

# Port Hills - Rock Roll, Cliff Collapse and Landslips



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Withheld under section 9(2)(b)(ii)

Released by the Minister for Canterbury Earthquake Recovery

## Purpose of this Briefing

- Set out a broad overview of the issues
- Set out some options for discussion
- Deals with rock roll initially, and then cliff collapse and landslips as one item

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## Rock Roll 1 – General Overview

- Earthquakes have increased pre-existing risks of rock roll, with resultant increase in life & property risks
- Estimated 105 properties where the chance of been killed is greater (worse) than 1 in 1,000; 443 at 1 in 10,000 based on 2012 model.
- By comparison, the risk of dying from a road accident is around 1 in 10,000 - but overall risks to life can be high (1 in 300 for a person in the 45-64 age band).
- Risk level reduces over time.

## Rock Roll 2 – General Overview

- Christchurch City Council issued section 124 notices prohibiting access to 268 properties at risk of rock roll based on observational information
- Modelling of risk zones does not fully align with the properties subject to s124 notices
- Natural hazard management usually rests with local government – but there are reasons for central government involvement
- Protection is often more cost-effective than retreat – but impossible to protect in all cases – and a level of residual risk will always remain

## Rock Roll 3 – Issues at Hand

- Three inter-related policy issues
  - Risk level
  - Managing change in risk over time
  - Options around protecting properties
- Both Crown and CCC need to be comfortable with approach chosen
- Cost sharing issues also need to be worked through

# Rock Roll 4 – Risk Levels

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- There is no “correct” level of risk
- GNS suggests an Annual Individual Fatality Risk figure somewhere between the range of 1 in 1,000, and 1 in 30,000
- Compared to transport, protecting statistical lives from rock roll is relatively expensive by at least one order of magnitude for risk levels approaching 1 in 10,000)

Specific Scenario	2012 risk levels – No of properties (value in brackets)	2016 risk levels – No of properties (value in brackets)
1 in 1,000	105 (\$46m)	24 (\$9m)
1 in 10,000	443 (\$221m)	318 (\$156m)

## Rock Roll 5 – Managing Change in Risk

- A property with a 1 in 5,000 risk in 2012 may have a 1 in 10,000 risk in 2016
- Overall package ideally includes a way of managing this change in risk for “marginal” properties
- Multiple options exist including buy and sell later approaches, providing owners with an element of choice as to when they re-occupy (time-limited accommodation support), as well as a do-nothing option

## Rock Roll 6 – Protecting Properties

- Options exist to protect cost-effectively in many cases – becomes more cost-effective as number of properties to be protected increases
- Bunds and source protection considered to be effective, and fences will also be effective in some situations
- Construction time of 6 – 18 months, and this in part will be driven by the amount of protective work required
- Any decision that involves protective structures (and especially fences) should have a caveat associated with it



# Rock Roll 7 – Providing Options

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2012 Risk Profile	Greater than 1 in 1,000	Between 1 in 1,000 and 1 in 5,000	Less than 1 in 5,000 risk
Option A	105 properties, permanent approach	Options available for 213 properties	No support available
2012 Risk Profile	Greater than 1 in 5,000	Between 1 in 5,000 and 1 in 10,000	Less than 1 in 10,000 risk
Option B	318 properties, permanent approach	Options available for 125 properties	No support available
2012 Risk Profile	Greater than 1 in 10,000	Less than 1 in 10,000	
Option C	443 properties, permanent approach	No support available	

# Rock Roll 8 – Developing Options

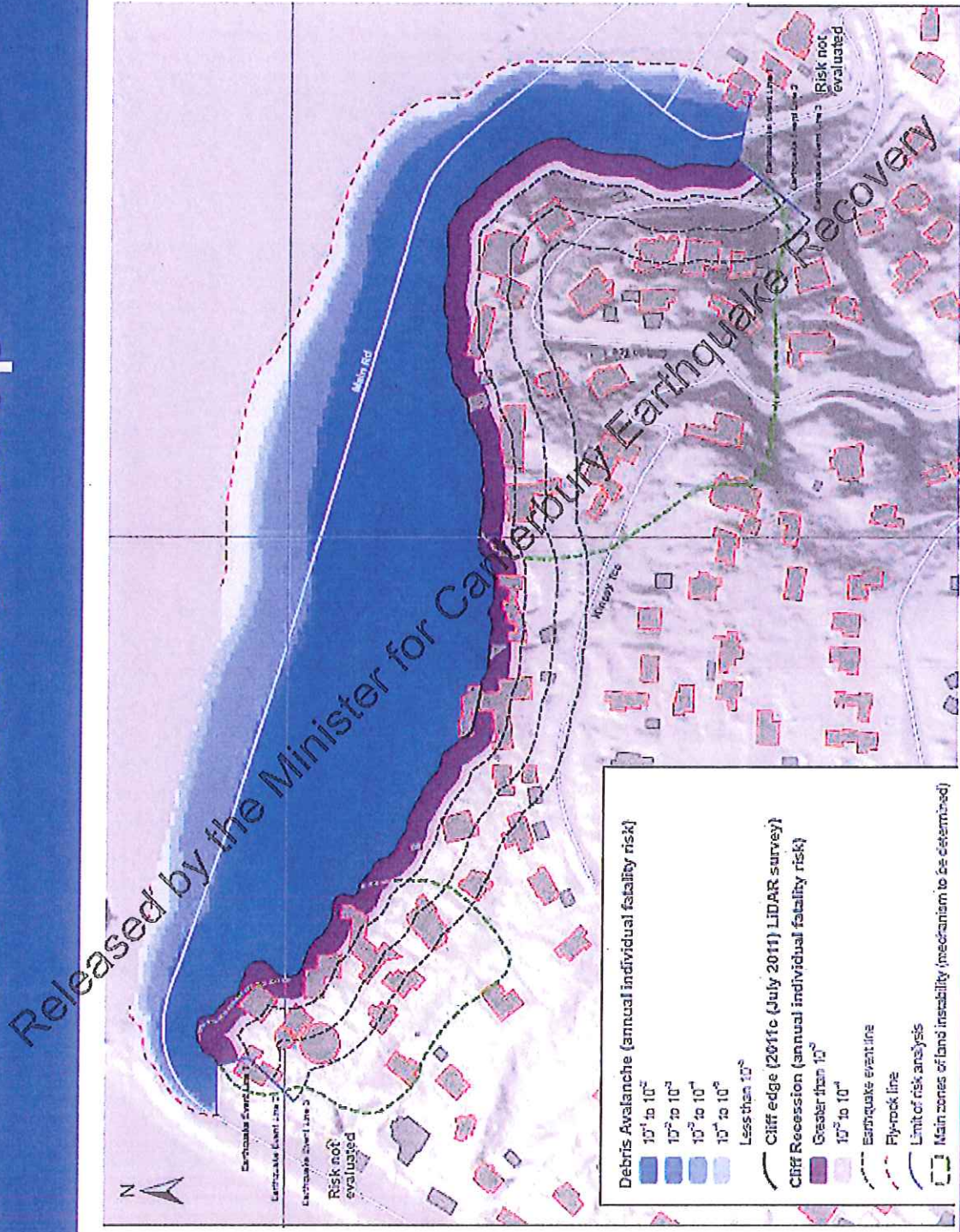
Option	A. Based on 1 in 1,000 risk level (2012 basis)	B. Based on 1 in 5,000 risk (2012 basis)	C. Based on 1 in 10,000 risk (2012 basis)
Protective structures	17	209	365
S 124 and offer	88	109	78
Total properties (\$m in brackets)	105 (\$40m)	318 (\$100-110m)	443 (\$130-140m)
Options for those with intermediate risk (vol. offer, accommodation support)	213	125	0

Those with intermediate risk are those within a risk band of 1 in 1,000 (2012) and 1 in 5,000 (2012 levels) in option A, and 1 in 5,000 (2016) and 1 in 10,000 (2012 model) in option B.

# Cliff Collapse (& Landslip) 1

- Incidence of cliff collapse, landslip and rock roll in Port Hills has increased due to seismic activity
- Life risk for cliff collapse areas has been quantified
- Land weakening back from cliff edges – may become unliveable within 50 years
- Landslip information not as well advanced

# Life Risk: Peacock's Gallop



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## Cliff Collapse 2 : Potential Approach

### Group 1:

- Immediate life-safety risk
- Infrastructure problematic
- Significant land damage that cannot be cost-effectively remediated
  - 160-180 Properties (130 s124 notices currently)
  - Voluntary Purchase Offer
- Estimated cost (\$130-145m gross; \$110-130m net)
- Area-wide land remediation possible for 16 properties (\$1.5m)

## Cliff Collapse 3 : Potential Approach

### Group 2:

- No immediate life-safety concerns that cannot be remediated
- Land damage is tolerable for now (rock mass has been weakened & properties may be unliveable in 50 years)
- Infrastructure could be maintained
  - 80-100 Properties
  - Managed through CCC monitoring
  - S124 notices prevent occupation of dangerous buildings until remediation/repairs completed (currently 15 with s124 notices)

## Cliff Collapse 4 : Landslips

- Geotechnical investigations still underway (6 months)
- 17 major landslips in the White & Green Zones, affecting approximately 650 properties (40 s124 notices)
- Approximately 17 properties similar to Group 1 Cliff Collapse for life-safety reasons (Lucas Lane)
- Potentially larger number with major to severe land damage that cannot be remediated
- Most remain liveable

# Cliff Collapse 5 : Landslips: EQC Land Damage Information

EQC Damage Categories and Descriptions		Indicative percentage of land damage for 17 Landslip Sites
LM1	<p><b>Small scale-Minor</b></p> <p>Individual cracks less than 50 mm wide, or less than 100mm cumulative crack widths over a typical 30m section</p>	40%
LM2	<p><b>Large scale-Major to severe</b></p> <p>Individual cracks greater than 50mm wide, or more than 100mm cumulative crack widths over a typical 30m section</p>	54%
LM3	<p><b>Land inundation</b></p> <p>Inundation from failed slopes (unretained and/or retained)</p>	6%



## Cliff Collapse 6 : Issues with Group 2 Properties & Landslips

- 1) Availability of building consents
- 2) Lifting of section 124 notices
- 3) Possible issuing of natural hazard notices under s72-74 of the Building Act
- 4) Availability of insurance and EQC coverage
- 5) Possible decrease in equity relative to pre-earthquake levels

## Cliff Collapse 7 : Approaches to Landslips

- Most landslip properties can be individually remediated, but some share similar characteristics with Group 1 Cliff Collapse properties
- Offering any assistance would raise significant precedent issues (within and outside Christchurch) for those with characteristics more in line with Group 2
- Possible reliance on normal processes