate the production of guidance manuals, as these can be produced without the need for resource management regulatory intervention

Doing nothing is assessed as being inappropriate to address the issues and achieve objective 19. Thus, option 5 is rejected as it would allow development and structural mitigation measures to proceed without a proper assessment of their potential to exacerbate natural hazards or adversely affect the environment.

5.5 Risk of acting or not acting if information is uncertain or insufficient

Section 32(4)(b) of the Resource Management Act requires the evaluation of appropriateness to take into account the risk of acting or not acting if there is uncertain or insufficient information about the subject matter of the policies or methods.

With regard hazard mitigation, there is neither uncertain nor insufficient information by which to analyse the appropriateness of acting or not acting upon the issues.

If no action is taken, there will be no intervention in the management of natural hazards and hazard mitigation works (where there is insufficient information). People would be free to develop without any requirement to consider the impacts produced by hazard mitigation works or in considering the various options that may be available to make a more sustainable long term choice. Furthermore, there will be no requirement to consider the risk and consequences from natural hazards if the mitigation works fail.

If there are no hazard management policies in place to deal with development in areas where the risks are uncertain, development and lives could be placed at risk and vulnerable to serious damage from a hazard event. For example, there is increasing pressure to develop in low lying coastal areas and on alluvial plains which are at risk from flooding and erosion. It is critical to assess the risks when developing in these areas to ensure the safety of people and property, especially in light of climate change impacts. Development in these areas often places pressure on sensitive ecosystems and it is important to consider potential mitigation measures that are more sympathetic to the environment and which promote long term sustainability.

The impacts of structural mitigation measures on the environment and surrounding properties will remain unclear or unnoticed. The pressures of subdivision, use and development will continue and probably increase. There is a very high risk that the safety of developments and lives will be compromised intentionally or inadvertently with no protection. The objective will not be achieved.

The risk of acting in the way proposed is that there may be some unforeseen costs, in time and money, in order to implement the policies and methods

properly. There may be some situations, where a development is constrained by the requirements to implement mitigation measures in order to minimise the risks from natural hazards.

It is also possible that a lack of certainty about hazard mitigation measures may curtail development. There may be an uncertain level of risk that could potentially be mitigated with effective mitigation measures, but a lack of knowledge may lead some people to take an overly precautionary approach and abandon the proposal, thereby unnecessarily constraining or preventing development.

It is clear to Greater Wellington that the risk of acting is much less than the risk of not acting.

6. Evaluation of policies and methods to achieve objective 20

The appropriateness of the policies and methods to achieve Objective 19 are evaluated by looking at the effectiveness and the efficiency of the policy and method options, and the risks or acting or not acting if there is uncertain or insufficient information.

6.1 The range of policy and method options considered

Objective 26 seeks to increase community resilience to natural hazard events and prepare people for the consequences of natural hazard events.

6.1.1 Regulatory direction to district and/or regional plans

Option 1 – Direction to plans to instigate structural programmes for community resilience

This approach would require regional and district plans to include rules and polices that instigate programmes of building structural resilience into communities and pre-existing developments.

Option 2 – Direction to district plans to identify and avoid subdivision and development in high risk areas

This option requires policies and rules to be included in district and regional plans to identify areas at high risk from natural hazards and to provide policies to avoid subdivision and development in high risk areas.

6.1.2 Regulatory direction as to matters to be given particular regard when making resource management decisions

Option 3 – Direction to consider minimising the adverse effects of natural hazards

This option requires local authorities to have particular regard to specified matters in order to minimise the adverse effects of natural hazards when making resource management decisions, including a requirement to avoid development if the hazard risk is assessed as high.

Option 4 – Direction to consider minimising the adverse effects of hazard mitigation measures

This option is to require local authorities to have particular regard to specified matters in order to minimise the effects from hazard mitigation measures when making resource management decisions, with a preference for soft engineered options.

6.1.3 Non-regulatory options

Option 5 – Provision of information about building hazard resilient communities that are prepared for natural hazard events

This approach is to actively engage the community in preparing for and raising awareness of natural hazards through public education programmes.

Option 6 – Provision of information about natural hazard and climate change effects

This approach is to develop and disseminate information about natural hazard and climate change effects, including how development may exacerbate those effects, and to suggest ways of mitigating any adverse effects. For example, design guidelines on how to locate dwellings on the coast to minimise the effects of natural hazards, hazard maps and reports on specific hazards and/or reports in specific areas of interest.

Option 7 – Provision of information about areas at high risk from natural hazards

This approach is to undertake investigation or research into specific hazards affecting the region and the risks they pose, in order to aid the development of risk management strategies and planning and decision making, including the development of policies for regional and district plans.

Option 8 – Provision of information about natural features to protect property from natural hazards

This option is to research and use historical records to identify natural features in the region that have the ability to provide natural protection from natural hazards.

6.1.4 Doing nothing

Option 9 – No intervention

This option offers no intervention on behalf of local authorities to reduce the impacts on communities from natural hazards or to raise awareness and preparedness for hazard events.

6.2 Effectiveness and efficiency of the policy and method options to achieve objective 26

Policy and method options	Analysis of Effectiveness	Effectiveness Rating	BENEFITS (social, economic and environmental)	COSTS (social, economic and environmental)	Efficient?
Regulatory direction to district and/or regional plans					
Option 1 Direction to plans to instigate structural programmes for community resilience	Requires district & regional plans to consistently promote certain actions. Changes to district & regional plans however, would not need to be made until a plan or the strategy was next reviewed, so effectiveness would be delayed. Would provide certainty and clarity. Provides a consistent framework for development of policies, rules and methods across the region. Sets out the principles to be applied, but specific decisions would still be determined at the local level. Would physically upgrade the structural resilience of buildings and developments in hazard prone locations. It would be prohibitively long and costly to implement such programmes.	Med	Increased clarity and certainty for everyone. The community as a whole agrees to various protection or restrictions through the plan making process. Discourages ad-hoc development. Provides a consistent framework for assessing development across the region. Efficient because provision is applied district/region wide and less information is required for individual consent applications. Reduction of damages to developments and communities in natural hazard events.	Costs associated with policy development and implementation, including costs of region/district wide studies and investigations, and the costs of the plan change process itself. The costs do not need to be incurred until a plan is reviewed. Making changes at this time would reduce costs. Extremely costly to authorities and individuals. Would result in litigation.	No
Option 2 Direction to district plans to identify and avoid subdivision and development in high risk areas	Provides specific information about natural hazard areas. Rules will invoke consents for development to ensure safety for new developments. The extent and location of the hazard areas will have been identified. Does not address the risk, only identifies the hazard areas.	High	Provides certainty and protection for people and the community, subdivision and development. Through the plan making process, public buy-in and acceptance of natural hazard areas and the necessary restrictions for avoiding these areas. Raised awareness of the natural hazard risk, leading to the building of more resilient communities.	Social cost for engaging the community to include hazard areas in district plan. May lead to litigation in some areas if hazard zones are applied to pre-existing development. Economic costs to commission research into natural hazards to identify and map high hazard areas Costs associated with policy development and implementation, including costs of	Yes

Policy and method options	Analysis of Effectiveness	Effectiveness Rating	BENEFITS (social, economic and environmental)	COSTS (social, economic and environmental)	Efficient?
	Requires district & regional plans to consistently promote certain actions. Changes to district & regional plans however, would not need to be made until a plan or the strategy was next reviewed, so effectiveness would be delayed. Would provide certainty and clarity. Provides a consistent framework for development of policies, rules and methods across the region. Sets out the principles to be applied, but specific decision making would still be determined at the local level.		Positive environmental outcome, as many high hazard areas also have highly sensitive environmental values (e.g. sand dunes). Positive outcomes for community safety as hazard risk is lowered. Lowers the psychological and emotional impact that occurs to people after a disaster destroys property and livelihood. Economic benefits from less damage to property and businesses in disaster events. Less damage lead to quicker recovery times allow and local economies to get up and running faster. Lower insurance costs after a hazard event/natural disaster if development is located out of high hazard areas. Environmentally and economically efficient if leads to avoidance of adverse impacts from natural hazards. Leads to well planned and designed development. Increased clarity and certainty for everyone. The community as a whole agrees to various protection or restrictions through the plan making process. Discourages ad-hoc development. Provides a consistent framework for assessing development across the	region/district wide studies and investigations, and the costs of the plan change process itself. The costs do not need to be incurred until a plan is reviewed. Making changes at this time would reduce costs.	

Policy and method options	Analysis of Effectiveness	Effectiveness Rating	BENEFITS (social, economic and environmental)	COSTS (social, economic and environmental)	Efficient?
			region. Efficient because provision is applied district/region wide and less information is required for individual consent applications.		
Regulatory direction as to the matters to be given particular regard in resource management decision making					
Option 3 Direction to consider minimising the adverse effects of natural hazards	Hazards can be considered at a site specific level, rather than relying on broader scale maps and more generalised knowledge. Considerations of risk and potential mitigation measures can be tailored to a particular proposal, rather than relying on generic solutions that may not be effective. Can include more hazards & risk considerations than those identified in general mapping. Provides interim protection until rules or policies are built into regional and district plans for high risk areas. Matters would be given "particular regard" when considering resource consents and notices of requirements. Particular regard however could only be given where "activity status" and/or "discretion" for a proposal relates to relevant topic. Provides interim direction prior to plan changes being made. Provides direction on how the region wants to see the region's resources	High	Hazard impacts can be assessed at a site specific level, leading to a greater understanding of the hazards and risk facing the development or subdivision. Provides informed decision making and allows targeted responses to manage the risks. May allow development to proceed in areas that would otherwise be declined due to uncertainty in the risk. Proposals have the opportunity to work with or around the hazard issues. Better understanding of hazards can lead to more environmentally sound mitigation measures. Because the focus is on a particular, often limited, site, it is efficient to examine many specified risks for that site. Environmentally, it allows more varied hazard impacts to be assessed and greater protection for a development. Positive outcomes for individual safety as risk from hazards is lowered. Lowers the psychological and emotional impact that occurs to people	Costs are borne by both local authorities and the applicant. Local authorities in identifying and flagging hazard areas and applicants in more site specific assessments. Broader hazards assessment may require more identification and analysis, and potentially more resources in redesign to accommodate those hazards. Cost would be born more by some proposals due to the activity status of applications and the matters discretion and control is reserved over. Costs of investigations, justifications and addressing particular matters which are site specific are borne by the applicant. Costs lie more with the developer as applications have to address matters specifically on a case by case basis.	Yes

Policy and method options	Analysis of Effectiveness	Effectiveness Rating	BENEFITS (social, economic and environmental)	COSTS (social, economic and environmental)	Efficient?
	managed. Provides a consistent framework for assessing development across the region. Specific decisions would still be determined at the local level. Unlikely to be effective by itself when considering applications as matters are broad and generic.		after a disaster destroys property and livelihood. Economic benefits from less damage to property and businesses in disaster events. Lower insurance costs after a hazard event/natural disaster if development is well designed to deal with natural hazards. Economically efficient if leads to minimising the adverse impacts from natural hazards. Leads to well planned and designed development and to the building of more resilient communities. Increased clarity and certainty for everyone. Requires development to address specified matters. Provides a consistent framework for assessing development across the region. The benefits are unlikely to be as high as for plans as the requirement is not as strong. I.e. the requirement to "consider" and only in certain circumstances.		
Option 4 Direction to consider minimising the adverse effects of hazard mitigation	Matters would be given "particular regard" when considering resource consents and notices of requirements. Particular regard however could only be given where "activity status" and/or "discretion" for a proposal relates to	High	Increased clarity and certainty for everyone. Requires development to address specified matters. Provides a consistent framework for	Cost would be born more by some proposals due to the activity status of applications and the matters discretion and control is reserved over. Costs of investigations, justifications and addressing particular matters which are	Yes

Policy and method options	Analysis of Effectiveness	Effectiveness Rating	BENEFITS (social, economic and environmental)	COSTS (social, economic and environmental)	Efficient?
measures	relevant topic. Provides interim direction prior to plan changes being made-. Would provide direction on how the region wants to see the region's resources managed. Provides a consistent framework for assessing development across the region. Specific decisions would still be determined at the local level. Unlikely to be effective by itself when considering applications as matters are broad and generic. Various hazard mitigation measures (hard and soft engineering) and their impacts and benefits can be assessed at a site specific level. Allows the best choice to be made that provides protection for both the development and environment, rather than an inflexible one- size-fits-all approach. Recognises the many localised variables that can affect a site and need to be taken into consideration for the best decision. Considerations of risk and potential mitigation measures can be tailored to each individual proposal, rather than relying on generic solutions that may not be effective. May result in projects that restore or enhance natural features in the environment that can act to protect		assessing development across the region. The benefits are unlikely to be as high as for plans as the requirement is not as strong. I.e. the requirement to "consider" and only in certain circumstances. Proposals have the opportunity to work with the natural environment with a potential win-win outcome. Impacts and benefits of mitigation measures can be assessed at a site specific level, leading to a greater understanding of the benefits and costs of the proposed measures. Provides informed decision making and allows targeted responses to manage the risks. May allow development to proceed in areas that would otherwise be declined due to uncertainty in the risk. Better understanding of various hard and soft options can lead to more environmentally sound mitigation measures. Because the focus is on a particular, often limited, site, it is efficient to examine many specified risks for that site. Positive outcomes for individual safety as risk from hazards is lowered. Lowers the psychological and emotional impact that occurs to people	site specific are borne by the applicant. Costs lie more with the developer as applications have to address matters specifically on a case by case basis. Assessment costs are borne mostly by the applicant. More considerations of the costs and benefits of a design means potentially greater costs to benefit both the development and the environment i.e. no cheap and dirty solutions, such as dumping car bodies and building hard fill to protect developments on an eroding coastline. Some environmental impacts may occur if structural engineering works proceed in areas at high risk from natural hazards and they represent the last practicable option. Some soft engineering measures require more regular maintenance than hard engineering structures, but some solutions have a virtually infinite design life e.g. sand dunes.	

Policy and method options	Analysis of Effectiveness	Effectiveness Rating	BENEFITS (social, economic and environmental)	COSTS (social, economic and environmental)	Efficient?
	development.		after a disaster destroys property and livelihood. Economic benefits from less damage to property and businesses in disaster events. Lower insurance costs after a hazard event/natural disaster if development is well designed to deal with natural hazards. Potentially cheaper to implement softer engineering measures, especially when cost is spread over the design life of the structure or measures. Can lead to restoration or enhancement of valuable natural features the environment such as sand dunes or wetlands. Economically efficient if leads to minimising the adverse impacts from natural hazards. Leads to well planned and designed development and to the building of more resilient communities.		
Non regulatory options					
Option 5 Provision of information about building hazard resilient communities that are prepared for natural hazard events	Raises community awareness of natural hazards and increases preparedness for hazard events. Ineffective in that it duplicates activities and requirements conducted under other acts of parliament.	Med	Raises community awareness of natural hazards and increases preparedness for hazard events.	Cost of conducting public education campaigns.	No

Policy and method options	Analysis of Effectiveness	Effectiveness Rating	BENEFITS (social, economic and environmental)	COSTS (social, economic and environmental)	Efficient?
Option 6 Provision of information about natural hazard and climate change effects	Saves individuals and businesses from conducting personal research. Gets information to wide audience and raises awareness of hazard issues. Helps the community and developers understand natural hazards issues, and assist s in formulating proposals that avoid, remedy or mitigate impacts on them. However, there is no obligation to follow through using this approach alone, so needs to be combined with regulatory tools.	Med	Free advice in the form of literature to developers which could beneficially influence design of proposals which avoid, remedy or mitigate adverse effects. An example is the provision of fault locations derived from studies such as the Wairarapa Fault Trace study 2006. Information increases community awareness of hazard issues and the need to prepare and plan developments to take account of natural hazards. Public understanding and memory of hazards declines quickly if information is not made readily available. Could engender a more positive/cooperative response from developers because it is non-regulatory.	Relatively cheap to do because it does not require specific identification of values, but there is the cost of preparing, printing and distribution of material. Costs to the environment (as an option on its own) include lack of enforceability and no certainty of compliance and enforcement; particular values are still not identified; principles could be incorrectly applied; and the values could be targeted for damage or destruction.	Yes
Option 7 Provision of information about areas at high risk from natural hazards	Identifies high risk areas that can be included in district plans. Cost efficient to conduct district or regional scale hazard identification studies, rather than one off, small scale studies. Provides clarity and certainty for developers and councils. Raises awareness of hazards and allows developments to be sited in low risk areas. Not certain that the actions will be appropriately resourced and will be achieved.	Med	Provides information that allows better informed decision making regarding natural hazards. Flags high risk areas that should be avoided. Identifies difference between areas with high risk and low to moderate risk, thereby defining which areas can be developed with appropriate mitigating measures. Removes uncertainties around location of hazard areas. Leads to safer more hazard resilient communities.	Economic costs to commission and conduct research to identify hazard areas. Organisational cost to analyse and decide on most appropriate ways to manage information. The application of relevant works in local authority developments may increase public spending on public developments, activities and infrastructure. Could lead to protracted negotiations and potentially poor results. Potential environmental costs because of a lesser commitment to get things done.	Yes

Policy and method options	Analysis of Effectiveness	Effectiveness Rating	BENEFITS (social, economic and environmental)	COSTS (social, economic and environmental)	Efficient?
	May not influence private developments.		Saves money in the medium to longer term by reducing damages and insurance costs from hazard events, due to developments and subdivisions being located in lower risk areas. Allows for flexibility of approach rather than imposition of regulatory policies. Recognises that people can "do the right thing" without compulsion. Economically efficient of financial support stimulates private effort and commitment.		
Option 8 Provision of information about natural features to protect property from natural hazards	Not certain that the actions will be appropriately resourced and will be achieved. May not influence private developments. Allows identification of features in the natural environment that can be used as natural mitigation and protection measures. Supports policy option 2. Cost efficient to conduct district or regional scale identification studies, rather than one off, small scale studies. Raises awareness of environmental considerations in hazard mitigation measures and allows more environmentally sustainable options to be chosen.	Med	Allows for flexibility of approach rather than imposition of regulatory policies. Recognises that people can "do the right thing" without compulsion. Economically efficient of financial support stimulates private effort and commitment. Provides information that allows better informed decision making regarding hazard mitigation options. Flags features that can be enhanced or restored to provide protection, without individuals having to shoulder the costs. Leads to safer more hazard resilient communities. Saves money by providing environmentally sustainable options that have a very long design life. May reduce damages and insurance costs from hazard events, due to	The application of relevant works in local authority developments may increase public spending on public developments, activities and infrastructure. Could lead to protracted negotiations and potentially poor results. Potential environmental costs because of a lesser commitment to get things done. Economic costs to commission and conduct research to identify natural buffering features. Organisational cost to analyse and decide on most appropriate ways to manage information.	Yes

Policy and method options	Analysis of Effectiveness	Effectiveness Rating	BENEFITS (social, economic and environmental)	COSTS (social, economic and environmental)	Efficient?
			developments and subdivisions being located in lower risk areas.		
Doing nothing					
Option 9 No intervention	This is not effective in resource management terms. Nor could it be argued to be efficient, given the issue continues unabated, and presumably would get worse.	Low	Local authorities are able to work with their communities to identify on a case-by-case basis what types of intervention is required – without a predetermined regional policy direction.	The issues will continue in the same trend or pattern, and the objective will not be achieved. Doing nothing will not achieve the purpose of the Resource Management Act. This is not effective resource management given the issue continues without regional direction. It would lead to continued unsustainable environmental outcomes, including economic, social and cultural outcomes.	No

Table 6: Evaluation of the effectiveness and efficiency of policy and method options to achieve objective 20

6.3 Results from evaluation of the most appropriate policy and method options to achieve objective 20

Policy and method options	Effectiveness	Efficient?	Selected (most appropriate) option(s)	Proposed policies and methods
Regulatory direction to district and/or regional plans				
Option 1 Direction to plans to instigate structural programmes for community resilience	Med	No	×	
Option 2 Direction to district plans to identify and avoid subdivision and development in high risk areas	High	Yes	✓	Policy 28 and method 1
Regulatory direction as to the matters to be given particular regard in resource management decision making				
Option 3 Direction to consider minimising the adverse effects of natural hazards	High	Yes	✓	Policy 50 and method 4
Option 4 Direction to consider minimising the adverse effects of hazard mitigation measures	High	Yes	✓	Policy 51 and method 4
Non regulatory options				
Option 5 Provision of information about building hazard resilient communities that are prepared for natural hazard events	Med	No	×	
Option 6 Provision of information about natural hazard and climate change effects	Med	Yes	✓	Method 14
Option 7 Provision of information about areas at high risk from natural hazards	Med	Yes	✓	Method 22

Policy and method options	Effectiveness	Efficient?	Selected (most appropriate) option(s)	Proposed policies and methods
Option 8 Provision of information about natural features to protect property from natural hazards	Med	Yes	✓	Method 23
Doing nothing				
Option 9 No intervention	Low	No	×	

Table 7: Results from the evaluation of the most appropriate of policy and method options to achieve objective 20

6.4 Discussion of options

The Wellington region is affected by a wide range of natural hazards. Peoples' actions, including mitigation measures and ongoing development can cause or increase the risk from natural hazards.

Because of the serious effects that hazard events and natural disasters have on a community and the economy, a planning response that leans heavily to regulatory options is the most appropriate to address the issues and achieve the objective, but supported by a number of non-regulatory methods. This leads to a response that includes:

- Option 2 (policy 28 and method 1), to avoid development and subdivision in high hazard areas in order to increase community resilience from natural hazards;

- Option 3 (policy 50 and method 4), to have a range of considerations when assessing the risks in areas with moderate risk of impacts from natural hazards which may be able to be effectively managed in order to increase community resilience from natural hazards;

- Option 4 (policy 51 and method 4), to have a range of considerations when assessing the impacts of hazard mitigation measures.

There are three non-regulatory methods to support these options and resultant policies:

- Option 6 (method 14), to provide this advice and other knowledge of natural hazards to the community and developers to raise awareness and increase resilience from natural hazards, and provide information to aid planning and decision making.

- Option 7 (method 22), to identify areas at high risk from natural hazards. This research can be used to produce maps that can be included into regional and district plans and is the most cost effective means of achieving this work, rather than requiring studies for each individual

development. It is critical that any decisions to avoid development in certain areas is backed up with sound scientific research.

- Option 8 (method 23), to identify natural features in the region that may provide a buffering effect and protect property from natural hazards.

While there are costs associated with implementing these options, the costs from natural disasters are exponentially higher, making the selection of these options and resultant polices the most appropriate way to address the issues and achieve objective 20.

Other policies and methods were also considered but are rejected for a number of reasons as follows.

Option 1 is not selected because of the excessive cost and difficulty of implementing such programmes. Some aspects of option 1 can be implemented by other strategies, such as through floodplain management plans raising houses or district plans requiring building upgrades to bring buildings up to acceptable earthquake engineering standards.

Option 5 is rejected because the Regional Policy Statement is not the appropriate place to mandate or necessitate such programmes. Furthermore, it duplicates requirements in the Civil Defence and Emergency Management Act 2002. Aspects of this option are delivered via option 4.

Option 9, doing nothing, is assessed as being inappropriate to achieve the objective 20. It is very important to be aware of natural hazards when planning a development and to build communities to minimise the risks. Option 9 is rejected because it would allow development to proceed without a proper assessment of the risks from natural hazards or the potential for the development to increase the risk. This could lead to developments and structural mitigation measures having an adverse impact on the environment and potentially increasing the risk from natural hazards. This is contrary to the aims of Part 2 of the Resource Management Act.

Objective 20 recognises and supports the hazard management principles of risk reduction and readiness, two of the four key emergency and hazard management principles that includes: reduction; readiness; response; and, recovery.

- Reduction is concerned with minimising the adverse impacts from natural hazards through sound planning and management in order to encourage the development of resilient communities that are better prepared for natural hazards and climate change effects.

- Readiness is about preparing for hazard events before they occur and involves local authorities, civil defence emergency management and the community. An important way to achieve this is through public education and by providing information and advice in order to raise awareness of natural hazard issues. If people are prepared and able to cope, the impacts from a natural hazard event are effectively reduced.

Options 2, 3, 4, 6, 7 & 8 will together, act to reduce the risks from natural hazards to people and communities, including businesses and civic infrastructure and are, therefore, the most appropriate way to address the issue and achieve objective 20

6.5 Risk of acting or not acting if information is uncertain or insufficient

Section 32(4)(b) of the Resource Management Act requires the evaluation of appropriateness to take into account the risk of acting or not acting if there is uncertain or insufficient information about the subject matter of the policies or methods.

With regard to natural hazards, there is neither uncertain nor insufficient information by which to analyse the appropriateness of acting or not acting upon the issues.

The risk of not acting in the way proposed is that the objective will not be achieved. If there is no action on behalf of local authorities to reduce the impacts on communities from natural hazards or to raise awareness and preparedness for hazard events (where there is insufficient information). Organisations and individuals are free to develop without any requirement to consider; the impacts from natural hazards or; the impacts of the development on the environment or; the ways in which the development exacerbate the risk from natural hazards or; the range of mitigation measures that may be required or; in considering the various options that may be available to make a more sustainable long term choice.

If there are no hazard management policies in place to deal with development in areas where the risks are uncertain, development and lives could be placed at risk and vulnerable to serious damage from a hazard event. It is critical to take a precautionary approach to developing these areas to ensure the safety of people and property, especially in light of climate change impacts. There is a very high risk that the safety of developments and lives will be compromised intentionally or inadvertently with no protection.

The risk of acting in the way proposed is that there may be some extra costs, in time and money, in order to implement the policies and methods properly. There may be some situations, where a development is constrained by the requirements to avoid high risk areas or by the need to modify the plans in order to minimise the risk or by the requirements to implement mitigation measures in order to minimise the risks from natural hazards.

It is also possible that a lack of certainty about natural hazards in some areas, may curtail development. Available information may indicate a general hazard risk, but being non-specific, it may lead to an overly precautionary approach, thereby constraining or preventing development unnecessarily. It is clear to Greater Wellington that the risk of acting is much less than the risk of not acting.

Appendix 1: Criteria used to determine regionally significant issues

The criteria used for determining whether an issue was a resource management issue of regional significance were:

- The issue was a natural or physical resource management problem.
- The issue was to be of regional significance (see further criteria below).
- The issue was about achieving the purpose of the Resource Management Act.
- The issue did not "repeat" the Resource Management Act, the New Zealand Coastal Policy Statement, any other national policy, or another issue in the Regional Policy Statement.
- The issue was explained in the context of the Wellington region.

Regional significance was determined using the following criteria

- The issue concerns a resource which is regionally significant, and the issue requires integrated management at a regional level ; and
- There is a potential shortage of the resource and resultant allocation issues; or
- There is a significant level of conflict over the resource which is either occurring or is foreseeable over the next 10 years; or
- The resource is potentially subject to significant adverse effects at a regional level; or
- There are significant issues in terms of Part 2 of the Resource Management Act which are, or are likely to, arise at a regional scale (eg maintenance and enhancement of access along waterways); or
- The community has signalled that it regards a particular issue as being of regional significance; or
- The issue is one of national significance (eg preservation of natural character) and requires regional intervention; or
- The issue is one of district significance but requires regional intervention; or
- The matter is one which a National Policy Statement or National Water Conservation Order requires to be addressed.

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