

## **5 Natural hazards**

### **5.1 Introduction**

The Waikato and Waipa rivers flow through the district and can carry large flood flows that create a hazard to use and development along the valley floors. The Waikato basin has a high water table in winter, which can create problems for some activities. The coastal margins are subject to storm events, and sandy areas are particularly vulnerable to damage by such events. The potential of global warming to increase the occurrence and worsen the effects of these and other hazards is also recognised. Other hazards such as volcanoes, earthquakes, high winds, and tsunami can have serious effects but they are addressed by means outside the district plan. The management strategy for the hazards addressed in the plan takes a long-term view. Subdivision and development in hazard-prone areas are discouraged to protect health, safety and property from unnecessary risks and also to ensure that natural mechanisms such as flood ways and ponding areas can function unimpeded.

5.2 Issue - Health, Safety and Property

Health, safety and property can be compromised by land use and development (including land protection works), particularly in areas subject to natural hazards.

OBJECTIVE	POLICIES
<p>5.2.1 Risks from natural hazards to health, safety and property, resulting from use, development or protection of land, are minimised.</p>	<p>5.2.2 Use or development of land subject to significant natural hazards should be avoided.</p> <p>5.2.2A Use or development of other land subject to natural hazards should be required to mitigate the related risks to health, safety and property.</p> <p>5.2.3 Use, development or protection of land should not increase the adverse effects of natural hazards, or compromise natural processes.</p> <p>5.2.4 Construction or alteration of a building should not take place on land that in the event of a 0.5 metre sea-level rise would be: (a) below mean high water springs, or (b) subject to inundation by storm surges, or (c) subject to coastal erosion.</p> <p>5.2.5 Development should minimise impervious surfaces, provide adequate stormwater drainage, and mitigate the off-site effects of stormwater drained from the site.</p> <p>5.2.6 Plantation forests should be provided with firebreaks and a source of water for fire fighting.</p> <p>5.2.7 Dwellings should be located where they will not be at abnormal risk from fire.</p> <p>5.2.8 Natural buffers against the effects of natural hazards should be used, maintained, or enhanced.</p> <p>5.2.9 Development should be designed and located to avoid or mitigate the predicted effects of global climate change on natural hazards, especially increased flooding, erosion, fire, and storms. Where there is incomplete information, a precautionary approach should be taken.</p>

5.2.10 Tamahere Country Living Zone

OBJECTIVE	POLICIES
<p>5.2.11 Hydrological characteristics of the Mangaonua, Mangaone and Mangaharakeke Streams and their tributaries are retained.</p>	<p>5.2.12 Subdivision, use and development must be undertaken in a manner that maintains or enhances the overall hydrological characteristics of the area including maintaining surface and groundwater flow regimes, ponding and drainage patterns.</p> <p>5.2.13 Modifications to flow paths, ponding areas and drainage patterns should be limited to minor adjustments that enable an overall enhancement of the environment or restore previously modified systems.</p> <p>5.2.14 Stormwater should be managed as close to its source as is practicable.</p>
<p>5.2.15 Risks from ponding of surface water and poor drainage are avoided.</p>	<p>5.2.16 Subdivision, use and development must not increase ponding hazards.</p> <p>5.2.17 Subdivision, use and development should avoid or mitigate the adverse effects of ponding of surface water.</p> <p>5.2.18 Stormwater management practices and devices should be in accordance with low impact design principles.</p>

5.3 Reasons and Explanations

**5.3.1 Risks of Natural Hazards**

The objective and policies address the risks from natural hazards. It is important to ensure that development does not result in people becoming more at risk from hazards. Many natural events such as flooding and erosion would be harmless if the affected land had been left undeveloped. Development in a hazard-prone area not only puts people and property in harm's way, it may worsen the effects. Building over land liable to subside into mine shafts is an example of this.

Rules in this plan are supplemented by building controls in the Building Act 2004 in respect of new building work in hazard-prone areas. The Waikato Regional Plan controls the causes of erosion, and damming and diversion of watercourses, so this plan is mainly concerned with separating development from known hazard areas, and preventing activities that would make things worse. Emergency responses are provided for under civil defence legislation.

**5.3.2 Avoidance rather than Mitigation**

Avoidance of development in hazard-prone areas is preferable to attempting to mitigate the effects, because hazard events are not always controllable or predictable. Some development might be allowed in lower-risk areas, where the development will not worsen the effects of the hazard either on-site or off-site, and where mitigation measures will be effective to preserve health and safety.

Detailed site investigations will be required to accurately assess the hazard, and resource consent will require the appropriate avoidance or mitigation measures to be undertaken. Mitigation might include modifying the natural event (e.g. through building stop banks) or modifying the design of the development (e.g. building to flood-resistant designs). Use of development setbacks will help avoid development being placed in a hazard-prone area.

The limitations of hazard protection works need to be recognised and reflected in the design and location of development. For example, stop banks provide a degree of protection against flooding but there is no guarantee they will protect against all floods. Land that is vulnerable to any significant hazard should either remain open space or be developed in a way that takes the potential hazard fully into account. With regard to flooding behind stop banks, minimum floor levels should relate to the design flood within the river rather than local ponding levels, except in Huntly where local ponding levels shown on the planning map are used.

Environmental effects (such as on the natural character of the coastal environment and margins of water bodies, including effects some distance away), natural processes and amenity values also need to be assessed when protection works are planned and undertaken.

### **5.3.3 Development should not increase Natural Hazards**

Natural hazards are often exacerbated by vegetation clearance, increase in impervious surfaces, changes in overland flow paths, earthworks, draining of wetlands and reclamation of land. The adverse effects can occur off-site of the activities, for example flooding downstream as a result of vegetation clearance, or flooding upstream as a result of flow paths being obstructed. Similarly, depositing fill material in a ponding area can reduce the storage capacity of the pond and increase the likelihood of flooding of adjacent low-lying properties. The effects, including cumulative effects, will be taken into account in considering new development proposals.

### **5.3.4 Coastal Erosion and Storm Events**

This policy recognises that the effects of coastal erosion and inundation can be extreme and unpredictable and that building in areas prone to these hazards is dangerous. This policy requires avoidance of these hazards, going further than the policy for hazards generally, which prefers avoidance to mitigation. Refer to the New Zealand Coastal Policy Statement in regard to new coastal development (policy 3.4.5) and existing coastal development (policy 3.4.6).

### **5.3.5 Stormwater**

Stormwater is a particular hazard in the district and its management needs to be considered in every development. Much of the district has no reticulated stormwater drainage system, and coupled with a regular rainfall and high natural water table, disposal options can be limited for many sites. On-site soakage is preferred to diverting water off-site

### **5.3.6 Fire Protection**

Firebreaks and provision of a water supply for fire fighting are simple and effective measures to prevent the spread of forest fire. Abnormal risks arise where dwellings are located in places inaccessible to fire service vehicles, or close to flammable vegetation.

### **5.3.7 Natural Buffers**

Using, maintaining and enhancing natural systems, such as wetlands, indigenous vegetation, sand dunes and coastal vegetation, can reduce the risk of natural hazards. For example, wetlands and vegetation can absorb water and then release it slowly, thus reducing flood peaks. Dunes act as a

buffer against the energy of waves and provide a sediment reservoir to replace eroded foreshore sediments. This policy is consistent with the New Zealand Coastal Policy Statement, section 3.4.3.

### **5.3.8 Precautionary Approach**

Scientific opinion differs about the possible impacts of global climate change, but majority opinion predicts that the effects could include a greater frequency and intensity of extreme weather events. Increased storms, floods and droughts, with the associated increased fire risk, may occur. The extent of these is uncertain and a precautionary approach is taken, because of the high potential for harm under the more serious scenarios. The Regional Coastal Plan, section 17.7.8 takes a similar approach.

### **5.3.9 Sea Level Rise**

The Ministry for the Environment has stated that a 0.5 metre sea level rise is an appropriate measure for use in district plans. This is consistent with the New Zealand Coastal Policy Statement, section 3.4.2.

### **5.3.10 Hydrological Characteristics within the Tamahere Country Living Zone**

The management of stormwater is an essential element of the Tamahere Country Living Zone. Management is required to maintain the functioning of natural water bodies and overland flow paths and to avoid ponding and surface water hazards. Changes to hydrology (including low and high flows, and groundwater levels), increased release of sediments and the discharge of contaminants need to be avoided. Earthworks need to be carefully managed to ensure that the natural features of the area are retained and hydrological characteristics are not unduly modified. Low impact storm water design principles should be utilised in management methods to protect natural water bodies. Minor changes to watercourses, such as realigning a channel, are acceptable when they enable efficient development of an area, provided that hydrological characteristics and effective stormwater management is maintained. Development must not alter the flow regimes relating to the Mangaonua, Mangaone and Mangaharakeke Streams.

### **5.3.11 Ponding of surface water and drainage within the Tamahere Country Living Zone**

Surface water ponding is an issue in some parts of the Tamahere Country Living Zone and this hazard is to be managed in accordance with District Plan provisions. Stormwater management incorporating low impact design principles is an important means of managing ponding of surface water by ensuring peak flows are not increased. Minor filling and earthworks are acceptable provided that the effects are contained on the property to be developed and ponding on other properties is not increased.

Earthworks and building development in ponding areas or on overland flow paths should be managed to avoid the potential for adverse consequences. Such consequences include ponding within a property or an adjoining property where water flow is diverted. Roads in the structure plan area are to include low impact design principles with features such as swales to allow disposal of stormwater through natural ground seepage.

### **5.3.12 Stormwater management practices within the Tamahere Country Living Zone**

Stormwater run-off within the catchment must be carefully managed in order to avoid adverse effects of increased flooding, erosion and contamination of receiving waterways. Stormwater systems should attenuate stormwater flow and optimise interception, detention and removal of waterborne pollutants from run-off prior to their discharge to these waterways. If stormwater disposal is managed in a sustainable manner, the impact on the environment is less and longer-term

maintenance costs are reduced. Management methods using low impact stormwater principles can also provide attractive amenity features.

Stormwater management facilities need to be designed to a high standard to avoid cumulative effects on the Waikato River and its tributaries. Complying with more general guidelines regarding stormwater management is not sufficient to protect and enhance this important receiving environment. For this reason stormwater management that integrates low impact design principles (rain tanks, rain gardens, swales) will manage most stormwater effects at source. The use of these stormwater management systems is to be part of an integrated approach to stormwater management.

### 5.4 Methods of Implementation

#### 5.4.1 Regulatory Methods

- (a) Rules controlling use and development, including coastal hazard mitigation, or a requirement for relocatable buildings in hazard-prone areas.
- (b) Rules controlling coastal hazard mitigation works by soft engineering techniques, such as dune stabilisation and beach nourishment, in preference to hard engineering techniques, such as gabions and groynes.
- (c) Indicate hazard-prone areas on Planning Map.
- (d) Esplanade reserves and strips.
- (e) Designations.

#### 5.4.2 Deleted

#### 5.4.3 Council Works and Services

- (a) The Council's flood, coastal and other protection works.

#### 5.4.4 Information, Education and Advocacy

- (a) Cooperate with the Waikato Regional Council to implement the public information objectives of the Regional Policy Statement.
- (b) Collate hazard information into a natural hazards register, and update that information regularly. As site-specific information is generated, this will be added to both the natural hazards register and to individual property files. The Council will also undertake research projects from time to time, so that the appropriate resources can be channelled into ensuring the register's increased effectiveness. The register will be used when assessing building permit applications in terms of section 36 of the Building Act 2004.
- (c) Publish monitoring results, especially movements in identified hazard areas such as coastal erosion areas.

### 5.5 Reasons for Methods

#### 5.5.1 Regulatory Methods

Regulatory methods are necessary to protect health, safety and property from hazards that are not always readily apparent. Rules are necessary because development and protection of hazard-prone areas is driven by short-term economic considerations and by lack of public understanding of the hazards.

## Waikato District Plan - Waikato Section

Esplanade reserves have hazard protection as well as other functions.

Designations mainly cover stopbank areas controlled by the Waikato Regional Council. Standards are adjusted to cover predicted additional effects of global climate change.

Soft engineering techniques, such as dune stabilisation and beach nourishment, are favoured because these are more effective and practical in many situations. Hard engineering techniques (e.g. the dumping of rocks, concrete and other spoil, walls, rip rap, gabion baskets and groynes) may prove ineffective as coastal forces are often underestimated. Hard engineering techniques also carry a risk of transferring the energy of the sea to other places, producing unforeseen results that can worsen the overall situation. Structures often conflict with the natural character of the coastal environment. Managed retreat, which includes moving buildings away from danger areas, will be considered along with soft engineering techniques.

### 5.5.2 Deleted

### 5.5.3 Council Works and Services

Extensive flood protection and drainage works have been developed, particularly along the Waikato River and its tributaries. High costs have reduced the likelihood of new major protection schemes being developed. Nevertheless, localised emergency protection works may be undertaken when required.

### 5.5.4 Information, Education and Advocacy

Lack of public information and awareness of hazards contributes greatly to ongoing demands for development of hazard-prone land. Information is an important tool to moderate this demand.

## 5.6 Anticipated Environmental Results

ISSUE	ANTICIPATED ENVIRONMENTAL RESULTS
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## Waikato District Plan - Waikato Section

<p>5.6.1 Health, safety and property</p>	<ul style="list-style-type: none"><li>(a) Identification of areas within the district that are prone to natural hazards.</li><li>(b) Reduction in the risks to people's health, safety and property from natural hazards.</li><li>(c) Recognition of and provision for avoiding coastal hazards.</li><li>(d) No new use, development or protection works on land subject to increased risk from natural hazards.</li><li>(e) Subdivision, use and development do not increase the scale of the existing natural hazard.</li><li>(f) Development density and design consistent with the degree of risk from natural hazards.</li><li>(g) Provision of adequate firebreaks and water sources for plantation forests.</li><li>(h) Maintenance and continued hazard protection of natural buffers such as flood plains, ponding areas, wetlands, sand dunes and cliffs.</li><li>(i) Avoidance or mitigation of the additional effects of natural hazards caused by global climate change.</li></ul>
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