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# Natural Hazards

## 8. Natural Hazards

### Explanatory Statement

The Western Bay of Plenty District is subject to a range of actual or potential natural hazards which will or may adversely affect human life, property or other aspects of the environment. The principal hazards affecting the *District* are coastal erosion and coastal inundation (temporary flooding from storm surge), tsunami, land instability, flooding, earthquake, and volcanic eruption.

While acknowledging the *Council's* statutory responsibilities, this section recognises the constraints imposed by the nature of some potential hazards affecting the *District* as well as the limitations of the level of existing information.

Areas considered most at risk from coastal erosion and coastal inundation are those already developed for urban purposes and which adjoin the open coastline e.g. Waihi Beach (including Bowentown) and Pukehina. These stretches of coastline have been the subject of a detailed study commissioned by *Council* to identify land at risk to these coastal hazards over 0-50 and 50-100 years. The study findings are reflected on the District Plan Maps through the identification of 'Coastal Erosion Areas' and 'Coastal Inundation Areas'. The Coastal Erosion Areas have been divided into primary risk and secondary risk based on 0-50 year and 50-100 year risk timeframes with more restrictive rules applying in the primary risk area. The Coastal Inundation Areas have not been divided into risk timeframes because the same restrictions apply within both. There is also a 'Coastal Erosion Area – Rural' in place for rural zoned areas adjoining the open coastline e.g. Matakana Island, Maketu and east of Pukehina.

The main area of known land instability is in the Minden where there exists land with the potential to slip when saturated. These and other potentially unstable areas have been identified on the District Planning Maps.

Heavy rain is a common feature of the Bay of Plenty Region and this may increase with global climate change. Low-lying areas, especially those in proximity to watercourses are at risk from inundation, scour and sedimentation. Within established urban areas land known to be susceptible to flooding exists in parts of Waihi Beach, Katikati, Te Puke and Pukehina. Again, such land has been identified on the Planning Maps.

Land identified on the Planning Maps as being at risk from the foregoing hazards is subject to various controls on *development* either through District Plan rules or other methods outside the District Plan. In many cases because of the quality of existing information such identification is very 'broad brush' and where more detailed study of specific areas eliminates land from the identified potential hazard then otherwise complying *development* will be able to proceed through the resource or building consent processes without additional restriction (e.g.

consent or Section 74 Building Act 2004 notices). Nevertheless there are some areas where *Council* has good information on the level of hazard risk and in these areas it is considered appropriate to control the intensification of *development*.

The Western Bay of Plenty adjoins the Taupo Volcanic Zone and is therefore considered to be subject to a high risk from earthquakes as well as at risk from volcanic eruptions originating from outside the *District*. Notwithstanding the limitations of addressing these potential natural hazards through the District Plan, much is achievable in terms of public education and preparedness through other methods such as emergency management plans.

## 8.1 Significant Issues

1. The Western Bay of Plenty District is subject to a range of actual or potential natural hazards which will or may adversely affect human life or the natural or built environment. The principal hazards affecting the *District* are coastal erosion, coastal inundation, tsunami, land instability, flooding, earthquake, and volcanic eruption.
2. Areas actually or potentially under threat from such natural hazards as coastal erosion, coastal inundation, land instability and flooding can be identified in advance. Specific areas more at risk than others from some hazards such as earthquakes and volcanic eruptions are more difficult to identify in advance and the potential effects of the hazards themselves so widespread and devastating that avoidance or control through the District Plan is not realistically possible.
3. Some areas now known to be at risk from actual or potential hazards have already been developed for urban purposes.
4. Some natural hazard avoidance, remedial, or mitigation measures have the potential to adversely impact on natural character and on significant ecological values existing within the coastal and other environments.

## 8.2 Objectives and Policies

### 8.2.1 Objectives

1. Minimisation of the risk of natural hazards to human life and the natural and built environment.

2. Protection of the existing natural character of the coastal environment and other natural features having recognised ecological, landscape or other significance to the *District*.

### 8.2.2 Policies

1. Adopt the best practicable options (including the 'do nothing' option) in the management of areas actually or potentially at risk from natural hazards and where possible adopt avoidance rather than mitigation or remedial measures.
2. Control or prevent the establishment of activities which have the potential to increase the extent to which natural hazards have or may have an adverse effect on human life or the natural or built environment.
3. Enable the *development* or redevelopment of land already subdivided or otherwise developed for urban purposes in areas now known to be at risk from natural hazards only where any likely adverse effects can be avoided or appropriately mitigated.
4. Ensure that new subdivision, land use activities or other *development* is located and designed so as to avoid the need for further hazard protection works.
5. Ensure that where hazard protection works are necessary their form, location and design are such as to avoid or mitigate potential adverse environmental effects.
6. Enable natural ecosystems in currently undeveloped areas to migrate inland as a result of dynamic coastal processes (including sea level rise as predicted by recognised national or international agencies).
7. Encourage the conservation and enhancement of natural features such as sand dunes and *wetlands* which have the capacity to protect existing developed land.
8. Prevent the use of concrete and block work foundations, floors and *walls* in the Coastal Erosion Areas.

## 8.3 Activity Lists

The following rules apply to those activities which are located within Natural Hazard Features identified on the District Planning Maps.

**Explanatory Note:**

For the purpose of interpretation, the Coastal Erosion Area – Rural means land adjoining the open coastline, zoned Rural and within 100m of *MHWS*, and this description shall take priority over the District Planning Maps with regard to location.

**8.3.1 Permitted Activities**

- (a) All Identified Natural Hazards
  - (i) *Buildings/Structures* within an *Approved Building Site – Natural Hazards*.
- (b) Stability Areas – Minden
  - (i) *Buildings/Structures* within Stability Area - Minden C.
- (c) Floodable Areas
  - (i) *Buildings/Structures* where evidence establishes:
    - A *building/structure* will be located clear of the floodable area irrespective of the extent of the floodable area shown by the Planning Maps; or
    - A *building/structure* will not be affected by the floodable area.

**Explanatory Note**

Suitable evidence may include, but is not limited to, aerial photographs, site inspections from *Council* engineers, and engineering assessments from a suitably qualified person.

- (ii) Support poles associated with electricity lines.
- (iii) Uninhabited farm *buildings/structures* including, but not limited to, pump sheds, implement sheds and storage sheds, provided that the property owner(s) enter into an agreement with *Council* confirming that they:
  - acknowledge the *building/structure* is subject to the risk of inundation from flooding;
  - accept the risks of any damage to the *building/structure* and/or its contents arising from that hazard; and
  - undertake not to take any action (legal or otherwise) against *Council* in relation to any damage to the *building/structure* and/or its contents as a result of the location of the *building/structure* within the Floodable Area.

- (d) Coastal Inundation Areas
  - (i) Support poles associated with electricity lines

### 8.3.2 Controlled Activities

- (a) All Identified Natural Hazards
  - (i) Updates to cross lease flat plans which incorporate consented building developments
  - (ii) Conversion of cross lease titles to freehold titles where each cross lease title has at least one lawfully established dwelling
- (b) Stability Areas – Minden
  - (i) Subdivision where all of the proposed privateways and building sites are within Stability Area - Minden C

### 8.3.3 Restricted Discretionary Activities

- (a) Coastal Erosion Area – Secondary Risk
  - (i) *Buildings/Structures* not within an *Approved Building Site – Natural Hazards*
- (b) Coastal Erosion Areas
  - (i) Subdivision of titles which are partially identified within the Coastal Erosion Area where;
    - there will be no increase in the number of titles located (wholly or partially) within the Coastal Erosion Area and;
    - all approved building sites are located outside of the Coastal Erosion Area.

#### **Explanatory note:**

For the purpose of this rule, subdivision excludes;

- Minor boundary adjustments (an adjustment of boundary between two adjoining *lots* which will not increase the risk or potential risk to existing *buildings/structures* or future *buildings/structures* from coastal erosion or coastal inundation)
- Updates to cross lease flat plans which incorporate consented building developments as provided for in Rule 8.3.2 (a) (i)

- Conversion of titles from cross lease to freehold as provided for in Rule 8.3.2 (a) (ii)
- (c) Floodable Areas and Coastal Inundation Areas
  - (i) *Buildings/Structures* not within an *Approved Building Site – Natural Hazards*
  - (ii) *Earthworks* over 5m<sup>3</sup> (except for maintenance, operation, upgrade and development of above ground lineal network utility structures and underground network utilities where the ground is reinstated to the same contour as existed immediately prior to the works being undertaken)
  - (iii) Closed board fences, retaining walls, raised gardens, concrete and block walls
- (d) Stability Areas – Minden (A, B1, B2 & U)
  - (i) *Buildings/Structures* not within an *Approved Building Site – Natural Hazards*
  - (ii) Subdivision, except as provided for in 8.3.2 (a) (i) - (ii)
  - (iii) Filling, excavation and other *development*
  - (iv) Vegetation removal
  - (v) Disposal of stormwater and wastewater

### 8.3.4 Discretionary Activities

- (a) Coastal Erosion Areas – Primary Risk and Rural
  - (i) *Buildings/Structures* not within an *Approved Building Site*
  - (ii) Construction of new public roads
  - (iii) *Reticulated Infrastructure*
  - (iv) Coastal and river protection works including groynes and sea walls
  - (v) Swimming pools
- (b) Coastal Erosion Area – Access Yard
  - (i) *Buildings/Structures*
- (c) Floodable Areas and Coastal Inundation Areas
  - (i) Subdivision
- (d) Stability Areas – Landslip and General
  - (i) *Buildings/Structures* not within an *Approved Building Site – Natural Hazards*
  - (ii) Subdivision

- (iii) Construction of new roads
- (iv) *Reticulated Infrastructure*

### 8.3.5 Prohibited Activities

- (a) Coastal Erosion Areas
  - (i) More than one *dwelling* (whether a *dwelling* or *minor dwelling*)
  - (ii) *Education facilities* for more than four persons
  - (iii) *Accommodation facilities* for more than four persons
  - (iv) Fixed (i.e. non-portable) solid waste management facilities including sanitary landfills and the disposal of *hazardous substances* (public or private)
  - (v) Subdivision of titles which are wholly identified within the Coastal Erosion Area and subdivision of titles which are partially identified within the Coastal Erosion Area but which do not qualify as Restricted Discretionary Activities under Rule 8.3.3 (b).

#### **Explanatory note:**

For the purpose of this rule, subdivision excludes;

- Minor boundary adjustments (an adjustment of boundary between two adjoining *lots* which will not increase the risk or potential risk to existing *buildings/structures* or future *buildings/structures* from coastal erosion or inundation)
- Updates to cross lease flat plans which incorporate consented building developments as provided for in Rule 8.3.2 (a) (i)
- Conversion of titles from cross lease to freehold as provided for in Rule 8.3.2 (a) (ii)

## 8.4 Matters of Control

### 8.4.1 Controlled Activities – Subdivision and Buildings within Stability Area - Minden C

*Council* reserves control over the following matters

- (a) Protecting each *lot* and surrounding *lots* from instability or erosion by:
  - (i) Managing *earthworks* within the site.
  - (ii) Controlling the location and formation of building sites, roads, accessways, tracks or *privateways* within the subdivision.
  - (iii) Controlling the location and type of wastewater and stormwater treatment and disposal systems.



- (iv) Detailing requirements for the retention or planting of vegetation including species selection that will help stabilize any cut slope or fill batter.
  - (v) Requiring the collecting and piping of stormwater, or its management by way of soakage or discharge to ground or to natural waterways, including the collection of roof water, as appropriate.  
The preference is for collection and discharge of stormwater to the base of gulleys at a rate that mimics natural catchment flow rates.
  - (vi) Avoiding erosion or natural hazards or mitigating these hazards when they cannot be avoided;
- (b) Building sites should be set back from existing waterbodies and ephemeral flowpaths to the extent that any risks to *buildings/structures* from instability and flooding are avoided.
  - (c) For subdivision and *development* in the Minden Stability Areas regard shall be had to the stability information requirements in Rule 8.6.

## **8.4.2 Controlled Activities – Updates to cross lease flat plans and conversion of cross lease titles to freehold titles**

*Council* reserves control over the following matters:

- (a) The relevant provisions of Section 12 – Subdivision and Development.
- (b) The subdivision activity performance standards and matters of control which apply to controlled activity subdivisions within the applicable zone.

## **8.5 Matters of Discretion**

### **8.5.1 Restricted Discretionary Activities**

#### **8.5.1.1 Coastal Erosion Area – Secondary Risk**

- (a) Extent to which the *building/structure* is relocatable, taking into account the design, location and materials of the *building/structure*, access to remove the *building/structure*, and the ability to rehabilitate the site including the removal of all parts of *buildings/structures* and services and the reinstatement of land to protect natural character and the ability of dunes to act as a buffer against erosion.
- (b) Avoidance of the use of concrete and block wall foundations, *walls* and flooring, except that for sheds and garages (used for non-

habitable purposes) all of these are allowed other than concrete and block walls.

- (c) *Buildings/structures* should be located as far away from the hazard as possible.
- (d) Any new information or assessment undertaken by a suitably qualified person/s which confirms that the land is not in fact subject to the natural hazard concerned.
- (e) The potential environmental effects of or likely to result from the proposal.

#### **8.5.1.2 Coastal Erosion Areas**

- (a) The extent to which the subdivision (new title boundaries and new building sites) affects the ability of any new or existing *buildings/structures* within the Coastal Erosion Area to be relocated.

#### **8.5.1.3 Floodable Areas and Coastal Inundation Areas**

- (a) The effect of the proposed activity (including its location and design) on the capacity of ponding areas and function of overland flow paths.
- (b) The appropriate minimum finished floor level of the proposed *building/structure*.

#### **Explanatory Notes:**

This is the combination of the flood level plus an additional freeboard height as stipulated in *Council's* Development Code.

*Council* will consider granting consent for sheds and garages (used for non-habitable purposes) without meeting minimum finished floor levels provided the owner of the property and building enters into an agreement with *Council* confirming the owner:

- acknowledges that the building is subject to the risk of inundation from flooding or coastal inundation;
- accepts the risks of any damage to the building and/or its contents arising from that hazard; and
- undertakes not to take any action (legal or otherwise) against *Council* in relation to the issue of a resource consent without imposing the required minimum finished floor levels.

*Council* can provide specific flood levels for all Coastal Inundation Areas and for some but not all of the Floodable Areas.

For Waihi Beach Floodable Areas (Planning Maps A03 and U01-U04) this shall be based on the 2% AEP (inclusive of climate change).

- (c) Verifiable new information which demonstrates that the subject site is not in fact under threat from the identified hazard.

#### **8.5.1.4 Stability Areas – Minden A, B1, B2 & U**

Council shall have regard to the following matters in addition to 8.4.1:

- (a) Subdivision shall be accompanied by a geotechnical report prepared by a suitably qualified person showing a building site capable of being approved and confirming as a minimum that:
  - (i) *Earthworks* required in forming each building site and access roads and/or *privateways* in the subdivision shall avoid or mitigate adverse effects on the stability of the land within the site and will have no adverse effects on the stability of adjacent land.
  - (ii) Each building site will be required to be set back an appropriate distance, as recommended by a geotechnical engineer, from any terraces or steep slopes to the extent that there are no adverse effects on the stability of the land or any adjacent land.
  - (iii) Stormwater and wastewater systems can be constructed and operated within each *lot* with no adverse effects on the stability of the adjacent land.
  - (iv) For subdivision and *development* in the Minden Stability Areas regard shall be had to information requirements in Rule 8.6.

#### **8.5.2 Discretionary/Non Complying Activities**

The matters in 8.4.1 and 8.5.1 and the following matters shall be used as a guide for assessing Discretionary Activities and Non-Complying Activities:

- (a) **Stability Areas**
  - (i) The design, location and materials of the *building/structure*

- (ii) The extent to which the proposal addresses any identified natural hazard.
- (iii) Any verifiable information which confirms that the property is in fact not under any threat from the hazard.
- (iv) For subdivision and *development* in the Minden Stability Areas regard shall be had to information requirements in Rule 8.6.

**(b) Coastal Erosion Areas – Primary Risk and Rural**

- (i) Extent to which the *building/structure* is relocatable, taking into account the design, location and materials of the *building/structure*, access to remove the *building/structure*, and the ability to rehabilitate the site including the removal of all parts of *buildings/structures* and services and the reinstatement of land to protect natural character and the ability of dunes to act as a buffer against erosion.
- (ii) Avoidance of the use of concrete and block wall foundations, *walls* and flooring, except that for sheds and garages (used for non-habitable purposes) all of these are allowed other than concrete and block walls.
- (iii) The degree to which the ability of buildings or structures to be relocated is affected.
- (iv) The extent to which the proposal addresses any identified natural hazard and the degree to which the physical risk to *buildings/structures* from coastal erosion can be avoided or mitigated.
- (v) Additions and alterations to existing *buildings/structures* should be landward of the existing *building/structure*.
- (vi) New *buildings/structures* or significant redevelopment of existing *buildings/structures* should be situated as far back from the toe of the foredunes as practicable. The most recent measurements of the toe of the foredune are available from *Council*.
- (vii) Imposition of consent conditions requiring that where the toe of the foredune comes within a distance of a *building/structure* which may put it at immediate risk (minimum of 8m), the *building/structure* is to be

relocated a sufficient distance back from the toe of the foredune to mitigate that risk. The distances specified in the conditions will depend on the latest scientific information available to *Council*.

- (viii) The impact that the proposal will have on the natural character of the coastal environment, recognising the ecological values of the dune area, and dune restoration.
- (ix) Registration of an encumbrance instrument on the title to address any of the matters above.
- (x) Scientific information from a suitably qualified coastal expert which demonstrates that the land within the Coastal Erosion Area is not under any actual or potential risk from coastal erosion. For the purpose of meeting this rule any assessment of coastal hazards shall include those standards outlined in the Bay of Plenty Regional Coastal Environment Plan.

**(c) Floodable Areas and Coastal Inundation Areas**

- (i) The effect of the proposed subdivision (including, but not limited to any building site, *building/structure* or earthworks) on the capacity of ponding areas and function of overland flow paths.
- (ii) The provision of finished site levels to mitigate adverse effects associated with inundation. For Waihi Beach (Planning Maps A03 and U01-U04) the flood level shall be based on the 2% AEP (inclusive of climate change).
- (iii) In the case of Floodable Areas, any verifiable new information which demonstrates that the subject site is not in fact under threat from flooding.

## 8.6 Stability Requirements - The Minden Lifestyle Structure Plan Area

The Minden Lifestyle Structure Plan area is divided into five stability risk areas i.e. A, B1, B2, C and U Stability Areas (see Planning Maps). The following provisions set out a description of each stability area followed by the stability requirements applying to *development* in that area.

**(a) Stability Area A**

**Description**

'An area in which processes or factors have been identified which indicate that past or active erosion or mass movement is evident or is likely to occur and which presents or may present an identifiable hazard to *buildings/structures* within the delineated area'.

Area A may be summarised as land subject to or likely to be subject to instability.

**Stability Assessment**

*Buildings/structures*, subdivision or other *development* including excavation, filling, removal of vegetation (excluding noxious plants), disposal of stormwater or domestic wastewater into or over the area delineated will not be permitted unless the following documentation is produced to the satisfaction of the *Council*.

Geomorphological and geological evidence and a 'stability analysis' demonstrating that the proposed *development* area will not be subject to instability or be inundated by debris from upslope, and how the proposed *development* will ensure that any *building/structure* will not become damaged by land slippage arising on or off the site.

A **stability analysis** shall include:

- (i) Topographical Survey (if not already available);
- (ii) Definition of the nature and continuity of the strata over the whole area of land involved and to a depth below which slipping is most unlikely, by means of test pits and/or continuous recovery core drilling;
- (iii) Definition of the density, effective stress shear strength parameters, residual shear strength parameters and the sensitivity of the soil in each stratum in which sliding is possible;
- (iv) Definition of ground water levels and piezometric pressures in the strata during extreme infiltration conditions;
- (v) Analysis of possible mechanisms of failure, relevant to the specific geomorphology of the site using effective stresses;
- (vi) A professional opinion as to the stability of the ground.

Even with a thorough stability analysis, complete avoidance of all risk cannot be obtained and no guarantee of safety expected.

**(b) Stability Area B1**

**Description**

'Area B1 is land where mass movement is evident or where the slope gradient is such that instability or erosion could occur, particularly if developed'.

Area B1 may be summarised as land potentially subject to instability.

**Stability Assessment**

*Buildings/structures*, subdivision or other *development* including excavation, filling, removal of vegetation (excluding noxious plants), disposal of stormwater or domestic wastewater into or over the area delineated will not be permitted unless the following documentation is produced to the satisfaction of the *Council*.

Geomorphological and geological evidence and a 'stability analysis' as outlined in 8.6(a) demonstrating that the proposed *development* area will not be subject to instability or be inundated by debris from upslope, and how the proposed *development* will ensure that any *structure* will not become damaged by land slippage on or off the site.

Restrictions on and requirements for subdivision, *buildings/structures* or other *development* are the same as for Area A but it shall be sufficient to demonstrate that the risks of instability and damage are at an acceptable level.

**(c) Stability Area B2**

**Description**

'Area B2 is land where the slope gradient is such that instability is not considered likely to occur, and no mass movement is evident, but is similar to land where instability and erosion has occurred elsewhere in the Western Bay of Plenty in similar materials due to cutting and/or filling and/or on site disposal of stormwater'.

The risk of instability or erosion is greater in areas delineated B1 than B2.

Area B2 may be summarised as land potentially subject to instability but less so if there is no onsite disposal of sewage or stormwater concentration, no significant vegetation removal, no significant cutting or filling.

### **Stability Assessment**

*Buildings/structures*, subdivision or other *development* such as excavation, filling, removal of vegetation (excluding noxious plants), disposal of stormwater or domestic wastewater into or over the area delineated will be allowed to proceed only if supported by the following documentation to the satisfaction of the *Council*.

A 'stability assessment' demonstrating that the proposed *development* will not result in the risks of instability or damage being at an unacceptable level.

A stability assessment shall include:

- (i) Topographical Survey (if not already available);
- (ii) Definition of the nature and continuity of the strata over the whole area of land involved and to a depth below which slipping is most unlikely, by means of test pits and/or drilling, and/or auguring;
- (iii) Assessment of the density, relative strength and the sensitivity of the soil in each stratum in which sliding is possible;
- (iv) Assessment of ground water levels and piezometric pressures in the strata during extreme infiltration conditions;
- (v) A professional opinion as to the stability and instability of the ground.

A stability assessment is likely to be sufficient where there will be no significant interference with existing vegetation, no cutting or filling in excess of 0.5m in depth and no in ground disposal of stormwater runoff.

### **(d) Stability Area C**

#### **Description**

'Area C is land not considered to be at risk from instability. A stability analysis or stability assessment would not generally be required'.

*Council* reserves control however over a number of matters relating to subdivision and *development* to ensure the protection of each *lot* and surrounding *lots* from any potential instability or erosion.



(e) **Stability Area U**

**Description**

'Area U is land that has not undergone geotechnical analysis and therefore the risk of instability is uncertain'.

Because of this unknown risk, all subdivision and *development* occurring within Area U requires Restricted Discretionary resource consent and applications must be accompanied by a specific stability analysis to determine the level of risk and appropriate mitigation measures.

## **8.7 Other Methods**

### **8.7.1 Building Act 2004**

Where as a result of stability investigations the land in question is found to be subject to or likely to be subject to slippage, but the building work itself will not accelerate or worsen the situation or affect other land, then *Council* may grant a building consent subject to the title being notated that the land is subject to or is likely to be subject to slippage pursuant to Section 72 of the Building Act 2004.

This will be used to exercise control over buildings within identified hazard prone areas. Such controls may include restrictions relating to building design and damage liability. Information on known site specific potential natural hazards will be recorded on *Council's* Geographic Information System and provided with all Project and Land Information Memoranda.

### **8.7.2 Coastal Protection Works**

The *construction*, repair and *maintenance* of coastal protection structures such as sea walls and the implementation of 'dune care' programmes will be achieved pursuant to *Council's* powers under other legislation including the Reserves Act 1977 and the Local Government Act 1974.

Resource consents from the *Regional Council* are required for any coastal protection works within the coastal marine area (i.e. below *MHWS*).

### **8.7.3 Earthworks and Vegetation Removal**

Consents to these activities are likely to be also required from the *Regional Council*.

### **8.7.4 Civil Defence**

Civil Defence plays an important education role. This, along with the emergency management plans is aimed at mitigating potential hazards as well as preparedness for emergencies.