

14 NATURAL HAZARDS

14.1 Background

The particular geology, hydrology and topography of the Hutt Valley make Upper Hutt vulnerable to a variety of natural hazards. Earthquakes and flooding are the most important natural hazards that threaten Upper Hutt's communities.

Natural hazards cannot be prevented, but the effects they have on people and the environment can be mitigated. Flood protection measures and land use planning are two ways to minimise risks.

The Council's function is to manage the actual and potential effects of the use, development or protection of land. This includes the use of controls to avoid, remedy, or mitigate the effects of natural hazards.

14.2 Resource Management Issues

14.2.1 *The potential damage, disruption and threats to the safety of the community and property as a result of activities located on or near an area prone to seismic hazard.*

Within Upper Hutt, the Wellington Fault occupies the north-western margin of the Upper Hutt/Te Marua basins. The north west side of the valley is the eroded fault scarp of the Wellington Fault. In many parts of Upper Hutt the exact location of the active fault is unknown. The level of accuracy ranges from +/-5m within Totara Park, to more than +/-50m between the Silverstream Bridge and south of Totara Park. The variation in accuracy is due to the lack of surface evidence like active faulting and other surface obstructions.

The adverse effects of earthquakes impact on both physical resources and people. Fault ruptures are the most obvious cause of damage but ground shaking is more widespread. The severity of the effect depends upon factors like distance from the fault, local topography, geological conditions and ground water conditions. Showing the active fault on the Planning Maps assists in identifying areas most likely to be affected by earthquakes.

A major earthquake in Upper Hutt is likely to damage resources and injure people. Buildings and infrastructure that straddle the fault may be severely damaged. The severity of damage in other areas of Upper Hutt will vary depending on the location. Conditions such as soil structure, ground water, and local topography as well as geological conditions will either attenuate or amplify the earthquake. There are also areas that may be prone to liquefaction and seismically induced slope failure.

14.2.2

Inappropriate development and activities located within floodplains that may result in damage to infrastructure and property and the obstruction of flood flow paths.

Upper Hutt is dissected by several tributary rivers which flow into the main Hutt River.

The area most at risk is the Hutt River floodplain. Recognising this, the Wellington Regional Council has undertaken protection works, such as stopbanks and river bank stabilisation. These stopbanks run parallel to the developed urban area from Totara Park to Trentham Memorial Park. During a large flood the stopbanks may be breached, causing severe damage and disruption to the City. The stopbanks have a maximum design flood capacity so that it is possible in a significant flood event that they could be overtopped or a breach could occur causing significant damage and disruption to the City.

In addition, the Heretaunga Flood Detention Embankment and outlet control structure (referred to as the Heretaunga Retention Dam) has been designed to reduce the frequency and severity of flooding in the downstream urban areas along the Heretaunga Drain. A line defining the predicted maximum extent of ponding behind the Heretaunga Dam has been identified on the Planning Maps. So that the ponding capacity of the Heretaunga Dam is not compromised, earthworks, buildings or structures should not be undertaken within the area encompassed by the Retention Line as shown on the Planning Maps.

Subdivision in the rural areas is likely to increase the potential for development close to rivers and will require careful consideration.

It is recognised that there are varying levels of risk within an identified Flood Hazard Extent. High hazard areas include Stream and River Corridors, Overflow Paths and Erosion Hazard Areas. In these higher risk areas flood waters can be both deep and fast moving and the risk of erosion is high. In some cases, parts of the Erosion Hazard Area may be less susceptible due to the characteristics of the location and thus represent a lower risk to people and property. Lower hazard areas within identified flood hazard extents predominately comprise ponding areas but can also include lower risk parts of the Erosion Hazard Area. Development should avoid higher hazard areas, with sufficient mitigation applied to lower hazard areas.

Certain upstream activities can increase the frequency and magnitude of flood events. For example, removal of vegetation can result in increased water run off, sedimentation and debris blockages, thus creating significant risks.

14.2.3 *The need for on-going river management activities and development of flood protection works along the Hutt River.*

The Hutt River's water levels are subject to wide and sudden fluctuations. In order to avoid, remedy or mitigate the potential adverse effects of inundation, there is a need to manage activities on and near the Hutt River, and to provide for flood protection work.

14.2.4 *The existing community in the Pinehaven catchment are susceptible to flood hazards.*

The Pinehaven Stream flows through an urbanised community. The development around the stream has limited the natural function of the stream and its floodplain. The Stream corridor, Overflow paths and land along the stream banks are the most sensitive areas to inappropriate development that can adversely affect the function of the floodplain and exacerbate the risk from flooding.

14.3	Objective
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14.3.1 *The avoidance, remedying or mitigation of the adverse effects of natural hazards on the environment.*

The Council has the responsibility under the Act to protect all aspects of the environment, not just people and property, from the adverse effects of natural hazards. Amenity values of an area and its ecological systems should also be protected against natural hazards.

It is not always feasible or practicable to avoid, remedy, or mitigate all potential effects of natural hazards at all times for all aspects of the environment. Some priority must be placed on human life and property, but preferably this can be achieved in conjunction with achieving other goals. The goal in managing the effects of natural hazards within the City, therefore, is the avoidance, remedying or mitigation of the adverse effects of natural hazards on the environment as appropriate to the circumstances, with priority on community protection.

14.3.2 *Identify Flood Hazard Extents and Erosion Hazard Areas in order to avoid or mitigate the risk to people and property and provide for the function of the floodplain.*

The extent of the threat from flood hazards and erosion hazards must be identified within the Pinehaven Stream and Mangaroa River catchments. The types of hazards within an identified Flood Hazard Extent can vary, with high hazard areas and lower hazard areas that need to be considered when planning for future development.

High hazard areas within the Flood Hazard Extent comprise the Stream and River Corridor, Overflow Paths and the Erosion Hazard Area. These are characterised by areas of moving flood water which may also be deep or fast and includes areas most at risk to erosion during a flood event. These are identified on the Hazard Maps. Subdivision within high hazard areas should be avoided given the threat these areas represent to people and property.

Outside the high hazard areas, but still within the Flood Hazard Extent, are lower hazard areas generally comprising the ponding areas and some parts of the Erosion Hazard Area. These areas are generally characterised by still or slow moving flood water and a lower risk of erosion. These areas are identified on the Hazard Maps. Subdivision or development may be possible in these areas subject to appropriate mitigation (such as raising the floor levels above the 1 in 100-year flood level).

All development should be undertaken in a manner that provides for the function of the floodplain to discharge flood waters and thereby ensure that the effects from flooding are not exacerbated on the site, adjacent properties or the wider environment.

14.3.3

To control buildings and activities within the upper areas of the Pinehaven Catchment Overlay to ensure that peak stormwater runoff during both a 1 in 10-year and 1 in 100-year event does not exceed the existing run off and therefore minimise the flood risk to people and property within the Flood Hazard Extent.

Development in the Pinehaven Catchment Overlay needs to be controlled to ensure that stormwater runoff does not exacerbate the impact of flooding in the lower catchment. Most of the upper catchment is currently undeveloped and any new development has the potential to affect the land use and peak stormwater runoff. This objective seeks to ensure that the peak stormwater runoff does not increase, thereby increasing the flood risk downstream.

14.4

Policies

14.4.1

To identify and mitigate the potential adverse effects of natural hazards that are a potentially significant threat within Upper Hutt.

Adequate information is necessary to make informed decisions on developments that may be affected by natural hazards. The main

objective relating to natural hazards is knowing where they can occur so that the effects can be avoided, or the appropriate management strategies can be put in place.

The Council will co-ordinate the provision of information identifying these hazards and the areas at risk. This can be used by developers, the community and the Council to consider the potential risks when making decisions on developments and deciding on possible mitigation measures where natural hazards are involved.

The Council will recognise the high and low hazard areas within the identified Pinehaven Stream and Mangaroa River Flood Hazard Extents.

High hazard areas comprise moving water that can also be deep and are the areas most at risk from erosion during a flood event. Accordingly, subdivision and development within high hazard areas should be avoided given the threat they have to people and property.

Lower hazard areas are generally characterised by still or slow moving flood water and a lower risk of erosion. In these areas, it may be possible to undertake development provided appropriate mitigation is implemented (for example floor levels above the 1 in 100-year flood extent or being setback from the stream or river bank).

Some parts of the identified Erosion Hazard Area within the Mangaroa Flood Hazard Extent may represent a lower risk depending on the characteristics of the site and its location in relation to the river. Where a site specific assessment identifies there is a lower threat then the erosion hazard may be considered a lower hazard area and assessed in accordance with the lower hazard policies.

14.4.2 ***In areas of known susceptibility to natural hazards, activities and buildings are to be designed and located to avoid, remedy, or mitigate, where practicable, adverse effects of natural hazards on people, property and the environment.***

This policy lessens the risk factor by restricting developments in hazard prone areas. These controls include appropriate separation distances from a river or fault, or designing structures and site development to meet acceptable levels of safety. This also enables applicants to consider the potential risks when making decisions on developments.

The effects of permitting more intensive subdivision (and subsequent development and infrastructure) could be substantial and controls on subdivision can reduce these.

14.4.3 ***Avoid development within high hazard areas of identified Flood Hazard Extents and Erosion Hazard Areas.***

The high hazard areas present a threat to people and property as they can contain both fast and deep flowing water in a 1 in 100-year flood event, or are at risk of bank collapse which has the potential to damage buildings and threaten lives.

The policy provides directive for careful consideration of development within the high hazard areas, with a strong directive to avoid development in these high hazard areas.

14.4.4 ***To control development (including buildings) within the lower hazard areas of identified Flood Hazard Extents and Erosion Hazard Areas by requiring mitigation to minimise the risk to people and property.***

The policy recognises that there are lower hazard areas within the identified Flood Hazard Extent and some parts of the Erosion Hazard Areas. The lower hazard areas are characterised by still or slowly moving water and a lower risk of erosion. As such, development within these lower hazard areas can be appropriate provided measures are incorporated to mitigate the risk.

14.4.5 ***Enable planned flood mitigation works within identified Flood Hazard Extents that decrease the flood risk to people and property or maintain the function of the floodplain.***

Flood mitigation works are undertaken to reduce the flood risk to people and property. This policy supports flood mitigation works as they are consistent with the purpose of providing for the continued function of the floodplain.

14.4.6 ***Within the Pinehaven Flood Hazard Extent, reduce blockage potential from fences, buildings and driveways in high hazard areas through design controls on development.***

Driveway crossings and structures over the stream channel within the flood hazard extent can impede flood flows. The flood risk and damage to people and property can be exacerbated by blockages of debris accumulating against fences, buildings and driveways crossing the stream. The blockage potential is compounded by the character of the catchment being urbanised and confined. This policy encourages fences, buildings and driveways to be appropriately designed.

14.4.7 ***Development within the Pinehaven Catchment Overlay is designed to ensure that the peak stormwater runoff, during both a 1 in 10-year and 1 in 100-year event, shall be at a rate no greater than when compared to the pre-development situation.***

Development in the Pinehaven Catchment Overlay needs to be controlled to ensure that stormwater runoff does not exacerbate the

impact of flooding in the lower catchment. The upper catchment is currently mostly undeveloped and any new development has the potential to increase peak stormwater runoff.

14.4.8 ***Within the Mangaroa Flood Hazard Extent enable accesses positioned above the 1 in 100-year level to serve dwellings where located within the lower hazard areas and avoid locating accesses to serve dwellings within high hazard areas.***

This policy enables access way and driveways to dwellings in the Mangaroa Flood Hazard Extent to be above the 1 in 100-year flood level when located in the lower hazard areas. It discourages access routes being located in high hazard areas where access ways could be compromised and properties become isolated during a 1 in 100-year flood event. The policy encourages access ways to be safely located as they assist with evacuation, if required, during a flood event.

14.4.9 ***Within the Mangaroa Flood Hazard Extent, enable non-habitable accessory buildings within the lower hazard areas.***

This policy recognises that the Mangaroa Flood Hazard Extent is predominantly rural. Rural activities are often supported by accessory buildings, therefore it is appropriate to provide for these in lower hazard areas where they are unlikely to present a blockage issue, or are less likely to be structurally compromised during a flood event.

14.5	Methods
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14.5.1 District Plan provisions consisting of the following:

1. Control of the location, and design of subdivisions through standards for subdivision and building design to avoid or mitigate the risk from natural hazards.
2. Management of the location and use of buildings in close proximity to earthquake faults and areas susceptible to inundation.
3. Restriction of activities and structures within the river berms of the Hutt River.
4. Management of activities involving the removal of vegetation and earthworks located on unstable slopes.
5. Information on Planning Maps. These indicate the type and extent of the flooding and fault band hazards.

14.5.2 To maintain an up-to-date Hazard Register which will record areas and sites of known or potential hazards. The information will be used in the building consent process, as well as for land information memoranda,

project information memoranda, and resource consent processes.

- 14.5.3** Information on liquefaction and slope failure hazards, which is held by the Council, will be supplied to persons applying for land information memoranda and project information memoranda.
- 14.5.4** The use of sections 72 - 76 of the Building Act 2004 and compliance with the New Zealand Building Code in the Council's building consent process for the structural safety of buildings to withstand wind, inundation, earthquakes and unstable ground.
- 14.5.5** The continued civil defence emergency management role of the Council, and its staff, under the relevant legislation.

14.6 Anticipated environmental results and monitoring

The following results are expected to be achieved by the objective, policies and methods in this Chapter. The means of monitoring whether this Plan achieves the anticipated results are also set out below.

Anticipated environmental results	Monitoring indicators	Data source
The avoidance, remedying, or mitigation of adverse environmental effects of natural hazards on communities, including mitigation measures in place in areas identified as being of high risk	<p>Effectiveness of conditions of consents and methods used in managing adverse effects</p> <p>Development in areas subject to natural hazards</p> <p>Reduction of downstream effects caused by flooding events</p> <p>Number of resource consent applications approved or declined in areas identified in the District Plan as being susceptible to natural hazards and whether these numbers change with time</p> <p>The economic and insured costs from flood hazard events and whether these decrease in time, allowing for changes in inflation</p> <p>The number of section 74 certificates imposed on the titles of properties at the time of building consent and whether these decrease in time</p>	<p>Council complaints register</p> <p>Council resource consent records for compliance with conditions</p>
Prevention of development which increases the level of risk in areas identified as being at high risk from natural hazards	Development in areas subject to natural hazards	Council and Wellington Regional Council records
Communities informed about, and prepared for, the occurrence of natural hazards	Consultation and community initiatives	Various