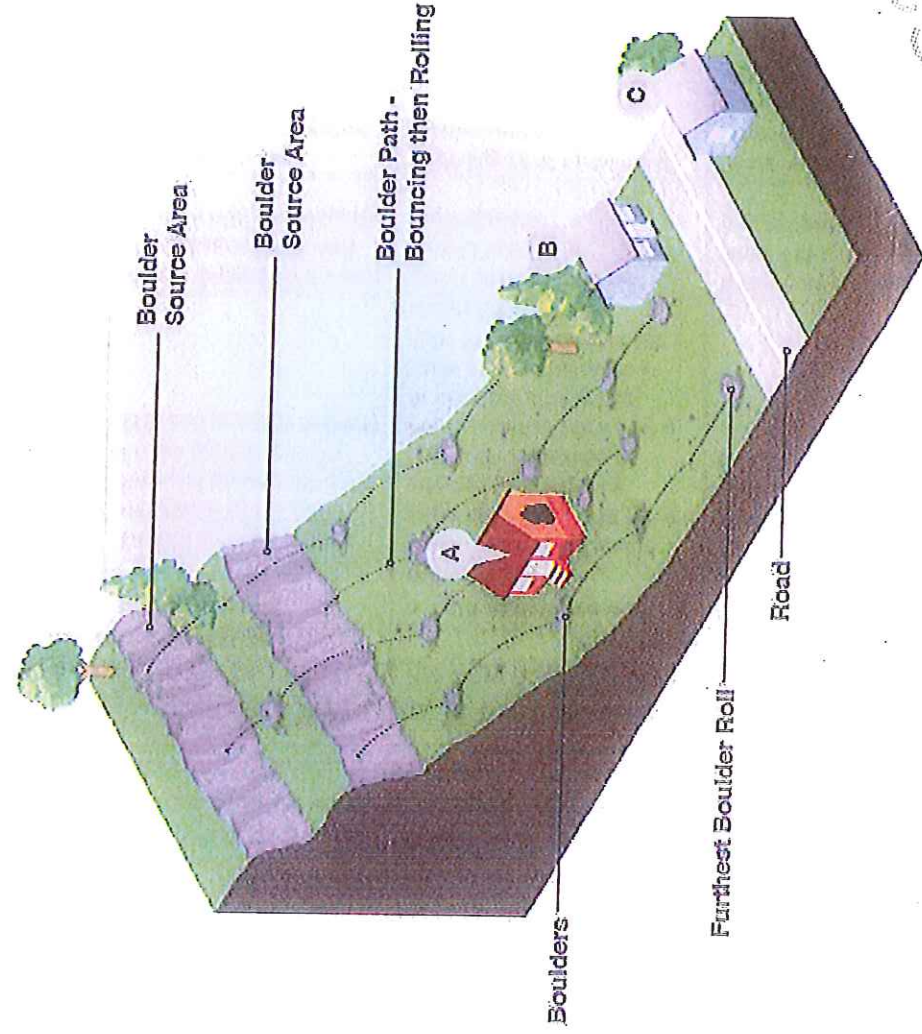


Port Hills Policy Decision Framework- Rock Roll (No Land Damage)

Key Characteristics of these areas:

- Land not damaged, but risk of rock roll has increased due to seismic activity.
- An estimated 450-700 properties are affected, 362 of which have s124 notices.
- CCC may add another 200 s124 property notices due to new information.
- CCC has existing natural hazard management processes.
- It may be possible to mitigate associated risks in some areas, although this may not be cost effective in all cases.



Number of Properties with S124 Notices due to Rock roll	362
Total CV (res)	\$218,000,000
Total LV (res)	\$95,000,000
Average CV (res)	\$602,000
Average LV (res)	\$263,000
Average damage (res)	Waiting for information from EQC
% of rebuilds (res)	Waiting for information from EQC



House	Description
A	<ul style="list-style-type: none"> • Damage from rock roll sustained or highly likely • Risk to life at intolerable level • Mitigation protection unlikely to be effective due to boulder energy levels
B	<ul style="list-style-type: none"> • House can be protected by fence or bund • Elevated life risk without protection works
C	<ul style="list-style-type: none"> • Either protected from rock roll risks by Houses A, B and the road, or very remote from boulder source • Rock fall mitigation not necessary

Key Issues to Consider

Decision Making

- Red Zone criteria are not met, as land may not be damaged.
- Many property owners are unable to occupy their homes due to immediate risk, currently managed through Council's s124 notices.
- These properties are at heightened risk from further rock roll in subsequent seismic events.
- Mitigation will be possible in many cases, but for some properties, mitigation will not be practical or cost effective.

Assistance Package Options

- Address through a Green Zone approach, with Council's s124 notices still in force. Council would change the District Plan to constrain future consenting, and consider risk mitigation measures. However, this does not meet CERA's objectives of providing certainty, timely decisions, confidence, or protecting the health and wellbeing of residents. CCC may not have the resources to fund risk mitigation installation costs and facilitated exit.
- Address through support for mitigation measures where possible (either Council funded or through cost sharing) and support for assistance to facilitate exit where necessary (either full Crown funding or through cost sharing). Cost sharing options could include the EQC and property owners, as per precedents.

Relevant Considerations

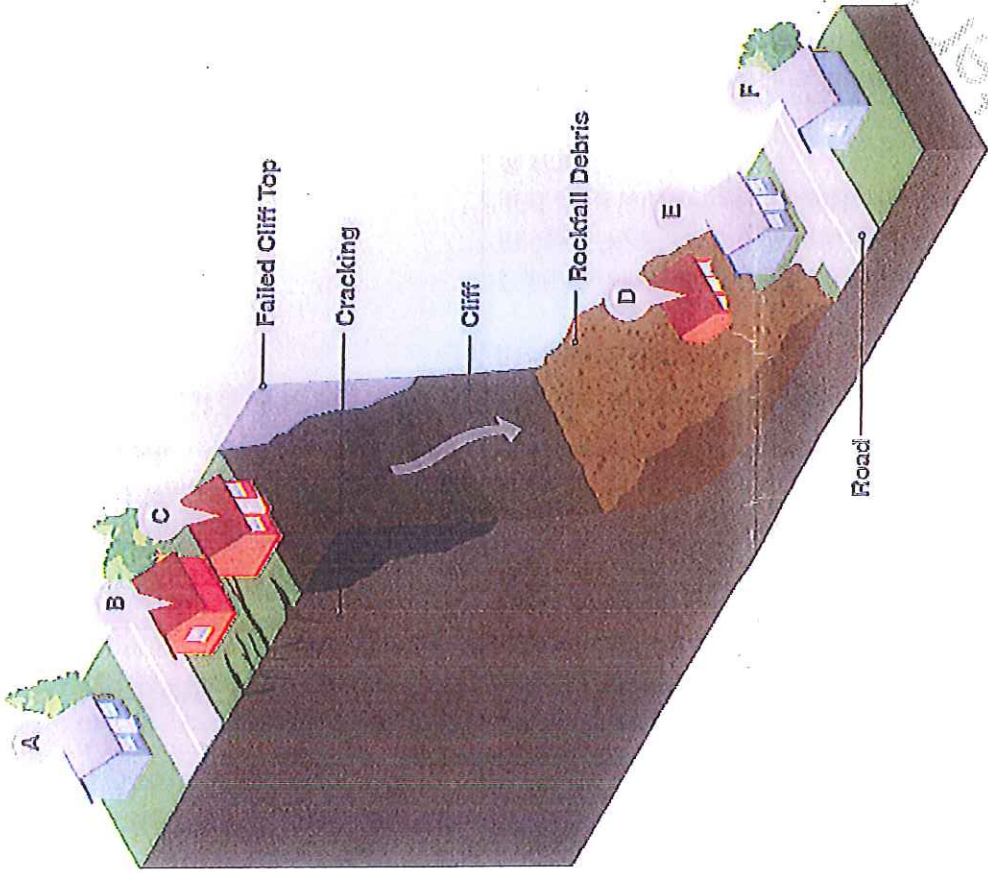
- There is a precedent risk for the Crown in providing 100% of funding associated with assistance/relocation and risk mitigation.
- Precedents already exist for cost sharing between Crown, Council, Property Owner and EQC.
- In the context of cost-sharing arrangements, CCC could be the decision-making body (with advice from Crown); in the context of full Crown funding, CERA should make decisions on mitigation measures and facilitated exit.
- Future insurability of properties at high risk from rock roll is unknown.
- In case of assistance, insurance proceeds may cover approximately 50% of Improvements Value.
Withheld under section 9(2)(h)
- Some risks may be minimised through protection of lifelines (CCC).

Policy options for Properties in the Port Hills- Rock Roll						
Green Zone all properties in the Port Hills facing risk from rock fall and rock roll (450-700+ properties)						
Option	1. Regulatory - District plan changes	2. Mitigation (where practical)		3. Assistance (where mitigation not practical/cost effective)		
		a. Council funded	b. Cost sharing	a. Split assistance and relocation	b. Split assistance that includes property owner	c. Full assistance (voluntary or compulsory)
Description	Change District Plan to constrain future consenting in the Port Hills. Government could assist with District Plan changes under the CER Act powers	Council would lead and fund risk mitigation works in the Port Hills without any assistance from the Crown	Council would lead the mitigation works with financial support from the Crown (and potentially EQC and property owners)	Crown and Council would assist homeowners to leave affected properties by paying for relocation of house (relatively few cases) or assist in reimbursing value of improvements at 2007 CV (whichever of the values is lower)	Crown, council and homeowner share the cost of assistance based on 2007 CV	Crown purchases properties in Port Hills with s124 notices facing risk from rock fall and rock roll at 2007 CV
Fiscal Cost	None	No direct cost to the Crown, but may have costs associated with mitigating land it owns	Would depend on the cost sharing agreement with Council, EQC and property owners	Direct cost to the Crown limited to its share of CV or moving costs	Direct cost to the Crown limited to 1/3 (or some proportion) of 2007 CV	Assistance costs likely to be borne by the Crown, with insurance proceeds to offset
Certainty	S124 notices address immediate risks; Plan changes would provide certainty in future, but no mechanism for Council to mitigate risk or facilitate exit in short term	Uncertainty over timeframe for mitigation works or potential retreat decisions	Uncertainty over timeframe for mitigation works	High degree of certainty of homeowners	Some certainty for homeowners, as unclear how insurance proceeds would be divided	High degree of certainty for homeowners
Precedent Risk	No precedent risk for the Crown (District Plan changes development by Council)	No precedent risk to the Crown	Precedent exists for Crown, Council and landowners to share cost of mitigation	Precedent of Government assistance for large scale natural hazard mitigation	Precedent of Government assistance for large scale natural hazard mitigation	High level of precedent risk, given that responsibility for land management rests with local authorities
Conclusions	Amending the District Plan is necessary to manage future risks, but this approach would not provide a mechanism in the short term for the Council to mitigate risks or facilitate exit. Future insurability uncertain.	Due to fiscal limitations, Council is unlikely to be able to effectively mitigate hazards or potential retreat in a timely manner. Measures may help to support future insurability.	Provide certainty to property owners, and support Council and EQC in managing hazards. Measures may help to support future insurability.	High cost and precedent of Crown managing known natural hazards	Provides certainty to property owners, and supports Council in managing hazards. Possible inconsistency with Red Zone policy in terms of attributing liability and costs to property owners	High cost and precedent of Crown managing known natural hazards

Port Hills Policy Decision Framework- Cliff Collapse, Inundation and Landslip

Key Characteristics of these areas:

- Land has suffered damage or has been severely compromised.
- Approximately 158 properties affected, of which 98 have s124 notices.
- Risk of cliff collapse or landslides in subsequent seismic event.
- On top of cliffs, land cannot support building platforms.
- At bottom of cliffs, inundation can affect homes and critical infrastructure.
- Land repair solutions would be difficult to implement, prolonged and disruptive.



Estimated Number of Properties	158
Residential properties (incl. vacant lots)	158
Total CV (res) (Information available for 150 properties)	\$131,000,000
Total LV (res) (150 properties))	\$60,000,000
Average CV (res) (150 properties)	\$882,000
Average LV (res) (150 properties)	\$401,000
Average damage (res)	Waiting for information from EQC
% of rebuilds (res)	Waiting for information from EQC

House	Description
A	<ul style="list-style-type: none"> • Some or minor land damage • Little risk of further land damage
B and C	<ul style="list-style-type: none"> • Significant land damage • High risk of further collapse • Not economically viable or practical to remediate
D	<ul style="list-style-type: none"> • Inundated by debris • Not economically viable or practical to remediate
E	<ul style="list-style-type: none"> • Little or no land damage now • High risk of inundation from further events
F	<ul style="list-style-type: none"> • No land damage and not at risk

Key Issues to Consider

Decision Making

- Red Zone criteria have been met for some properties - area-wide land damage that cannot be individually remediated.
- These areas are at risk from further cliff collapse or land movement in subsequent seismic events.
- Land remediation is not generally cost effective or practical for these properties.
- Many property owners are unable to occupy their homes due to immediate risk, currently managed through Council's s124 notices. Essentially, people will be required to leave their properties.

Assistance Package Options

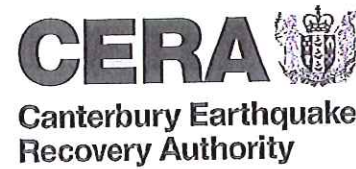
- Address through a Green Zone, with Council's s124 notices still in force, and allow owners to pursue claims with EQC and insurers. However, this may not meet CERAs' objectives of providing certainty, timely decisions, confidence, or protecting the health and wellbeing of residents.
- Address through a Red Zone-style offer, through a capped or uncapped *voluntary* offer, or through a *compulsory* offer.

Relevant Considerations

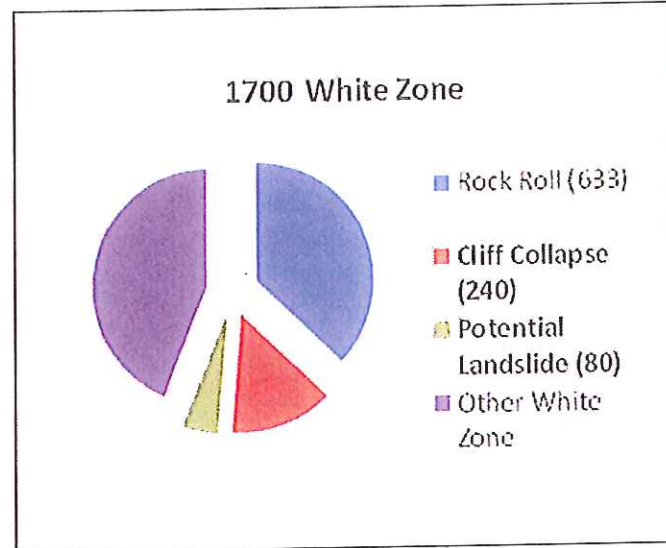
- Future insurability of inhabitable properties is unknown.
- Insurance proceeds may cover approximately 50% of Improvements Value.
- EQC may pay out (either in part or in whole) for slightly more than 20 of these properties.
- Precedent risks for the Crown.
- Some properties on this land are considered to be too unstable for conventional demolitions.
- There is no precedent for a capped offer in the Red Zone, nor for compulsory offers.
- This is "core" business for EQC.

Four Policy options for Properties in the Port Hills- Cliff Collapse, Inundation and Landslip

Description	1. Green Zone all properties, allow insurance schemes/policies to play out.	2. Red Zone properties with s124 notices facing cliff collapse and subsidence		
		a. Capped, voluntary offer	b. Uncapped, voluntary offer	c. Compulsory offer
Fiscal Cost	No direct fiscal cost to the Crown	Net impact on Crown reduced by insurance proceeds Partial purchase introduces complexity in apportioning any insurance recovery and who will negotiate with the insurer & EQC	Net impact on Crown reduced by insurance proceeds Gross estimate is approximately \$131M	Net impact on Crown uncertain (lower if insurance paid out, higher if insurance policies cancelled)
Certainty	High degree of uncertainty for property owners, and potential future insurability issues	High degree of certainty, unless homeowners negotiate with EQC and insurers	High degree of certainty, unless homeowners choose to negotiate with EQC and insurers	High degree of certainty
Precedent Risk	No precedent risk for the Crown or Council	Risk of precedent with Crown intervening when EQC has paid out in similar situation elsewhere	Risk of precedent with Crown intervening when EQC has paid out in similar situations elsewhere	Risk of precedent with Crown intervening when EQC has paid out in similar situation elsewhere, and compulsory acquisition precedent for CERA
Equity with Flat-land	Inconsistent with Red Zone policy (assuming "bad land" supposition)	Capped offer is different to and invites comparisons with Red Zone offer	Consistent with Red Zone policy, but potentially higher compensation paid to high-value properties	Red Zone offers were not compulsory
Conclusions	High degree of uncertainty for property owners and inconsistent with Red Zone policy	High degree of certainty for owners, lower fiscal cost for the Crown but greater cost for residents relative to the flat land offer	Consistent with Red Zone policy	Not clear that compulsion is needed, s124 notices prevent occupation



Port Hills White Zone – Cliff Collapse/Debris Inundation and Landslips- Context



Geotechnical Information for Cliff Collapse/ Debris Inundation

- Agreed dataset with CERA, CCC and geotechnical advisors
- GNS modelling of risk contours
- Risk will **not** reduce significantly over time

Possible Group 1 Criteria for Cliff Collapse

- Properties at an **immediate life-safety risk** that cannot be remediated
- Horizontal **infrastructure difficult and costly to maintain** (sewerage, access, roads, water).

Possible Group 2 Criteria for Cliff Collapse

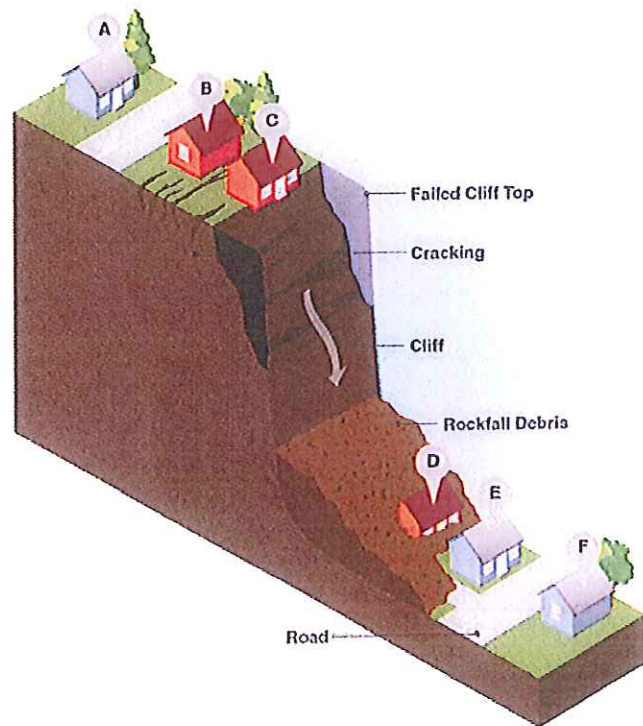
- **No immediate life-safety concerns** that cannot be remediated on an individual basis.
- Buildings are not badly damaged, and investments in repair are viable (building consents may be available)
- Horizontal infrastructure can be **economically maintained for now**

Issue exists (discussed overleaf) where buildings are damaged, and it would be inadvisable to invest in repairs/ rebuilds (building consents unlikely to be available)

Geotechnical Information for Landslips

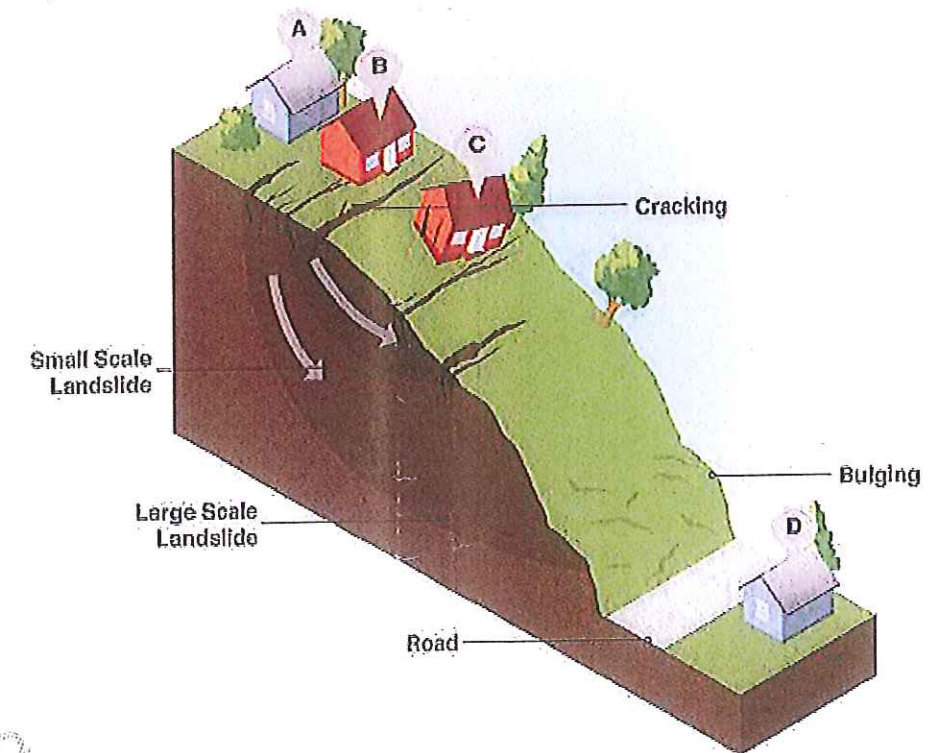
- **Geotechnical investigations still underway** (in part reliant on rainfall)
- CERA has commissioned a desktop study for landslips, and initial results are available
- Some buildings have damage, and it does not appear sensible to repair these.

Cliff Collapse/ Debris Inundation Graphic and Legend



House	Description
C	<ul style="list-style-type: none"> • Significant land damage • Life –safety risk • High risk of further collapse • Not economically viable or practical to remediate • Group 1
D	<ul style="list-style-type: none"> • Inundated by debris • Life –safety risk • Not economically viable or practical to remediate • Group 1
B	<ul style="list-style-type: none"> • Land cracking associated with cliff collapse • No significant life-safety risks • Likely restrictions on further building • Group 2- GREEN Zone
E	<ul style="list-style-type: none"> • Little or no land damage now • No significant life-safety risk • Low risk of inundation from further events • Group 2- GREEN Zone
A	<ul style="list-style-type: none"> • Some or minor land damage • Little risk of further land damage • GREEN Zone
F	<ul style="list-style-type: none"> • No land damage, and not directly exposed to risk • GREEN Zone

Landslip Graphic



There are 16 major landslips in the White Zone

- 5 are connected with cliff collapse/debris inundation areas (life risk)
- 1 is separate from cliff collapse/debris inundation areas (life risk) and may require a separate response (straddles Green and White Zone)
- The remaining 10 could potentially be green zoned, but further monitoring, detailed investigation and mapping will be necessary; approximately 340-360 buildings are within the area of these landslips, of which 85-110 may be badly damaged.
- There are outstanding issues with those landslip properties that have significant building or land damage given the potential comparison with cliff collapse/debris inundation-affected properties

- See overleaf -



Port Hills White Zone – Cliff Collapse/Debris Inundation and Landslips

Category	# Properties <i>(All numbers indicative)</i>	Value <i>(All figures indicative)</i>	Implications	Issues
Group 1	145-155 (130 with s124 notices)	\$90-100M	<ul style="list-style-type: none"> Retreat 	<ul style="list-style-type: none"> Nature of assistance package to be decided (Red Zone precedent will be strong) Voluntary offer
Group 2	75-100 (14 with s124 notices)	\$48-70M	<ul style="list-style-type: none"> Monitor and manage through standard CCC natural hazard processes No building consents for major renovations available 	<ul style="list-style-type: none"> No assistance proposed Lifting of existing s124 notices required (CCC indicates that this is unlikely to be a problem)
Vacant				
G1	3	\$750,000	<ul style="list-style-type: none"> Building consents may not be available 	<ul style="list-style-type: none"> Nature of assistance package to be decided (if any)
G2	0	0		
G1 Commercial	3	\$2.8M	<ul style="list-style-type: none"> Building consents may not be available 	<ul style="list-style-type: none"> Nature of assistance package to be decided (if any)
G1 Not-for-Profit	TBC	N/A	<ul style="list-style-type: none"> Building consents may not be available 	<ul style="list-style-type: none"> Nature of assistance package to be decided (if any)

Some cliff collapse and landslip properties share similar characteristics

- Little immediate life risk
 - May have suffered land damage that cannot be remediated and/or
 - Building may have severe structural damage
- Would be inadvisable to invest further in these areas. Existing processes (i.e. building consents) should be effective in ensuring that no further significant investment occurs
- Property owners will not be able to continue to live in these properties
- **Issue arises around whether to include in any assistance package**
- One scenario is to provide no assistance, and rely on normal insurance procedures (seeking information from EQC on their possible approach, but insurance proceeds for build damage is likely to be forthcoming)
- Offering any assistance would raise significant precedent issues around landslips in New Zealand.
- **Very difficult to isolate these properties from similar cliff collapse properties**

Cause	Location	# Properties	Possible Action
Life risk close to dwelling	Heberden Avenue	3	Place in Group 1 or Group 2 (possible subdivision)
Access issues:			
Private Roads	Redcliffs	2	Place affected properties in Group 1 or remediate/mitigate
Public Roads	Heberden Avenue	2	
Group remediation required	Redcliffs	16	Assess whether remediation feasible and cost effective. Possibly assist property owners with remediation works

Landslip Sites - Breakdown of figures

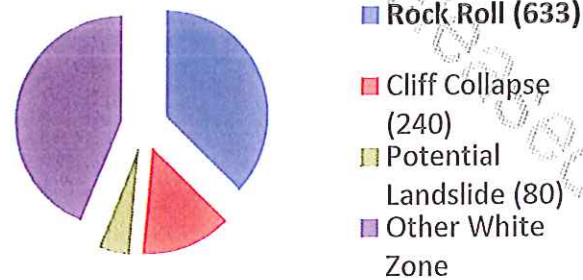
Description of Sites	Number of Sites (16 in total)
Connected with cliff collapse/debris inundation areas	5
Can likely be green zoned (little land or building damaged observed)	1
May be possible to green zone, but more investigation required (potential life safety impact, or land damage suggests building consents may not be available)	10

Other Cliff Collapse/ Debris Inundation Issues

- Demolitions- CERA will want to manage demolitions for Group 1 sites, given health and safety considerations, and the potential impact on critical infrastructure
- Many Group 1 dwellings may not be badly damaged; therefore, insurance proceeds may not be as high as for the Red Zone Flat Land
- Some Group 2 properties may subsequently need to be acquired to remediate critical infrastructure lifelines. Specific communications needed to manage this potential issue. (May affect 14 properties in Redcliffs, Peacock's Gallop and Heberden Avenue)
- 2 Green Zone properties in Redcliffs included in Group 1 (1 property) and Group 2 (1 property). Specific communications needed to manage this issue

Port Hills White Zone – Rock Roll

1700 White Zone



1. State of Play

Overview

- 298 properties AIFR from rock roll is worse than 1 in 1,000 (at 2012 risk level)
- 633 properties AIFR from rock roll is worse than 1 in 10,000 (at 2012 risk level)
- 23 different areas ('sub-sectors')

Geotechnical Information

- Risk contours have been modelled (GNS)
- GNS developing an alternative 1yr scenario with the effect of aftershocks removed; final model to be delivered Monday.

ALL NUMBERS WILL CHANGE

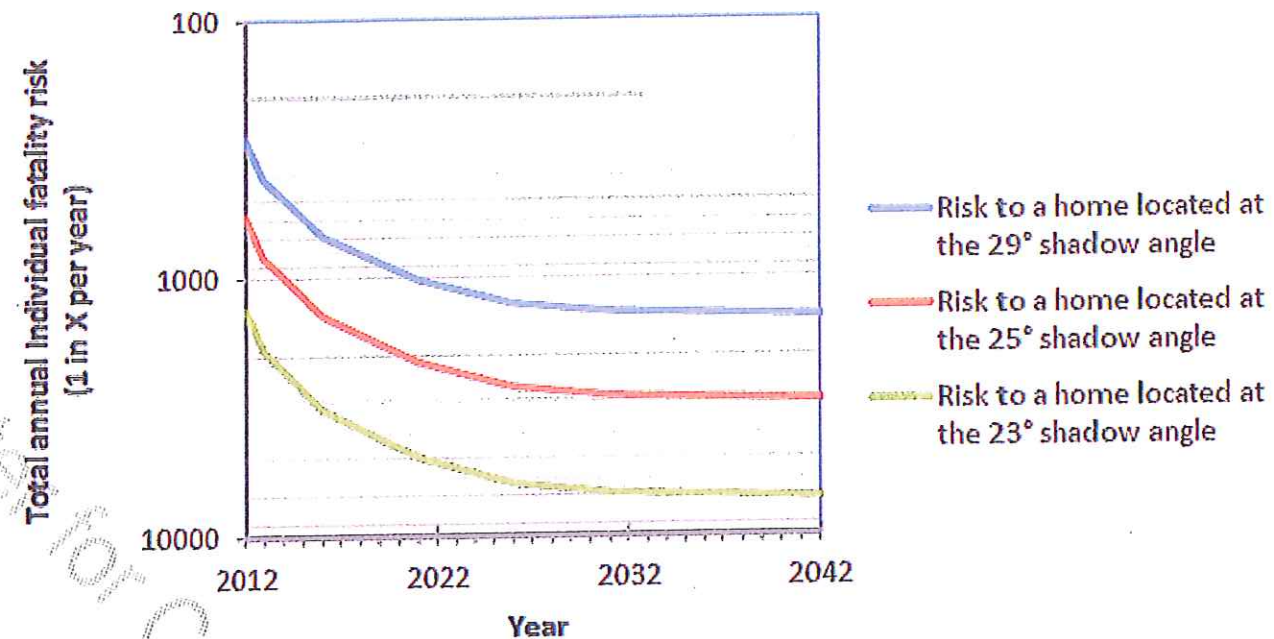
- Rock roll risk will decrease over time as seismic activity reduces, further seismic events would interrupt trend
- Model assumptions and uncertainty
 - Scale factor of 1.2 to allow for unmapped boulders and rock masses having been broken and disturbed by the earthquakes
 - 0.67 occupancy ie an average person will spend 16/24 hours per day at home
 - GNS estimates uncertainties on the AIFR modelling at about an order of magnitude (factor of 10) in either direction

Sub-sector analysis

- Options
 - Accept risk
 - Mitigate (fence, bund, at source)
 - Retreat (interim or long term)
 - Cost/benefit analysis

2. Results to date

Risk levels decrease over time



Cost benefit ratio varies between sites and depending on timeframe

Area	Number of houses (Value in \$m)				INDICATIVE BCR (Cost of mitigation in \$m)			
	Y1		Y5		Y1		Y5	
	Worse than 1 in 1000	Worse than 1 in 10000	Worse than 1 in 1000	Worse than 1 in 10000	Worse than 1 in 1000	Worse than 1 in 10000	Worse than 1 in 1000	Worse than 1 in 10000
Wakefield Ave North	28 (19)	28 (19)	0 (0)	28 (19)	2.3 (8)	2.3 (8)	0 (0)	2.3 (8)
Wakefield Ave South	38 (14)	43 (16)	8 (3)	43 (16)	3.2 (5)	3.5 (5)	2.5 (1)	3.5 (5)
Avoca Valley	29 (14)	36 (16)	0 (0)	33 (15)	1.2 (11)	1.5 (11)	0 (0)	1.3 (11)
Bowenvale West	4 (2)	39 (25)	0 (0)	20 (14)	1.1 (2)	1 (24)	0 (0)	2.4 (6)
Bowenvale East	33 (21)	33 (21)	0 (0)	16 (10)	4.5 (5)	4.5 (5)	0 (0)	4 (2)
Morgans Valley	0 (0)	18 (10)	0 (0)	18 (10)	0 (0)	1 (10)	0 (0)	1 (10)
Lyttelton SE	3 (1)	57 (25)	1 (0)	10 (4)	3.2 (0)	4.8 (5)	0.9 (0)	6.2 (1)
Lyttelton NW	11 (4)	49 (20)	0 (0)	49 (20)	2.6 (2)	3 (7)	0 (0)	3 (7)
TOTAL (including other areas, approximate)	298 (\$162)	633 (\$335)	20 (\$10)?	450 (\$250)?	(\$90)?	(\$127)?	(\$10)?	(\$90)?

What the numbers mean: Wakefield Ave South as an example.

- 38 (14) There are 38 houses with a risk level of greater than 1 in 1000 in year 1 and they are worth \$14 million
- 43 (16) There are 43 houses with a risk level of greater than 1 in 10000 in year 1 and they are worth \$16 million. This includes the 38 with a risk level of greater than 1 in 1000
- 3.2 (5) The cost benefit ratio of protection for properties with a risk greater than 1 in 1000 in year 1 is 3.2. This protection would cost \$5 million
- 3.5 (5) The cost benefit ratio of protection for properties with a risk greater than 1 in 10000 in year 1 is 3.5. This protection would cost \$5 million

3. Considerations

- Current and future life safety risk
- Cost of reducing risk is high relative to other options
- Probable effectiveness
- Cost (capital, maintenance, any interim assistance to households)
- Timeliness (6-18 months lead time for protective works depending on scale of project, number of work sites, procurement methodology, approach to land/access issues etc)
- Societal and individual risk tolerance (see below)
- Community acceptance and impact (certainty, ability to move on with lives)
- Government and CCC roles (funding, development including any land purchase, ownership and maintenance)
- Precedent

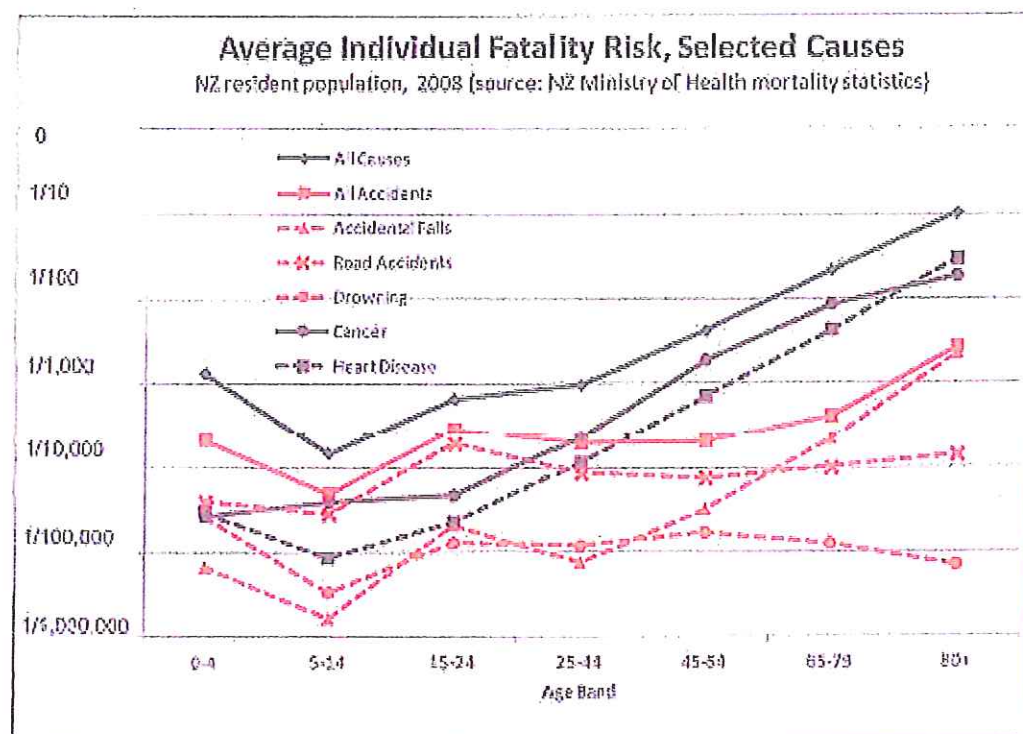
5. Risk Issues

- In most scenarios protection appears more appropriate than retreat
- Issue remains as to whether CCC will remove s124 notices assuming protection structures are built, albeit we are optimistic this will be able to be worked through
- Extent to which protection is desired will reflect a risk tolerance over both the immediate and medium term

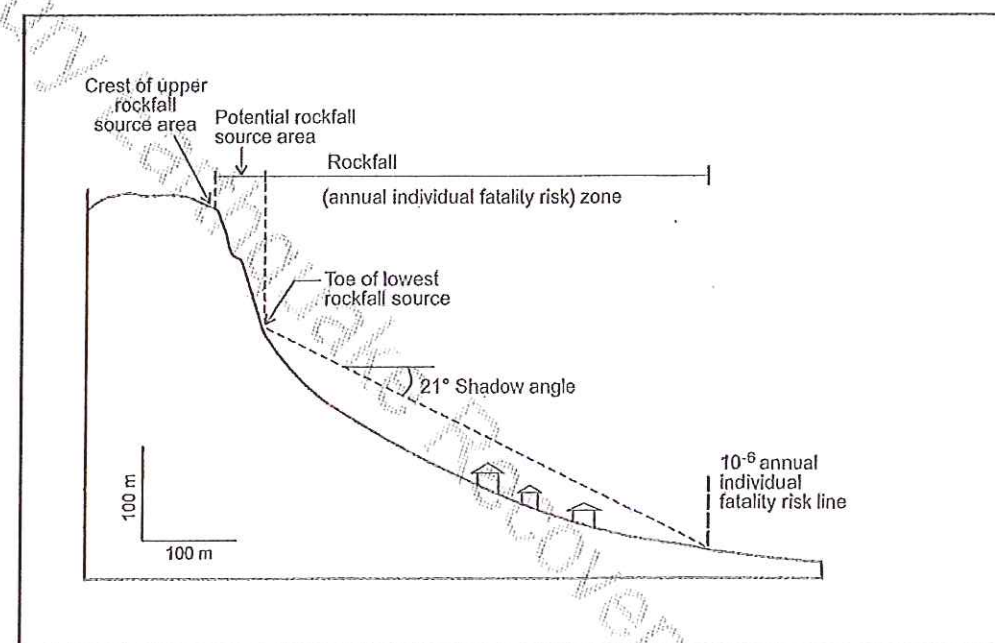
6. Going Forward

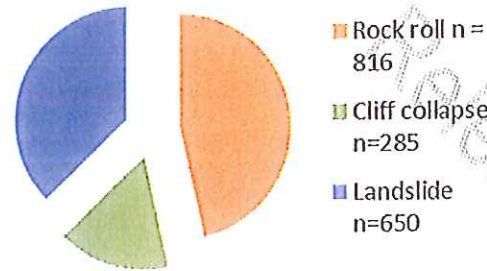
- Finalised figures to be confirmed
- Funding mix with CCC to be discussed; typically local government takes responsibility for these type of issues
- Confirmation with CCC of removal of s124 notices is critical; suggest meeting with senior CCC officials and Mayor
- Rapaki Bay
 - Houses on multiply owned Maori land
 - Runanga has suggested a like-for-like 'land swap' - may require legislative change re reserve land

4. Comparative Risk



Shadow Angles





Port Hills White Zone – Cliff Collapse, Debris Inundation and Landslips

1. Background

Cliff Collapse / Debris Inundation

- Cliff tops have collapsed; base inundated with debris
- Risk to life at cliff edge and base
- Land weakening back from cliff edges – may become unliveable within 50 years

Refer Box 5 for detail

Landslips

- Similarities with cliff collapse
- Seventeen landslip sites – generally risk is to property rather than life

Refer Box 7 for detail

Category	Number (all numbers indicative)	Value (all figures indicative)
Cliff/debris Group 1	160-185 properties (130 with s124 notices)	\$130-145M gross (\$110-130M net)
Cliff/debris Group 2	80-100 properties (15 with s124 notices)	\$55-75M gross (\$40-65M net)
Landslip	17 sites 650 properties (approx) (40 with s 124 notices)	

2. Possible Groupings

Group 1: Cliff top and base

- Immediate life safety risk
- Infrastructure problematic
- Significant land damage that cannot be cost-effectively remediated
- Small number of landslip properties have these attributes

Group 2: Weakened land

- No immediate life-safety concerns that cannot be remediated
- Land damage is repairable, but rock mass has been weakened
- Infrastructure could be maintained

Landslip

- Geotechnical information less complete

Refer Box 6 for detail



3. Possible Approaches

Group 1

- Ongoing occupation inadvisable

Group 2

- Range of property damage but area remains liveable for now
- Building consents likely to be available
- CCC likely to lift section 124 notices
- Insurance may become an issue
- Decrease in equity relative to pre-earthquake levels

Refer Box 8 for detail

Landslip

- Relatively small number similar to Group 1 for life safety reasons
- Potentially larger number with major to severe land damage that cannot be remediated
- Most remain liveable (similar to Group 2)
- Some of these properties are in the Green zone

4. Conclusions to date

Group 1

- Consider voluntary offer
- Area-wide land remediation possible for one group of 16 properties (\$1.5m) required

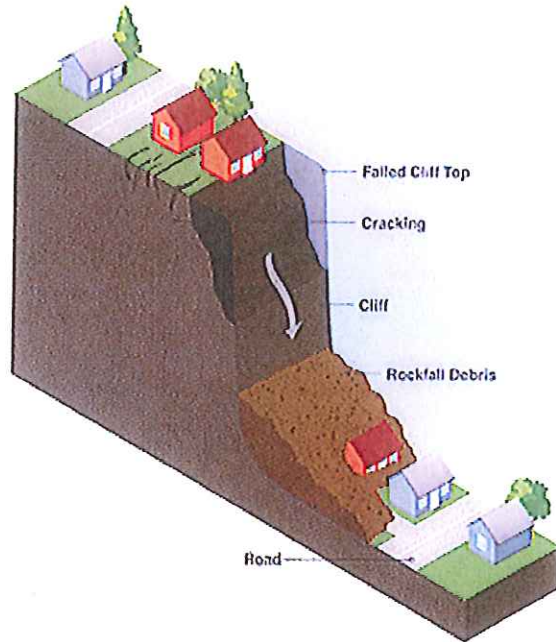
Group 2 and landslip

- Issue arises around whether to include in any assistance package
- Possible reliance on normal insurance procedures
- Offering any assistance would raise significant precedent issues (within and outside Christchurch)
- Cliff collapse typically the responsibility of local government
- Cost share between Crown and Christchurch City Council can be argued in various ways

Refer Box 7 for detail

Port Hills White Zone – Cliff Collapse/Debris Inundation and Landslips

5. Cliff Collapse/ Debris Inundation Graphic



6. Geotechnical Information

- Agreed dataset with CERA, CCC and geotechnical advisors.
- GNS modelling of risk contours, and the risk will **not** reduce significantly over time.

Possible Group 1 Criteria for Cliff Collapse

- Properties are at an **immediate life-safety risk that cannot be remediated.**
- Horizontal **infrastructure difficult and costly to maintain** (sewerage, roads, access, water).
- Properties are **subject to significant cliff collapse, debris inundation and/or land cracking that cannot be cost-effectively remediated.**

Possible Group 2 Criteria for Cliff Collapse

- There are **no immediate life-safety concerns** that cannot be remediated on an individual or collective property basis.
- Any land damage is repairable in a cost-effective manner.
- Horizontal **infrastructure could be economically maintained for the present**, subject to detailed investigations.
- Damage very possible in the next 50 years.

7. Geotechnical Information for Landslips

- Geotechnical investigations still underway.
- Initial results are available.

Most landslip properties can be individually remediated, but a small number share similar characteristics with Group 1 Cliff Collapse properties:

- Immediate life risk
- Significant land damage that cannot be remediated *and/or*
- Building may have severe structural damage
- Reactivation of landslip will damage rebuilds

8. Cliff Collapse and Debris Inundation Properties- Breakdown of figures

Category	# Properties (All numbers indicative)	Value (All figures indicative)	Implications	Issues
Group 1	160-185 (130 with s124 notices)	\$130-145M gross (\$110-130M net)	<ul style="list-style-type: none"> • Ongoing occupation inadvisable 	<ul style="list-style-type: none"> • Nature of assistance package to be decided (Red Zone precedent will be strong) • Voluntary offer
Group 2	80-100 (15 with s124 notices)	\$55-75M gross (\$40-65M net)	<ul style="list-style-type: none"> • Investigate, monitor and manage through standard CCC natural hazard processes 	<ul style="list-style-type: none"> • Questions of assistance arise • RMA zoning likely to result in future constraints

9. EQC Damage Categories and Descriptions

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



10. Description of Groups		
Issue	Group 1- Retreat	Group 2- Remain in home
Purchase offer	Yes- Voluntary	No?
Zoning	Red Zone equivalent	Green, with limitations?
Life risk	Yes in most cases	No
Building damage	Major repairs/rebuild required in some cases Building consents unlikely to be available for this work	Building damage ranges from minor to major Building consents available to repair damage in most cases
Land damage	Significant damage, which cannot be cost-effectively remediated	Low to moderate damage, which can be remediated in the short to medium term
Subject to s124 notices	Yes in 70-80% of cases, and these cannot be lifted	In 15-30% of cases, but these appear likely to be able to be lifted

11. Considerations for Future	
Issue	Group 2- Remain in home
Subject to District Plan Changes	Yes, property owners may be unable to expand dwellings or subdivide properties Potential restrictions on building/resource consents for significant repair or new building work
Christchurch City Council Monitoring	Yes, Council will need to investigate, and monitor these properties to assess new land damage and life-safety risks. Likely identified as a hazard management area requiring future (medium to long term) land-use decisions
Subject to s72-74 of the Building Act	Yes, unless individual or group remediation is possible, or the hazard is not considered "likely" (i.e. will happen without seismic activity)
Mention of hazard on Land Information Memorandum	Yes
Availability of EQC Coverage	EQC have not considered policies in the Port Hills around future insurance, but they can decline to cover if a hazard notice is in place
Availability of insurance	Uncertain availability
Future home equity	Could decrease further
Impact on critical infrastructure	Some properties may need to be subsequently acquired for critical infrastructure remediation
Ability to sell property	Yes, but at a decreased price relative to pre-earthquake levels
Future stability of property	May be suitable for occupation for several decades

12. Other Cliff Collapse/ Debris Inundation Issues

- Demolitions- CERA will want to manage demolitions for Group 1 sites, given health and safety considerations, and the potential impact on critical infrastructure
- Many Group 1 dwellings may not be badly damaged, with an effect on insurance proceeds
- Some Group 2 properties may subsequently need to be acquired to remediate critical infrastructure lifelines. Specific communications needed to manage this potential issue. (May affect 14 properties in Redcliffs, Peacock's Gallop and Heberden Avenue)
- 2 Green Zone properties in Redcliffs included in Group 1 (1 property) and Group 2 (1 property). Specific communications needed to manage this issue

14. Borderline Cases- Cliff Collapse

Cause	# Properties	Possible Action
Life risk close to dwelling	3	Place in Group 1 or Group 2 (possible subdivision)
Public and Private Road access issues due to life-safety risk	4	Place affected properties in Group 1 or remediate/mitigate
Group remediation required	16	Assess whether remediation feasible and cost effective. Possibly assist property owners with remediation works

13. Viewpoints of Christchurch City Council

Legislative Framework

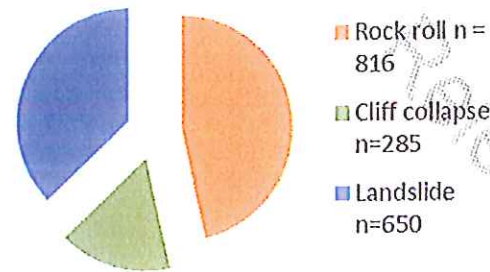
Section 124 Building Act notices prohibits access to buildings; discretionary under the Building Act

There is a close correlation between properties at heightened life-safety risk according to the Institute of Geological and Nuclear Sciences cliff collapse study, and the section 124 notices associated with cliff collapse.

Christchurch City Council Application of these Provisions

The Council is likely to lift section 124 notices relating to cliff collapse for Group 2 properties (where residents would remain in their homes), but require assurances on status of land for these properties.

The Council is likely to introduce changes to the District Plan to place a hazard line around Group 2 properties. This may mean that building footprints cannot be increased, and that new buildings must be constructed as far away from the source of the risk as possible.



Port Hills White Zone – Rock Roll (816 properties)

1. Background

- Earthquakes have increased pre-existing risks of rock roll in the Port Hills - with resultant increase in risk to life and property.
- Further rock roll may be triggered by earthquakes, or by non seismic events such as rain, snow and frost.
- Estimated 94 properties where the chance of been killed is greater (worse) than 1 in 1000; 435 at 1 in 10,000.
- 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.

Refer boxes 5, 6, 10 and 12 for detail

2. Issues

- 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 align in all cases with the properties subject to s124 notices (54 fall outside the modelled 1 in 10,000 zone).
- Christchurch City Council intends to review the placement of s124 notices in light of the modelling – but no guarantees of outcomes.

Refer box 13 for detail

3. Options

- Do nothing and let the Christchurch City Council processes run their course (could augment by “buying time”).
- Mitigate by constructing protective barriers (6-18 month lead time before barriers would be in place).
- Purchase offer to affected parties.

4. Conclusions to date

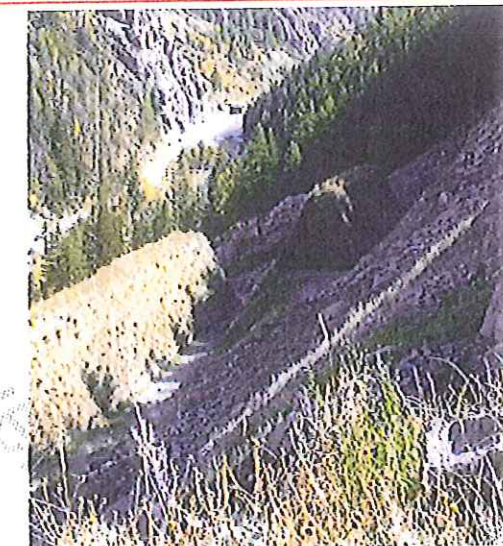
- Natural hazard management usually rests with local government – but there are reasons for central government involvement.
- Protection is often more cost-effective than retreat – but impossible to protect in all cases.

Key Issues

- Approach going forward around risk level and timeframe.
- Work with Council around removal of s124 notices.
- Agree cost share model with Council.

Refer boxes 11, 14 and 15 for detail

5. Mitigation Costs	Risk Level	2012		2016	
		Number of properties	Cost to remedy (\$m)	Number of properties	Cost to remedy (\$m)
	1 in 1,000	94	30-40	22	4-8
	1 in 10,000	435	110-180	290	65-120



Port Hills White Zone – Rock Roll (816 properties)

6. State of Play

Overview

- **94 properties** with an Annual Individual Fatality Risk (AIFR) **greater than 1 in 1,000** (at 2012 risk level).
- **435 properties** with an AIFR **greater than 1 in 10,000** (at 2012 risk level), including the 94 properties described above.
- **268 buildings** have section 124 Building Act notices preventing entry (issued by Christchurch City Council).

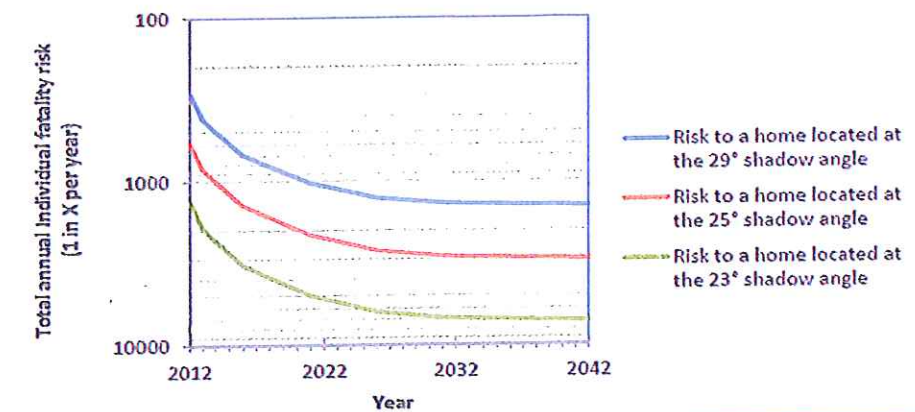
Geotechnical Information

- The Institute of Geological and Nuclear Sciences (GNS) has completed studies of rock roll
- This GNS study includes maps showing where there is heightened AIFR due to rock roll.
- GNS has produced AIFR estimates for multiple scenarios, including a conservative one (occupancy 24 hours per day, multiplication of known boulders by a factor of 1.2), and a less conservative one (occupancy 16 hours per day, residents are not in their homes during aftershocks).
- GNS estimates uncertainties in their AIFR modelling at about an order of magnitude (i.e. 1 in 1,000 may in fact be 1 in 100, or 1 in 10,000).
- It is expected that rock roll risk will decrease over time, as seismic activity reduces (this may change in the event of a further significant and local seismic event).

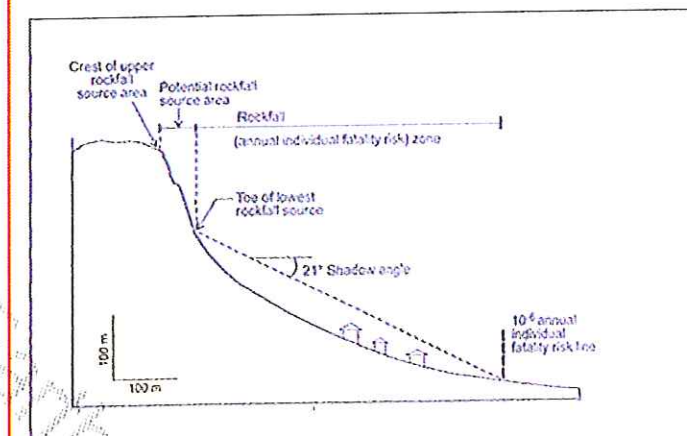
9. Considerations for rock roll mitigation options:

- **Life-safety risk due to rock roll:** will decrease over time.
- **Precedent:** Central Government involvement may set precedent in other parts of New Zealand affected by rock roll.
- **Effectiveness of protection structures:** may not reduce risk to an acceptable level.
- **The cost of reducing life risk:** high relative to other sectors (i.e. transport).
- **The cost of fences or bunds:** in addition to capital and maintenance costs, could include interim assistance to households.
- **Timeliness of mitigation:** 6-18 months required for protective works (depending on scale of project, number of work sites, procurement methodology and approach to land/access issues).
- **Societal and individual risk tolerance.**
- **Community acceptance of life-safety risks and timeliness of mitigation.**
- **Division of Government and Christchurch City Council roles:** funding, land purchase for fences/bunds, ownership and maintenance.

7. Reduction of annual individual fatality risks due to rock roll in the Port Hills over time



8. Representation of rock roll



10. Risk Parameters

- 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, especially at risk levels of 1 in 10,000 or lower.
- A joint approach with the Christchurch City Council is needed to ensure consistency with approach regarding s124 notices.
- A level of on-the-ground assessment is desirable.

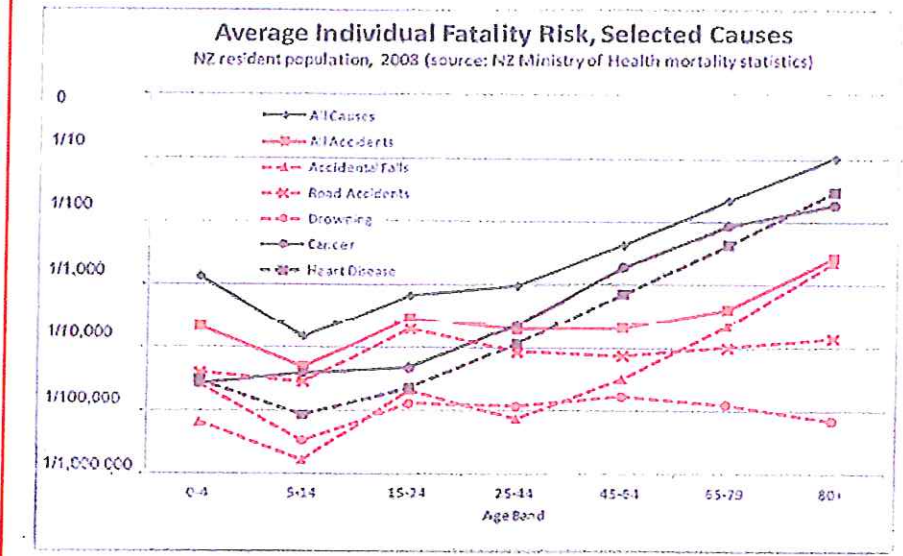
11. Cost-benefit ratio of Port Hills sites, including changes over time

Area	Number of affected properties (value in \$ millions)				Value of houses divided by cost of mitigation - INDICATIVE ONLY (Cost of mitigation in \$ millions)			
	2012		2016		2012		2016	
	Greater than 1 in 1,000 (\$)	Greater than 1 in 10,000 (\$)	Greater than 1 in 1,000 (\$)	Greater than 1 in 10,000 (\$)	Greater than 1 in 1,000 (\$)	Greater than 1 in 10,000 (\$)	Greater than 1 in 1,000 (\$)	Greater than 1 in 10,000 (\$)
Wakefield North	7 (6)	16 (10)	1 (0)	15 (10)	0.7 (8)	1.3 (8)	0 (0)	1.2 (8)
Wakefield South	9 (3)	35 (13)	4 (2)	33 (12)	0.8 (4)	3 (4)	1.5 (1)	2.8 (4)
Avoca Valley Road	2 (2)	32 (16)	0 (0)	27 (13)	0.1 (11)	1.5 (11)	0 (0)	1.2 (11)
Avoca Tussock Farm	0 (0)	3 (3)	0 (0)	0 (0)	0 (0)	1 (3)	0 (0)	0 (0)
Avoca Port Hills Rd	6 (2)	17 (7)	3 (1)	9 (3)	0.7 (3)	1.5 (5)	1.2 (1)	0.4 (8)
Avoca Stonehaven	5 (2)	24 (11)	2 (1)	14 (6)	0.4 (6)	1.3 (9)	0.2 (3)	0.9 (6)
TOTAL	94 (46)	435 (234)	22 (9)	290 (156)				

What the numbers mean: Wakefield North as an example:

- There are 7 buildings with a risk level of greater than 1 in 1,000 in 2012 and they are worth \$6 million.
- There are 16 buildings with a risk level of greater than 1 in 10,000 in 2012 and they are worth \$10 million. This includes the 7 with a risk level of greater than 1 in 1,000.
- The cost benefit ratio of protection for properties with a risk greater than 1 in 1,000 in 2012 is 0.7. This protection would cost \$8 million.
- The cost benefit ratio of protection for properties with a risk greater than 1 in 10,000 in 2012 is 1.3. This protection would cost \$8 million.

12. Annual Individual Fatality Risks in New Zealand



13. Viewpoints of the Christchurch City Council

Legislative Framework

Section 124 of the Building Act allows a territorial authority to prohibit access to a "dangerous" building based on risk, the possibility of land/building collapse, and the potential to cause injury.

Where it is reasonable to do so, a territorial authority may issue a **building consent** even if the land upon is subject to a **natural hazard**. However, a **hazard notice** (under section 72 of the Building Act) must be registered on the certificate of title, which also appears on Land Information Memoranda.

Christchurch City Council Application of these Provisions

To remove a section 124 notice, the Council must be satisfied that risks have been reduced sufficiently, and protection is appropriately designed and built; Christchurch City Council indicates this is most likely in the case that bunds are used, as questions remain about the effectiveness of fences.

Where a rock roll protection system allows for the removal of section 124 notices, it is likely that a **hazard notice** will not be issued.

Restrictions on building consents and subdivisions are likely until risks associated with rock roll have reduced sufficiently.

14. Rock Roll - Breakdown of Figures

Annual Individual Fatality Risks	Number of properties	Value of properties (\$m)	Number of properties with s124 notices	Value of those properties with s124 notices (\$m)
Risks greater than 1 in 1,000	94	\$54	54	\$31
Risks greater than 1 in 10,000 (includes greater than 1 in 1,000)	435	\$234	214	\$122
Risks less than 1 in 10,000	381	\$175	54	\$22

15. Going Forward

- Finalised figures to be provided.
- Cost sharing with Christchurch City Council to be discussed; typically local government takes responsibility for natural hazard mitigation.
- Confirmation needed that Christchurch City Council will remove section 124 Building Act notices.
- Rapaki Bay in the Port Hills is affected by rock roll:
 - This is Maori Reserve Land, and multiply-owned Maori land
 - Runanga has suggested a like-for-like 'land swap' with other Reserve Land - may require a change to the Christchurch City Council District Plan.

ROCK ROLL SCENARIOS – NOT GOVERNMENT POLICY ; 14 JUNE 2012

Purpose: This A3 sets out rock roll scenarios to inform discussions between the Minister for the Canterbury Earthquake Recovery Authority and the Christchurch City Council Mayor regarding the Port Hills. 4 broad scenarios are developed, with specific scenarios relating to whether the desired risk level is met through a mix of protection works (e.g. bunds) and a voluntary offer, or through use of a voluntary offer alone.

Requirements: The approach chosen must result in (geotechnically-related) section 124 notices that are associated with rock roll being managed within a reasonable timeframe and through a reasonable process. The approach must also be promulgated as quickly and clearly as it possible. Some caveats (eg. fences will be built conditional on detailed design) are acceptable. It also must reduce as much as practicable residual risk on any party. Removing s124 notices remains a Christchurch City Council decision.

GENERAL SCENARIO	1. Manage to a risk level of 1 in 1,000 based on 2012 seismicity (94 properties)		2. Manage to a risk level of 1 in 10,000 based on 2012 seismicity (435 properties)		3. Manage to a risk level of 1 in 1,000 based on 2016 seismicity (22 properties)		4. Manage to a risk level of 1 in 10,000 based on 2016 seismicity (290 properties)	
	<i>Rationale</i>	<ul style="list-style-type: none"> Focus effort on those most at risk, recognising that risks for those not covered will reduce over time. Reduce risk of expenditure with an associated low level of safety improvement. 		<ul style="list-style-type: none"> Extend response to a broader group Risk level similar to risk of road accident death Provide community with greater assurance and stability (though some may feel this is an over-reaction). 		<ul style="list-style-type: none"> Focus effort on those with the worst long-term risks Reduce risk of expenditure with an associated low level of safety improvement relative to scenario 1A and B By the time fences/bunds can be put in place risks are likely to have reduced 		<ul style="list-style-type: none"> Focus effort on those with long-term risk – to bring risk to the same level as road death Reduce risk of expenditure with an associated low level of safety improvement relative to scenario 2A and 2B Recognise that by the time fences/bunds can be put in place risks are likely to have reduced
<i>Variant</i>	<ul style="list-style-type: none"> Provide property owners whose properties lie between 1 in 1,000 and 1 in 10,000 an option to receive financial assistance with accomodation costs for 2 years if they wish not to return to their house immediately 				<ul style="list-style-type: none"> Provide property owners whose properties lie between 1 in 1,000 and 1 in 10,000 an option to receive financial assistance with if they wish not to return to their house immediately 			
<i>Specific Scenario</i>	1A. Protect and vol. offer	1B. Offer only	2A. Protect and vol. offer	2B. Retreat only	3A. Protect and vol. offer	3B. Offer only	4A. Protect and vol. offer	4B. Offer only
# Properties protected	29	nil	340	nil	15	Nil	181	nil
# Properties retreat	65	94	95	435	7	22	109	290
Overall Cost (\$m)	\$30-40m	\$54m	\$110-180m	\$234m	\$4-8 m	\$9m	\$65-120m	\$156m
	Withheld under section 9(2)(f)(iv)		Withheld under section 9(2)(f)(iv)		Withheld under section 9(2)(f)(iv)		Withheld under section 9(2)(f)(iv)	
	Withheld under section 9(2)(f)(iv)		Withheld under section 9(2)(f)(iv)		Withheld under section 9(2)(f)(iv)		Withheld under section 9(2)(f)(iv)	
<i>Comment</i>	In scenario 1A, there is very little protection work implied, so this could be completed within 12 months.		Would undertake work immediately -- estimated 18 months to complete		In scenario 3A, little protection work is implied, so this could be completed within 12 months.		Would undertake work immediately -- estimated 18 months to complete	

Items common to all scenarios : Can protect important roading through Wakefield North in all scenarios if desirable through construction of a bund ; If protection is to be built, provide all property owners who will be protected with the option of financial assistance until fences are built ; Planned evacuation strategy and assistance with relocation to avoid aftershock risk.

Also Note : In the 1 in 10,000 scenarios (scenarios 2A, 2B, 4A and 4B), the expenditure involved to save one statistical life is at least an order of magnitude (10 times) the expenditure required to save a statistical life in transport.

ROCK ROLL SCENARIOS – NOT GOVERNMENT POLICY - 15 JUNE 2012

Purpose: This A3 sets out rock roll scenarios to inform discussions between the Minister for Canterbury Earthquake Recovery Authority and the Christchurch City Council Mayor regarding the Port Hills. 4 broad scenarios are developed, with specific scenarios relating to whether the desired risk level is met through a mix of protection works (e.g. bunds) and a voluntary offer, or through use of a voluntary offer alone.

Requirements: The approach chosen must result in (geotechnically-related) section 124 notices that are associated with rock roll being managed within a reasonable timeframe and through a reasonable process. The approach must also be promulgated as quickly and clearly as it possible. Some caveats (eg. fences will be built conditional on detailed design) are acceptable. It also must reduce as much as practicable residual risk on any party. Removing s124 notices remains a Christchurch City Council decision.

GENERAL SCENARIO	1. Manage to a risk level of 1 in 1,000 based on 2012 seismicity (105 properties)		2. Manage to a risk level of 1 in 10,000 based on 2012 seismicity (443 properties)		3. Manage to a risk level of 1 in 1,000 based on 2016 seismicity (24 properties)		4. Manage to a risk level of 1 in 10,000 based on 2016 seismicity (318 properties)		
	<i>Rationale</i>	<ul style="list-style-type: none"> Focus effort on those most at risk, recognising that risks for those not covered will reduce over time. Reduce risk of expenditure with an associated low level of safety improvement. 		<ul style="list-style-type: none"> Extend response to a broader group. Risk level similar to risk of road accident death. Provide community with greater assurance and stability. (though some may feel this level of response is an over-reaction). 		<ul style="list-style-type: none"> Focus effort on those with the worst long-term risks. Reduce risk of expenditure with an associated low level of safety improvement relative to scenario 1A and B. By the time fences/bunds can be put in place risks are likely to have reduced. 		<ul style="list-style-type: none"> Focus effort on those with long-term risk – to bring risk to the same level as road death. Reduce risk of expenditure with an associated low level of safety improvement relative to scenario 2A and 2B. Recognise that by the time fences/bunds can be put in place risks are likely to have reduced. 	
<i>Variant</i>	<ul style="list-style-type: none"> Provide property owners whose properties lie between 1 in 1,000 and 1 in 10,000 an option to receive financial assistance with accommodation costs for 2 years if they wish not to return to their house immediately. 				<ul style="list-style-type: none"> Provide property owners whose properties lie between 1 in 1,000 and 1 in 10,000 an option to receive financial assistance if they wish not to return to their house immediately. 				
<i>Specific Scenario</i>	4A. Protect and vol. offer	1B. Offer only	2A. Protect and vol. offer	2B. Offer only	3A. Protect and vol. offer	3B. Offer only	4A. Protect and vol. offer	4B. Offer only	
# Properties protected	17	nil	365	nil	19	nil	209	nil	
# Properties retreat	88	105	78	443	5	24	109	318	
Overall Cost (\$m)	\$43m	\$46m	\$130-140m	\$221m	\$5m	\$9m	\$100-110	\$156m	
Withheld under section 9(2)(f)(iv)		Withheld under section 9(2)(f)(iv)		Withheld under section 9(2)(f)(iv)		Withheld under section 9(2)(f)(iv)		Withheld under section 9(2)(f)(iv)	
Overall cost if assume protect if also protects lifeline	\$52m 54 properties retreated from	\$56m 71 properties retreated from	\$137m 78 properties retreated from	\$202m 345 properties retreated from	\$12m 5 properties retreated from	\$8m 19 properties retreated from	\$107m 96 properties retreated from	\$149m 149 properties retreated from	
Comment	In scenario 1A, there is very little protection work implied, so this could be completed within 12 months.		Would undertake work immediately – estimated 18 months to complete.		In scenario 3A, little protection work is implied, so this could be completed within 12 months.		Would undertake work immediately – estimated 18 months to complete.		

Items common to all scenarios : Can protect important roading through Wakefield North in all scenarios if desirable through construction of a bund; If protection is to be built, provide all property owners who will be protected with the option of financial assistance until bunds/fences are built; Planned evacuation strategy and assistance with relocation to avoid aftershock risk.

Also note : In the 1 in 10,000 scenarios (scenarios 2A, 2B, 4A and 4B), the expenditure involved to save one statistical life is at least an order of magnitude (10 times) the expenditure required to save a statistical life in transport.

Port Hills Discussion: 10 August (Not Government Policy)

Issue 1 : Mitigation for the Rock Roll White Zone

The table below highlights options in terms of mitigation. Engineering advice is that all of the options below will (subject to detailed design) be effective in reducing rock roll risks to an acceptable level. Hundreds of potential protection options exist; it is not feasible to analyse all options.

- Relevant issues are timeliness (accessing land, design, consenting and construction), impact on homeowners, public and residents' perceptions, ongoing management and maintenance responsibilities and funding, as well as benefit-cost considerations.
- Options that involve access or construction on private land are more difficult and likely to be more time consuming, especially if there are multiple private owners involved and / or access or construction is on private land where there is no significant benefit gained from the protective structures.
- Benefit-cost ratios below are somewhat conservative in that there will be benefits not counted in the calculation (vacant and commercial; in some cases some red zoned properties would gain protection). Only those areas that have a benefit cost ratio of greater than one (taking into account the value of properties in the White Zone and those in the Green Zone with s124 notices) are included in Table 1 below.
- A range of issues relate to mitigation. For example, should owner-initiated protection works be an option (some are likely to seek this) and if so through what process? Would some financial contribution be sought from those who would benefit?

Table 1 : Breakdown of areas

Area	Type of protection	Capital cost (\$m)	Total Cost Present Value (\$m)	Properties protected			Value of properties protected (\$m)	Benefit-cost ratio	Protection on private or public land	Cumulative cost of protection/mitigation (no protection = \$135m)
				White	Green with s124	Total				
Horotane (Area 1)	Bund	1.9	2.1	6	0	6	5.2	2.5	Private	\$132m
Bridle Path (Area 2)	Primarily bund, some fence and at source protection	5.3	6.2	31	0	31	13.7	2.2	Private	\$124m
Governors Bay East (Area 3)	Bund	0.9	1	2	0	2	2.1	2.2	Private	\$123m
Heberden (Area 4)	Mix of fence and bund, some at source protection	9.8	12.2	21	6	27	16	1.3	Public (CCC)	\$119m
Avoca Valley (Area 5)	Primarily bund, some fence and at source protection	7.4	8.3	19	0	19	10	1.2	Private	\$118m
Cass Bay (Area 6)	At source protection	0.5	0.5	1	0	1	0.6	1.2	Private	\$118m
Bowenvale (Area 7)	Primarily fence, some at source protection	4.6	5.8	11	0	11	6.5	1.1	Private	\$117m
Total		30.4	36.1	91	6	97	54.1	N/A		N/A

Possible Packages for the 158 White Zone Properties

- Three packages developed reflecting different preferences for mitigation.

Table 2 : Description of Packages

	Scenario 1 : No mitigation	Scenario 2 : Mitigate in areas 1 to 3 above (BCA > 2:1)	Scenario 3 : Mitigate in all areas where benefits outweigh costs
Number of White Zone properties protected	0	39	91
Number of White Zone properties retreated	158	119	67
Cost (this includes green zoned s124s)	\$135m	\$123m	\$117m

- Preference will be influenced by the BCA results above, but also a range of non-monetised (but real) factors such as timeliness of response, precedent-setting, disruption caused through construction phase, risks associated with construction etc. The importance of these non-monetised factors should not be under-estimated.

Port Hills Discussion: 10 August (Not Government Policy)

Issue 2 : Which properties ?

This question determines the scope of properties where a policy response (either protection or retreat) is implied – the “at-risk” group

Since 29 June, intensive exercise to:

- o match the intent of the Council with regard to s124 notices with 29 June zoning decisions, and
- o ensure definitions are consistent with those decisions made on the flat (eg. vacant, commercial, and other properties that would not receive an offer if they were on the flat – eg. Council owned properties are excluded)

Table 3 : Number and value of properties in different categories

	Red		White		Green with geotechnically-related s124 notices		Total
	Number of properties	Capital Value (\$m)	Number of properties	Capital Value (\$m)	Number of properties	Capital Value (\$m)	Number of properties
Rock roll	75	38	158	85	17	12	250
Cliff collapse	192	156	0	0	4	2	196
Total	267	194	158	85	21	14	446

Not included in these figures are:

- o 7 green-zoned cliff collapse properties (most likely baches) in Taylors Mistake Bay where the Council have placed a s124 notice. These have no rating valuation.
- o 5 rock roll properties that the PHGG recommended be rezoned from white to green. The capital value of these is approximately \$2m.

Questions that arise:

1. Do we confirm the definition used for current zoning (worse than 1 in 10,000 in 2016) and essentially think about properties in this risk zone as the at-risk group for whom a policy response is implied?
 - o Relatively few of these properties would reach 1 in 10,000 if the timeframe was extended (additional 20 properties by 2018; a further 9 by 2021). Some of these 29 properties that would reach 1 in 10,000 by 2021 have s124 notices in place
2. Do we add to the group of properties currently zoned as either red or white those who are zoned green but have a geotechnically-related s124 notice in place (as per the table above)?
 - o Note that there are other properties in the green zone where engineers consider there to be some risk; CERA has used a test of there being a geotechnically-related s124 notice in place as being the test for further consideration
 - o Taking a decision to rezone properties with a geotechnically-related s124 notice will place pressure around the 18 landslip properties that are zoned green where there is a geotechnically-related s124 notice in place
3. Do we include in the at-risk definition those 7 cliff collapse properties highlighted above in Taylors Mistake Bay, and do we rezone the 5 rock roll properties highlighted above from white to green?
4. Included in the white zone are some properties where the Council are unlikely to place a s124 notice (ie. the engineers' assessment does not completely align with the GNS mapping exercise). Do we include this group in the at-risk group?

NB. All capital values in the table are rounded. The figures have been drawn from data that has been formally signed off by the Christchurch City Council. Property numbers represent the count of buildings that fall within relevant definitions (residential, not for profits and residential part builds). As such, the general approach is that one building with 3 units is represented as 1 property in the tables above. This is the way in which the data has consistently been treated in the Port Hills but it does imply that the number of offers to property owners will be greater than this amount. Transaction and other costs are not included in the figures; neither are any returns from insurance. Some properties are at risk from both cliff collapse and rock roll; these have been included in the data as cliff collapse properties.

Other Broad Issues

- o Discussion with Council recommended
 - o Timing - complexity of the policy package will affect ability to make full announcements by 17 August
 - o Cost sharing – it has been agreed in principle that all costs associated with rock roll areas will be shared by the Crown and Christchurch City Council; details not yet finalised
- o Paper needs to be prepared for, and agreed by, joint Ministers (this must include agreement of formal criteria for zoning). Work on related matters such as transaction design is well underway, but requires completion and Ministerial consideration. Signals sent around the nature of any review are also important.