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5.0 NATURAL HAZARDS

5.1 Introduction

Natural hazards are natural events in the weather, earth, water or sea. Their actions can harm human life, property, or other aspects of the environment. The Gisborne District experiences a range of natural hazards including those below:

- **Land Instability** - The land is frequently prone to slope movement and erosion. This is due to the young, folded and faulted geology common in the District. Slope failures are a significant hazard throughout the District. Infrastructure such as the Gisborne urban area water pipeline, roads and the railway line have been extensively damaged in the past from land movements. Many private properties have also been affected.
- **Flooding** - Flooding is a major hazard. The Poverty Bay Flats, including part of Gisborne urban area, are at risk from the Waipaoa and the Waimata/ Taruheru River systems. Another significant area at risk is the Mangatuna/ Wharekaka area near Tolaga Bay. Flood control works give some protection but the floodplains are still vulnerable. There are numerous other localities where flooding can be a hazard.
- **Coastal Hazards** - Except for the Lottin Point area which consists of hard volcanic rocks the rest of the coastline is subject to one or more natural hazards. These include sea and wind erosion, landslip and flooding from the sea and coastal rivers. Coastal erosion is occurring at many places. These include Muriwai, Wainui, Tatapouri, Turihaua, South Whangara, Tolaga Bay, Kaiaua, South Anaura Bay, Tokomaru Bay, Waipiro Bay and Reporua. Within the last 150 years there have been approximately 8 Tsunami recorded on the Gisborne District Coast.
- **Seismic Activity** - The Gisborne District is a tectonically active region. It is close to the boundary of two of the major plates of the Earth's crust. The relative motion of the two plates is taken up by rock deformation, fault movements and uplift. Some areas (fault zones) are weaker than surrounding areas and are more prone to movement. Seismic activity causes frequent earthquakes and some unusual features in this District such as gas seeps, hot springs, mud volcanoes and liquefaction (loss of strength of certain materials during shaking).
- **Volcanic Activity** - There are no active volcanoes in the Gisborne District. The district is exposed to volcanic activity from the Central Plateau and the Bay of Plenty Regions. Ash falls from various volcanic events in those regions could occur in this District as happened in the 1995 Ruapehu eruption. This can be a health hazard, and could affect water supplies, especially rural supplies. It can also affect cropping and grazing of land.
- **Global Warming and Climate Change** - Over the last few decades there has been growing concern that human activity has led to increases in the atmospheric concentrations of 'greenhouse gases' like carbon dioxide, methane and chlorofluorocarbons (CFCs). This is likely to cause global warming. The major results of global warming could be a rise in global mean sea level and climate change. However there is uncertainty about sea level rise, especially over the likely extent of any rise within a particular time. Most authorities accept some rise is probable.

While scientific debate still continues the potential environmental impacts should be considered. The rise in sea level is likely to accelerate erosion in some places already subject to it and could cause it in new areas. Climate change may result in more frequent "unusual" climatic events and greater extremes. More extreme weather will lead to increases in events such as flooding, landslip and erosion.

The very nature of natural hazards means any management strategy needs to take a long-term view. A 100-year planning horizon is commonly accepted for hazard assessment. Most buildings constructed of modern materials are likely to last much longer than 100 years. Once buildings are erected and sites developed, there is an expectation and an economic necessity to replace buildings on the same site.

The Regional Coastal Environment Plan (RCEP) for the Gisborne District provides background material, the policy framework for the coastal environment and the specific rules for the coastal marine area. Therefore that Plan should be referred to for any matters that relate specifically to the coastal marine area. Both the RCEP and this Plan should be referred to for matters in the coastal environment. The Regional Policy Statement also contains objectives and policies for natural hazards which should be referred to.

The issues and objectives which follow relate to all hazards. There are general policies and methods also relating to all hazards and more specific policies and methods relating to particular hazards, including rules.

5.2 Issues

- 5.2.1 People, property and the environment are adversely affected by natural hazards, including land instability, flooding, seismic and volcanic activity and coastal hazards.
- 5.2.2 There is uncertainty about the location, frequency and extent of natural hazards.
- 5.2.3 The adverse effects of natural hazards are increased by inappropriate subdivision, use and development.
- 5.2.4 It can be difficult to predict exactly the impacts and potential impacts of natural hazards on individual properties. This applies to both the timing and the extent of hazard events.
- 5.2.5 The limited knowledge and understanding of natural hazards and their effects mean that land use and development decisions have often been made without due recognition of the actual or potential risks. This can reduce the safety of communities with risk of damage to life, property, infrastructure and the environment.

5.3 General Objectives

1. A pattern of human settlement that:
 - provides a high level of personal safety from natural hazards for its inhabitants;
 - avoids or mitigates the risk to property and infrastructure from natural hazards; *and*
 - does not accelerate or worsen the adverse effects of natural hazards upon the natural and physical environment.
2. A community informed of the potential natural hazards of the District.
3. The protection of natural features that could lessen the impact of natural hazards.

Principal reason (1): Natural hazards are caused by natural processes. They only become hazards due to their interface with human activities. Hence this objective is expressed in terms of human settlement and activities. The objective seeks that for existing and new development the risk of loss of life or injury is minimised, damage to property and the environment is avoided and there is no transfer of adverse effects. The Regional Policy Statement gives this direction.

Principal reason (2): A community more aware of this Districts natural hazards will encourage more informed landuse or development decisions with regard to the potential risks.

Principal reason (3): Natural hazards are naturally occurring events. There are natural features that can reduce the scale or impact of these events. For example wetlands or swamps in upper catchments can assist in detaining overland flow thereby reducing main channel flood flows. Protection of these features can help to avoid adverse effects. As some natural features in the coastal environment such as beaches, sand dunes, barrier islands may migrate inland as a result of dynamic coastal processes protection mechanisms need to allow for this mobility.

5.4 General Policies

1. In extreme hazard areas where the natural hazard cannot be avoided or mitigated new development and any related subdivision should not occur.
2. In all hazard prone areas, any new subdivision, use and development should avoid or minimise any risk of loss of life or injury or other environmental damage due to natural hazard.
3. Any assessment of a resource consent application within a hazard prone area shall consider, but is not limited to, the following matters:
 - whether minimum floor levels for residential buildings should be set to reduce the susceptibility to danger and damage from flooding;
 - the desirability of residential buildings being relocatable so they may be moved if the risk of damage becomes imminent.
4. Patterns of human settlement, development and activities should not induce or accelerate the risk of natural hazards. When assessing an application for a resource consent the effects of that application on any hazard risk shall be considered. This includes but is not limited to the following:
 - the likelihood and effect of unrestrained material escaping and increasing potential hazard damage;
 - any diversion of overland flows of floodwaters or stormwater;
 - the safety of any occupants of buildings and evacuation procedures;
 - potential flood conditions, including silt deposition, at the site;
 - site topography and location of the building;
 - likelihood of increased erosion elsewhere;
 - stormwater collection and disposal systems should be designed to mitigate any adverse effects on the stormwater system or avoid an increase in the risk or severity of flooding or land instability;
 - other measures in place to reduce the potential effects of the proposed buildings or site development on the movement of floodwater;
 - extent to which natural buffers exist and are adversely affected.

5. To recognise the limits of attempts to control natural processes by physical work and restrict such attempts to appropriate situations where they are:
 - needed to protect existing development, or waahi tapu or new public infrastructure such as ports, roads and bridges; and
 - have a favourable benefit to cost ratio; and
 - will have no more than a minor adverse effect on the natural character of the coastal environment, lakes and rivers and their margins, or areas / features of natural or cultural significance, or other adverse environmental effects; and
 - will not cause or worsen hazards to other lands or waters; and
 - are the best practical alternative.
6. Mitigation works shall be designed and constructed in sympathy with the environment recognising:
 - the dynamic, complex and interdependent nature of biological and physical processes;
 - effect on amenity values;
 - effects on the landscape and natural features of the locality;
 - any effect on public access.
7. A precautionary approach should be adopted where activities with unknown or little understood effects are proposed, or the effects on natural processes are difficult to assess.
8. In carrying out hazard assessments or considering resource consent applications the possibility and implications of climate change are to be recognised. In particular the likelihood of the following matters should be considered:
 - a change in sea level;
 - altering of coastal processes;
 - increased inundation of low lying estuarine areas;
 - higher local temperatures;
 - changes in rainfall patterns;
 - increase in cyclonic storms.
9. The integrity of natural systems and features that provide a defence against natural hazards should be recognised and protected. These include:
 - the capacity of foredunes to act as natural protection against inundation and erosion;
 - wetlands;
 - margins of estuaries.

Explanation and Principal reason (1): These are areas where severe effects from natural hazards can be expected to occur. The hazards will not necessarily occur frequently, but they can occur at any time with little warning. In the past decisions to develop or use land were made with little knowledge or acceptance of potential hazards. These areas or activities are now under threat affecting peoples' well-being or livelihood. This has created a dependence on structural works to offer protection which are becoming increasingly expensive and not effective against all events. With greater knowledge now available, it is no longer necessary to expose people and their assets to such risks. Extreme hazard areas are defined as:

- River and Floodway Flood Hazard Area 1 and 9;
- Extreme Risk Coastal Hazard Area.

This policy will assist to avoid the establishment of any further dwellings that are likely to be affected by flooding or other natural hazard.

Explanation and Principal reason (2): These are areas where significant effects from natural hazards can be expected to occur. These hazards are not necessarily so severe that use and development need to be avoided altogether, but where use and development do occur precautions need to be taken to avoid risk.

Hazard Prone Areas include all land identified as follows:

- *Flood Hazard Overlay Areas 2-10;*
- *Coastal Hazard Overlay Areas High, Moderate and Safety Buffer;*
- *Areas Sensitive to Coastal Hazards;*
- *Land Instability Overlay.*

Explanation and Principal reason (3): These are areas where significant effects from natural hazards can be expected to occur. These hazards are not necessarily so severe that use and development need to be avoided altogether. The precautions listed are some common ways that the adverse effects of hazards can be minimised.

Explanation and Principal reason (4): While little can be done to prevent some hazards like volcanic or seismic events from occurring, other natural hazards can be avoided or their impacts minimised by appropriate management.

Explanation and Principal reason (5): Much of this Districts population and economic activity are established on river flood plains or in areas of coastal erosion and therefore already carries some risk. In some circumstances the construction or maintenance of physical works as attempts to control natural processes may be appropriate. These would include low cost, low impact works and where the value or importance of the assets to be protected justifies greater spending.

Explanation and Principal reason (6): Attempts to control natural processes need to be designed with full consideration of the actual effects on the environment.

Explanation and Principal reason (7): Knowledge of natural processes may be incomplete as the entire ecological system is very complex. Also there is considerable uncertainty about the impacts of global warming. Therefore it is difficult to fully assess the likely effects a proposal may have. To avoid repeating past mistakes a precautionary approach is considered more sustainable.

Explanation and Principal reason (8): These factors are all expected to occur due to climate change. They should be taken into account in any relevant assessment.

Explanation and Principal reason (9): Elements of the natural environment, such as beaches, sand dunes, lagoons and wetlands provide a buffer against natural hazards. These features should be recognised and protected from inappropriate subdivision, use and development so they continue to fulfil their natural function.

5.5 FLOOD HAZARD

5.6 Introduction

Flood hazard assessments have been carried out for several areas in the District. These include the Poverty Bay Flats, Gisborne urban area, and the Mangatuna/Wharekaka Area for the Hikuwai/Uawa River.

The flood hazard varies across liable areas. Generally towards the edge of the flooded area depths are shallow and floodwaters move at slow speeds. Therefore the degree of hazard is low. However floodwaters are generally deep and flow swiftly in the vicinity of the main river channel and other major flood flow paths. These areas generally have a high degree of flood hazard with silt and debris deposition.

The process of assessing flood hazard, firstly involves a study into flood behaviour. This involves estimating discharge for the various sized floods and the determination of water levels, velocities and depth of flooding. Then secondly a 'design flood standard' is selected. The determination of that 'design flood standard' balances the social, economic and ecological considerations against the consequences of flooding. If the standard is too low development will be inundated relatively frequently with greater damage. If the standard is too high land will incur unwarranted controls. The selection of the design flood standard depends on flood behaviour, landuse and consequences of larger floods.

The level of protection offered by flood mitigation works may be different from the design flood standard adopted for land use planning. That level is dictated by economics of the situation or physical limitations of the site. It is prudent to assume that floods may occur greater than the ability of protection works to contain them. The design flood standard is intended to reduce the impacts of such floods, by avoiding or limiting development which would be affected.

5.6.1 Poverty Bay Flats

The Waipaoa River Flood Control Scheme (WRFCS), constructed between 1953 and 1973, is a system of stopbanks and channel improvements on the Waipaoa River and some of its tributaries. After extensive flooding from the 1988 storms, repairs were carried out to the WRFCS so that all the Scheme will contain a discharge up to 5000 cumecs with varying levels of freeboard.

The WRFCS offers only partial protection to the Poverty Bay Flats as the flood control system can be overtopped by discharges greater than design capacity. Also, while the Waipaoa River is the dominant element on the Poverty Bay Flats there are other important drainage features. These include the Waimata and Taruheru River system, Te Arai River, Waikakariki Stream and the Whakaahu Stream (Ngatapa and Patutahi), the Mahunga Stream (Ormond) and the Whatatuna and Pipiwhakao Drain (Manutuke). In major coastal storms these are capable of creating significant overland flooding without any input from the Waipaoa, which has most of its catchment well inland.

On this basis, in 1992 Council adopted a 'design flood standard' for the Poverty Bay Flats. Refer to Report EW 3453: Poverty Bay Flats Flood Hazard Mapping Technical Report, July 1991, and Gisborne District Council Report 92/117 Flood Hazard Planning, March 1992. It introduced landuse management policies to minimise adverse effects from flooding. This design flood standard was seen as high enough to ensure that the impacts of flooding are sustainable, yet not so high that development is unnecessarily restricted. In determining that standard the uncertainties of climate change, river aggradation and the lack of long historical records were taken into account. The standard adopted in 1992 is still appropriate.

During 1995/1997 the WRFCS has been extensively reviewed. Council has adopted a long-term plan for the WRFCS to involve:

- repositioning of the inner banks and creation of floodways across river loops;
- a diversion cut through the neck of the Ormond Loop;
- raising of some Scheme stopbanks.

The Taruheru River system was also reviewed in 1995 to 1997. As at 1997 there is a significant lack of capacity in the main Taruheru stream channel and impediments to berm flow. A proposal has been designed involving channel widening, minor stop-banking and berm improvements to improve the Taruheru main channel from the confluence with the Turanganui river to Waihirere (17.3 km).

Although these actual and planned improvements will reduce the flooding risk from the Waipaoa and Taruheru River systems, land on the Poverty Bay floodplain will continue to be subject to a flooding hazard. The areas where flooding is able to be predicted by experience and computer modelling are specifically identified by Flood Hazard Overlays. The Flood Hazard Overlays indicate the different flood hazard categories. They refine the policies first introduced and implemented since 1992, in light of improvements made to the WRFCS since 1992. The 1996 study also includes the Ngatapa Valley.

Under the 'design flood standard' conditions there is still a considerable area of the Poverty Bay floodplain not covered by the Flood Hazard Overlay. This does not imply that flooding will never be experienced in these areas. In a number of situations flooding could occur, as follows

- local stormwater overflow due to drain and/or culvert blockage;
- floods greater than the design flood standard, eg. a particularly intense but localised storm;
- failure of the Waipaoa River main scheme stopbanks.

It is appropriate that some landuse controls be introduced for that part of the Poverty Bay floodplain that is not covered by the Flood Hazard Overlays.

Refer Engineering
and Works
Technical Report
EWTR 96/04:
Poverty Bay Flood
Hazard Mapping,
Revised September
1996.

5.6.2 Gisborne Urban Area

The Taruheru, Waimata and Turanganui Rivers, their tributaries and the Waikanae Stream provide the natural drainage system for the Gisborne urban area.

The Waimata River has its origins in the hill country north of Gisborne. The river has a very flat slope within the urban area and the bed levels are below mean sea level. It is deeply incised into the alluvial flats. It is capable of conveying large floods without inundating large areas of the Gisborne urban area.

The Taruheru River flows into Gisborne from the north-west, and joins the Waimata River to form the Turanganui River before discharging into the sea. The condition of the river is critical to the drainage and flood protection of a major part of the Eastern Poverty Bay Flats. Prior to the completion of the WRFCS overflows from the Waipaoa River regularly flowed to the Taruheru River and Waikanae Stream. The main channel of the Taruheru River has gradually reduced due to the changes in the catchment and sedimentation.

The design flood standard for the Waimata and Taruheru Rivers in the Gisborne urban area is the 100-year return period flood. The areas affected have been identified on the Flood Hazard Overlay on the District Urban and Rural planning maps.

Flooding of the Gisborne urban properties and streets from stormwater system overflows has occurred during past storm events. The 1977 storm saw widespread flooding in residential parts of Gisborne urban area. Flooding houses and properties often leads to an overload of sewerage reticulation systems which in turn leads to sewage overflows into streams and properties.

Once the capacity of the primary stormwater system (which includes gullies, sumps, pipes and open drains) is exceeded there is overland flow along secondary flow paths. Council is currently carrying out a stormwater system improvement programme. Once that is finished the information will be available to indicate secondary flow paths on the Urban and Rural planning maps.

Refer to Engineering and Works Report EW 3242: Waimata-Taruheru Flood Hazard Mapping, May 1991.

If an area is not covered by a flood hazard overlay it does not mean that it will never be flooded. Properties outside the extent of the Overlay could still be subject to inundation in unusual circumstances such as catastrophic rainfall, or blockages of culverts and secondary stormwater flow paths.

5.6.3 Te Karaka Township

Te Karaka Township is located on the Waipaoa River floodplain and could suffer extensive property damage in the event of a flood. The risk of flooding has increased over the years due to the steady aggradation of the Waipaoa River. The Te Karaka Flood Control Scheme, with stopbanks along part of the river has a (1996) capacity of 5000 cubic metres per second was completed after Cyclone Bola in 1988. The Scheme required a 250 m floodway, including the Waipaoa River and adjoining land to be kept substantially free of development. Any development or obstructions would decrease the primary channel capacity and increase the risk of flooding of adjacent land.

Although the Flood Control Scheme reduces the risk of flooding it does not eliminate that risk. The Transitional District Plan (Waikohu Section) therefore also included measures to minimise the effects of flooding:

- a floodwater pathway with landuse restrictions;
- a floodwater ponding area immediately to the east of the township with landuse restrictions;
- minimum floor levels for new buildings in Te Karaka Township.

The Te Karaka Flood Control Scheme is being reviewed in 1997 / 1998. The initial stopbank design provided for future alterations allowing for the effects of aggradation. From that review further landuse requirements may be required. In the interim the existing provisions will continue.

5.6.4 Mangatuna and Wharekaka Area

The Uawa River and its tributaries make up the main drainage system for Tolaga Bay. The river has its origins as the Waiau River flowing through deep valleys in the upper reaches then entering its floodplain at Willow Flat, where it is known as the Hikuwai River. It then combines with the Mangaheia stream to form the Uawa River before discharging into the sea at Tolaga Bay. The river overflows its banks from time to time (twice last century) in its lower reaches inundating large areas of land. The river contains large amounts of silt during floods which is deposited over the floodplain.

The flood-spread area extends from Willow Flat to Tolaga Bay, generally confined between the State Highway, the Paroa and Tauwhareparae Roads and the Wharekaka area. A flood study carried out in 1991 determined the velocities, flood levels, depths, and siltation in this area. The flood hazard in the Mangatuna area was reviewed in early 2004.

The meandering path of the Hikuwai River in the Mangatuna area is such that the area between State Highway 35 and Paroa Road acts as a floodway during major floods. Much of this area is subject to very heavy silt and/or debris deposition. During floods water overflowing the Hikuwai River flows into Wharekaka. The drainage system cannot cope and deep ponding with deposition of silt occurs. The floodwaters entering the downstream area of Mangatuna and west of Wharekaka spreads along the wide flat basin and combines with the Mangaheia River floodwater to flow through the Uawa River.

Floodwaters of the Hikuwai River deposit large quantities of silt on the floodplain. Depths ranging from 0.25 m to 0.6 m were observed near houses after Cyclone 'Bola'.

Refer to the Engineering and works Department Technical Reports EWTR 96/04 : Poverty Bay Flood Hazard Mapping, Revised September 1996; EW.3242 : Waimata /Taruhuru Flood Hazard Mapping, May 1991 and Tolaga Bay Flood Hazard Mapping Technical Report, August 1991, as revised in GDC2004/477.

5.7 Policies for Flood Hazard

10. In developing plan provisions, and in assessing resource and building consent applications, the Council will adopt 'design flood standards' for flood hazard assessments as follows:
- **(Waipaoa River within the) Poverty Bay Flats**
Peak flood flow of 5830 cumecs in the Waipaoa River at Kanakanaia over a period of 30 hours. (Cyclone Bola hydrograph plus 10%) plus a flood equal to the magnitude of the July 1985 event from all other rivers and streams on the floodplain.
 - **Gisborne Urban area**
Flood equal to the magnitude of the July 1985 event or the 1977 event.
 - **Te Karaka**
Peak flow of 5300 cumecs in the Waipaoa River at Kanakanaia.
 - **Mangatuna / Wharekaka area**
A flood equal to the magnitude of the "Bola" flood in the Hikuwai River as measured at Willow Flat.
11. The Council will recognise that localised flooding may occur outside the areas described in Policy 10.
12. When designing and carrying out earthworks or roadworks any adverse effects resulting from the diversion of floodwater should be avoided, remedied or mitigated.
13. Activities on land within the Waipaoa River Floodway should avoid causing aggradation of the berms during floods by trapping silt.
14. The Council will not consent to any building associated with commercial, industrial or other development sensitive to flood hazard in the Citrus Grove Development Control Area unless the requisite floodway and minimum ground levels set out in Appendix 36 a) to c) have been constructed and achieved. Where it is necessary to obtain subdivision consent prior to the floodway being constructed and the ground levels achieved then conditions will be imposed to require these works to be completed prior to s.224(c) approval.

HEC 2 Hydraulic
Model of the Te
Karaka Flood
Control Scheme
EWTR 97/06,
Sept 1997.

Explanation and Principal reason (10): The design flood standard must be high enough to ensure that the impacts of flooding are minimised yet not so high that development is unnecessarily restricted. They generally represent 100-year floods, recognising the limitations in attempting to predict the frequency of floods due to the short historical record and the possibility of climate change. The selected standards seek to minimise the flood hazard yet maximise the net benefits from the continued use of the floodplains.

Explanation and Principal reason (11): If an area is not covered by a flood hazard predictive model it does not mean that it will never be flooded. Properties outside the extent of the model could still be subject to inundation in unusual circumstances such as catastrophic local rainfall, blockages of culverts or secondary stormwater flow paths, or stopbank failure.

Explanation and Principal reason (12): Diverting floodwaters could cause harm to people or properties where this did not previously occur.

Explanation and Principal reason (13): The Waipaoa Floodway is liable to aggradation from the deposition of silt. Obstructions, which slow the passage of floodwaters, increase silt deposition. This reduces its capacity to contain floodwaters and thus lowers the level of protection on the Poverty Bay Flats. Occasional growing of low species during summer is acceptable for the purposes of improving soil fertility and structure.

NOTE: See also general policies for natural hazards.

Explanation and Principal Reason (14): The Citrus Grove Development Area is considered to be viable for non-rural land use and development only if the floodway and minimum ground levels set out within the relevant Plans are constructed and achieved and maintained on an ongoing basis.

5.8 SEISMIC HAZARD

5.9 Introduction

The Gisborne District has a considerable history of moderate seismic events, and physical features influenced by this seismic activity. Major earthquakes, although very rare, could occur at any time. Evidence of earthquake fault lines has been significantly modified by erosion and subsequent development.

Surface movement on a fault line will cause massive ground deformation and destruction of any structure built across the fault or within the crush zone. This would be an extremely rare event. The main adverse effect of earthquakes is caused by ground shaking. This can occur anywhere in the district, whether or not close to a fault line, as the ground movement of an earthquake can be transmitted for hundreds of kilometres. Effects include damage to or failure of buildings, building contents, infrastructure, and personal injury. Earthquakes can also cause secondary effects including landslides, flooding and liquefaction. Liquefaction occurs in saturated soils when as a result of an earthquake shaking soil particles are re-arranged and the mixture of soil and water acts as a liquid rather than a solid.

There is little the District Plan can effectively contribute to mitigating the hazard, as all parts of the District can be affected. Some areas, because of their underlying geology are more vulnerable than others. As information becomes available the Council may incorporate specific hazard overlays into the Plan, as it has done for other specific natural hazards.

The Council enforces national requirements governing the structural standards for buildings. These standards were developed to take account of the effects of earthquakes on buildings. Standards are enforced under the Building Legislation provisions.

5.10 LAND INSTABILITY HAZARD

5.11 Introduction

Most of the elevated land of the District has potential for instability resulting in slippage, slumping, slope failures and general soil erosion. The risk of loss of life, injury or damage to property from the land instability hazard will be considered in this chapter. Issues concerning the loss of the soil resource or the effects on the natural environment are considered elsewhere in the Plan.

It is difficult to always be precise in identifying the land at risk as susceptibility factors are very site specific and require detailed risk investigation in consideration of the type of development proposed. Some areas are well recorded but the absence of such information does not imply other areas are free from hazards.

For those likely areas of urban or rural residential development, where soil and slope instability are of potential concern, or have had detailed hazard assessments carried out, a Site Caution Overlay indicates potential land instability. The Overlay acts as a signal to advise the public there may be additional site-specific controls required for protection measures or a need to avoid development.

The site caution overlay does not include the general rural areas where although the potential land instability hazard is no less, there is a lower level of development. Usually there is available space for a suitable building platform. Any proposed development in these areas will still be assessed as to site suitability at Building Consent stage but will not be specifically identified by a hazard overlay.

Several areas have a heightened potential for adverse effects of land instability. This is due to their physical characteristics and their proximity to urban areas. There is a greater demand for new development in these areas compared to most of the district. Section sizes are often smaller. In particular these areas occur in the "lifestyle zones" to the north of Gisborne urban area, and at Te Puia Springs. The hazards include:

Riverbank Edges - These are sloping sides of incised, significant waterbodies and adjacent former flood plain terrace edges. These may be susceptible to slumping as a result of riverbank erosion or saturation during prolonged periods of rain. Lithology is generally layered alluvial sediments rather than erosion resistant rock. Susceptibility is dependent on watercourse flow and velocity, side slopes with respect to lithology, presence of any riverbank erosion protection work (tree planting or engineered protection) and position with respect to waterbody meanders.

Erosion Debris Inundation - Hill country within this Overlay is underlain with soft tertiary age rocks. Mudstone and Alternating Mudstone/Sandstone are prone to surface slip and slump erosion. Susceptibility depends on slope, lithology and vegetation with high ground moisture levels being the usual trigger. Altering the vegetation may not in itself afford a sufficiently high level of long-term protection. Development down slope, either close to the toe of such hill country or in valley bottoms is prone to inundation with the soil erosion products. This could be solid material or further out, a high water content slurry. Higher velocity movements impart greater damage.

Refer to urban and rural planning maps for location of site caution overlay.

Gisborne Periphery Slope Instability - Bordering the Poverty Bay Flats and Gisborne urban area to the North East and occurring as "caps" to Kaiti Hill and hills to the South East are estuarine Quaternary age beach deposits and lake beds. They tend to be intermingled with mudstone lithology. These are layered deposits of a very variable nature and are very site specific. They include soft sand and tephra deposits prone to severe sheet erosion, gravels (eg. Matokitoki gravels), well-consolidated sand deposits of a sandstone nature and various types of poorly cohesive tephra and clay deposits. The tephra layers may hold considerable water and clay components and may have a very high shrinking and swelling capacity. These layers may impart instability irrespective of the presence of underlaying or overlying stable layers. The potential for deep-seated earthflow erosion precludes secure building development in many areas. This area has been mapped as a Site Caution Overlay.

Te Puia Springs - Structural damage to buildings and infrastructure is an on-going problem at Te Puia Springs because of the existence of very large deep-seated earthflows.

Makorori settlement - This area is inherently unstable and complicated by a lack of formal stormwater surface drainage with poor subsurface drainage. There is a strong potential for slope failure due to saturation of underlying materials. Detailed hazard assessments were carried out in 1983 & 1984.

The hazard exists in varying degrees according to the location of the sites but could involve:

- landslip or inundation from debris from slopes above; or
- flooding and knock-down through the impetus of storm-driven seas; or
- landslip or collapse of old slip debris through in part saturation, and erosion of the toe by wave action.

Waimata Riverbank - A land instability hazard exists in a 285m long bend of the Waimata River bank between Tukura Road and Hinaki Street in the Gisborne urban area. It is a well-developed residential area with the houses constructed close to the edge of the slumped slope. The hazard involves:

- some areas in the river bank with slopes greater than 1 in 2.5 are unstable and may slump when wet or loaded;
- some areas are liable to slump under severe conditions such as cracking and saturation;
- erosion on the outer side of the bend in the river and bed degradation during large floods may also cause the progressive failure of otherwise stable slopes;
- The Overlay identifies an area that includes the immediate hazard area adjacent to the river and a fringe area 15 m parallel and landward of the hazard area.

5.12 Policies for Land Instability

14. It shall be recognised that most of the elevated land in the district has the potential for land instability. Developers and the Council shall take this into account when developing sites, considering resource consents or preparing plans under the Act. Council may require further more detailed information including the preparation of full geotechnical reports. It may require the effects of the hazard to be avoided, remedied or mitigated or decline the proposal.
15. Areas particularly at risk from known instability problems shall be identified in this Plan.
16. The Council will recognise that localised instability may occur outside the areas described in Policy 15.
17. It shall be recognised that within the area described as Site Caution Overlay to the north and east of the Gisborne urban area and at Te Puia Springs, there is significant potential for damage to development due to land instability. In developing plan provisions and in assessing resource and building consent applications in these areas the Council will have particular regard to the potential for instability.
18. It shall be recognised that within the Makorori Township Land Instability Hazard Overlay building construction, earthworks of any kind, vegetation removal, stormwater and effluent disposal systems all have the potential to cause or increase slope instability and landslip, and that properties are liable to damage from landslip from the higher slopes behind.
19. In developing plan provisions, and in assessing resource and building consent applications for Makorori, the Council will be guided by the following documents:
 - Makorori Beach Township Engineering Geology Report; Kingston Reynolds Thom and Allardice Ltd, December 1983;
 - Makorori Beach Township Geotechnical Report Volume 1 and 2; Kingston Reynolds Thom and Allardice Ltd, April 1986;
 - Report to Cook Council Council of 4 December 1986; RDR Elliott, County Manager.

20. It shall be recognised that in and close to the steep bank of the Waimata River between Tukura Road and Hinaki Street there is a heightened risk of instability affecting property. In particular the following activities should be carefully assessed to ensure they do not increase the risk of landslip:
- earthworks that may steepen the slope or that may add load on the surface;
 - discharge of stormwater which may saturate or scour the riverbanks;
 - removal of vegetation that is stabilising the riverbank;
 - construction of buildings that may add load on the surface or allow water to penetrate the ground.
21. In developing plan provisions, and in assessing resource and building consent applications for the Waimata Riverbank Hazard Overlays, the Council will be guided by the following documents:
- Waimata River Left Bank Proposed Hazard Zone, Report EW93/01 Engineering and Works Department, March 1993.

Principal reason (14): It is difficult to always be precise in identifying the land at risk as susceptibility factors are very site specific and require detailed risk investigation in consideration of the type of development proposed.

Principal reason (15 and 16): Where research or previous experience has identified areas particularly at risk then identification of them will enable informed decision-making by owners, potential owners and consent authorities. Some areas are well recorded but the absence of such information does not imply other areas are free from hazards.

Explanation and Principal reason (17): Land instability is a particular hazard in these areas, due to their physical characteristics and their proximity to urban areas. There is a greater demand for new development in these areas compared to most of the district. The overlay acts as a signal to advise the public there may be additional site-specific controls required for protection measures or a need to avoid development.

Explanation and Principal reason (18): These activities all have the potential to saturate the ground or load it beyond its bearing strength, leading to slope failure. Instability in the area between the housing area and the Highway behind could cause landslip even without further development of the area.

Explanation and Principal reason (19): These reports make up a detailed assessment of the natural hazards at Makorori and recommend strategies for dealing with the problems. However in some respects they can be supplemented by more recent knowledge.

Explanation and Principal reason (20): These activities have the potential to cause or increase the risk of landslip in this area, and therefore require to be carefully assessed.

Explanation and Principal reason (21): The report contains a detailed assessment of the natural hazard and recommends strategies for dealing with the problems.

NOTE: See also general policies for natural hazards.

5.13 COASTAL HAZARDS

5.14 Introduction

Coastal natural hazards include sea and wind erosion, landslip and flooding from the sea and coastal rivers. Except for those parts of the coast made up of volcanic rocks, the entire Gisborne District coastline is subject to one or a combination of these.

Coastal hazard assessment

Coastal hazard planning has been used in this District since 1980 for the Waiapu County, and since 1982 for Wainui Beach. It informs the public of the existence and relative intensity of natural hazards and controls any development of land subject to, or likely to be subject to, adverse effects from actual and potential coastal hazards.

In 1994 a coastal hazard assessment programme was established. Coastal hazards were to be assessed in two stages. First an initial assessment of areas sensitive to coastal hazards (ASCH) for medium priority sections of the coast. Secondly a detailed assessment of risk within coastal hazard zones (CHZ) for high priority sections of the coast.

A study was carried out in 1994 as an initial assessment of Areas Sensitive to Coastal Hazards (ASCH) for parts of the Gisborne Districts coastline. The basis for the assessments is a Coastal Hazard Database incorporating a standardised Coastal Sensitivity Index (CSI) technique for ranking sections of the coast with different sensitivities to coastal hazards. CSI's were derived by numerically integrating 8 variables. These are elevation, storm wave run up, gradient, tsunami run-up, lithology, landform, long-term trend, and short-term fluctuation. The number so obtained was ranked into one of the 5 sensitivity classes ranging from very low, low, medium, high to very high. The results of the study are summarised in a Coastal Hazard database, a summary of natural coastal hazards for each of the coastal areas assessed and the ASCH's delineated on photo maps. These are included in the Regional Coastal Environment Plan and this Plan. Further assessments of Areas Sensitive to Coastal Hazard were carried out for Tatapouri in 1998 and from Makorori to the Pouawa River mouth in 1999.

A detailed Coastal Hazard Zone assessment was carried out in 1995 for a 21 km stretch of coastline between the Waipaoa River Mouth and Makorori Point. This assessment process determined the extent of coastal hazards, forecast shoreline positions for the years 2050 and 2100 AD and provided the basis to determine the relative degree of risk by risk zoning. The CHZ was divided into extreme, high and moderate risk zones and a safety buffer zone. Further detailed Coastal Hazard Zone assessments were subsequently carried out as follows:

- 1998: *Tolaga Bay and Anaura Bay*
- 2001: *Wainui Beach (review of 1995 CHZ)*
- 2004: *Southern Poverty Bay*
- 2008: *Tokomaru Bay*

Refer CMCL Report
Numbers:
CR95/3
CR98/5
CR2001/6
CR2004/1

Refer CMCL Report
December 1994

Refer Opus Report No. 2
– UO5A1.15 (Dec 1998)
and CMCL Report No.
CR99/3

5.15 Policies for Coastal Hazard

22. Where subdivision use and development are proposed in an area identified as an Area Sensitive to Coastal Hazard (ASCH), the Council shall take into account the nature of the coastal hazards identified and the interaction with the type of use or development; including any subsequent use or development permitted as a result of the resource consent application or designation requirement. In exercising its powers on any subdivision consent, resource consent or building consent the Council shall take into account the information contained in the ASCH database. It may require further more detailed information, including the preparation of full Coastal Hazard Assessments as described in the Regional Coastal Environment Plan. It may require the effects of the hazard to be avoided, remedied or mitigated or decline the application.

Explanation and Principal reasons (22): The Areas Subject to Coastal Hazard have been delineated on a broad basis on the basis of existing information and site studies. This information may not be sufficient to assess all developments, especially the more intensive ones. Depending on the nature of the proposed development, and the degree of risk, it may be necessary to require more detailed information to be prepared.

This District Plan must not be inconsistent with the Regional Coastal Environment Plan and the Regional Policy Statement. Those documents contain extensive and detailed policies relating to natural hazards. The methods and rules in this District plan must be prepared and administered in the light of the Regional documents which must also be followed in any resource consent under this plan. It is particularly appropriate for a Council such as Gisborne District, which has both District and Regional powers to have one integrated policy framework. It is noted also that the Council's regional and district powers in respect of natural hazards are effectively the same.

Refer to General Policies 5.4, Chapter 3.8 of Regional Coastal Environment Plan and Chapter 2.3 of the Regional Policy Statement.

5.16 METHODS OF IMPLEMENTATION

There is a diverse range of natural hazards experienced in this District. Strategies are developed for each individual hazard, generally involving a combination of the following methods:

5.16.1 Information and Research

1. Council will continue to carry out research to improve its knowledge of particular hazards in particular areas.
2. The Council will seek opportunities to increase knowledge about seismic hazards. Where appropriate such information will be incorporated into this Plan and included in any relevant Project or Land Information Memorandum.
3. Council will provide preliminary advice about potential land stability issues to landowners and developers.
4. Records of sites that have been filled will be held by Council.
5. Additional coastal hazard assessment for priority areas will be carried out as described in the Regional Coastal Environment Plan.
6. Council will undertake new, and review existing, flood and inundation hazard assessments, as follows:
 - a) Stormwater secondary flow paths in Gisborne urban area;
 - b) Review Te Karaka Flood Control Scheme;

- c) Carry out further Coastal Hazard Zone Assessments for parts of the coastline subject to development pressure. Initial priorities include Tolaga Bay, Anaura Bay, Tokomaru Bay, Te Araroa and Hicks Bay;
- d) Any new information will be incorporated into Council flood hazard records, and this District Plan and will be available for use in Project Information and Land Information Memoranda.

Principal reasons (1 - 6): Increased knowledge of hazards enables informed decisions to be made. The areas selected for priority are more intensely settled areas where there is insufficient research information and analysis.

Note : Funding for this method will need to be sought through the Annual Plan process.

5.16.2 Works and Services

1. In addition to regulatory approaches to natural hazard management, the Council can undertake event modification works itself. Any works would be undertaken by or on behalf of the 'operational' rather than the 'regulatory' arm of Council. For example the Gisborne District Council has flood control functions under the Soil Conservation and Rivers Control Act 1941. Its functions include to minimise and prevent flood damage and to maintain, alter and improve the efficiency of watercourses in order to provide defence against flooding. Any work undertaken by the operational arm of Council is subject to the Act and plans prepared under that Act are administered by Council.
2. Council will investigate, construct and maintain works pursuant to the Soil Conservation & Rivers Control Act 1941 and Land Drainage Act 1908 designed to avoid or mitigate flooding.
3. Council will investigate and upgrade stormwater systems.
4. Where appropriate Council will carry out catchment treatment that could involve tree planting, land purchase and retirement, drainage and hill toe protection works.
5. Council will consider land instability hazards during planning, design and construction of Council services.
6. Council will manage beach access to minimise the impact on any sensitive frontal dunes through Council Reserve Management functions.
7. Council will provide and maintain erosion protection measures where these are necessary and the most effective means of mitigating natural hazards. In doing so Council will comply with the provisions of this Plan, the Regional Policy Statement and the Regional Coastal Environment Plan.
8. Council will promote support for community based Dune Care programmes.

Principal reasons (1 - 8): These services are carried out on behalf of ratepayers and residents to provide a level of protection from the dangers and inconvenience of natural hazards.

5.16.3 Regulation

1. The Council will assess and monitor Gisborne building stock according to requirements of the Building Act 1991 and subsequent legislation. The Council will continue to pursue an active programme under the Building Act of assessing buildings for earthquake risk and requiring strengthening as appropriate.
2. Council will apply as appropriate the provisions of Section 36 of the Building Act on any building consent application, including declining the consent, requiring mitigation or requiring the owner to indemnify Council for any liability for damage.
3. The Council will include areas subject to natural hazards in Hazard Overlays on the Urban and Rural planning maps. Restrictions applying to these Overlays will be included in this Plan.
4. Overlays include the following:
 - a) **Flood Hazard Overlay 1 (River and Floodway):** These are the main routes for floodwaters. They include all watercourses and adjacent berms liable to regular flooding. Floodwaters could be deep and fast flowing. These are areas unsuitable for regular human occupation. Floodway areas are areas which even if only partially blocked would cause a significant redistribution of flood flows. Care needs to be taken not to alter the level of the land in a way which could divert floodwaters and cause adverse effects. Activities which could trap sediment in a flood and build up the river berms should also be avoided.
 - b) **Flood Hazard Overlay 2A (Moderate/High Hazard Areas):** Similar to Flood Hazard Overlay 2 except that:
 - i) The flood hazard varies between “moderate” and “high”; and
 - ii) Flood warning systems and evacuation plans provide some measure of protection to residents

Within this overlay some areas are unsuitable for permanent habitation, while others may be suitable subject to the practicality of evacuation routes and the potential numbers to be evacuated.
 - c) **Flood Hazard Overlay 2 (High Hazard Areas):** Flooding in high hazard areas is associated with flow over stopbanks and roads and deep overland flow confined to narrow valleys. Floodwaters could cause structural damage to buildings and in extreme cases light framed houses could be swept away. Heavy silt deposition can occur. These areas are generally unsuitable for permanent habitation. Care needs to be taken not to alter the level of the land in a way which could divert floodwaters and cause adverse effects. Activities which could trap sediment in a flood and build up the river berms should be avoided.

Refer to Urban and Rural Planning Maps for location of overlays.

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- d) **Flood Hazard Overlay 3 (Flood Ponding Areas):** This contains low-lying areas or basins subject to occasional but relatively deep flooding. Generally floodwaters would be slow moving or stationary. For Poverty Bay these areas have been flooded in 1985 and/or 1988. Ponding areas store floodwaters during major rainfall events. Infilling of these areas may divert and raise the level of floodwaters elsewhere.
- e) **Flood Hazard Overlay 4 (Areas Liable to Flooding):** contains areas on floodplains that have previously been flooded. For Poverty Bay that is flooding from the 1985 and/or 1988 floods. For the Mangatuna/ Wharekaka area it is flooding from the 1988 flood. For the Waimata Taruheru and Turanganui Rivers and the Waikanae Creek it is flooding from the 1977 and/or 1985 flood.
- f) **Flood Hazard Overlay 5 (Flood Fringe Areas):** contains areas that have not previously flooded but are expected to be flooded under design flood standard conditions. Generally water would be shallow and slow moving. These areas are generally suitable for permanent habitation as flooding should not cause structural damage. However floor levels need to be high enough for inhabitants to remain safely in houses until effective evacuation can take place. Care needs to be taken not to alter the level of the land in a way which could divert floodwaters and cause adverse effects.
- g) **Flood Hazard Overlay 6 (Old River Loops):** These areas are old river loops that can be flooded to depths exceeding 1m. They are not generally suitable for residential occupation because the depth of water could cause difficulties in evacuation. Care needs to be taken not to alter the level of the land in a way which could divert floodwaters and cause adverse effects.
- h) **Flood Hazard Overlay 7 (Urban Stormwater Flood Hazard Area):** These areas are affected by flooding from local streams and drains in design flood conditions. The stormwater reticulation system within the Gisborne urban area is presently undergoing an upgrading programme and the extent of this area may be able to be reduced when this programme is complete. However, work on this has only just begun and therefore the 1977 and 1985 floodspread maps are to be used until then as the basis of this overlay area.
- i) **Flood Hazard Overlay 8 (Urban Ponding Areas):** Urban ponding areas store floodwaters during major rainfall events. Infilling of these areas would put extra stress on urban reticulation systems or require expensive upgrading of such systems.
- j) **Flood Hazard Overlay 9 (Urban Floodways):** These are main routes for floodwaters. They include all rivers, streams and watercourses and adjacent berms liable to flooding. Floodwaters could be deep and fast flowing. Floodway areas are areas which even if partially blocked would cause a significant redistribution of flood flows. Care needs to be taken not to cause adverse effects by diverting or impeding floodwaters.

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- k) **Makorori Hazard Overlay:** Because of the extremely unstable underlying geology, building construction, earthworks of any kind, vegetation removal, stormwater and effluent disposal systems all have the potential to cause or increase slope instability and landslip. Properties are liable to damage from landslip from the higher slopes behind.
- l) **Waimata Riverbank Erosion Hazard Overlay:** The Waimata riverbank may be susceptible to slumping as a result of instability and riverbank erosion. Lithology is generally layered alluvial sediment rather than erosion resistant rock. Saturation and additional loading as a result of building activities, earthworks and vegetation removal or stormwater discharge can increase the potential for slumping which could damage development near the top of the slope.
- m) **Waimata Riverbank Fringe Overlay:** The Waimata riverbank may be susceptible to slumping as a result of instability or riverbank erosion as described above. Saturation and additional loadings as a result of building activities, stormwater discharges, earthworks and vegetation removal can increase the potential for slumping which could damage development near the top of the slope. Slope failure in the erosion hazard area may cause disturbance in the fringe area which could damage buildings.
- n) **Site Caution Overlay:** This overlay is a signal to advise the public there may be additional site-specific controls required for protection measures or a need to avoid development. Subdivision of land will be assessed in order to avoid the creation of new sites which cannot be satisfactorily developed.
- o) **Coastal Hazard Overlay 1 - Extreme Risk Area:** This area lies adjacent to the coast and encompasses the area subject to high impact short-term shoreline fluctuations. There is a significant possibility of values being damaged or destroyed in any one year. Erosion could occur to the full width of this area in a single storm.
- p) **Coastal Hazard Overlay 2 - High Risk Area:** This area lies adjacent to and landward of the Extreme Risk Area. It encompasses the area subject to potential sea and wind erosion, flooding or landslip with a high probability of occurring between now and the year 2050 AD. The shoreline is forecast to lie at the inland edge of this area by about the year 2050 AD.
- q) **Coastal Hazard Overlay 3 - Moderate Risk Area:** This area lies adjacent and landward of the High Risk Area. It encompasses the area subject to potential sea and wind erosion, flooding and landslip with a high probability of occurring during the period 2050 2100 AD. The shoreline is forecast to lie at the inland edge of this area by about the year 2100 AD according to the 1995 Coastal Hazard Assessment.

- r) **Coastal Hazard Overlay 4 - Safety Buffer:** This area is likely to be affected by coastal erosion beyond the year 2100 AD on present assumptions. This would be affected by any change in the rate of sea-level rise and any change in storm frequency due to climate change. Buildings erected now are likely to be still in existence by the time the area comes to be affected by erosion. It has been mapped now for advance warning and to enable the rate of change to be monitored.
- s) **Areas Subject To Coastal Hazard (ASCH):** See the Regional Coastal Environment Plan. These are areas which have been assessed as being potentially subject to coastal hazard. A preliminary study of these areas was carried out in 1994 by Dr J.G. Gibb for the Council. This was based on the factors of sea and wind erosion, landslip and flooding from the sea and coastal rivers. These areas are identified in the aerial photographs in the Map Volume of the Gisborne District Combined Regional Land and District Plan. The majority of the Gisborne coastline is affected. (See also the Regional Coastal Environment Plan).

The results of the study will be incorporated by the Council into Land Information and Project Information Memoranda, and in decisions on building consents, resource consents and subdivisions. Developers of sites in these areas may be required to carry out more in depth analysis of the degree of hazard as part of their applications.

The areas concerned are shown on aerial photographs included with the Urban and Rural planning maps.

Principal reasons (1 -2): These are responsibilities Council exercises outside the Act. They complement the other methods taken in this Plan.

Principal reason (3 and 4): In the areas concerned additional restrictions are required to avoid or mitigate the effects of natural hazards. Without such restrictions people and structures could be adversely affected by avoidable hazards.

5.16.4 Other Legislation

1. Many of Councils functions outside the Act are concerned with avoiding, remedying or mitigating the adverse effects of natural hazards. These include Civil Defence Act 1983, Building Act 1991, operational duties under the Soil Conservation and Rivers Control Act 1941, Land Drainage Act 1908, and the Local Government Act 1977. Council will carry out its responsibilities and duties under these other Acts.

Refer to aerial photographs in the volume of planning maps to the CRLDP and Appendix Five to the RCEP.

Principal reason (1): These other functions are described because they will complement the Council's actions under the Act and will assist it to avoid and mitigate the effects of natural hazards.

5.16.5 Public Awareness

1. Council will build public awareness of natural hazards and their effects.
2. Civil Defence will carry out initiatives for public education and awareness programmes.

3. Council will carry out rainfall and river monitoring and give public flood warning.
4. Council will encourage individual responses, which could include insurance cover, emergency preparedness, elevation of essential electrical systems and high value assets, alternative water supplies to underground tanks in flood prone areas, appropriate waste disposal design.
5. Council will provide advisory services that could help to modify causes of natural hazards, and ensure appropriate land management practices.

Principal reasons (1 - 5): Raising the public awareness of the potential effects of natural hazards can encourage the community to take initiatives that will help to reduce the impact of hazard events.

People can lessen the risk to themselves and property from seismic and related activity. The role of the Civil Defence organisation is important in this regard. Council by having an input into the Civil Defence programme will play a part in raising the public awareness about seismic and related hazards.

Refer to 22.9.3.3 and 22.10.3.3 for rules relating to flood control in Amenity and Heritage Reserve zones.

5.17 REGIONAL RULES FOR NATURAL HAZARDS

Note:

1. Activities shall comply, where relevant, with the Regional or District rules in Chapter 3-Cultural Heritage, Chapter 4-Natural Heritage, Chapter 6-Land, Chapter 7-Beds of Lakes and Rivers and Chapter 8-Utilities. Chapter 9 – Contaminated Sites, Chapter 9A – Hazardous Substances, Chapter 10 – Signs, Chapter 12 – Subdivision and Chapter 14 – Financial Contributions.
2. The regional rules for each overlay apply in addition to the zone rules for the area.
3. Subject to any other rule to the contrary in this Plan, the following requirements shall apply in all Natural Hazard Overlays; as denoted on the Urban and Rural Planning Maps, or ASCH Aerial Photographs.

Refer to 7.7.5 for the planting of trees in the beds of lakes/streams for soil conservation and hazard control

5.17.1 Permitted Activities

The following activities shall be permitted activities in respect to Chapter 5 – Natural Hazards:

- 5.17.1.1 Planting of trees and shrubs carried out or supervised by the Gisborne District Council for the purpose of soil conservation and river control
- 5.17.1.2 Small-scale and temporary engineering investigations and associated structures carried out or supervised by the Gisborne District Council
- 5.17.1.3 Any existing, lawfully established activity in a hazard overlay is a permitted activity if it is not addressed as a controlled, restricted discretionary, discretionary, non-complying or prohibited activity.
- 5.17.1.4 The maintenance and minor upgrading of all legally established existing structures.

5.18 REGIONAL RULES FOR FLOOD HAZARD OVERLAY 1 (River and Floodway - F1)

5.18.1 Restricted Discretionary Activities

The following shall be restricted discretionary activities:

- 5.18.1.1 Annual cropping except maize or sweetcorn.
- 5.18.1.2 Any activity in the road reserve that may result in the diversion or ponding of floodwaters, including any new road, road alteration or shape correction.
- 5.18.1.3 New fencing other than temporary electric fencing and boundary fencing and boundary fencing.
- 5.18.1.4 Construction of soil conservation and river control works.
- 5.18.1.5 Earthworks which alter the level of the land.
- 5.18.1.6 Planting of trees or shrubs.
- 5.18.1.7 Construction or installation of new structures associated with network utility activities.
- 5.18.1.8 Addition to or alterations of non-residential buildings.
- 5.18.1.9 The installation or alteration of culverting or bridging of streams, watercourses or rivers.

*Refer also to 7.7.2,
7.7.4, 7.7.9.*

*Refer to 7.7.5 for the
planting of trees on the
beds of lakes/streams for
soil conservation and
control of natural hazards.*

Council shall restrict its discretion with regard to 5.18.1.1 - 5.18.1.9 to the matters a) - c) specified below:

*Refer also to 7.7.9, 7.7.12
and Chapter 8.*

- a) Restriction or diversion of the passage of floodwaters
- b) Aggradation of the bed or berms of the rivers
- c) The endangering of lives or property in the event of flooding

Refer also to 7.7.3.

5.18.2 Prohibited Activities

The following shall be prohibited activities for which no resource consent shall be granted, whether or not provided for in the zone concerned:

- 5.18.2.1 The construction of all new buildings (except network utilities), and addition to or alteration of existing residential buildings
- 5.18.2.2 Commercial horticulture involving perennial tree or shrub species
- 5.18.2.3 Artificial shelter belts
- 5.18.2.4 Cropping of maize or sweetcorn

5.19 REGIONAL RULES FOR FLOOD HAZARD OVERLAY 2 (High Hazard Areas – F2)

Refer also to 4.10 for structures and vegetation clearance in the Riparian Management Area Overlay

REGIONAL RULES FOR FLOOD HAZARD OVERLAY 2A (Moderate/High Hazard Areas – F2A)

5.19.1 Permitted Activities

The following activities shall be permitted activities:

- 5.19.1.1 The establishment of new permanent horticulture, woodlots or shelter belts in Flood Hazard Overlay 2A, where the rows of structures to support the plants and/or the rows of plants are parallel to the likely overland flood flows

5.19.2 Restricted Discretionary Activities

The following activities shall be restricted discretionary activities:

- 5.19.2.1 Construction or relocation of, additions to or alterations of buildings
- 5.19.2.2 Earthworks which alter the existing ground level
- 5.19.2.3 The establishment of woodlots, shelter belts or new permanent horticulture in Flood Hazard Overlay 2, including any structures to physically support the plants
- 5.19.2.4 The establishment of woodlots, shelter belts or new permanent horticulture in Flood Hazard Overlay 2A where the rows of structures to support the plants and/or the rows of plants are not parallel to the likely pathway of overland flood flow
- 5.19.2.5 Any activity within the road reserve that may result in the diversion or ponding of floodwater, including any new road, road alteration or shape correction.
- 5.19.2.6 Construction of soil conservation and river control works
- 5.19.2.7 Construction or installation of network utility structures.

Council shall restrict its discretion with regard to 5.19.2.1 - 5.19.2.7 to the matters a) - c) specified below:

- a) Restriction or diversion of the passage of floodwaters
- b) Aggradation of the bed or berms of the rivers
- c) Endangering of lives or property in the event of flooding

Refer to Chapter 8 for additional rules relating to network utilities.

5.20 REGIONAL RULES FOR FLOOD HAZARD OVERLAY 3 (Flood Ponding Areas-F3)

Refer also to 4.10 for structures and vegetation clearance in the Riparian Management Area Overlay.

REGIONAL RULES FOR FLOOD HAZARD OVERLAY 4 (Liable to Flooding-F4)

REGIONAL RULES FOR FLOOD HAZARD OVERLAY 5 (Flood Fringe Areas-F5)

General Rules

The following General Rules shall apply to activities identified in a flood hazard overlay:

5.20.1.1 Obstruction of Floodwaters

- a) Rural Industrial A Zone: Not more than 33 percent of the F4 floodway width identified on any one site, within this zone is to be obstructed by buildings or other solid objects (including solid fences).

5.20.1.2 Ground Level within the Citrus Grove Development Control Area

- a) No building shall be constructed prior to the floodways and minimum ground level of 3.9m above mean sea level as set out in the structure plan and Appendix 36 a) to c) being achieved.
- b) No site shall be used for industrial or commercial purposes prior to the floodways and minimum ground level of 3.9m above mean sea level as set out in the structure plan and Appendix 36 a) to c) being achieved.

5.20.1.3 Maintenance of constructed Floodways within the Citrus Grove Development Control Area.

- a) No activity or use shall be undertaken or established within the constructed floodways which would affect and/or compromise floodway capacity and structural integrity.

5.20.2 Permitted Activities

5.20.2.1 Internal alteration of residential buildings; habitable building, decks and pergolas attached to an existing residential building

5.20.2.2 Accessory buildings associated with a residential dwelling in the area covered by Overlays 4 and 5

5.20.2.3 Construction, additions to or alterations to the upper floor levels of any existing residential or habitable buildings.

5.20.3 Restricted Discretionary Activities

The following activities shall be restricted discretionary activities:

5.20.3.1 Construction or relocation of, additions to or external alterations of residential buildings and habitable buildings

PROVIDED THAT

5.20.3.1.1 All residential buildings shall have minimum habitable floor levels as specified in Table 1 below:

Poverty Bay and Gisborne urban area:	300 mm above the design flood standard or 600 mm above general ground level whichever is the greatest;
Mangatuna and Wharekaka (Tolaga Bay):	500 mm above the design flood standard;
Te Karaka	1.0m above general ground level or 300mm above flood level, whichever is the greater.

Table 1: Minimum habitable floor levels

5.20.3.2 Conversion of accessory buildings or non-habitable rooms into residential buildings and/or habitable rooms

PROVIDED THAT

5.20.3.2.1 All residential buildings shall have minimum habitable floor levels as specified in Table 1 above.

5.20.3.3 Any new road, road alteration or shape correction that alters the pavement level in the FH3 and FH4 Overlay areas

5.20.3.4 Any earthworks that alter the ground level in the FH3 & FH4 areas, including filling of ponding areas

Council shall restrict its discretion with regard to 5.20.3.1 - 5.20.3.4 to the matters a) - c) specified below:

- a) Restriction or diversion of the passage of floodwaters
- b) Aggradation of the bed or berms of the rivers
- c) The endangering of lives or property in the event of flooding

5.20.3.5 Erection of buildings or solid objects (including fences) which will obstruct 33 percent or more of the F4 floodway width on a site

Council will restrict its discretion to the matters a) – e) specified below:

- a) Enhancement of amenity values
- b) Provision of landscaping and signage
- c) Site layout particularly building design and location on site
- d) Mitigation of flood risk
- e) Provision of network utility services

5.20.3.6 Erection of buildings or solid objects (including fences) within the area hatched blue in Appendix 34

Council will restrict its discretion to the matters a) – e) specified below:

- a) Enhancement of amenity values
- b) Provision of landscaping and signage
- c) Site layout particularly building design and location on site
- d) Mitigation of flood risk
- e) Provision of network utility services

5.21 REGIONAL RULES FOR FLOOD HAZARD OVERLAY 6 (Old River Loops - F6)

5.21.1 Restricted Discretionary Activities

The following activities shall be restricted discretionary activities:

- 5.21.1.1 The construction of buildings except for residential buildings. The relocation, additions to or alterations of all buildings
- 5.21.1.2 Any new road, road alteration or shape correction that alters the pavement level, or earthworks which alter the natural ground level

Council shall restrict its discretion with regard to 5.21.1.1 and 5.21.1.2 to the matters a) - c) specified below:

- a) Restriction or diversion of the passage of floodwaters
- b) Aggradation of the bed or berms of the rivers
- c) The endangering of lives or property in the event of flooding

5.21.2 Prohibited Activities

The following shall be prohibited activities for which no resource consent shall be granted, whether or not provided for in the zone concerned:

- 5.21.2.1 The construction and relocation of residential buildings

5.22 REGIONAL RULES FOR FLOOD HAZARD OVERLAY 7 (Urban Stormwater Flood Hazard Area - F7)

General Rules

5.22.1 Any new residential building erected or relocated in the area shall have minimum habitable floor levels as follows. (The highest level shall apply):

- a) 300 mm above general ground level or
- b) 200 mm above the 1977 and/or 1985 flood level or
- c) 200 mm freeboard above any adjacent road crown, footpath or ground acting as a hydraulic control or weir

5.22.2 Restricted Discretionary Activities

The following activities shall be restricted discretionary activities:

- 5.22.2.1 Any activity in the road reserve that may result in the diversion or ponding of floodwaters, including any new road, road alteration or shape correction.
- 5.22.2.2 Any new solid fence, or alterations to existing solid fence, along any property boundary
- 5.22.2.3 Earthworks that change the permanent level of the land
Council shall restrict its discretion with regard to 5.22.2.1 - 5.22.2.3 to the matter a) specified below:
 - a) Avoiding, remedying or mitigating any effects of flooding. This includes ensuring that activities shall not restrict or divert the passage of floodwaters.

5.23 REGIONAL RULES FOR FLOOD HAZARD OVERLAY 8 (Urban Ponding Areas - F8)

5.23.1 Restricted Discretionary Activities

The following activities shall be restricted discretionary activities:

- 5.23.1.1 Any activity in the road reserve that may result in the diversion or ponding of floodwaters, including any new road, road alteration or shape correction.
- 5.23.1.2 Any new solid fence, or alterations to existing solid fence, along any property boundary
- 5.23.1.3 Earthworks that change the permanent level of the land
- 5.23.1.4 Filling of ponding area with earth or other material
- 5.23.1.5 Construction, relocation, additions to or external alterations of residential and habitable buildings
- 5.23.1.6 Construction or installation of new network utility structures.

Council shall restrict its discretion with regard to 5.23.1.1 - 5.23.1.6 to the matter a) specified below:

- a) Avoiding, remedying or mitigating any effects of flooding. This includes ensuring that activities will not restrict or divert the passage of floodwaters.

Refer to Chapter 8 for additional rules relating to network utilities.

5.24 REGIONAL RULES FOR FLOOD HAZARD OVERLAY 9 (Urban Floodways - F9)

5.24.1 Restricted Discretionary Activities

The following activities shall be restricted discretionary activities:

- 5.24.1.1 The installation or alteration of culverting or bridging of rivers, streams and watercourses
- 5.24.1.2 Planting of trees or shrubs on the banks/berms of rivers or streams
- 5.24.1.3 Construction or installation of network utility structures.

Council shall restrict its discretion with regard to 5.24.1.1 - 5.24.1.3 to the matters a) - d) specified below:

- a) Avoiding, remedying or mitigating any effects of flooding
- b) Restriction or diversion of the passage of floodwaters
- c) Aggradation or erosion of the banks and berms of rivers, streams or watercourses
- d) Access for machinery

Refer to Chapter 7 for additional rules relating to the beds of lakes and rivers.

Refer to Chapter 8 for additional rules relating to network utilities.

5.24.2 Discretionary Activities

The following shall be discretionary activities:

- 5.24.2.1 The replacement of watercourses/drains in the Taruheru Block with alternative drainage infrastructure including pipes and swales.
- 5.24.2.2 Construction of soil conservation and river control or protection works where they do not accelerate or worsen the effects of natural hazards.
- 5.24.2.3 The construction of or addition to any structure (excluding buildings) not specifically provided for as a permitted activity or a restricted discretionary activity (excluding maintenance and minor upgrading).

5.24.3 Prohibited Activities

The following shall be prohibited activities for which no resource consent shall be granted, whether or not provided for in the zone concerned:

- 5.24.3.1 The construction of or addition to any building (excluding maintenance and minor upgrading)
- 5.24.3.2 Deposition of any lawn clippings, tree prunings or any other waste material
- 5.24.3.3 Raising the level of the land by the depositing of materials (excluding activities subject to Rule 5.24.2.1, 5.24.2.2 and 5.24.2.3)

5.25 REGIONAL RULES FOR RULES FOR LAND INSTABILITY

General Rules

The following General Rules shall apply to all activities in the Makorori Land Instability, Waimata Riverbank Erosion Hazard and Waimata Riverbank Fringe Overlays:

- 5.25.1 Land disturbance shall not exceed 1m³ in any 3 month period, except for land disturbance directly associated with the construction of a building platform.
- 5.25.2 Vegetation shall not be removed if the vegetation is more than 2m high, and vegetation removal shall not exceed 10m² in any 12 month period.
- 5.25.3 Stormwater discharges shall be designed and constructed to avoid erosion of riverbanks.

Refer to Chapter 12.8.3 for rules relating to subdivision in the Waimata Riverbank Fringe Overlay

5.26 REGIONAL RULES FOR MAKORORI HAZARD OVERLAY

5.26.1 Restricted Discretionary Activities

The following activities shall be restricted discretionary activities:

- 5.26.1.1 Land disturbance of more than 1m³ in any 3 month period, except for land disturbance directly associated with the construction of a building platform
- 5.26.1.2 Installation of septic tanks or soakage pits
- 5.26.1.3 Removal of vegetation of more than 10m² in any 12 month period
- 5.26.1.4 Removal of vegetation that is more than 2m high

Council shall restrict its discretion with regard to 5.26.1.1 - 5.26.1.4 to the matter a) specified below:

- a) Ensuring that activities do not cause or contribute to land instability.

5.26.2 Prohibited Activities

The following activities shall be prohibited activities for which no resource consent shall be granted whether or not provided for in the zone concerned:

- 5.26.2.1 Subdivision, except for adjustment of boundaries which will not create any additional housing sites, or for the creation of esplanade reserves

Refer also to 12.10.1.

5.27 REGIONAL RULES FOR WAIMATA RIVERBANK EROSION HAZARD OVERLAY

5.27.1 Restricted Discretionary Activities

The following activities shall be restricted discretionary activities:

- 5.27.1.1 Land disturbance including filling of more than 1m³ in any 3 month period
- 5.27.1.2 Vegetation removal of more than 10m² in any 12 month period
- 5.27.1.3 Removal of vegetation that is more than 2m high
- 5.27.1.4 Extensions to existing buildings
- 5.27.1.5 Construction of any ancillary buildings
- 5.27.1.6 Any new protection works, or alterations to existing protection works that mitigate natural hazards
- 5.27.1.7 Construction or relocation of residential buildings
- 5.27.1.8 Stormwater discharges
- 5.27.1.9 Subdivision of land

Refer to 4.10 for structures in the Riparian Management Area Overlay.

Council shall restrict its discretion with regard to 5.27.1.1 - 5.27.1.9 to the matter a) - b) specified below:

- a) Ensuring that activities do not cause or contribute to land instability;
- b) Ensuring that any new development have a reasonable factor of safety against settlement or slipping

Refer to 4.10 for rules relating to structures and vegetation clearance in the Riparian Management Area Overlay.

5.28 REGIONAL RULES FOR WAIMATA RIVERBANK FRINGE OVERLAY

5.28.1 Restricted Discretionary Activities

The following activities shall be restricted discretionary activities:

- 5.28.1.1 Any new protection works or alterations to existing protection works that mitigate natural hazards
- 5.28.1.2 Construction or relocation of any new residential building
- 5.28.1.3 The installation or diversion of stormwater discharge systems

Council shall restrict its discretion to the matters specified below:

- a) Ensuring that activities do not cause or contribute to land instability;
- b) Ensuring that any new dwellings have a reasonable factor of safety against settlement or slipping

Refer to 12.8.3 for additional matters for discretion with respect to subdivision in the Waimata Riverbank Erosion Hazard Overlay.

5.29 REGIONAL RULES FOR SITE CAUTION LAYER

This overlay is a signal to advise the public there may be additional site specific controls required for protection measures or a need to avoid development.

5.29.1 Restricted Discretionary Activities

The following activities shall be restricted discretionary activities:

5.29.1.1 Subdivision of land

Council shall restrict its discretion to the matter a) specified below:

Refer to 12.6 – Building Platforms and 12.8.4 for additional matters for discretion with respect to subdivision.

- a) Ensuring that activities do not cause or contribute to land instability.

5.30 REGIONAL RULES FOR COASTAL HAZARD OVERLAY 1 (Extreme Risk Area)

5.30.1 Discretionary Activities

The following activities shall be discretionary activities.

5.30.1.1 The installation or alteration of works designed to mitigate the effects of coastal hazards

5.30.1.2 Additions to or alterations of existing buildings

Refer to 12.10.2.

5.30.1.3 Any activity, including earthworks, that will alter natural dune landform

5.30.1.4 Removal of any works designed to mitigate the effects of coastal hazards

5.30.2 Prohibited Activities

The following activities shall be prohibited activities for which no resource consent shall be granted whether or not provided for in the zone concerned:

5.30.2.1 Subdivision to enable new development to occur, except for the provision of esplanade reserves

5.30.2.2 New buildings

5.31 REGIONAL RULES FOR COASTAL HAZARD OVERLAY 2 (High Risk Area)

5.31.1 Discretionary Activities

The following activities shall be discretionary activities:

5.31.1.1 Construction of new commercial or habitable development

5.31.1.2 Additions to or alterations of existing buildings

5.31.1.3 Any activity, including earthworks, that will alter natural dune landform, beaches, wetlands or sand spits.

5.31.2 Prohibited Activities

The following activities shall be prohibited activities for which no resource consent shall be granted whether or not provided for in the zone concerned:

5.31.2.1 Subdivision for new commercial or residential development

5.32 REGIONAL RULES FOR COASTAL HAZARD OVERLAY 3 (Moderate Risk Area)

Refer to 12.7.4.

5.32.1 Discretionary Activities

The following activities shall be discretionary activities:

5.32.1.1 Subdivision

5.32.1.2 Construction of residential and habitable development

5.32.1.3 Any activity, including earthworks, that will alter natural dune landform, beaches, wetlands or sand spits.

Refer to 4.8 for additional rules relating to land disturbance in the Coastal Environment Overlay.

5.33 REGIONAL RULES FOR COASTAL HAZARD OVERLAY 4 (Safety Buffer Area)

5.33.1 Discretionary Activities

The following activities shall be discretionary activities:

5.33.1.1 Subdivision

5.33.1.2 Any activity, including earthworks, that will alter natural dune landform, beaches, wetlands or sand spits.

5.34 REGIONAL RULES FOR AREAS SUBJECT TO COASTAL HAZARD (ASCH)

See the Regional Coastal Environment Plan. These are areas which have been assessed as being potentially subject to coastal hazard. A preliminary study of these areas was carried out in 1994 by Dr J.G. Gibb for the Council. This was based on the factors of sea and wind erosion, landslip and flooding from the sea and coastal rivers.

Refer to 12.10.3.

The results of the study will be incorporated by the Council into Land Information and Project Information Memoranda, and in decisions on building consents, resource consents and subdivisions. Developers of sites in these areas may be required to carry out more in depth analysis of the degree of hazard as part of their applications.

The areas concerned are shown on aerial photographs attached to the planning maps. The majority of the Gisborne coastline is affected.

Refer to 12.9.3.

5.35 ANTICIPATED ENVIRONMENTAL RESULTS

- a) There is greater public awareness and recognition of the existence and potential effects of natural hazards.
- b) Development is avoided where natural hazards cannot be avoided, remedied or mitigated.