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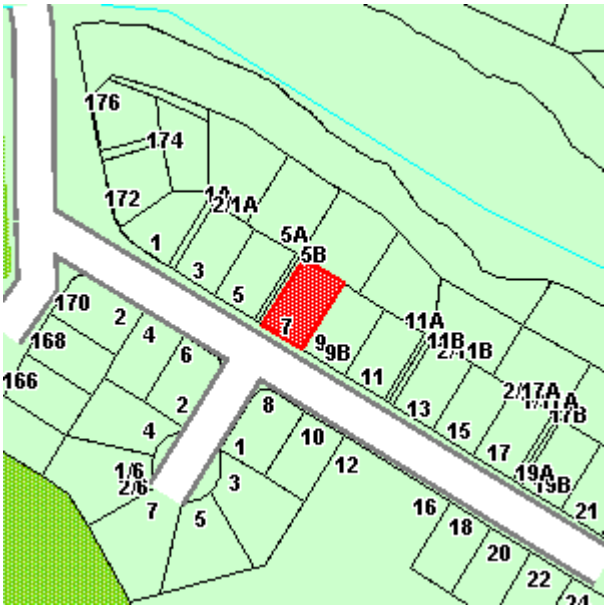
Property hazard report - 7 Sample Drive, Christchurch City



Street Address: 7 Sample Drive
Christchurch City

Land area: .0493 ha

Report Date: 11/03/2008 10:35 a.m.

Requested by: info@propertyinsight.co.nz

File Number:

Legal description:
LOT 99 DP 9999

This map is created by PropertyInsight and is not a copy from a District Plan map nor does it signify hazard level.

Summary

Landslide Hazard

Susceptibility to landslide as assessed from slope/rock strength model	High

Flood Hazard

Is this property in an area where soils data indicate that it may be susceptible to flooding?	Yes

Coastal Hazard

Within a modelled 1 in 100 year or 1 in 500 year tsunami inundation zone?	Yes

Earthquake Hazard

Earthquake frequency	Moderate
Likely response in a strong distant earthquake	No increase in shaking
Likely response in a strong close by earthquake	No increase in shaking
Susceptibility to liquefaction	Low (Uncertain)
Susceptibility to fault rupture	Low

Introduction

This report contains high level assessments of hazards relating to some natural or man-made events that may affect this property. The report is based on geological mapping, scientific models and complemented with information from some local authorities. The report does not replace a site investigation or an engineering report. The purpose of the hazard report is to provide a better understanding of the hazards that may affect a property.

Colours used in this report (maps, ratings or otherwise) are a visual aid only and do not represent an assessment in their own right.

A more detailed description of natural hazards assessed in this report and the steps you can take to reduce the impact of natural disasters can be found at www.propertyinsight.co.nz, section "Managing Hazards". PropertyInsight is a joint venture involving the Institute of Geological and Nuclear Sciences Limited, Quotable Value Limited and Niu Pacific Limited.

*** Please note the disclaimer at the end of this document ***

Hazard Assessment

	LANDSLIDE HAZARD	RATING
Assessment	**Susceptibility to slope instability** This property is in an area where the susceptibility to slope instability as assessed from the combination of slope and rock/soil materials ranges from moderate to high.[1]	**High**
Explanation	Landslide susceptibility is assessed on the basis of a model that includes slope and rock/soil information. This method provides an indication of the susceptibility to moderate and large landslides. Susceptibility to smaller landslides such as those that could result from excavations undertaken in subdivision development are only possible when detailed elevation data is available. The model includes an estimate of the hazard posed by debris falling from landslides on or near the property and from collapse due to landslides falling from or near the property.	
Sources	1. Slope stability is assessed using slope data derived from Land Information New Zealand elevation data and a geological database developed by GNS from the best available geological maps (last update 2004).	

	FLOOD HAZARD	RATING
Assessment	**Is this property in an area where soils data indicate that it may be susceptible to flooding?** This property is in an area described within a national soils dataset as being a riverbed, natural floodplain, tidal marsh or other area that may be subjected to flood inundation. Based on the soils in this area, the historic flood return interval is inferred to be 1 in 100 years or more frequent for part of the property and less frequent than 1 in 100 years for the remainder.[1]	**Yes**

Explanation	To assess the susceptibility of a property to flooding, different data sets are used based on their availability for that location. These data sets range from regional geological and soil maps to detailed local flood models. The differing origins of the data sets may sometimes result in conflicting information. Soil profiles were used in the determination of natural floodplain and tidal marsh locations and in making estimates of flooding frequency. Soils show the long term historic record of flooding. Changes in rainfall patterns and changes to rivers and to vegetation in the catchments may over time change the frequency and size of floods. Similarly, river protection works and changes to the height of the stop banks or other land (for example, cutting or filling during subdivision and during construction on the property) will alter a property's susceptibility to flooding. If recent changes to the pattern of flooding have occurred, they may not be reflected in the soil profile and in this assessment. This information is based on national scale data, and local area variations may not be well represented. For more detailed local variations, the reader is referred to the local authority and district plans.
Sources	1. Flood interval information is based on flood hazard susceptibility maps compiled by Landcare Research and is derived from the New Zealand Land Resources Inventory and the New Zealand Fundamental Soil Layer. Additional soil maps, surveys, and professional interpretation were used to classify natural floodplains in urban areas.

	COASTAL HAZARD	RATING
Assessment	**Within a modelled 1 in 100 year or 1 in 500 year tsunami inundation zone?** A preliminary tsunami inundation model suggests part or all of this property is within the area that could be affected by a 1 in 500 year tsunami. The centre of this property is approximately 300 m from the nearest coast, estuary, or tidal river and is at an elevation of about 3 m. Modelling for this area used detailed topographic data obtained from the Local Authority. Modelling suggests the height of a tsunami on the Christchurch coast with a return period of 100 years could be up to 2.7 m and one with a 500 year return period could be up to 5.6 m high. It is likely that a tsunami on the Christchurch coast will have a distant source. [1]	**Yes**
Explanation	Modelling tsunami travel across water and land is complex. For the National Tsunami Hazard and Risk Review, GNS Science developed models that were used to establish the hazard and risk posed by tsunami to New Zealand (Berryman 2005). This assessment is based on these models and estimates the likelihood of a property being impacted by a tsunami. The assessment may relate to only part of the property and does not indicate the level of damage resulting to property which depends on water depth, water speed and the type and amount of debris.	
Sources	1. Tsunami wave heights at the coast are from modelling undertaken for the 'Review of Tsunami Hazard and Risk in New Zealand' completed by GNS Science in 2005 (Berryman 2005). Modelling of tsunami wave impact on the land was undertaken by GNS Science using information published by the Coastal Engineering Research Centre of the US Army Corps of Engineers (Camfield 1980). The model uses elevation data	

	and the quality of that data is important. Where possible the GNS study used data from local councils (typically contours at 5, 2, 1 m or smaller intervals). However in some areas the elevation model was based on the national 20 m contour dataset held by Land Information New Zealand (LINZ) and the quality of the data results in increased uncertainty in modelling. Where this lower quality data was used, the hazard rating is tagged as being uncertain. Modelling for those areas of Christchurch City where detailed elevation data was available resulted in estimates of inundation every 10 m from the coast whereas in areas covered by lower quality elevation data estimates were made only every 50 m. It has not been possible to verify the results of the modelling with actual tsunami impacts in New Zealand due to the lack of comprehensive data on historic events.

	EARTHQUAKE HAZARD	RATING
Assessment	**Earthquake frequency** This property is in an area which has a moderate level of earthquake activity by New Zealand standards. Moderate shaking (MM6) is likely to be experienced once in every 30 years and strong shaking (MM8) is likely to be experienced once in every 4440 years. MM7, MM9, and MM10 shaking is likely to be experienced every 210, 146820, and 500000 years respectively.[1]	**Moderate**
	Likely response in a strong distant earthquake This property is in an area where the ground is classified as shallow soil. In a strong distant earthquake these materials are unlikely to cause any increase in shaking.[2]	**No increase in shaking**
	Likely response in a strong close by earthquake This property is in an area where the ground is classified as shallow soil. In a strong close by earthquake these materials are unlikely to cause any increase in shaking.	**No increase in shaking**
	Susceptibility to liquefaction This property is in an area where the liquefaction susceptibility ranges from low (which suggests the property could begin to experience liquefaction when ground shaking reaches MM10, which on average is expected to occur every 500000 years in this area) to negligible (which suggests the property is unlikely to experience liquefaction even when ground shaking reaches MM10). It is not possible to assign a single value due to the proximity of the property to boundaries of geological data used in this assessment.[3]	**Low (Uncertain)**
	Susceptibility to fault rupture This property has a low susceptibility to fault rupture. No active faults are known near this property.[4]	**Low**
Explanation	Earthquakes are a regular occurrence in most regions. The chance and strength of an earthquake occurring ("earthquake frequency") varies across the country. Potential	

	damage to a property also depends on local conditions such as the susceptibility to liquefaction, ground shaking, and fault rupture. The earthquake frequency assessment provides the expected time in years between certain levels of earthquake shaking (Modified Mercalli Intensity or MMI scale). When the expected time between potential damaging earthquakes is short, the earthquake hazard is high. Ground shaking from an earthquake generally weakens as it travels away from the earthquake source. However shaking can be amplified in some places by the shape of valleys and ridges (topographic amplification) and by the type and thickness of soil or rock (ground shaking amplification). The construction style and height of a building can also influence the amount of shaking damage that occurs. The average expected time for earthquake shaking provided above is based on an 'average' soil (a shallow soil). Other rock or soils types can amplify or reduce the level of shaking compared to this 'average' soil depending on the distance from the earthquake and its strength. When the earthquake source is distant, shaking levels are low over most rock or soil types. Past earthquakes have shown that very soft soils can amplify the shaking associated with strong distant earthquakes. Higher levels of shaking typically lead to more damage to buildings and property. When an earthquake is large and located close by, shaking intensities can be very strong (MM8 or greater) over most rock or soil types, but with one exception. Past earthquakes have shown that very soft soils may reduce the high shaking associated with strong close by earthquakes because the very soft materials can absorb some of the shock rather than transmitting it. In general this tends to protect houses from much of the earthquake shaking and resulting damage but may not protect high-rise buildings. Liquefaction causes the soil to behave as a liquid and can occur when soils are strongly shaken during an earthquake. The assessment gives the likely strength of shaking required to cause liquefaction. At this level of shaking, little damage to buildings is expected but if the strength of shaking exceeds this level, damage to buildings and buried structures may occur. An active fault is one that has ruptured the ground surface in the past and is expected to move in the future. Buildings sited across a fault that ruptures are likely to suffer considerable damage. Not all faults can be located accurately and information on how often movement occurs and how large future movements might be is often uncertain. The assessment is based on the accuracy with which the locations of active faults are known. Where the location is not well known, the zone in which rupture could occur is broad and the hazard is assessed as uncertain. Where the location of the fault is accurately known, the zone is narrow and the hazard is assessed as high.
Sources	1. Earthquake frequency data is extracted from a national synthetic earthquake catalogue developed by GNS (last update 2002). 2. Ground shaking amplification susceptibility is assessed using a geological database developed by GNS from the best available geological maps (last update 2004). Rock/soil characteristics taken from the database and an estimated thickness is used to assess the susceptibility in the vicinity of the property. No geotechnical or subsurface data has been used in making this assessment. 3. Liquefaction is assessed using a geological database developed by GNS from the best available geological maps (last update 2004). Rock/soil characteristics taken from the database and an estimated depth to ground water is used to assess the liquefaction susceptibility in the vicinity of the property. No geotechnical or subsurface data has been used in making this assessment. 4. The fault rupture susceptibility assessment is based on the active faults database developed by GNS from the best available fault mapping (last update 2007).

Property Information

Street address:	7 Sample Drive, Christchurch City
Valuation reference:	99999/99999
Property ID. (QPID):	9999999
Territorial authority:	Christchurch City (60)
Category:	Residential-Dwelling-1980's
Land area:	.0493 ha
Floor area:	150 m^2
Legal description:	LOT 99 DP 9999
Construction materials:	Steel/G-Iron, Mix.Material
Nature of improvements:	

Disclaimer

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A Property Hazard Report is not based on any site-specific geological or engineering investigation at the relevant property. A Property Hazard Report is not a geological or engineering report for a property and does not replace the need for a site inspection in respect of any issues relating to geological, foundation or other hazard-related conditions at the relevant property.

The map showing property boundaries in a Property Hazard Report is indicative only and is not intended or designed to replace a certificate of title or land survey information. If you need a Certificate of Title or land survey information for any purpose then you can order these from QV's website.