

Released by the Minister for Canterbury Earthquake Recovery

5 April 2013

Hon Gerry Brownlee
Minister for Canterbury Earthquake Recovery
Parliament Buildings
WELLINGTON

Dear Minister Brownlee

In response to your letter of the 12th of March, please find attached the following.

- The Port Hills Zoning Review Advisory Group minutes and recommendations that have been updated to provide further reasoning for the zoning recommendations
- The minutes of the Advisory Group's meetings of 19 March and 3 April where the Group reviewed all the properties listed in appendix A and B of your letter.
- A table prepared by the Advisory Group that provides reasons for the zoning status of each of the properties in appendix A and B of your letter.
- An updated set of zoning maps to capture decisions.

As you may be aware the Group reconvened as soon as the secretariat had a chance to extract, from our previous meetings, all the considerations the Group had made for each of the properties in question. This meeting occurred on Tuesday 19 March 2013 and we took the full day to confirm or identify all the reasons for each property listed.

I would like to emphasise that the Group had considered the entire Port Hills area not only those areas covered by the GNS modeling. Even within the areas covered by the modeling a wide range of additional information influenced our decisions. For example:

- a) Field reported land cracking mapping
- b) Ground truthing reports
- c) GNS reports (some very comprehensive)
- d) 3D modeling
- e) Supplementary geotechnical advice requested by the panel at earlier meetings
- f) Model revisions reported to the panel but not included in the maps
- g) Model accuracy guidance from geotechnical experts.

All of these additional sources of information do modify the way in which the modeled risk contours on the maps provided to you should be interpreted. For example:

- Revised Property Earthquake Recovery
- a) Cliff collapse retreat lines are very inaccurate against ground truthing at the ends of the cliff zones—the model does not capture reducing cliff height or steeply sloping ground adequately so careful interpretation is required in these model zones.
 - b) Cliff collapse model results are much better on high and steep cliffs than they are for low cliffs or steeply sloping ground
 - c) Cliff retreat lines do not follow the cliff profile accurately where the cliff propagates into a narrow valley.
 - d) 3D modeling generally underestimates rock roll risk because there are many situations where boulders were mapped well beyond the extremities of the 3D model.
 - e) The 2D model does not always account for specific geographical features in determining risk profiles, as it incorporates area averaging effects that are not always consistent with ground truthing and field observations.
 - f) Man made cliffs are treated the same as natural cliffs by the model but we have both good field evidence and geotechnical advice that man-made cliffs are more stable than natural ones.

These are not an exhaustive list of the considerations the Group had to take into account throughout its work. They are provided to help explain why the reasons for each property zoning decision are, in some cases, necessarily abbreviated.

In addition they show why zoning conclusions may differ markedly from those that could be derived from only considering the 2D map risk profiles.

One matter that was immediately apparent to the Group, from the appendix lists, was that there were many lots that were listed because the risk contours crossed the land boundary. For these properties the criterion applied was the location of the risk line in relation to the main habitable building (dwelling). This is because the risk model assumes occupancy of any spot for 67% of each day. Consequently more than [40%] of the lots in the appendices are explained by this.

Please note that as a result of our deliberations on 19 March the Group has revised its recommendations in respect of a small number of Council properties and vacant sections which were not on your list. These properties are:

- 2 Stronsay Lane
- 10 Reservoir Lane
- 11 Reservoir Lane
- 54 Morgans Valley
- 27 Morgans Valley
- 284R Main Road Redcliffs
- 64 Heberden Avenue

I would be happy to meet with you to brief you further on our response, if you think this would be helpful.

Yours sincerely



Keith Turner
CHAIR
PORT HILLS ADVISORY GROUP

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Port Hills Zoning Review Advisory Group



Date & Time	9.00 am – 5.30 pm Monday 26 November 2012, 8.30am – 7.00pm Tuesday 27 November, 8.30am – 7.00pm Wednesday 28 November, 8.30am – 7.00pm Thursday 29 November, 3.30pm – 5.30pm 11 December, 2.00pm – 4.00pm 17 December, 12.00pm – 1.30pm 19 December 2012 ¹ , 9.00am – 7.00pm 19 March 2013, 7.00pm– 8.00pm 4 April 2013		
Location	CERA Offices, Christchurch		
Meeting	<table border="0"> <tr> <td style="vertical-align: top;"> Advisory Group: <ul style="list-style-type: none"> - Dr Keith Turner – Independent Chair - Diane Turner – Deputy Chief Executive, Recovery Strategy, Planning and Policy, CERA - Kevin Locke – General Manager, Capital Programme, CCC - David Jennings – Independent Geotechnical Engineer - Patricia Noble – Senior Legal Advisor, CERA </td> <td style="vertical-align: top;"> Attendees: <ul style="list-style-type: none"> - Dr Jan Kupec – CERA - John Scott – CERA - Chris Massey – GNS Science - Don Macfarlane – CCC/PHGG - Ethan Stetson – CCC - John WA Scott – CERA - [redacted] – CERA - [redacted] CERA - [redacted] – CCC/PHGG - Bronwyn Arthur - CERA² - David Corlett –CERA³ - Katrinka Good –CERA </td> </tr> </table>	Advisory Group: <ul style="list-style-type: none"> - Dr Keith Turner – Independent Chair - Diane Turner – Deputy Chief Executive, Recovery Strategy, Planning and Policy, CERA - Kevin Locke – General Manager, Capital Programme, CCC - David Jennings – Independent Geotechnical Engineer - Patricia Noble – Senior Legal Advisor, CERA 	Attendees: <ul style="list-style-type: none"> - Dr Jan Kupec – CERA - John Scott – CERA - Chris Massey – GNS Science - Don Macfarlane – CCC/PHGG - Ethan Stetson – CCC - John WA Scott – CERA - [redacted] – CERA - [redacted] CERA - [redacted] – CCC/PHGG - Bronwyn Arthur - CERA² - David Corlett –CERA³ - Katrinka Good –CERA
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Background Papers	<ul style="list-style-type: none"> ▪ Terms of Reference for the Port Hills Zoning Review Advisory Group ▪ Overview map of Port Hills showing review requests ▪ Cabinet Paper and Recommendations - Port Hills Zoning Review Framework October 2012 ▪ Cabinet Minute - Port Hills Zoning Review Framework October 2012 ▪ Joint Ministers Paper - Rezoning Lucas Lane October 2012 ▪ Joint Ministers Paper - Rezoning White Zone Rock Roll Properties in the Port Hills August 2012 ▪ Joint Ministers Paper - Rezoning properties in Horotane Valley and Bridle Path Road September 2012 ▪ Briefing Note - Mitigation Measures for Horotane Valley and Bridle Path Road August 2012 ▪ Briefing Note - White Zone Rock Roll Properties - Zoning 		

¹ Kevin Locke was not in attendance for the 19 December meeting and attended the 19 March 2013 meeting until 12 noon.

² Bronwyn Arthur attended only the 19 March 2013 meeting, from 9.00-9.10am.

³ David Corlett and Katrinka Good only attended the 3 April meeting of the Group.

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Geotechnical Data

Considerations August 2012

- Briefing Note - Process and Timeline Going Forwards on the Port Hills July 2012
- Joint Ministers Paper - Rezoning in the Port Hills June 2012
- Briefing Note - Cliff Collapse in the Port Hills June 2012
- Joint Ministers Paper - Rezoning Some White Zone Properties in the Port Hills Green May 2012
- Briefing Note - Initial Considerations Following Receipt of Geotechnical Reports in the Port Hills May 2012
- Briefing Note - Port Hills White Zone - Update January 2012
- Briefing Note - Port Hills White Zone - Indicative Timeline January 2012
- Cabinet Minute and Paper - Port Hills White Zone: Some Further Green Zoning December 2011
- Briefing Note - Initial zoning of white residential land in the Port Hills November 2011
- Cabinet Minute and Paper - Canterbury Earthquake Recovery: Rezoning of White (Unzoned) Non-Residential Land November 2011
- Briefing Note - Port Hills White Zone Update and Decision Process October 2011
- General legal advice tabled at 19 March meeting
- Joint Ministers Paper - Decisions on Canterbury Land - Green Zones for Banks Peninsula October 2011
- Joint Ministers Paper - Initial Green Zones for the Port Hills September 2011
- Cabinet Paper - Land Damage from the Canterbury Earthquakes June 2011
- All zoning application forms and additional information provided by property owners requesting a zoning review

- Institute of Geological and Nuclear Sciences (GNS Science) reports:
 - Canterbury Earthquakes 2010/2011 Port Hills Slope Stability: Geomorphology mapping for rockfall risk assessment
 - Canterbury Earthquakes 2010/11 Port Hills Slope Stability: Principles and criteria for the assessment of risk from slope instability in the Port Hills, Christchurch
 - Canterbury Earthquakes 2010/11 Port Hills Slope Stability: Pilot study for assessing life-safety risk from cliff collapse
 - Canterbury Earthquakes 2010/11 Port Hills Slope Stability: Life-safety risk from cliff collapse in the Port Hills
 - Canterbury Earthquakes 2010/11 Port Hills Slope Stability: Additional assessment of the life-safety risk from rockfalls (boulder rolls) GNS Consultancy Report 2013/214 September 2012 FINAL
 - Canterbury Earthquakes 2010/11 Port Hills Slope Stability: Pilot

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	<p>study for assessing life-safety risk from rockfalls (boulder roll)</p> <ul style="list-style-type: none"> - Canterbury Earthquakes 2010/11 Port Hills Slope Stability: Life-safety risk from rockfalls (boulder roll) in the Port Hills ▪ GNS summary brochure: Understanding life safety risk concepts for rockfall and cliff collapse in the Port Hills ▪ GNS summary brochure: Understanding life safety risk concepts for rockfall and cliff collapse in the Port Hills ▪ GNS summary brochure: Life-safety risk from rockfall on the Port Hills ▪ Field mapping of land cracking by Port Hills Geotechnical Group and GNS Science ▪ Christchurch City Council - Rockfall ground truthing reports for individual sites ▪ Canterbury Earthquake Recovery Authority - Geovert Port Hills 3D rockfall modelling report ▪ Aurecon GIS map system for CERA zoning based on data sourced from GNS Science, the Port Hills Geotechnical Group (PHGG) and 3D Geovert rock roll model information for the Port Hills as at 26 November 2012 ▪ GNS rockfall risk model revisions reported to the Panel and included in the GIS viewer ▪ Guidance from geotechnical experts on GNS risk and Geovert 3D rockfall models accuracy and limitations ▪ Supplementary geotechnical advice requested by the Panel from geotechnical experts at GNS Science, Christchurch City Council, PHGG and CERA
<p>PHZRAG objectives</p>	<ol style="list-style-type: none"> 1. Consider all applications from property owners in the former Port Hills White Zone who wish to have their zoning reassessed. 2. Make recommendations to the Minister for Canterbury Earthquake Recovery for changes where it is found that in the judgement of the PHZRAG (the Group): <ol style="list-style-type: none"> a. The zoning of a property is inconsistent with the criteria agreed by Cabinet; OR b. There are anomalies in the zoning of a property because: <ol style="list-style-type: none"> i. The boundary lines have not been drawn sensibly; and/or ii. The green zoning of an individual property, or a small number of properties, would result in clearly not viable infrastructure servicing costs. (This would typically be because such properties are serviced by infrastructure wholly or partly in a red zone, or the main purpose of the infrastructure is to service properties in a red zone)

Minister for Canterbury Earthquake Recovery
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Port Hills Zoning Review Advisory Group



Revised Minutes for Canterbury Earthquake Recovery

Subject	ACTION / Issues
<p>Introduction</p>	<ol style="list-style-type: none"> 1. The purpose of the Group is to check that: <ul style="list-style-type: none"> • The red/green zoning criteria have been consistently applied; and • Boundary lines have been drawn sensibly (in accordance with the criteria taking into account existing boundaries). 2. The Group must reach a joint recommendation; Dr Keith Turner (Chair) has a casting vote if required. 3. The Group will report its findings to the Minister for Canterbury Earthquake Recovery. <p>NOTE: These Minutes identify individual properties by reference to maps which also show risk lines derived from GNS Science studies on rock roll and cliff collapse modelling.</p> <p>It is important to recognise that the Group considered information from multiple sources as listed above when forming its recommendations. This was necessary because:</p> <ul style="list-style-type: none"> • The Group considered the entire Port Hills area (defined as 75km² of elevated land located from Westmorland to Sumner, as well as Lyttelton to Diamond Harbour), not only the areas covered by the GNS Science life safety risk modelling; and • For some properties within the areas modelled by GNS Science, due to complex geology and topography, and limitations in the GNS model, the Group considered other sources of information and expert advice in order to gain a more accurate picture of the true level of risk exposure.
<p>Background – Policy</p>	<p>Overview of the policy framework for zoning and issues pertaining to the Port Hills. Please find the Terms of Reference for the Group attached. (Appendix 1)</p> <p><i>Presentation provided by:</i></p> <ul style="list-style-type: none"> - John WA Scott, Principal Policy Advisor, CERA

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<p>Background – Geotechnical Data</p>	<p>Overview of the background and methodology used in the Institute of Geological and Nuclear Sciences' (GNS Science) reports, the Port Hills Geotechnical Group's (PHGG) work, Geovert 3D rock roll modelling and geotechnical assessments, which informed the Government's zoning decisions. Summary data was available for each area and was discussed.</p> <p>GNS Science's life risk, rock roll and cliff collapse studies and associated models have been independently peer reviewed by internationally-recognised experts Tony Talg, Laurie Richards and Fred Baynes. GNS Science's normal internal review processes have been followed.</p> <p><i>Presentations provided by:</i></p> <ul style="list-style-type: none"> - Dr Chris Massey, GNS Science - Don Macfarlane, PHGG/ Christchurch City Council (CCC) - Dr Jan Kupec, Chief Geotechnical Advisor, CERA
<p>Background – Infrastructure Considerations</p>	<p>CCC has not identified any areas where the green zoning of an individual property, or a small number of properties, would result in clearly not viable infrastructure servicing costs (comprising the three waters and the roading system).</p> <p><i>Presentation provided by:</i></p> <ul style="list-style-type: none"> - John WA Scott, Principal Policy Advisor, CERA
<p>Site visits</p>	<p>Prior to beginning the detailed assessment of all applications for review, the Group made site visits to a range of green zone and red zone areas representative of the areas under review. This enabled the Group to understand through field observation the geotechnical factors affecting zoned and review properties, and included the majority of areas where the available data indicated that a possible change in zoning should be given careful consideration. Following the review, the Group undertook a second round of site visits to most areas, to confirm that field conditions matched the Group's recommendations.</p>
<p>General Observations</p>	<p>Through discussions with GNS Science and PHGG representatives, the Group gained an understanding of how the GNS Science studies assessed future Annual Individual Fatality Risk (AIFR) in the Port Hills based on seismicity; weather; geological and topographic conditions; boulder roll and cliff collapse data collected between 2010 and 2012; and ground truthing by the PHGG. [GNS Science in most cases adjusted its life-risk models on the basis of this ground truthing] GNS Science reports have been peer reviewed by independent, internationally-recognised geotechnical and life-risk experts.</p> <p>The Group accepted the GNS Science studies on life risk for rock roll, cliff</p>

Research Centre for Canterbury Earthquake Recovery

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	<p>collapse and debris inundation as the primary geotechnical resource to support its review of zoning decisions but emphasised that other sources of information (as listed in these Minutes) were also used.</p> <p>The Group therefore also agreed to consider new geotechnical information furnished by GNS Science, or where relevant, advice and information derived from the PHGG, CCC and other experts, and results from the Geovert 3D (3D) rock roll study.</p> <p>The Group noted some limitations in the GNS Science model, which underscored the need to exercise judgement and in some cases seek new expert advice in forming zoning recommendations:</p> <ul style="list-style-type: none"> • The GNS Science model related to the use of suburb-wide assessments to predict rock roll. While generally appropriate, the GNS Science model may locally over or understate life risk for particular properties, due to localised effects that were averaged out by the area-wide models. • GNS Science's cliff-collapse studies have not assessed cliffs less than 10 metres in height or at angles of less than 45 degrees, man-made cliffs in areas without pre-existing slopes, slopes that were not formerly coastal cliffs, or soil cliffs. • GNS Science' assessment of life risk on cliff tops has been based on observations from recent earthquakes, and the application of these observations to other geologically and topographically similar slopes in the Port Hills. • In some areas, GNS Science reports, PHGG reports and the 3D model have under predicted boulder run out distances and/or bounce heights. This is due to site-specific variations in some areas, such as the shape of slopes, the size/shape of boulders, and the nature of the materials and vegetation along the rockfall paths. • It was noted for the Group that the 3D model was commissioned by CERA in order to provide a separate report based on a different methodology from GNS Science models and PHGG reports. This 3D report was intended to serve as a counterpoint and secondary resource. It is comparable to preliminary design-level data, and was not internationally peer reviewed. In some cases there were marked differences between the GNS Science and 3D model results; the Group relied primarily on the GNS Science results in these cases. • In some instances the GNS Science model may have overstated the risk to life from cliffs where the cliffs modelled are on the boundary of the acceptance criteria used, i.e. just over 10 metres in height or just over 45 degrees in slope angle. • In some areas the GNS Science model has boundary or edge effects, where risks at the outside extent of rock roll or cliff collapse-affected areas may be over or understated. • As part of initial zoning work, CERA and CCC commissioned
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	<p>safety risk line and applied a reasonableness test to achieve a sensible outcome.</p> <ul style="list-style-type: none"> • The Group agreed that a rock roll-affected property zoned for residential use would typically be recommended for red zoning if the dwelling was entirely within or substantially intersected by the 1 in 10,000 2016 AIFR line as defined by GNS Science (67% occupancy model with the effect of aftershocks removed). • Commercial properties where buildings were within or substantially intersected by the 1 in 10,000 2016 AIFR line typically have been recommended for red zoning. • Properties that are zoned rural under the CCC's City Plan and the Banks Peninsula District Plan are generally recommended for green zoning. Rural properties have been recommended for red zoning where they are included in the GNS Science rock roll or cliff collapse models, are part of the residential settlement pattern for the area, have met the red zoning criteria, and the Group has applied its guiding considerations in a consistent manner. • All Crown and CCC owned land be recommended for green zoning. • Where properties did not strictly meet the red zoning criteria, but the intent of the criteria was met, namely exposure to high levels of life safety risk, the Group has recommended that these properties be zoned red. <p>The Group understood that the zoning review Cabinet Minute identified that area-wide engineering solutions for rock roll mitigation were judged not to be desirable due to uncertainty, disruption, timeliness and cost-effectiveness.</p> <p>The Group noted that a considerable amount of work has taken place to evaluate the feasibility of area-wide rock roll mitigation, as part of the zoning decision-making process. The Group received expert advice that rock roll mitigation could include "at source" treatment (primary mitigation), mid-path mitigation through fences and bunds (secondary mitigation), and dwelling design and vegetation measures, such as the planting of forests between rockfall sources and dwellings (tertiary mitigation). In the case of the Port Hills, such options must be able to account for vertical and horizontal acceleration caused by earthquakes leading to significant boulder flux (i.e. multiple boulder strikes in the same location within a short space of time) in many areas. It was also noted that tertiary mitigation in the form of forests is not a permanent solution, as trees need to be actively managed, and may be lost to fire or harvested at any time.</p> <p>The Group did not consider options for either area-wide or individual mitigation measures in its decision-making. The Group understood that in some cases property owners may be interested in constructing individual mitigation solutions. This is a course of action they can pursue with CCC.</p>
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Canterbury Earthquake Recovery Authority

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	<p>The Group was advised that the Government has decided to remove a hazard posing an immediate life risk to properties on Lucas Lane, and that the properties affected have been zoned green.</p>
<p>Review Applications</p>	<p>All information supplied by property owners who applied to have their zoning reviewed was read and considered by the Group.</p> <p>Within each of the areas, as set out below, each of the review applications was considered. As a general rule, the Group considered the area-wide geotechnical features and risks first, before considering how they impacted on each specific review application property. The Group was acutely aware that the review was very important to each applicant, and applied itself to the review task with considerable care to ensure all factors were considered in making its recommendations.</p>
<p>Explanation of terms</p>	<p>The Group agreed that it would be useful to include in the Minutes an explanation of the terms 'boundary effect', 'benching effect'/the presence of roads and 'diminished rock source'.</p> <p>The Group agreed that the following explanations would be useful.</p> <ul style="list-style-type: none"> • "Boundary effect: the GNS model becomes less certain at the edges of the modelled area." • "Benching effect: presence of a road: in most circumstances the presence of flat areas such as road carriageways and building platforms tends to reduce the rockfall risk for properties located below the 'bench'." • "Diminished rockfall source: one of a number of technical terms used in the GNS report which relate to the ability of the rockfall source to generate more or fewer rocks. A diminished rock source would be expected to generate fewer rocks than the neighbouring rock sources."

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<p>Findings</p>	
<p>Area 1 Whitewash Head/ Scarborough Maps 26 and 27</p>	<p>A zoning review was requested for the following properties in this area:</p> <ul style="list-style-type: none"> • withheld under section 9(2)(a) • • • <p>The Group reviewed the key geotechnical issues for Whitewash Head/ Scarborough, which showed that:</p> <ul style="list-style-type: none"> • The area is exposed to cliff collapse and land damage risks, particularly on the north eastern cliff, which has a complex geology of interlayered basaltic lava and other material of volcanic origin. Cliff height is generally between 100m to 120m in this section of Whitewash Head. Approximately 450m of the cliff side had failed, up to 17m back from the original edge, during the recent earthquakes and aftershocks, resulting in the loss of an estimated 150,000m³ of cliff material. Significant ground displacement (mass movement) towards the new cliff line has been observed, as evidenced by ground cracking, generally located within 30m to 40m of the cliff line. The cliff is expected to retreat in portions, but large amounts have been known to collapse at one time, beyond the first line of cracking. • Based on the available geotechnical data, the Group considered that the properties in this area have the potential for immediate cliff collapse with an associated risk to life. • The south eastern cliff (vicinity of Tirohanga Lane and further south) is subject to a different topography and geology, and is not as prone to failure. There has been only minor loss at the cliff top. Based on the available geotechnical data, the Group observed that the properties in this area are set back from the cliff edge, and also that there is no immediate elevated risk to life on these properties. • In other green zone areas, some cliff collapse and land cracking was observed. The land damage in these areas does not have an associated elevated risk to life. • The western side of Whitewash Head is subject to localised rock roll. There is no reported geotechnical evidence demonstrating an elevated risk to life. <p>RECOMMENDATIONS:</p> <ol style="list-style-type: none"> 1. THAT 25A Taylor's Mistake Road be rezoned from green to red

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	<p>Reason for Decision:</p> <p>25A Taylors Mistake Road has the potential for immediate cliff collapse and this carries an immediate risk to life.</p> <p>2. THAT no other changes be made to zoning in Whitewash Head/ Scarborough</p> <p>Reasons for Decision:</p> <p>For all other properties in the red zone, the geotechnical data shows that there is the potential for immediate cliff collapse with associated risk to life.</p> <p>For all other properties currently zoned green, the geotechnical data shows that they meet green zone criteria, as there is no reported evidence of land damage with an associated risk to life.</p>
<p>Area 2 Clifton (Peacocks Gallop – Shag Rock Reserve) Map 19</p>	<p>A zoning review was requested for the following properties in this area:</p> <ul style="list-style-type: none"> • • • withheld under section 9(2)(a) • • • • • • • <p>The Group reviewed the key geotechnical issues for Clifton, which showed that:</p> <ul style="list-style-type: none"> • The area is exposed to cliff collapse and land damage risks. • The cliff in this area has a complex geology of interlayered basaltic lava and other material of volcanic origin, together with windblown soils. • The cliff height is approximately 70m to 80m over the majority of its 300m length, above the Shag Rock reserve. Approximately 200m of the cliff edge had failed, up to 13m back from the original edge, during the recent earthquakes and aftershocks. Significant cliff collapse debris (talus) was observed at the base of the cliff, and has extended up to 60m away from the cliff bottom. • Significant ground displacement (mass movement) was observed at

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	<p>the eastern and western ends of the cliff, as evidenced by ground cracking, generally located within 30m to 40m of the cliff line. CCC has commissioned GNS Science to investigate these two mass movement areas as a matter of priority, as part of the CCC's responsibility to manage natural hazards.</p> <ul style="list-style-type: none"> Cliff top properties are exposed to immediate cliff collapse and mass movement, with associated risks to life. Properties at the base of the cliff are exposed to debris inundation with associated elevated risks to life. <p>RECOMMENDATIONS:</p> <ol style="list-style-type: none"> THAT 4 The Spur be rezoned from green to red <p>Reason for Decision:</p> <p>There is the potential for immediate cliff collapse at this property, and this carries an immediate risk to life.</p> <ol style="list-style-type: none"> THAT 284R Main Road Redcliffs be rezoned from red to green <p>Reason for Decision:</p> <p>The property at 284R Main Road Redcliffs is CCC owned.</p> <ol style="list-style-type: none"> THAT no other changes be made to zoning in Clifton (Peacocks Gallop- Shag Rock Reserve) <p>Reasons for Decision:</p> <p>For all other properties in the red zone, the geotechnical data shows that there is the potential for immediate cliff collapse and land slip with associated risk to life. Of note, GNS has also advised that the eastern mass movement area around the intersection of Kinsey and Clifton Terraces had moved approximately 1m over three earthquake events.</p> <p>For all other properties currently zoned green, the geotechnical data shows that they meet green zone criteria, as there is no reported evidence of land damage with an associated risk to life.</p>
<p>Area 3 Richmond Hill Map 20</p>	<p>A zoning review was requested for the following properties in this area:</p> <ul style="list-style-type: none"> withheld under section 9(2)(a)

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The Group reviewed the key geotechnical issues for **Richmond Hill**, which showed that:

- The area at the top of the cliff (Richmond Hill Road) is exposed to cliff collapse and land damage risks.
- Cliff top properties are exposed to immediate cliff collapse and mass movement, with associated risks to life.
- The cliffs in this area have a complex geology of interlayered basaltic lava and other material of volcanic origin, with cliff collapse debris (talus) at the base of cliffs.
- The cliff height below Richmond Hill Road is approximately 70m to 80m over the majority of the area. Approximately 150m of the cliff sides had failed, up to 5m back from the original edge, during the recent earthquakes and aftershocks. These cliffs have an extensive zone of low strength material running through the exposed cliffs at mid-height.
- Significant ground displacement towards the new cliff line was observed, as evidenced by ground cracking. Some movement has been recorded locally since the earthquakes.
- The geology in this area suggests there is the potential for significant cliff failure, and the GNS Science earthquake retreat lines may not represent the full extent of possible failure.
- Ground displacement (mass movement) was observed at the south eastern end of the cliff top, as evidenced by ground cracking, generally located within 30m to 40m of the cliff edge. This mass movement area is under further investigation as a matter of priority by CCC/GNS Science.

RECOMMENDATION:

1. **THAT** no changes be made to zoning in Richmond Hill

Reasons for Decision:

For all properties in the red zone, the geotechnical data shows that there is the potential for immediate cliff collapse and land slip with associated risk to life.

For all properties currently zoned green, the geotechnical data and expert advice shows that they meet green zone criteria, and the Group observed that there is no reported evidence of land damage with an associated risk to life.

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	<p>Reason for Decision:</p> <p>124A Main Road has the potential for immediate debris inundation from cliff collapse, and carries an immediate risk to life.</p> <p>2. THAT no other changes be made to zoning in Redcliffs</p> <p>Reasons for Decision:</p> <p>For all other properties in the red zone, the geotechnical data shows that there is the potential for immediate cliff collapse and land slip with associated risk to life.</p> <p>For all other properties currently zoned green, the geotechnical data shows that they meet green zone criteria, as there is no reported evidence of land damage with an associated risk to life.</p>
<p>Area 5 Avoca Valley, Hillsborough Maps 6 and 7</p>	<p>A zoning review was requested for the following properties in this area:</p> <ul style="list-style-type: none"> • • • • • withheld under section 9(2)(a) • • • • • • • • • <p>The Group reviewed the key geotechnical issues for Avoca Valley, which showed that:</p> <ul style="list-style-type: none"> • The area is exposed to rock roll risks. • There are several continuous moderately sized rock bluffs running along the ridge line on the western edge of the valley, which decrease in size and continuity near the northern end of the valley. • GNS Science mapped approximately 250 boulder falls in the western side of this valley, predominately triggered by the 22 February 2011 event. There were likely more boulders that fell, but it was not possible to systematically record all of these due to life risks associated with collecting this data. A significant percentage of these

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	<p>boulders rolled down to the residential properties near the base of the valley.</p> <ul style="list-style-type: none"> At the northern end of the valley, there are smaller sized rock bluffs, and some local topographical features (including an old loess quarry) that may offer limited protection from rock roll. <p>Other points of note:</p> <ul style="list-style-type: none"> GNS Science advised that its rock roll risk model overstates the risk to properties on the north eastern side of Avoca Valley Road. This is due to the benching effect of the road and the reduction in slope gradient, which means that the risk level decreases rapidly. While properties in this location are touched by the Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 line, expert advice confirmed that the GNS risk line overstates the risk to properties in this specific area. <p>RECOMMENDATIONS:</p> <ol style="list-style-type: none"> THAT 275 Port Hills Road, and 2, 4A, 4B and 6 Avoca Valley Road be rezoned from green to red <p>Reasons for Decision:</p> <p>Following a close examination of the GNS Science rock roll model, it was determined that the dwellings at 4A, 4B and 6 Avoca Valley Road are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016.</p> <p>Due to inconsistency in the GNS Science model for this location, and the Group's mandate to ensure that zoning boundary lines are drawn sensibly, 2 Avoca Valley Road and 275 Main Road met the criteria to be zoned red.</p> <ol style="list-style-type: none"> THAT 301 and 311 Port Hills Road be rezoned from green to red <p>Reason for Decision:</p> <p>These properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <ol style="list-style-type: none"> THAT no other changes be made to zoning in Avoca Valley
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	<p>Reasons for Decision:</p> <p>For all other properties in the red zone, the geotechnical data shows that these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>For all other properties currently zoned green, the GNS Science model shows that they meet green zone criteria, as they are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll.</p>
<p>Area 6 Horotane Valley, Heathcote Map 8</p>	<p>A zoning review was requested for the following properties in this area:</p> <ul style="list-style-type: none"> • • [withheld under section 9(2)(a)] • • <p>The Group reviewed the key geotechnical issues for Horotane Valley, which showed that:</p> <ul style="list-style-type: none"> • The southern end of Horotane Valley Road is exposed to rock-roll risks. • Continuous moderately-sized rock bluffs run along the two ridge lines bordering the valley area. These decrease in size and continuity near the northern end of the valley. Castle Rock is also a rockfall source for this valley. • GNS Science mapped over 2,500 boulder falls in the Horotane and Morgans Valley/Bridle Path Road area, predominately triggered by the 22 February 2011 event. There were likely more boulders that fell, but it was not possible to systematically record all of these due to life risks associated with collecting this data. • A significant percentage of these boulders rolled down to the residential properties near the base of the valley, at the end of Horotane Valley Road. • The GNS Science risk model in this area has recently been modified to account for diminished rockfall sources near the western end of the ridge line, and topographical features below this ridge line, which reduces the risk slightly in this section of the valley. <p>RECOMMENDATIONS:</p> <ol style="list-style-type: none"> 1. THAT 48 Horotane Valley Road be rezoned from red to green

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	<p>Reason for Decision:</p> <p>As a result of further information on the GNS Science rock roll model, it was determined that 48 Horotane Valley Road is exposed to an Annual Individual Fatality Risk of less than 1 in 10,000 in 2016.</p> <p>2. THAT no other changes be made to zoning in Horotane Valley</p> <p>Reasons for Decision:</p> <p>For all other properties in the red zone, the geotechnical data shows that these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>For all other properties currently zoned green, the GNS Science model shows that they meet green zone criteria, as they are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll.</p>
<p>Area 7 Morgans Valley, Heathcote Maps 9 and 10</p>	<p>A zoning review was requested for the following properties in this area:</p> <ul style="list-style-type: none"> • • withheld under section 9(2)(a) • <p>The Group reviewed the key geotechnical issues for Morgans Valley, which showed that:</p> <ul style="list-style-type: none"> • The eastern portion of Morgans Valley is exposed to rock-roll risks. • There are numerous continuous large rock bluffs around the semi-circular shaped ridgeline that borders this valley area. The semi-circular valley profile means that properties at the valley base are surrounded by numerous potential rock fall sources. • GNS Science mapped over 2,500 boulder falls in the Horotane and Morgans Valley/Bottle Path Road area, predominately triggered by the 22 February 2011 event. There were likely more boulders that fell, but it was not possible to systematically record all of these due to life risks associated with collecting this data. • A large percentage of the boulders that fell in this valley appeared to originate from discrete rock bluffs that failed in large volumes, meaning that the size of boulders was larger than the average size recorded elsewhere in the Port Hills. Several homes in this valley were either hit or penetrated by boulders, and there were numerous near misses. • As a result of their large size, these boulders travelled significantly

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	<p>further than the 3D rock roll modelling had predicted (which used a smaller average boulder size to predict run-out distances).</p> <p>RECOMMENDATIONS:</p> <p>1. <i>THAT 24 Bridle Path Road be rezoned from green to red</i></p> <p>Reason for Decision:</p> <p>The dwelling at 24 Bridle Path Road is clipped by the 1 in 10,000 in 2016 Annual Individual Fatality Risk line as defined by GNS Science risk modelling. The Group accepted the expert advice that the model is slightly anomalous in this instance, and the risk to occupants may be higher.</p> <p>2. <i>THAT 54 Morgans Valley and 27 Morgans Valley be rezoned from red to green</i></p> <p>Reasons for Decision:</p> <p>The properties at 27 and 54 Morgans Valley Road are CCC owned.</p> <p>3. <i>THAT no other changes be made to zoning in Morgans Valley</i></p> <p>Reasons for Decision:</p> <p>For all other properties in the red zone, the geotechnical data shows that these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>For all other properties currently zoned green, the GNS Science model shows that they meet green zone criteria, as they are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll.</p>
<p>Area 8 Bridle Path Road, Heathcote Valley Maps 11 and 12</p>	<p>A zoning review was requested for the following properties in this area:</p> <ul style="list-style-type: none"> • • • • • • • • • <p style="text-align: center;">withheld under section 9(2)(a)</p>

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withheld under section 9(2)(a)

The Group reviewed the key geotechnical issues for the **Bridle Path Road** area, which showed that:

- This area is exposed to rock roll risks.
- There are numerous continuous medium-sized rock bluffs running along the ridge line parallel to Bridle Path Road. Some of these rock bluffs (located above Hammerton Lane) are related to historic quarrying activities.
- GNS Science mapped over 2,500 boulder falls in the Horotane and Morgans Valley/Bridle Path Road area, predominately triggered by the 22 February 2011 event. A large percentage of these boulders fell in the Bridle Path Road area. There were likely more boulders that fell, but it was not possible to systematically record all of these due to life risks associated with collecting this data.
- Several homes were hit by boulders, and a number of boulders passed just beside dwellings. Several boulders rolled down to Bridle Path Road itself.
- GNS had revised the boulder roll risk model in select areas of Bridle Path Road to account for a previous anomaly in this area that understated the risk from rock roll.
- Expert advice provided to the Group indicated that the majority of the rock source above 230, 242 and 238 Bridle Path Road was removed by CCC during the Civil Defence Emergency period immediately after the earthquake events as it impacted directly on the road below. The GNS model overstates the risk to these properties.

RECOMMENDATIONS:

1. **THAT** a lot (Lot LDP 403583) associated with 112 Bridle Path Road be rezoned from green to red

Reason for Decision:

The zoning boundary lines for 112 Bridle Path Road had not been drawn sensibly to include all land in the title.

2. **THAT** no other changes be made to zoning in the Bridle Path Road area

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	<p>Reasons for Decision:</p> <p>For all other properties in the red zone, the geotechnical data shows that these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>For all other properties currently zoned green, the GNS Science model shows that they meet green-zone criteria, as they are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll.</p>
<p>Area 9 Lyttelton Maps 31, 32, 33, 34, 35 and 37</p>	<p>A zoning review was requested for the following properties in this area:</p> <ul style="list-style-type: none"> • • • • • • • • <p style="text-align: center;">withheld under section 9(2)(a)</p> <p>The Group reviewed the key geotechnical issues for Lyttelton, which showed that:</p> <ul style="list-style-type: none"> • There are numerous continuous large-sized rock bluffs in the Lyttelton area, and elevated areas are exposed to boulder roll risks. • Lyttelton is exposed to cliff collapse risks in the lower coastal areas, particularly surrounding the Port of Lyttelton. These are believed to be both natural and man-made cliffs. • The topography in the elevated areas is complex, with numerous deeply incised valleys. The GNS Science rock roll model required an extensive amount of PHGG ground truthing and judgment to ensure that the GNS Science model depicted this complex terrain as accurately as possible. • GNS Science mapped about 550 boulder falls in this area, predominately triggered by the 22 February 2011 event, although about 20% of boulder fall occurred on 13 June 2011. There were likely more boulders that fell, but it was not possible to systematically record all of these due to life risks associated with collecting this data. • The GNS Science risk model in this area has recently been modified to more accurately account for the diminished rockfall sources in select elevated locations in Lyttelton, which reduces the risk in these areas (i.e. near Walkers Road, Harmans Road and Gilmour Terrace).

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	<p>RECOMMENDATIONS:</p> <p>1. <i>THAT 46A, 50, 52 and 54 Voelas Road, 10 Harmans Road, and 27, 25, 25A, 25B, 25C, 25D, 25E, 25F, 25K and 25L Walkers Road be rezoned from red to green</i></p> <p>Reason for Decision:</p> <p>As a result of further information on the GNS Science rock roll model, it was determined that these properties are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll.</p> <p>2. <i>THAT 14, 16 and 18 Gilmour Terrace be rezoned from red to green</i></p> <p>Reason for Decision:</p> <p>As a result of further information on the GNS Science rock roll model in the Gilmour Terrace area, it was determined that these properties are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll.</p> <p>3. <i>THAT the property located at 73 Hawkhurst Road (being the portion of Part RS 266 having the area of 0.4046 hectares more or less, contained in certificate of title CB2C/1236) retain its red zoning, and that the balance of the land contained in certificate of title CB2C/1236 remain green zoned contingent on a separate certificate of title being issued for that land (map 34)</i></p> <p>Reason for Decision:</p> <p>The property located at 73 Hawkhurst Road (being the portion of Part RS 266 having the area of 0.4046 hectares more or less, contained in certificate of title CB2C/1236) is exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling. A separation enables an offer to be made for the residential portion on this title.</p> <p>4. <i>THAT 66 Hawkhurst Road be rezoned from red to green</i></p> <p>Reason for Decision:</p> <p>This property is exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>5. <i>THAT 19 College Road be rezoned from red to green</i></p>
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	<p>Reason for Decision:</p> <p>The Group agreed that the risk as shown in GNS Science's risk maps is slightly overstated for this property. Expert advice provided to the Group indicated that this is because the property is at the boundary of the model (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints), and also because the local topography would tend to direct rockfall away from the dwelling. Thus it is judged that the dwelling is exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll.</p> <p>6. THAT 7 Endeavour Place be rezoned from red to green</p> <p>Reason for Decision:</p> <p>Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property due to the presence of gullies to the west and north-east of the property which would tend to divert rockfall away from the property. It is judged that the property is exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll.</p> <p>7. THAT a lot (Lot 1 DP 10943) associated with 33 Brenchley Road be rezoned from green to red</p> <p>Reason for Decision:</p> <p>The zoning boundary lines for 33 Brenchley Road had not been drawn sensibly to include all land in the title.</p> <p>8. THAT the Naval Point Club be rezoned from green to red</p> <p>Reason for Decision:</p> <p>This building is located on Arskine Point, Charlotte Jane Quay. It has the potential for immediate debris inundation from cliff collapse, and carries an immediate risk to life.</p> <p>9. THAT 37 Ross Terrace be rezoned from green to red</p> <p>Reason for Decision:</p> <p>This property is exposed to an Annual Individual Fatality Risk of 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>10. THAT no other changes be made to zoning in Lyttelton</p>
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	<p>Reasons for Decision:</p> <p>For all other properties in the red zone, the geotechnical data shows that there is the potential for immediate cliff collapse with associated risk to life, and/or that these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>For all other properties currently zoned green, the geotechnical data shows that they meet green zone criteria, as there is no reported evidence of land damage with an associated risk to life, and these properties are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>The Group noted that parts of Lyttelton Port area are exposed to the potential for immediate debris inundation from cliff collapse, and carry an associated risk to life. The Group did not make zoning recommendations for anything in the Port area.</p>
<p>Area 10 Rapaki Map 39</p>	<p>No requests were received for a review of the zoning of properties in this area.</p> <p>The Group reviewed the key geotechnical issues for Rapaki area, which showed that:</p> <ul style="list-style-type: none"> • The small residential area zoned Papakāinga in the Banks Peninsula District Plan below and to the southeast of Tamatea (the peak above Rapaki) is exposed to boulder roll risks. • The boulders originate from a large rock outcrop at the top of Tamatea. GNS Science mapped over 300 boulder falls in this area, predominately triggered by the 22 February 2011 event, although approximately 10% were generated during the 13 June 2011 earthquake event. • The average boulder size that was generated from this rock outcrop was significantly larger than the Port Hills average boulder size. As a result, these boulders travelled significantly further than the 3D rock roll modelling had predicted (which used a smaller average boulder size to predict runout distances). • Two houses were hit or penetrated by boulders in Rapaki, and in one case, two large boulders passed completely through a dwelling and travelled some distance downslope. <p>RECOMMENDATIONS:</p> <p>1. THAT 253 and 289 Governors Bay Road, and 9 Omaru Road, be rezoned from green to red</p>

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	<p>Reason for Decision:</p> <p>These properties are zoned Papakāinga in the Banks Peninsula District Plan and are exposed to an Annual Individual Fatality Risk of 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>2. THAT no other changes be made to zoning in the Rapaki area</p> <p>Reasons for Decision:</p> <p>For all other properties in the red zone, the geotechnical data shows that these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>For all other properties currently zoned green, the GNS Science model shows that they meet green zone criteria, as they are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll.</p>
<p>Area 11 Corsair Bay/ Cass Bay Maps 36 and 38</p>	<p>A zoning review was requested for the following properties in this area:</p> <ul style="list-style-type: none"> • withheld under section 9(2)(a) • <p>The Group reviewed the key geotechnical issues for Corsair Bay/Cass Bay area, which showed that:</p> <ul style="list-style-type: none"> • Cass Bay is at the intersection of three valleys; the associated valley ridges generally have non-continuous minor rockfall sources. This area is exposed to rock roll risks. • GNS Science/PHGG have mapped several boulder falls in this area. • The existence of narrow valleys has the potential to focus boulders in specific areas. • The GNS Science risk model in this area has recently been modified to account for diminished rockfall sources in select locations above Mariners Cove, which reduces the risk in these areas. <p>RECOMMENDATIONS:</p> <p>1. THAT 26 Mariners Cove be rezoned from red to green</p> <p>Reason for Decision:</p>

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	<p>As a result of further information on the GNS Science rock roll model, it was determined that this property is exposed to an Annual Individual Fatality Risk of less than 1 in 10,000 in 2016 due to rock roll.</p> <p>2. THAT 21 and 23 Buxtons Road be rezoned from green to red</p> <p>Reason for Decision:</p> <p>These properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>3. THAT no other changes be made to zoning in the Corsair Bay and Cass Bay area</p> <p>Reasons for Decision:</p> <p>For all other properties in the red zone, the geotechnical data shows that these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>For all other properties currently zoned green, the GNS Science model shows that they meet green zone criteria, as they are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll.</p>
<p>Area 12 Governors Bay Maps 40, 41, 42 and 43</p>	<p>A zoning review was requested for the following properties in this area:</p> <ul style="list-style-type: none"> • • withheld under section 9(2)(a) • • <p>The Group reviewed the key geotechnical issues for the Governors Bay area, which showed that</p> <ul style="list-style-type: none"> • Governors Bay is situated at the intersection of a number of valleys. • The higher elevations of this area are exposed to rock roll risks, although many residential buildings are sited on ridge lines. • Rock roll risks also affect some properties at lower elevations. • Small developed areas at lower elevations close to the coast line are exposed to cliff collapse risks. • GNS Science/CCO mapped some boulder falls in this area, but Governors Bay is some distance from recent earthquake event epicentres and so was not shaken as severely as other areas.

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	<p>RECOMMENDATIONS:</p> <p>1. <i>THAT 3 Leading Light Lane, and 41 and 43 The Terrace be rezoned from green to red</i></p> <p>Reason for Decision:</p> <p>These properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>2. <i>THAT 1, 2, 3 and 4 Maori Gardens be rezoned from green to red</i></p> <p>Reason for Decision:</p> <p>These buildings have the potential for immediate debris inundation from cliff collapse, and carry an immediate risk to life.</p> <p>3. <i>THAT 58 Zephyr Terrace be rezoned from green to red</i></p> <p>Reason for Decision:</p> <p>The dwelling on this property is exposed to an Annual Individual Fatality Risk of 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>4. <i>THAT 56 Zephyr Terrace be rezoned from green to red</i></p> <p>Reason for Decision:</p> <p>This property is exposed to an Annual Individual Fatality Risk of 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>5. <i>THAT no other changes be made to zoning in the Governors Bay area</i></p> <p>Reasons for Decision:</p> <p>For all other properties in the red zone, the geotechnical data shows that these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>For all other properties currently zoned green, the GNS Science model shows that they meet green zone criteria, as they are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll, and</p>
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<p>Area 13 Charteris Bay Map 44</p>	<p>there is no reported evidence of land damage with an associated risk to life.</p> <p>A zoning review was requested for the following property in this area:</p> <ul style="list-style-type: none"> withheld under section 9(2)(a) <p>The Group reviewed the key geotechnical issues for the Charteris Bay area, which showed that:</p> <ul style="list-style-type: none"> Charteris Bay is outside the area covered by the GNS Science risk model and 3D model, as there is no Light Detection and Ranging (LIDAR) data for this area. PHGG/CCC advisors have noted that rock outcrops directly above select properties were weakened and fractured during recent earthquakes. As a result, these properties are exposed to significant rock roll hazard. <p>RECOMMENDATIONS:</p> <ol style="list-style-type: none"> <i>THAT 332, 334 and 342 Marine Drive be rezoned from green to red</i> <p>Reasons for Decision:</p> <p>There is a significantly elevated hazard to life on these properties due to rock roll, such that the risk is comparable to red zoned properties within GNS Science-modelled areas. Accordingly, it was considered that this recommendation is consistent with the intent of the red zoning criteria agreed to by Cabinet.</p> <ol style="list-style-type: none"> <i>THAT 336 Marine Drive be rezoned from green to red</i> <p>Reasons for Decision:</p> <p>There is a significantly elevated hazard to life on the property due to rock roll, such that the risk is comparable to red zoned properties within GNS Science-modelled areas. Accordingly, it was considered that this recommendation is consistent with the intent of the red zoning criteria agreed to by Cabinet.</p> <ol style="list-style-type: none"> <i>THAT no other changes be made to zoning in the Charteris Bay area</i> <p>Reason for Decision:</p> <p>For all other properties currently zoned green, they meet green zone criteria, as land damage and any life risk can be addressed on an individual basis.</p>
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Area 14
Heberden
Avenue Area
Maps 23, 24 and
25

A zoning review was requested for the following properties in this area:

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The Group reviewed the key geotechnical issues for the Heberden Avenue area, which showed that:

- Continuous medium and minor sized rock bluffs run along the ridge line above Heberden Avenue.
- North of Awaroa Lane there are also numerous medium-sized cliffs on the eastern side of the road. Properties adjacent to these cliffs are exposed to both cliff collapse and boulder roll risks.
- South of Awaroa Lane, residential dwellings extend into reasonably steep terrain.
- Some properties are below a narrow pine forestry belt, which stops above the Evans Pass Road and Sumnervale Drive area. This has provided some protection for properties downslope, but a significant percentage of boulders penetrated the tree line and went on to the land below.
- Where the tree line was absent, boulders travelled further down slope, suggesting vegetation does provide some mitigating effect on boulder roll risk, albeit not a permanent one.
- GNS Science recorded approximately 400 boulder falls in this area, predominately triggered by the 22 February 2011 and 13 June 2011 earthquake events.
- The cliff collapse areas do not generally extend to the western edge of Heberden Avenue, except near the Colenso, Nayland Street and Wiggins Street intersections.

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	<p>Other points of note:</p> <ul style="list-style-type: none"> The GNS Science risk model in this area has recently been modified to more accurately account for more prevalent rockfall sources in select locations, and longer boulder roll paths than the suburb-wide average in other locations. <p>RECOMMENDATIONS:</p> <p>1. <i>THAT 141 Nayland Street be rezoned from green to red</i></p> <p>Reason for Decision:</p> <p>141 Nayland Street has the potential for immediate debris inundation from cliff collapse, and carries an immediate risk to life.</p> <p>2. <i>THAT 71 Heberden Avenue be rezoned from green to red</i></p> <p>Reasons for Decision:</p> <p>This property is exposed to an Annual Individual Fatality Risk of 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling. 71 Heberden Avenue also has the potential for immediate debris inundation from cliff collapse, and carries an immediate risk to life.</p> <p>3. <i>THAT 48 and 50 Heberden Avenue be rezoned from green to red</i></p> <p>Reason for Decision:</p> <p>For 48 and 50 Heberden Avenue, the geotechnical data shows that the dwellings located on these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>4. <i>THAT 47 Truro Street be rezoned from green to red</i></p> <p>Reason for Decision:</p> <p>The geotechnical data shows that 47 Truro Street is exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>5. <i>THAT 110 and 102 Sumnervale Drive, and 43, 45 and 47 Ocean View Terrace be rezoned from green to red</i></p>
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	<p>Reason for Decision:</p> <p>As a result of further expert advice on the GNS Science rock roll model, it was determined that these dwellings are exposed to an Annual Individual Fatality Risk of 1 in 10,000 in 2016 or greater due to rock roll.</p> <p>6. THAT 27 Ocean View Terrace, and 98, 1/104, 2/104, 106 and 114 Sumnervale Drive be rezoned from green to red</p> <p>Reason for Decision:</p> <p>Further consideration and expert advice indicated that the GNS Science rock roll model for this area may have underestimated the risk for these properties through suburb-wide averaging. The dwellings on these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 in 2016 or greater due to rock roll.</p> <p>7. THAT no other changes be made to zoning in the Heberden Avenue area</p> <p>Reasons for Decision:</p> <p>For all other properties in the red zone, the geotechnical data shows that there is the potential for immediate cliff collapse with associated risk to life, and/or these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>For all other properties currently zoned green, the geotechnical data shows that they meet green zone criteria, as there is no reported evidence of land damage with an associated risk to life, and these properties are exposed to an Annual Individual Fatality Risk of less than 1 in 10,000 due to rock roll as defined by GNS Science risk modelling.</p>
<p>Area 15 Wakefield Avenue North and Nayland Street (North of Arnold Street) Maps 20 and 21</p>	<p>No requests were received for a review of the zoning of properties in this area.</p> <p>The Group reviewed the key geotechnical issues for Wakefield Avenue North and Nayland Street, which showed that:</p> <ul style="list-style-type: none"> • The area at the base of the cliff parallel to Wakefield Avenue and Nayland Street is exposed to debris inundation from cliff collapse. • The cliffs in this area have a complex geology of interlayered basaltic lava and other material of volcanic origin together and cliff collapse debris (talus) at the base of cliffs.

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	<ul style="list-style-type: none"> • The cliff height is approximately 70m to 80m over the majority of the area above Wakefield Avenue but reduces to about half of this at the northern end beside Nayland Street. Approximately 150m of the cliff sides had failed, up to 5m back from the original edge, during the recent earthquakes and aftershocks. These cliffs have an extensive zone of low strength material running through the exposed cliffs at mid-height. • Nayland Street at the north end of Wakefield Avenue and below Richmond Hill is exposed to cliff collapse risks. • The elevated risk zone extends generally to the south side on Nayland Street at its maximum, but reduces in extent to the west as the cliff reduces in height. • Debris that fell from the cliff near Wakefield Avenue ran out approximately 50m on to the level terrain below the cliff. One fatality was recorded in this area (northern end immediately adjacent to the base of the cliff beside Wakefield Avenue) during the 22 February 2011 event due to debris inundation. • The GNS Science cliff collapse model shows that the area immediately adjacent to the base of the cliff is in an elevated risk zone but this reduces quickly to lower risk levels by the eastern side of Wakefield Avenue. <p>RECOMMENDATION:</p> <ol style="list-style-type: none"> 1. <i>THAT no changes be made to zoning in Wakefield Avenue North and Nayland Street.</i> <p>Reasons for Decision:</p> <p>For all properties in the red zone, the geotechnical data shows that there is the potential for immediate cliff collapse and land slip with associated risk to life.</p> <p>For all properties zoned green, the geotechnical data shows that they meet green zone criteria, as there is no reported evidence of land damage with an associated risk to life.</p>
<p>Area 16 Wakefield Avenue South (South of Arnold Street) Maps 21 and 22</p>	<p>A zoning review was requested for the following properties in this area:</p> <ul style="list-style-type: none"> • • withheld under Section 9(2)(a) • •

Resource Management Act 1991
 Canterbury Earthquake Recovery Authority

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Released by the Minister for Canterbury Earthquake Recovery

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withheld under section 9(2)(a)

The Group reviewed the key geotechnical issues for the **Wakefield Avenue South** area, which showed that:

- A continuous large rock bluff runs just below the Sumner Valley ridge in the southern Wakefield Avenue area.
- The north portion of this area has a series of moderately (about 40m high) sized cliffs (the proximity of which to Wakefield Avenue varies at different locations).
- The northern part of this area (between Paisley and Arnold Streets) is exposed to both boulder roll and cliff collapse risks, although the cliffs are smaller in this area than in northern portions of Wakefield Avenue.
- The southern portion of this area (south of Paisley Street) is exposed to boulder roll risks.
- GNS Science mapped approximately 800 boulder falls in this area, predominately triggered by the 22 February 2011 event, although a small percentage of the total boulder fall occurred on 13 June 2011. There were likely more boulders that fell, but it was not possible to systematically record all of these due to life risks associated with collecting this data.

RECOMMENDATIONS

1. **THAT** 122 Wakefield Avenue be rezoned from green to red

Reason for Decision:

The geotechnical data shows that this property is exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.

2. **THAT** 2/110 Wakefield Avenue be rezoned from green to red, and that 1/110 Wakefield Avenue remain green zoned contingent on a fee simple subdivision taking place, having the effect of creating fee simple titles for these two properties, in place of the existing cross-lease titles from 2/110 Wakefield Avenue

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Reasons for Decision:

The geotechnical data shows that the dwelling at 2/110 Wakefield Avenue is exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.

The dwelling located at 1/110 Wakefield Avenue is not exposed to an Annual Individual Fatality Risk of 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling. A fee simple title subdivision is required for the zoning recommendations to be realised.

- 3. **THAT 4 Campbell Street and 2 Denman Street be rezoned from red to green**

Reasons for Decision:

Following detailed consideration, the Group was advised that the GNS Science rock roll model for this area has, on balance, overestimated the risk for these properties from suburb-wide averaging through the benching effect provided by adjacent land and the road. The dwellings on these properties are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll.

- 4. **THAT the property located at 70 Wakefield Avenue (being Lot 6 DP331163, contained in certificate of title 523222) be rezoned from green to red, and that the balance of the land contained in certificate of title 523222 (being Lot 500 DP431936 and Lot 404 DP374322) remain green zoned, contingent on a separate certificate of title being issued for that land**

Reasons for Decision:

The property located at 70 Wakefield Avenue is exposed to an Annual Individual Fatality Risk of 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling.

For the balance of the land contained in certificate of title 523222 (Lot 500 DP431936 and Lot 404 DP374322) there is no reported evidence of land damage with an associated risk to life, and it is not exposed to an Annual Individual Fatality Risk of 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling.

- 5. **THAT 104B Wakefield Avenue and 48 Sumnervale Drive be rezoned from green to red**

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	<p>Reason for Decision:</p> <p>These properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 in 2016 due to rock fall as defined by GNS Science risk modelling.</p> <p>6. THAT no other changes be made to zoning in the Wakefield Avenue South area</p> <p>Reasons for Decision:</p> <p>For all other properties in the red zone, the geotechnical data shows that there is the potential for immediate cliff collapse with associated risk to life, and/or these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>For all other properties currently zoned green, the geotechnical data shows that they meet green zone criteria, as there is no reported evidence of land damage with an associated risk to life, and these properties are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling.</p>
<p>Area 17 Taylors Mistake/ Boulder Bay Maps 28, 29 and 30</p>	<p>No requests were received for a review of the zoning of properties in this area.</p> <p>The Group reviewed the geotechnical issues for Taylors Mistake and Boulder Bay area, which showed that:</p> <ul style="list-style-type: none"> • Areas on or near the shoreline of Taylor Mistake Bay and Boulder Bay are subject to elevated life risk from cliff collapse. • Areas to the north and south of Taylors Mistake Bay are also subject to boulder roll. <p>RECOMMENDATIONS:</p> <p>1. THAT 1, 2, 4, 8, 9 and 10 Boulder Bay be rezoned from green to red</p> <p>Reason for Decision:</p> <p>These structures have the potential for immediate debris inundation from cliff collapse, and carry an immediate risk to life.</p> <p>2. THAT 30, 31, 32 and 33 Taylors Mistake Bay be rezoned from green</p>

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	<p style="text-align: center;"><i>to red</i></p> <p>Reasons for Decision:</p> <p>The geotechnical data shows that these structures are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling. 30 Taylors Mistake Bay is also exposed to the potential for immediate debris inundation from cliff collapse, and carries an immediate risk to life.</p> <p style="text-align: center;">3. THAT 28 Taylors Mistake Bay be rezoned from green to red</p> <p>Reason for Decision:</p> <p>This structure is located on a cliff top, and is exposed to the potential for immediate cliff collapse, and carries an immediate risk to life.</p> <p style="text-align: center;">4. THAT 55, 56, 57, 58, 59, 60, 62, 63, 64, 67, 68 and 69 Taylors Mistake Bay be rezoned from green to red</p> <p>Reason for Decision:</p> <p>These structures are exposed to the potential for immediate debris inundation from cliff collapse, and carry an immediate risk to life.</p> <p style="text-align: center;">5. THAT no other changes be made to zoning in the Taylors Mistake/ Boulder Bay area</p> <p>Reasons for Decision:</p> <p>For all other properties zoned green, the geotechnical data shows that they meet green zone criteria, as there is no reported evidence of land damage with an associated risk to life, and these properties are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling.</p>
<p>Area 18 Ferrymead, St Andrews Hill Road & Quarry Road Map 13</p>	<p>A zoning review was requested for the following properties in this area:</p> <ul style="list-style-type: none"> • • • withheld under section 9(2)(a) • • •

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Resecond by the Minister for Canterbury Earthquake Recovery

The Group reviewed the key geotechnical issues for the **Ferrymead, St Andrews Hill Road and Quarry Road** area, which showed that:

- This area has a complex terrain with a number of small cliffs (in some cases man-made) bordering Main Road, and man-made cliffs around Quarry Road and the CCC reservoir.
- The cliffs comprise rock in some areas, and loess soils in others.
- This area is exposed to cliff collapse risks and has experienced significant land damage; the cliffs bordering Main Road have been modelled by GNS Science, but other cliffs and slopes in this area do not meet the criteria to be included in the model.
- Ground cracking near Main Road is most likely related to the effects of liquefaction.
- The cause of the ground cracking to the west of King Park is related to the effect of earthquakes on the steep loess cliffs that border Quarry Road in this area.

RECOMMENDATIONS:

1. **THAT 62 Main Road** be rezoned from green to red

Reason for Decision:

As defined by GNS Science risk modelling, 62 Main Road has the potential for immediate debris inundation from cliff collapse, and carries an immediate risk to life.

2. **THAT 10 Quarry Road, 2/51A and 51C St Andrews Hill Road** be rezoned from green to red

Reasons for Decision:

Further consideration and expert advice indicated that 10 Quarry Road, and 2/51A and 51C St Andrews Hill Road are exposed to the potential for immediate land damage with an associated risk to life as a result of the earthquakes. Accordingly it was considered that this recommendation is consistent with the intent of the red zoning criteria agreed to by Cabinet.

3. **THAT 39 Mount Pleasant Road** be rezoned from green to red

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	<p>Reason for Decision:</p> <p>As defined by GNS Science risk modelling, 39 Mount Pleasant Road has the potential for immediate cliff collapse, and carries an immediate risk to life.</p> <p>4. THAT no other changes be made to zoning in the Ferrymead, St Andrews Hill Road and Quarry Road area</p> <p>Reasons for Decision:</p> <p>For all other properties in the red zone, the geotechnical data shows that there is the potential for immediate cliff collapse or land slip with associated risk to life.</p> <p>For all other properties currently zoned green, the geotechnical data shows that they meet green zone criteria, as there is no reported evidence of land damage with an associated risk to life.</p>
<p>Area 19 McCormacks Bay, including the Balmoral Hill Area Maps 14, 15 and 16</p>	<p>A zoning review was requested for the following properties in this area:</p> <ul style="list-style-type: none"> • • [withheld under section 9(2)(a)] • • <p>The Group reviewed the key geotechnical issues for the McCormacks Bay Road area, including the Balmoral Hill area, which showed that:</p> <ul style="list-style-type: none"> • The Balmoral Hill area is on a ridge line, or knoll, located between a series of variable height cliffs abutting McCormacks Bay to the west, Main Road to the north and Redcliffs to the east. Access to this area is via Glenstrae Road to the south, and via Balmoral Lane from McCormacks Bay Road. • The cliffs to the west and north vary in height, starting from about 15m. The lower portion of the Redcliffs area is a sea-cut cliff up to 50m in height. • Pockets of medium-sized cliffs border the eastern side of McCormacks Bay Road where material fell on to or beside adjacent houses. Towards the north the cliffs increase in height (between McCormacks Bay Road and Glenstrae Road) and generally more rock debris fell from the higher cliffs. • This area is exposed to cliff collapse risk. The Group agreed that, based on advice received from PHGG and GNS Science, life risk associated with cliff collapse is underestimated in select areas and that the cliffs have shown signs of on-going deterioration.

Passed by the Minister for Canterbury Earthquake Recovery

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RECOMMENDATIONS:

1. **THAT 120A and 120B McCormacks Bay Road be rezoned from green to red**

Reason for Decision:

120A and 120B McCormacks Bay Road have the potential for immediate debris inundation from cliff collapse, and carry an immediate risk to life.

2. **THAT 6 and 8 Balmoral Lane, and 156 and 156A McCormacks Bay Road, be rezoned from green to red**

Reasons for Decision:

The Group agreed that the GNS Science cliff collapse model for this area understates the risk to these dwellings. 156 and 156A McCormacks Bay Road have the potential for immediate debris inundation from cliff collapse, and carry an immediate risk to life. 6 and 8 Balmoral Lane have the potential for immediate cliff collapse, and carry an immediate risk to life. Accordingly, it was considered that this recommendation is consistent with the intent of the red zoning criteria agreed to by Cabinet.

3. **THAT 76 McCormacks Bay Road be rezoned from green to red**

Reasons for Decision:

Further consideration and expert advice indicated that the property is exposed to the potential for immediate land damage with an associated risk to life as a result of the earthquakes. Accordingly, it was considered that this recommendation is consistent with the intent of the red zoning criteria agreed to by Cabinet.

4. **THAT no other changes be made to zoning in the McCormacks Bay and Balmoral Hill area**

Reasons for Decision:

For all other properties in the red zone, the geotechnical data shows that there is the potential for immediate cliff collapse or land slip with associated risk to life, and/or these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.

For all other properties currently zoned green, the geotechnical data shows

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	<p>that they meet green zone criteria, as there is no reported evidence of land damage with an associated risk to life, and these properties are exposed to an Annual Individual Fatality Risk less than 1 in 10,000 due to rock roll as defined by GNS Science risk modelling.</p>
<p>Area 20 Moncks Bay Maps 17 and 18</p>	<p>A zoning review was requested for the following properties in this area:</p> <ul style="list-style-type: none"> • • • withheld under section 9(2)(a) • • • <p>The Group reviewed the key geotechnical issues for the Moncks Bay area, which showed that:</p> <ul style="list-style-type: none"> • Moncks Spur is a north-south running narrow ridgeline, the north end of which finishes just before Main Road. • There is a small sea-cut rock cliff at the end of the ridge which is included in the GNS cliff model. The remaining ridge line is covered in a loess blanket of variable thickness. • The loess banks behind two properties immediately south of the end of the spur partly failed during the earthquakes, and as a result, CCC issued s124 notices on both properties. • The area around Red Rock Lane and Bay View Road had isolated rock outcrops, many of which have recently had remedial works undertaken on them. Together with topography effects, this indicates that GNS risk maps overstate the rock roll risk in this area. <p>RECOMMENDATIONS:</p> <ol style="list-style-type: none"> 1. THAT 4 and 8 Moncks Spur be rezoned from green to red <p>Reasons for Decision:</p> <p>Further consideration and expert advice indicated that these properties are exposed to the potential for immediate land damage with an associated risk to life as a result of the earthquakes. Accordingly, it was considered that this recommendation is consistent with the intent of the red zoning criteria agreed to by Cabinet.</p> <ol style="list-style-type: none"> 2. THAT 69A Bay View Road be rezoned from red to green

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Released by the Ministry of Environment and Conservation

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withheld under section 9(2)(a)

The Group reviewed the key geotechnical issues for the **Beckenham, Cashmere, Cashmere Hills Hillsborough and Huntsbury** areas, which showed that:

- This area generally comprises several north-south running valleys with discontinuous rock outcrops running near the crest of these valleys and occasional localised small cliffs.
- The cliffs comprise rock in some areas, loess soils in others, and a number are man-made.
- The properties in the upper and mid-slopes of these long valleys that have rock outcrops above them are exposed to rock fall risks.
- Properties above and below some of the localised cliffs and steep slopes are exposed to localised cliff collapse risks (e.g. View Terrace and Port Hills Road).
- Approximately 200 fallen boulders were mapped in these areas, reflecting smaller mass continuous rockfall source areas and the greater distance from the earthquake epicentres.
- Pockets of ground cracking damage occurred in this area, focused around small man-made cliffs in some cases, and on the lower valley slopes where they abut level ground at the valley base. This slope damage is probably due, in part, to liquefaction and lateral spreading in the valley base.
- Part of the Lucas Lane area is exposed to a landslide risk with an associated risk to life, and remedial works are being designed to address this issue.

RECOMMENDATIONS:

1. *THAT 5 Reservoir Lane, 68 Rapaki Track, 212A Centaurus Road and 79 Bowenvale Avenue be rezoned from green to red*

Reason for Decision:

The geotechnical data shows that the dwellings on these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.

2. *THAT 351 Port Hills Road be rezoned from green to red*

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Respassed by the Ministers for the Environment and the Minister for Earthquake Recovery

	<p>Reason for Decision: Commercial properties where buildings were within or substantially intersected by the 1 in 10,000 2016 AIFR line typically have been recommended for red zoning.</p> <p>3. THAT 2 Stronsay Lane, 10 Reservoir Lane and 11 Reservoir Lane be rezoned from red to green</p> <p>Reason for Decision: This recommendation is consistent with the guiding consideration that rock roll-affected properties zoned for residential use would typically be recommended for red zoning if the dwelling was entirely within or substantially intersected by the 1 in 10,000 2016 AIFR line as defined by GNS Science (67% occupancy model with the effect of aftershocks removed). These properties do not satisfy this test.</p> <p>Only a small fraction on the eastern boundary of the property at 2 Stronsay Lane is clipped by the life safety risk line. The majority of the section is outside the life safety risk line. In addition, the source area is diminished.</p> <p>The section at 10 Reservoir Lane is steeply sloping and the identified rockfall source is on the property itself, namely the southern third of the section is the rockfall source, see attached map. Even without treatment the area within the life safety risk line covers only the southern and steeply sloping property parts. Expert advice provided to the Group was that there is sufficient space to place a building on to the northern part of the section, or treat the source and remove the risk altogether.</p> <p>The rockfall source at 11 Reservoir Lane covers only a small portion of this property, namely the southwestern most corner. Approximately 80% of the section is at reduced life risk levels. An incised gully exists at the eastern boundary that will channel any potential rocks away from a potential building area on the northern boundary.</p> <p>4. THAT no other changes be made to zoning in the Beckenham, Cashmere, Cashmere Hills Hillsborough and Huntsbury area</p> <p>Reasons for Decision: For all other properties in the red zone, the geotechnical data shows that there is the potential for immediate cliff collapse or land slip with associated risk to life, and/or these properties are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016 due to rock roll as defined by GNS Science risk modelling.</p> <p>For all other properties currently zoned green, the geotechnical data shows that they meet green zone criteria, as there is no reported evidence of land damage with an associated risk to life, and these properties are exposed to</p>
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	an Annual Individual Fatality Risk less than 1 in 10,000 in 2016 due to rock roll as defined by GNS Science risk modelling.

Appendix 1 – Terms of Reference for the Port Hills Zoning Review Advisory Group

Appendix 2 – Overview map and Proposed Changes maps

Appendix 3 – Table (Appendix A and Appendix B)

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Meeting Tuesday 19 March 2013
 Port Hills Zoning Review Advisory Group



Meeting	Participants
<p>Tuesday 19 March, 9am – 7pm CERA offices, Christchurch</p>	<p>Advisory Group:</p> <ul style="list-style-type: none"> - Dr Keith Turner – Independent Chair - Diane Turner – Deputy Chief Executive, Recovery Strategy, Planning and Policy, CERA - Kevin Locke – General Manager, Capital Programme, CCC (until 12.30pm) - David Jennings – Independent Geotechnical Engineer (by telephone) - Patricia Noble – Senior Legal Advisor, CERA <p>Attendees:</p> <ul style="list-style-type: none"> - Dr Jan Kupec – CERA - Don Macfarlane – CCC/PHGG - [redacted] – CCC/PHGG - [redacted] – CERA - Bronwyn Arthur – CERA (9.00am to 9.10am)
<p>Introduction</p>	<p>The Chair opened the meeting and noted that it had been called in response to a letter from the Minister for Canterbury Earthquake Recovery dated 12 March 2013. He explained the Minister had requested information explaining the reasons for the Group's recommendations in respect of certain properties. This was to enable the Minister to provide property owners with information to help them understand how the Group's recommendations had been reached. A list of properties for which further explanation was sought was appended to the letter.</p> <p>Bronwyn Arthur, Chief Legal Officer CERA, was invited to join the meeting. Bronwyn talked about the importance of being able to demonstrate how the Group reached its recommendations. She tabled a one-page document summarising the grounds on which there was potential for the Minister's zoning decisions to be judicially reviewed. Bronwyn Arthur then left the meeting. The Group noted receipt of her advice.</p>
<p>Discussion of matters raised</p>	<p>The Group agreed that in responding to the Minister's letter it would be important to re-emphasise that multiple sources of information had been considered by the Group when forming its recommendations. The maps referenced in the PHZRA Minutes were not in themselves an information source.</p> <p>It was agreed that the 26 Nov-19 Dec PHZRA Minutes will be updated to reflect the discussion at this meeting. The revised Minutes will emphasise (e.g. using bold type) that while properties are identified by reference to maps which show risk lines derived from GNS modelling, the model was only one of several information sources used by the Group in forming its recommendations – the model does not in all cases give the best picture of the level of risk. The list of data used in making decisions was updated and refined to include all data sources in the revised Minutes.</p>

Requested by the Minister for Canterbury Earthquake Recovery

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	<p>The revised Minutes will include a list of all properties whose owners had applied for a zoning review. The Minutes will also emphasise that the Group examined the entire Port Hills area (defined as 75km² of elevated land located from Westmorland to Sumner, as well as Lyttelton to Diamond Harbour) not only the areas covered by the maps. The mapped area encompasses all properties for which a zoning review was requested.</p> <p>The Group then moved on to consider what further information it could provide on the properties identified in the Minister's letter.</p>
<p>Appendix B properties</p>	<p><i>Appendix B of the Minister's letter contained 'properties which appear to be outside any area of identified risk'.</i></p> <p>The Group worked through the listed properties and discussed the criteria, guiding considerations and range of information, including expert geotechnical advice, they had considered in relation to each.</p> <p>The Group commented that expert advice had been that for select properties within the area covered by the GNS model that the level of risk (as illustrated by the maps) was either understated or overstated. For those properties other sources of information including expert advice were considered to provide a more accurate picture of the level of risk. The Group's recommendations were formed after consideration of all of the available information.</p> <p>For properties outside the GNS modelled area the Group's recommendation had been based on expert advice.</p> <p>The Group's responses and reasoning on individual properties are summarised in the appended chart.</p>
<p>Appendix A properties</p>	<p><i>Appendix A of the Minister's letter contained 'properties wholly or partly within an area of identified risk'.</i></p> <p>The Group discussed its approach to vacant properties. The Chair noted that for residential properties in rock roll areas the fundamental Cabinet-agreed criterion was the location of the risk line (1 in 10,000 Annual Individual Fatality Risk at 2016) in relation to the dwelling footprint. The criteria do not specify how to deal with vacant land in residential areas and these had therefore been considered on a case by case basis.</p> <p>The Group therefore agreed the following additional guiding considerations:</p> <ul style="list-style-type: none"> • In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve sensible outcomes. • The Group agreed that a rock roll-affected property zoned for residential use would typically be recommended for red zoning if the dwelling was entirely within or substantially intersected by the 1 in 10,000 2016 AIFR line as defined by GNS Science (67% occupancy

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Meeting Tuesday 19 March 2013
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	<p>model with the effect of aftershocks removed).</p> <ul style="list-style-type: none"> All Crown and CCC owned land should be recommended for green zoning. <p>The Group worked through the listed properties and discussed criteria, guiding considerations and the range of information, including expert geotechnical advice, they had considered in relation to each.</p> <p>For the 'Appendix B' list (as for the 'Appendix A' list), the Group commented that expert advice had been that for some properties within the GNS modelled area, the level of risk (as illustrated by the maps) was understated or overstated. For those properties, other sources of information including expert advice had provided a more accurate picture of the level of risk. The Group's recommendations had been formed after consideration of all of the available information.</p> <p>The Group agreed to revise its recommendations as follows:</p> <ul style="list-style-type: none"> Recommend 351 Port Hills Road (commercial land in old quarry site) is rezoned red Recommend 2 Stronsay Lane (vacant section) is rezoned green Recommend 10 Reservoir Lane (vacant section) is rezoned green Recommend 11 Reservoir Lane (vacant section) is rezoned green Recommend 54 Morgans Valley (CCC land) is rezoned green Recommend 27 Morgans Valley (CCC land) is rezoned green Recommend 284R Main Road Redcliffs (CCC land) be rezoned green Recommend 24A Kinsey Terrace (CCC land) be rezoned green. Recommend 64 Heberden Ave (previously recommended for rezoning to red) remains zoned green <p>The Group's responses and reasoning behind its recommendations on individual properties is summarised in the appended chart.</p>
<p>Next steps</p>	<p>The Group agreed the following:</p> <ul style="list-style-type: none"> To consolidate the day's discussion into a suitable form for the Minister The Group to issue a revised set of PHZRAG Minutes including explanations, greater emphasis on the word 'dwelling' in relation to life safety risk lines where a dwelling currently exists on the land, and identifying every property whose owners applied for a review The Group to reissue the set of maps to reflect the new recommendations Outputs will be: (1) a set of minutes from this 19 March meeting recording the decisions made including changes to recommendations; and (2) a revised set of the full PHZRAG Minutes that includes all recommendations along with the reasons to support those recommendations.

Appendix: Properties Considered At This Meeting
 (Refer to table)

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Meeting Wednesday 3 April 2013
 Port Hills Zoning Review Advisory Group

Meeting	Participants
<p>Wednesday 3 April, 7pm-8pm CERA offices, Christchurch. Conference phone meeting</p>	<p>Advisory Group:</p> <ul style="list-style-type: none"> - Dr Keith Turner – Independent Chair (phone) - Diane Turner – Deputy Chief Executive, Recovery Strategy, Planning and Policy, CERA - Kevin Locke – General Manager, Capital Programme, CCC (phone) - David Jennings – Independent Geotechnical Engineer (phone) - Patricia Noble – Senior Legal Advisor, CERA <p>Attendees withheld under section 9(2)(a)</p> <ul style="list-style-type: none"> - CERA - Katrinka Good – CERA - David Corlett – CERA
<p>Introduction</p>	<p>The Chair opened the meeting and noted that there were two substantive matters for consideration. These both relate to the wording of the guiding considerations.</p> <p>These are:</p> <ol style="list-style-type: none"> 1) Concern about the use of the term "equity." 2) Vacant sections- need to revise wording. <p>It was noted that there is not the intention to change the zoning recommendations but the wording of the guiding considerations need to better reflect the Group's reasoning in making the decisions.</p>
<p>Guiding considerations</p>	<p>Group agreed wording for guiding principle for vacant land.</p> <p>"In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve sensible outcomes."</p> <p>Group confirmed wording for guiding consideration for rock-roll affected properties was to remain unchanged.</p>

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Meeting Wednesday 3 April 2013
Port Hills Zoning Review Advisory Group

<p>Information to support recommendation on individual properties</p>	<p>44 Sumnervale Drive and 1 Finnsarby.</p> <p>Both properties have had detailed scrutiny. The Group received advice on the model for 44 Sumnervale. The Group noted that more explanatory information has been added to the table, but as there are several pages of information available this should be summarised.</p> <p>Need to ensure that the essence of reasons is contained in the supporting documentation. Check that there is an explanation for 2/51 St Andrews Hill.</p>
<p>Explanation of Geotechnical terms</p>	<p>The Group agreed that it would be useful to include in the Minutes an explanation of the terms: 'boundary effect', 'benching effect'/the presence of roads and 'diminished rock source'.</p> <p>The Group agreed that the following explanations would be useful.</p> <ul style="list-style-type: none"> • "Boundary effect: the GNS model becomes less certain at the edges of the modelled area" • "Benching effect/presence of a road: in most circumstances the presence of flat areas such as road carriageways and building platforms tends to reduce the rockfall risk for properties located below the 'bench'." • "Diminished rockfall source: one of a number of technical terms used in the GNS report which relate to the ability of the rockfall source to generate more or fewer rocks. A diminished rock source would be expected to generate fewer rocks than the neighbouring rock sources."
<p>Finalising and transmitting of Group documents</p>	<p>Reference in minutes to Lytleton Port to be amended to remove mention of Port Company, and refer to 'anything in the Port.'</p> <p>Noted receipt of general legal advice at meeting of 19 March and reference this in the minutes in the "Background Papers" list.</p> <p>The Group agreed that the other editorial refinements and minor changes suggested to the meeting minutes of 19 March 2013 and 26 November 2012- 19 March 2013 could be made.</p> <p>Letter to MCER, minutes, table and maps to be sent to Minister. Copy to be sent to Group members excluding the maps which they can access online.</p>

Released by the Minister for Canterbury Earthquake Recovery

1	108A Bowenvale Ave	1	Bowenvale	Remain green	More than half of property within risk area	<p>Set-Back Guiding Consideration</p> <p>In applying the Port Hills residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.</p> <p>Not applicable - see criterion</p>	<p>This property covers a large area zoned 'rural residential' of which only part is within the life safety risk line.</p>
2	101G Bowenvale Ave	1	Bowenvale	Remain green	Touching risk area	<p>The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.</p>	<p>Only a small portion of the dwelling on this property is inside the life safety risk line.</p> <p>Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property because there is a limited rockfall source and the presence of the road/pathway provides additional protection which is not reflected in the model. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)</p>
3	101H Bowenvale Ave	1	Bowenvale	Remain green	More than half of property within risk area	<p>The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.</p>	<p>Only a small portion of the dwelling on this property is inside the life safety risk line.</p> <p>Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property because there is a limited rockfall source and the presence of the road/pathway provides additional protection which is not reflected in the model. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)</p>
4	101A Bowenvale Ave	1	Bowenvale	Remain green	Half of property within risk area	<p>The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.</p>	<p>The dwelling on this property is outside the life safety risk line.</p>

Prepared by the **Port Hills Earthquake Recovery** **Center for Community Earthquake Recovery**

5 101E Bowenvale Ave	1	Bowenvale	Remain green	Less than half of property within risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Not applicable
6 147 Bowenvale Ave	1	Bowenvale	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
7 73A Bowenvale Ave	1	Bowenvale	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
8 14 Datefield Drive	1	Bowenvale	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
9 11 Maurice Knowles Lane	1	Bowenvale	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
10 54 Bowenvale Ave	1	Bowenvale	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
11 Note that properties further up the valley, which may also be affected by risk, cannot be seen on the map	1	Bowenvale	Remain green		The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwellings on the properties at the back of the valley are outside the life safety risk line.
12 74 Major Aitken Dr	1	Bowenvale	Remain green	More than half of property within risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	This property covers a large area zoned 'rural residential' of which only part is within the life safety risk line.

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13/18 Emerald Lane	1	Bowenvale	Remain green	Less than half of property within risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Not applicable
14/87E Whaka Tce	2	Woodlawn Rise	Remain green	Less than half of property within risk area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	87E Whaka Terrace is a small lot containing electricity infrastructure owned by CCC. The property is outside the life safety risk line. (The properties at 87A and 87B Whaka Terrace contain dwellings which are outside the life safety risk line.) Not applicable
15/27 Major Aitken Drive	2	Woodlawn Rise	Remain green	Less than half of property within risk area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable
16/2 View Tce	3	Centaurus Rd	Remain green	Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that there is a boundary effect within the GNS model which overstates the life safety risk to this property (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints). There is no immediate risk to life associated with this property.
17/2F View Tce	3	Centaurus Rd	Remain green	Touching EQ event lines	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable
18/4 View Tce	3	Centaurus Rd	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that there is a boundary effect within the GNS model which overstates the life safety risk to this property (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints). There is no immediate risk to life associated with this property.
19/6 View Tce	3	Centaurus Rd	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that there is a boundary effect within the GNS model which overstates the life safety risk to this property (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints). There is no immediate risk to life associated with this property.

20	18 View Terrace	3	Centaurus Rd	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that there is a boundary effect within the GNS model which overstates the life safety risk to this property (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints). There is no immediate risk to life associated with this property.
21	10 View Terrace	3	Centaurus Rd	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that there is a boundary effect within the GNS model which overstates the life safety risk to this property (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints). There is no immediate risk to life associated with this property.
22	216 Centaurus Rd	3	Centaurus Rd	Remain green	Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that there is a boundary effect within the GNS model which overstates the life safety risk to this property (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints). There is no immediate risk to life associated with this property.
23	54 Rapaki Rd	4	Rapaki Rd	Remain green	Touching risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Not applicable
24	58 Rapaki Rd	4	Rapaki Rd	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2316 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
25	9 The Crescent	4	Rapaki Rd	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2316 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.

26	10 The Crescent	4	Rapaki Rd	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
27	11R The Crescent	4	Rapaki Rd	Remain green	Less than half of property within risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Not applicable
28	79 Albert Terrace	4	Rapaki Rd	Remain green	Less than half of property within risk area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable
29	58 Hillsborough Terrace	4	Rapaki Rd	Remain green	Less than half of property within risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Not applicable
30	365 Port Hills Rd	5	Stonsay	Remain green	Touching Risk Area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
31	351 Port Hills Rd	5	Stonsay	Revised rec: green > red	More than half of property within risk area	See Guiding Consideration	Commercial properties where buildings were within or substantially intersected by the 1 in 10,000 2016 AIFR line typically have been recommended for red zoning.	Not applicable

by the Minister for Canterbury Earthquake Recovery

32 375 Port Hills Rd	5	Stronsay	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property because there is a diminished rockfall source located on the property. ('Diminished rockfall source' is one of a number of technical terms used by GNS and relates to the ability of the rockfall source to generate different amounts of rocks. A diminished rock source would be expected to generate fewer rocks than the neighbouring rock sources.)
33 373 Port Hills Rd	5	Stronsay	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property because there is a diminished rockfall source located on the property. ('Diminished rockfall source' is one of a number of technical terms used by GNS and relates to the ability of the rockfall source to generate different amounts of rocks. A diminished rock source would be expected to generate fewer rocks than the neighbouring rock sources.)
34 371 Port Hills Rd	5	Stronsay	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property because there is a diminished rockfall source located on the property. ('Diminished rockfall source' is one of a number of technical terms used by GNS and relates to the ability of the rockfall source to generate different amounts of rocks. A diminished rock source would be expected to generate fewer rocks than the neighbouring rock sources.)
35 369 Port Hills Rd	5	Stronsay	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property because there is a diminished rockfall source located on the property. ('Diminished rockfall source' is one of a number of technical terms used by GNS and relates to the ability of the rockfall source to generate different amounts of rocks. A diminished rock source would be expected to generate fewer rocks than the neighbouring rock sources.)

by the Master for Orberbury Alquaque Recovery

36	333 Port Hills Rd	5	Stromsay	Remain green	Half of property within risk area / Cliff Collapse Area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GMS model. There is not the potential for immediate cliff collapse or land slip as assessed by GMS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk lines.
37	335 Port Hills Rd	5	Stromsay	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GMS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
38	337 Port Hills Rd	5	Stromsay	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GMS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
39	19 Stromsay Ln	5	Stromsay	Remain green	Touching Risk Area	See Guiding Consideration	In applying the Port Hills residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Not applicable
40	323 Port Hills Rd	5	Stromsay	Remain green	More than half of property within risk area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable
41	321 Port Hills Rd	5	Stromsay	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GMS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
42	339 Port Hills Rd	5	Stromsay	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GMS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.

Canterbury Earthquake Recovery

Property Address	Zoning	Touching Risk Area/Touching EQ Event Lines	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Not applicable
43 327 Port Hills Rd	5	Stonsay	Remain green	Touching Risk Area/Touching EQ Event Lines	Not applicable
44 315 Port Hills Rd	6	Port Hills Road	Remain green	More than half of property within risk area	The dwelling on this property is outside the life safety risk line.
45 317 Port Hills Rd	6	Port Hills Road	Remain green	Half of property within risk area	The dwelling on this property is outside the life safety risk line.
46 310 Port Hills Rd	6	Port Hills Road	Remain green	Touching Risk Area	Expert advice provided to the Group indicated that the risk to this properties is overstated due to the benching effect provided by Port Hills Road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)
47 308 Port Hills Rd	6	Port Hills Road	Remain green	Touching Risk Area	Expert advice provided to the Group indicated that the risk to this properties is overstated due to the benching effect provided by Port Hills Road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)
48 May be more properties in area of risk further down Port Hills Rd that are out of sight on this map	6	Port Hills Road	Remain green	NA	The Group is confident that they have not missed any risk areas. Between maps 5 and 6 there are the following properties: 330 Port Hills Road (dwelling not affected), 319A Port Hills Road (dwelling not affected) and 321 Port Hills Road (dwelling not affected).
49 275 Port Hills Rd	6	Port Hills Road	Rec: green > red	Touching risk area	This property has been recommended for red zoning, consistent with the Group's mandate to ensure that zoning boundary lines are drawn sensibly.

50/2 Avoca Valley Rd	6	Port Hills Road	Rec: green > red	Touching risk area	The zoning of this property is an anomaly because the boundary lines have not been drawn sensibly.	Not applicable - see criterion	This property has been recommended for red zoning, consistent with the Group's mandate to ensure that zoning boundary lines are drawn sensibly.
51/4B Avoca Valley Rd	6	Port Hills Road	Rec: green > red	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	GNS has advised that the rock roll model understates the life safety risk to this property and the property is in an elevated risk area. Following ground truthing and a close examination of the model, it was determined that the dwellings at 4A, 4B and 6 Avoca Valley Road are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016.
52/6 Avoca Valley Rd	6	Port Hills Road	Rec: green > red	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	GNS has advised that the rock roll model understates the life safety risk to this property and the property is in an elevated risk area. Following ground truthing and a close examination of the model, it was determined that the dwellings at 4A, 4B and 6 Avoca Valley Road are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016.
53/1 Avoca Valley Rd	6	Port Hills Road	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line. In addition, expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property as it does not take into account the presence of Avoca Valley Road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)
54/3 Avoca Valley Rd	6	Port Hills Road	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line. In addition, expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property as it does not take into account the presence of Avoca Valley Road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)

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55	55 Avoca Valley Rd	6	Port Hills Road	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line. In addition, expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property as it does not take into account the presence of Avoca Valley Road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.) Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property as it does not take into account the presence of Avoca Valley Road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)
56	56 Avoca Valley Rd	6	Port Hills Road	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property as it does not take into account the presence of Avoca Valley Road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)
57	57 Avoca Valley Rd	6	Port Hills Road	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property as it does not take into account the presence of Avoca Valley Road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)
58	58 Avoca Valley Rd	6	Port Hills Road	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property as it does not take into account the presence of Avoca Valley Road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)
59	59 Avoca Valley Rd	6	Port Hills Road	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property as it does not take into account the presence of Avoca Valley Road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)
60	60 Avoca Valley Rd	6	Port Hills Road	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property as it does not take into account the presence of Avoca Valley Road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)

61	19E Avoca Valley Rd	6	Port Hills Road	Remain green	All of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property as it does not take into account the presence of Avoca Valley Road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)
62	23 Avoca Valley Rd	6	Port Hills Road	Remain green	Half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property as it does not take into account the presence of Avoca Valley Road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)
63	27 Avoca Valley Rd	6	Port Hills Road	Remain green	Half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property as it does not take into account the presence of Avoca Valley Road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)
64	31 Avoca Valley Rd	6	Port Hills Road	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line. In addition, expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property as it does not take into account the presence of Avoca Valley Road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)
65	8 Gilders Grove	6	Port Hills Road	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line. In addition, expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property as it does not take into account the presence of Avoca Valley Road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)
66	50 Avoca Valley Rd	7	Avoca Valley	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line. In addition, expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property as it does not take into account the presence of Avoca Valley Road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)

67	54 Avoca Valley Rd	7	Avoca Valley	Remain green	Touching Risk Area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
68	66 Avoca Valley Rd	7	Avoca Valley	Remain red	Touching Risk Area	The annual individual fatality risk associated with the residential dwelling is greater than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is touched by the life safety risk line.
69	73 Avoca Valley Rd	7	Avoca Valley	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
70	77 Avoca Valley Rd	7	Avoca Valley	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
71	79 Avoca Valley Rd	7	Avoca Valley	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
72	87 Avoca Valley Rd	7	Avoca Valley	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
73	48 Horotane Valley Rd	8	Horotane Valley	Rec. red to green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line. In addition, the GNS model has been amended since this property was zoned, and now reflects the protective effect of the local topography.
74	49 Horotane Valley Rd	8	Horotane Valley	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
75	66 Flinders Rd	9	Bridle Path Rd (1)	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property because State Highway 74 acts as a bench, the benefit of which is not accounted for in the GNS model. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)

76	168 Flinders Rd	9	Bridle Path Rd (1)	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property because State Highway 74 acts as a bench, the benefit of which is not accounted for in the GNS model. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rock/fall risk for properties located below the flat area.)
77	74 Flinders Rd	9	Bridle Path Rd (1)	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property because State Highway 74 acts as a bench, the benefit of which is not accounted for in the GNS model. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rock/fall risk for properties located below the flat area.)
78	76 Flinders Rd	9	Bridle Path Rd (1)	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property because State Highway 74 acts as a bench, the benefit of which is not accounted for in the GNS model. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rock/fall risk for properties located below the flat area.)
79	40 Bridle Path Rd	9	Bridle Path Rd (1)	Remain green	Less than half of property within risk area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable
80	26A Bridle Path Rd	9	Bridle Path Rd (1)	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
81	22 Bridle Path Rd	9	Bridle Path Rd (1)	Remain green	More than half of property within risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Not applicable
82	10 Bridle Path Rd	9	Bridle Path Rd (1)	Remain green	Less than half of property within risk area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Expert advice provided to the Group indicated that the Gondola was undertaking individual rock roll protection measures.
83	10A Bridle Path Rd	9	Bridle Path Rd (1)	Remain green	Less than half of property within risk area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Expert advice provided to the Group indicated that the Gondola was undertaking individual rock roll protection measures.

84	3	Bridle Path Rd		Bridle Path Rd (if Remain green)	Touching risk area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable
85	10	Morgans Valley	Remain green	Morgans Valley	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line. In addition, expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property due to local topographical effects and because the property is at the boundary of the model (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints). Expert advice provided to the Group indicated that the GNS model overstates the risk to this property as it does not take into account the benefit of the road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)
86	10	Morgans Valley	Remain green	Morgans Valley	Less than half of property within risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Expert advice provided to the Group indicated that the GNS model overstates the risk to this property as it does not take into account the benefit of the road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)
87	10	Morgans Valley	Remain green	Morgans Valley	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling site on this property is just touched by the life safety risk line (the dwelling has been demolished following earthquake damage). Expert advice provided to the Group indicated that the GNS model overstates the risk to this property as it does not take into account the benefit of the road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)
88	10	Morgans Valley	Remain green	Morgans Valley	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the risk to this property as it does not take into account the benefit of the road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)

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Risk based by the Minister for Canterbury Earthquake Recovery

89/23B Morgans Valley	10	Morgans Valley	Remain green	Touching risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Not applicable
90/87 Morgans Valley	10	Morgans Valley	Remain green	All of property within risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	This property is a large subdivision balance lot, used for rural activities.
91/70 Morgans Valley	10	Morgans Valley	Remain green	All of property within risk area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable
92/70A Morgans Valley	10	Morgans Valley	Remain green	More than half of property within risk area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable
93/56 Morgans Valley	10	Morgans Valley	Remain red	Touching risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Expert advice provided to the Group indicated that the GNS risk model understated the risk to this property due to topographical effects not included in the model and a boundary effect (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints). The model is too influenced by a gully at a neighbouring property.
94/58 Morgans Valley	10	Morgans Valley	Remain red	Less than half of property within risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Expert advice provided to the Group indicated that the GNS risk model understated the risk to this property due to topographical effects not included in the model and a boundary effect (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints). The model is too influenced by a gully at a neighbouring property.
95/75 Morgans Valley	10	Morgans Valley	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 50/16 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the dwelling at this property is located higher than a gully that runs beside the property. The gully provides the dwelling with protection from rock roll.

96	144	Bridle Path Rd	11	Bridle Path Rd (2)	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
97	92	Bridle Path Rd	11	Bridle Path Rd (2)	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
98	116	Bridle Path Rd	11	Bridle Path Rd (2)	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
99	96	Bridle Path Rd	11	Bridle Path Rd (2)	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
100	182	Cannon Hill Crescent	12	Bridle Path Rd (3)	Remain green	Half of property within risk area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable
101	238	Bridle Path Rd	12	Bridle Path Rd (3)	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the majority of the rockfall source had been removed during the Civil Defence Emergency period immediately after the earthquake events, and the GNS model overstates the risk to this property.
102	154	Bridle Path Rd	12	Bridle Path Rd (3)	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
103	242	Bridle Path Rd	12	Bridle Path Rd (3)	Remain green	Less than half of property within risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Expert advice provided to the Group indicated that the majority of the rockfall source had been removed during the Civil Defence Emergency period immediately after the earthquake events, and the GNS model overstates the risk to this property.

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104	221 Bridle Path Rd	12	Bridle Path Rd (3) Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property as it does not account for the presence of Bridle Path Road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)
105	225 Bridle Path Rd	12	Bridle Path Rd (3) Remain green	Less than half of property within risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property as it does not account for the presence of Bridle Path Road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)
106	201 Bridle Path Rd	12	Bridle Path Rd (3) Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the risk to this property.
107	12 Hammetton Lane	12	Bridle Path Rd (3) Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
108	3 Quarry Rd	13	Mt Pleasant	Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the risk to this property. There is a small cliff behind the property, there is an edge effect with the model and there is no evidence that there is immediate risk to life.
109	7 Quarry Rd	13	Mt Pleasant	Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice indicates that the GNS model overstates the risk to this property and there is no evidence of immediate risk to life. The dwelling is set back from the cliff and touched only by the second and third event lines.
110	9 Quarry Rd	13	Mt Pleasant	Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.

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111	111 Quarry Rd	Mt Pleasant	Remain green	Touching Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The building on this site (a tennis club) is set back from the life safety risk line.
112	54 Main Rd	Mt Pleasant	Remain green	Touching Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
113	1/20 McCormacks Bay Rd	Mt Pleasant	Remain green	Touching Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the risk to this property is overstated. This is because this property is located at the end of the cliff (where it turns into a steep slope) and there is a boundary effect in the GNS model (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints).
114	2/20 McCormacks Bay Rd	Mt Pleasant	Remain green	Touching Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the risk to this property is overstated. This is because this property is located at the end of the cliff (where it turns into a steep slope) and there is a boundary effect in the GNS model (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints).
115	18 McCormacks Bay Rd	Mt Pleasant	Remain green	Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the risk to this property is overstated. This is because the property is located at the end of the cliff (where it turns into a steep slope) and there is a boundary effect in the GNS model (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints).
116	24 McCormacks Bay Rd	Mt Pleasant	Remain green	Touching Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
117	27 Mt Pleasant Rd	Mt Pleasant	Remain green	Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.

118	29 Mt Pleasant Rd	13	Mt Pleasant	Remain green	Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
119	31 Mt Pleasant Rd	13	Mt Pleasant	Remain green	Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
120	33 Mt Pleasant Rd	13	Mt Pleasant	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
121	35 Mt Pleasant Rd	13	Mt Pleasant	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
122	37 Mt Pleasant Rd	13	Mt Pleasant	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
123	57 Mt Pleasant Rd	13	Mt Pleasant	Remain green	Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the risk to this property is overstated. This is because the property is located at the end of the cliff (where it turns into a steep slope) and there is a boundary effect in the GNS model (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints).
124	28 Aratoro Pl	13	Mt Pleasant	Remain green	Touching Cliff Collapse Area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Expert advice provided to the Group indicated that this property was located on a steep slope, rather than a cliff, and the GNS model overstates the life safety risk due to a boundary effect (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints).

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125 8 Virginia Lane	15	Virginia Lane	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model. See Guiding Consideration	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
126 10 Virginia Lane	15	Virginia Lane	Remain green	Less than half of property within risk area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable
127 11 Virginia Lane	15	Virginia Lane	Remain green	Touching risk area	See Guiding Consideration	In applying the Port Hills residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Not applicable
128 12 Virginia Lane	15	Virginia Lane	Remain green	Touching risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Not applicable
129 20 Glenstrae Rd	15	Virginia Lane	Remain green	Obscured from map	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model. See Guiding Consideration	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
130 22 Glenstrae Rd	15	Virginia Lane	Remain green	Obscured from map	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable
131 7 Main Rd	16	Redcliffs (1)	Remain green	Touching Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slips assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	All Crown and CCC land should be recommended for green zoning.	Not applicable
132 17 Main Rd	16	Redcliffs (1)	Remain green	Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slips assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	All Crown and CCC land should be recommended for green zoning.	Not applicable

133	19 Main Rd	16	Redcliffs (1)	Remain green	Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
134	122 McCormacks Bay Rd	16	Redcliffs (1)	Remain green	Touching Cliff Collapse Area - One Green property among many red	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
135	150 McCormacks Bay Rd	16	Redcliffs (1)	Remain green	Touching Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice that there is a boundary effect within the GNS model impacting this property (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints). Thus the risk is overstated in the GNS model and there is no immediate risk to life associated with this property.
136	154 McCormacks Bay Rd	16	Redcliffs (1)	Remain green	Touching Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice that there is a boundary effect within the GNS model impacting this property (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints). Thus the risk is overstated in the GNS model and there is no immediate risk to life associated with this property.
137	11 Glenstrae Rd	16	Redcliffs (1)	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
138	15 Glenstrae Rd	16	Redcliffs (1)	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
139	1 Glenstrae Rd	16	Redcliffs (1)	Remain green	Touching Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.

140	5 Glenstrae Rd	16	Redcliffs (1)	Remain green	Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
141	7 Glenstrae Rd	16	Redcliffs (1)	Remain green	Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
142	17 Glenstrae Rd	16	Redcliffs (1)	Remain green	Touching Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
143	19 Glenstrae Rd	16	Redcliffs (1)	Remain green	Touching Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice that there is a boundary effect within the GNS model impacting this property (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints). Thus the risk is overstated in the GNS model and there is no immediate risk to life associated with this property.
144	29 Glenstrae Road	16	Redcliffs (1)	Remain green	Touching Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice indicates that the GNS model overstates the risk to this property. The property is located above a bench in an old man made quarry. This and the local geology mean that there is no immediate risk to life associated with this property.
145	136 Main Rd	16	Redcliffs (1)	Remain green	Cliff Collapse Area	See Outstanding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable
146	136C Main Rd	16	Redcliffs (1)	Remain green	Cliff Collapse Area	See Outstanding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable

147	16 Balmoral Lane	Redcliffs (1)	Rec. green > red	Touching EQ event lines	<p>The Group agreed that the GNS Science cliff collapse model for this area understates the risk to the property. 6 Balmoral Lane has the potential for immediate cliff collapse, and carries an immediate risk to life. Accordingly, it was considered that this recommendation is consistent with the intent of the rezoning criteria agreed to by Cabinet. The Group determined that the intent of the following condition had been met. There is the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.</p>	<p>Where properties did not strictly meet the red zoning criteria, but the intent of the criteria was met, the Group has recommended that these properties be zoned red.</p>	<p>Expert advice provided to the Group indicated that the GNS model underestimates the risk to this property, and the property carries an immediate risk to life. GNS has confirmed that the risk to this property is understated as the GNS model does not accurately reflect the cliff line impacting this property.</p>
148	10 Balmoral Lane	Redcliffs (1)	Remain green	Touching EQ event lines	<p>There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.</p>	<p>Not applicable - see criterion</p>	<p>Expert advice provided to the Group indicated that the risk to this property is overstated in the GNS model in terms of the event lines as the cliff is not very high and there is a boundary effect as this property is at the edge of the model (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints). The dwelling on this property is outside the life safety risk line.</p>
149	10A Balmoral Lane	Redcliffs (1)	Remain green	Touching EQ event lines	<p>There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.</p>	<p>Not applicable - see criterion</p>	<p>The dwelling on this property is outside the life safety risk line.</p>
150	11 Balmoral Lane	Redcliffs (1)	Remain green	Cliff Collapse Area and EQ Event Lines	<p>There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.</p>	<p>Not applicable - see criterion</p>	<p>The dwelling on this property is outside the life safety risk line.</p>
151	15 Balmoral Lane	Redcliffs (1)	Remain green	Touching Cliff Collapse Area and EQ Event Lines	<p>There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.</p>	<p>Not applicable - see criterion</p>	<p>The dwelling on this property is outside the life safety risk line.</p>

152/17 Balmoral Lane	16	Redcliffs (1)	Remain green	Touching Cliff Collapse Area and EQ Event Lines	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the dwelling at this property is set back from the cliff and there is no immediate risk to life.
153/19 Balmoral Lane	16	Redcliffs (1)	Remain green	Touching Cliff Collapse Area and EQ Event Lines	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the dwelling at this property is set back from the cliff and there is no immediate risk to life.
154/35 Balmoral Lane	16	Redcliffs (1)	Remain green	Touching Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
155/31 Glendeviers Terrace	16	Redcliffs (1)	Remain red	Touching EQ event lines	There is the potential for immediate cliff collapse as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that this property is located in an area of cliff deformation. The cracking continues beyond the retreat lines and there is the potential for immediate cliff collapse or land slip with associated risk to life.
156/26 Glendeviers Terrace	16	Redcliffs (1)	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
157/32A Raekura Place	16	Redcliffs (1)	Remain green	Touching cliff collapse area	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is just touched by the life safety risk line.
158/2 Moncks Spur Road	17	Redcliffs (2)	Remain green	Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	+J247 Expert advice provided to the Group indicated that the GNS model overstates the risk to this property.
159/2A Cave Tee	17	Redcliffs (2)	Remain green	Cliff Collapse Area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Expert advice provided to the Group indicated that the GNS model overstates the risk to this property because it does not accurately reflect the local topography in the location of the cliff edge.
160/200 Main Rd	17	Redcliffs (2)	Remain green	Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the risk to this property as the property is a steep slope, not a cliff.

161 22A Glendevore Terrace	17	Redcliffs (2)	Remain green	Cliff Collapse Area	See Garding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Not applicable
162 12 Defender Lane	17	Redcliffs (2)	Remain red	Touching EQ event lines	There is the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model significantly understates the life safety risk to this property. There is movement and cracking under the dwelling which reacts to rainfall. 12 Defender Lane is occupied by a residential dwelling. Below the property are steep to very steep slopes and they form two distinct benches. The GNS risk maps appear to pick up the lower bench of the cliff only. Expert advice is that there is the potential for collapse in a future earthquake and the risk on balance is similar to other properties to the south along Defender Lane.
163 14 Defender Lane	17	Redcliffs (2)	Remain red	Touching EQ event lines	There is the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model significantly understates the life safety risk to this property. Number 12 Defender Lane could inundate 14 Defender Lane, which is vacant land. Below the property are steep to very steep slopes and they form two distinct benches. The GNS risk maps appear to pick up the lower bench of the cliff only. Expert advice is that there is the potential for collapse in a future earthquake and the risk on balance is similar to other properties to the south along Defender Lane.
164 10 Defender Lane	17	Redcliffs (2)	Remain red	Touching EQ event lines	There is the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model significantly understates the life safety risk to this property. There is movement and cracking under the dwelling which reacts to rainfall. 10 Defender Lane is occupied by a residential dwelling. Below the property are steep to very steep slopes and they form two distinct benches. The GNS risk maps appear to pick up the lower bench of the cliff only. Expert advice is that there is the potential for collapse in a future earthquake and the risk on balance is similar to other properties to the south along Defender Lane.

165	12 Cliff St	18	Moncks Bay	Remain red	Touching cliff collapse area	There is the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life. See Guiding Consideration	Not applicable - see criterion	Not applicable
166	14 Cliff St	18	Moncks Bay	Remain green	Touching Cliff Collapse area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Not applicable
167	242 Main Rd	18	Moncks Bay	Remain green	Touching Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the risk to this property. The property is located by a small sea-cut cliff where no damage had been noted.
168	19A Bay View Rd	18	Moncks Bay	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the risk to this property. The property is located by a small sea-cut cliff where no damage had been noted.
169	71 Bay View Rd	18	Moncks Bay	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the rockfall source at number 9 Red Rock Lane and the gully behind number 67A Bay View Road has been treated. Expert opinion is that the risk to this property is overstated in the GNS model.
170	1 Red Rock Lane	18	Moncks Bay	Remain green	Less than half of property within risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Not applicable
171	4 Red Rock Lane	18	Moncks Bay	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the rockfall source at number 9 Red Rock Lane and the gully behind number 67A Bay View Road has been treated. Expert opinion is that the risk to this property is overstated in the GNS model.

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172	9 Red Rock Lane	18	Moncks Bay	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the dwelling at 9 Red Rock Lane is above the rockfall source. Expert advice provided to the Group indicated that the rockfall source at number 9 Red Rock Lane and the gully behind number 67A Bay View Road has been treated.
173	10 Red Rock Lane	18	Moncks Bay	Remain green	Less than half of property within risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Expert advice provided to the Group indicated that the dwelling at 9 Red Rock Lane is above the rockfall source. Expert advice provided to the Group indicated that the rockfall source at number 9 Red Rock Lane and the gully behind number 67A Bay View Road has been treated.
174	23 Red Rock Lane	18	Moncks Bay	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the dwelling on this property is located above the source area.
175	31 Bay View Rd	18	Moncks Bay	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the rockfall source at number 9 Red Rock Lane and the gully behind number 67A Bay View Road has been treated. Expert opinion is that the risk to this property is overstated in the GNS model.
176	67A Bay View Rd	18	Moncks Bay	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the rockfall source at number 9 Red Rock Lane and the gully behind number 67A Bay View Road has been treated. Expert opinion is that the risk to this property is overstated in the GNS model.
177	69A Bay View Rd	18	Moncks Bay	Rec. red > green	All of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property because it does not take into account that the rockfall source at number 9 Red Rock Lane and the gully behind number 67A Bay View Road have been treated.
178	6 Red Rock Lane	18	Moncks Bay	Remain green	More than half of property within risk area	See Guiding Consideration	See comment under Additional Information	Expert advice provided to the Group indicated that the rockfall source impacting this property is fully contained on the property.
179	16 Hurst Seager Lane	18	Moncks Bay	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.

180/5 The Spur	19	Kinsey Terrace	Remain green	Touching Cliff Collapse area and EQ Event Lines	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property because it does not take into account localised treatment of the cliff pre-dating the earthquake events.
181/6 The Spur	19	Kinsey Terrace	Remain green	Touching Cliff Collapse area and EQ Event Lines	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property because it does not take into account localised treatment of the cliff pre-dating the earthquake events.
182/1 Clifton Bay	19	Kinsey Terrace	Remain green	Touching Cliff Collapse area	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the risk to life at this property. The cliff collapse risk line touches the dwelling at this property, however there is a large flat area between the cliff and the dwelling. The Group agreed to recommend that the green zoning would remain for this property.
183/27 Clifton Tce	19	Kinsey Terrace	Remain green	Touching EQ event lines	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Not applicable
184/2 Kinsey Tce	19	Kinsey Terrace	Remain red	Touching EQ event lines	There is the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that there is mass movement in this area. While risk to life has not been quantified for this area, significant ground displacement (mass movement) was observed at the eastern end of the cliff. GNS has advised that the eastern mass movement area around the intersection of Kinsey and Clifton Terraces has moved approximately 1 metre laterally and 300-500mm vertically over three earthquake events. Given the mass movement and relatively high elevation, there is thought to be an immediate risk to life associated with this property. The Group spent a significant amount of time in this area

185/22 Kinsey Tce	19	Kinsey Terrace	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Not applicable
186/24A Kinsey Tce	19	Kinsey Terrace	Revised rec: red > green	Touching EQ event lines	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	24A Kinsey Terrace is a narrow strip of land owned by CCC outside of the event lines. (The small triangle of adjacent land is part of the title for 28 Kinsey Terrace.) Expert advice provided to the Group indicated that the GNS model has overstated the risk to this property. The cliff is a man-made slope (man-made slopes in the Port Hills in general were less likely to suffer from shaking damage). The dwelling is set back from the recession line and there is no immediate risk of failure causing risk to life.
187/274 Main Rd	19	Kinsey Terrace	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model has overstated the risk to this property. The cliff is a man-made slope (man-made slopes in the Port Hills in general were less likely to suffer from shaking damage). The dwelling is set back from the recession line and there is no immediate risk of failure causing risk to life.
188/276 Main Rd	19	Kinsey Terrace	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model has overstated the risk to this property. The cliff is a man-made slope (man-made slopes in the Port Hills in general were less likely to suffer from shaking damage). The dwelling is set back from the recession line and there is no immediate risk of failure causing risk to life.
189/280A Main Rd	19	Kinsey Terrace	Remain red	Touching EQ event lines	There is the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the group indicated that significant ground displacement (mass movement) was observed at the western end of this cliff, as evidenced by ground cracking, accentuated by earthquakes and rainfall.
190/1/278 Main Rd	19	Kinsey Terrace	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that this property is inside a mass movement cliff risk area and life safety does not appear to be at risk. The cliff below the property is geologically different from neighbouring properties.
191/26 Kinsey Tce	19	Kinsey Terrace	Remain red	Touching EQ event lines	There is the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that this property has significant cracking associated with land movement and associated risk to life.

192/272 Main Rd	19	Kinsey Terrace	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the cliff location is not accurately represented by the model. The dwelling is intersected by the second and third event lines, but there is no evidence of cracking and experts believe there is no immediate risk to life. The cliff to the north does not affect the property - the life safety risk lines are the result of a boundary effect on the model (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints).
193/264 Main Road	19	Kinsey Terrace	Remain green	Touching Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
194/266 Main Rd	19	Kinsey Terrace	Remain green	Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
195/268 Main Rd	19	Kinsey Terrace	Remain green	Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
196/1 Mulgans Track	19	Kinsey Terrace	Remain green	Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the cliff location is not accurately represented by the model. The dwelling is set back 18m from the edge of the cliff.
197/5 Richmond Hill Rd	20	Richmond Hill Rd	Remain green	Touching Cliff Collapse area	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
198 Bowling club on Richmond	20	Richmond Hill Rd	Remain green	Touching Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the risk to number 10 Richmond Hill Road due to the cliff geometry and topographical effects.

199/69 Wakefield Ave	21	Wakefield (1)	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Following a review of the risk profile for this area, including a site visit, GNS advised the Group that the rock roll risk to this property is less than 1 in 10,000 at 2016 risk levels. This is because the rockfall source areas in this area are less significant than the suburb average used in the risk model.
200/83 Wakefield Ave	21	Wakefield (1)	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Following a review of the risk profile for this area, including a site visit, GNS advised the Group that the rock roll risk to this property is less than 1 in 10,000 at 2016 risk levels. This is because the rockfall source areas in this area are less significant than the suburb average used in the risk model.
201/1/91 Wakefield Ave	21	Wakefield (1)	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The life safety risk line just touches the dwelling on this property. Following a review of the risk profile for this area, including a site visit, GNS advised the Group that the rock roll risk to this property is less than 1 in 10,000 at 2016 risk levels. This is because the rockfall source areas in this area are less significant than the suburb average used in the risk model.
202/93 Wakefield Ave	21	Wakefield (1)	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Following a review of the risk profile for this area, including a site visit, GNS advised the Group that the rock roll risk to this property is less than 1 in 10,000 at 2016 risk levels. This is because the rockfall source areas in this area are less significant than the suburb average used in the risk model.
203/97 Wakefield Ave	21	Wakefield (1)	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Following a review of the risk profile for this area, including a site visit, GNS advised the Group that the rock roll risk to this property is less than 1 in 10,000 at 2016 risk levels. This is because the rockfall source areas in this area are less significant than the suburb average used in the risk model.
204/4 Campbell Street	21	Wakefield (1)	Rec. red > green	Half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Following a review of the risk profile for this area, including a site visit, GNS advised the Group that the rock roll risk to this property is less than 1 in 10,000 at 2016 risk levels. This is because the rockfall source areas in this area are less significant than the suburb average used in the risk model.

205/2 Denman Street	21	Wakefield (1)	Rec: red > green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Following a review of the risk profile for this area, including a site visit, GNS advised the Group that the rock fall risk to this property is less than 1 in 10,000 at 2016 risk levels. This is because the rockfall source areas in this area are less significant than the suburb average used in the risk model.
206/44 Summervale Dr	22	Wakefield (2)	Remain red	Touching risk area	The zoning of this property is an anomaly because the boundary lines have not been drawn sensibly.	Not applicable - see criterion	Expert advice provided to the Group indicates that the model line in relation to this property is an anomaly due to the local topography.
207/1 Finnsarby Pl	22	Wakefield (2)	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
208/4 Finnsarby Pl	22	Wakefield (2)	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
209/1/6 Finnsarby Pl	22	Wakefield (2)	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicates that the GNS model overstates the life safety risk to this property due to the presence of the road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)
210/8 Finnsarby Pl	22	Wakefield (2)	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicates that the GNS model overstates the life safety risk to this property due to the presence of the road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)
211/10 Finnsarby Pl	22	Wakefield (2)	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicates that the GNS model overstates the life safety risk to this property due to the presence of the road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)
212/1/12 Finnsarby Pl	22	Wakefield (2)	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicates that the GNS model overstates the life safety risk to this property due to the presence of the road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)

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213 14 Finsbury Pl	22	Wakefield (2)	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicates that the GNS model overstates the life safety risk to this property due to the presence of the road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.) Not applicable
214 100A Wakefield Ave	22	Wakefield (2)	Remain green	Within risk area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable
215 106 Wakefield Ave	22	Wakefield (2)	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
216 108 Wakefield Ave	22	Wakefield (2)	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
217 112 Wakefield Ave	22	Wakefield (2)	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
218 114 Wakefield Ave	22	Wakefield (2)	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
219 124 Wakefield Ave	22	Wakefield (2)	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
220 69 Ocean View Tce	22	Wakefield (2)	Remain green	More than half of property within risk area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable
221 19 Ocean View Tce	23	Sumnervale	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.

222 106 Summervale Dr	23	Summervale	Rec: green > red	Touching risk area (only just)	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice is that the model significantly understates risk due to suburb wide averaging and different rockfall sources. The advice indicated that the road between this property and the cliff provides a bench, but the Group is not convinced that it provides sufficient protection. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area, but the Group did not consider this to be sufficient for this property.)
223 48 Heberden Ave	24	Heberden (1)	Rec: green > red	Less than half of property in risk area	The annual individual fatality risk associated with the residential dwelling is greater than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group is that the model significantly understates risk due to topographical constraints which would tend to focus rockfall in this area. The advice indicated that the road between this property and the cliff provides a bench, but the Group is not convinced that it provides sufficient protection. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area, but the Group did not consider this to be sufficient for this property.)
224 58 Heberden Ave	24	Heberden (1)	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
225 66 Heberden Ave	24	Heberden (1)	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
226 68 Heberden Ave	24	Heberden (1)	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.

227	74 Heberden Ave	24	Heberden (1)	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line. In addition, expert advice provided to the Group indicates that the GNS model overstates the level of life safety risk because the local topography would tend to direct rockfall away from the property, and the model does not account for the presence of the road and flat terrain which reduces the likelihood of rocks reaching the property. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)
228	40 Campbell Street	24	Heberden (1)	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
229	388 Truro Street	24	Heberden (1)	Remain green	Touching risk area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable
230	101 Heberden Ave	24	Heberden (1)	Remain green	More than half of property in risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
231	103 Heberden Ave	24	Heberden (1)	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
232	1 Awaroa Ln	24	Heberden (1)	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
233	2 Awaroa Ln	24	Heberden (1)	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.

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234 S Awaroa Ln	24	Heberden (1)	Remain green	Within risk area	See Guiding Consideration based by the	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	This property is a large subdivision balance lot used for rural activities.
235 61 Heberden Ave	24	Heberden (1)	Remain green	Less than half of property within risk area / Touching EQ Event Lines	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 20% risk levels as per the GNS model. There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicates that the GNS model overstates the life safety risk to this property and that the cliffs and lower slopes in this area are man-made and they performed well in the numerous earthquakes.
236 2/55 Heberden Ave	24	Heberden (1)	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicates that the GNS model overstates the life safety risk to this property and that the cliffs and lower slopes in this area are man-made and they performed well in the numerous earthquakes.
237 1/55 Heberden Ave	24	Heberden (1)	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicates that the GNS model overstates the life safety risk to this property and that the cliffs and lower slopes in this area are man-made and they performed well in the numerous earthquakes.
238 51B Heberden Ave	24	Heberden (1)	Remain green	Cliff Collapse Area / Touching EQ event lines	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicates that the GNS model overstates the life safety risk to this property and that the cliffs and lower slopes in this area are man-made and they performed well in the numerous earthquakes.
239 51A Heberden Ave	24	Heberden (1)	Remain green	Cliff Collapse Area / Touching EQ event lines	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicates that the GNS model overstates the life safety risk to this property and that the cliffs and lower slopes in this area are man-made and they performed well in the numerous earthquakes.
240 51C Heberden Ave	24	Heberden (1)	Remain green	Cliff Collapse Area / Touching EQ event lines	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicates that the GNS model overstates the life safety risk to this property and that the cliffs and lower slopes in this area are man-made and they performed well in the numerous earthquakes.

241	51 Heberden Ave	24	Heberden (1)	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicates that the GNS model overstates the life safety risk to this property and that the cliffs and lower slopes in this area are man-made and they performed well in the numerous earthquakes.
242	72 Colenso St	25	Heberden (1)	Remain green	Less than half of property within risk area	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicates that the GNS model overstates the life safety risk to this property due to the presence of the road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.) Not applicable
243	21 Heberden Ave	25	Heberden (2)	Remain green	Cliff Collapse area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable
244	23 Heberden Ave	25	Heberden (2)	Remain green	Cliff Collapse area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable
245	35 Heberden Ave	25	Heberden (2)	Remain green	Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicates that the model overstates the level of life safety risk because it incorrectly considers the steep slope by the property with a driveway cut into it to be a cliff. In addition, the dwelling is set back 17 metres from the cliff and is outside the first and second event lines.
246	37 Heberden Ave	25	Heberden (2)	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicates outside of life safety risk and retreat line. Only marginal impact.
247	39 Heberden Ave	25	Heberden (2)	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicates outside of life safety risk and retreat line. Only marginal impact.
248	13 Heberden Ave	25	Heberden (2)	Remain green	Touching Cliff Collapse Area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable
249	14 Heberden Ave	25	Heberden (2)	Remain green	Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.

250	2506 Heberden Ave	25	Heberden (2)	Remain green	Touching Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life. See Guiding Consideration	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
251	147 Esplanade Ave	25	Heberden (2)	Remain green	Touching Cliff Collapse Area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable
252	147A Esplanade Ave	25	Heberden (2)	Remain green	Touching Cliff Collapse Area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable
253	4 Scarborough Rd	25	Heberden (2)	Remain green	More than half of property in Cliff Collapse Area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable
254	54 Scarborough Rd	25	Heberden (2)	Remain green	Touching cliff collapse area	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life. See Guiding Consideration	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
255	2 Scarborough Rd	26	Whitewash Head	Remain green	Cliff Collapse Area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable
256	1 Whitewash Head	26	Whitewash Head	Remain green	Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life. See Guiding Consideration	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overestimates the risk to this property as the property is at the boundary of the model (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints).
257	2 Whitewash Head	26	Whitewash Head	Remain green	Cliff Collapse Area / Touching EQ event lines	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life. See Guiding Consideration	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overestimates the risk to this property as the property is at the boundary of the model (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints).
258	4 Whitewash Head	26	Whitewash Head	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life. See Guiding Consideration	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.

259	25B Taylors Mistake Rd	Whitewash Head	Remain green	Touching EQ event lines	See Guiding Consideration based by the	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	This property is set back from the cliff edge and not subject to extensive land cracking.
260	21 Taylors Mistake Rd	Whitewash Head	Remain green	Touching EQ event lines	These is not the potential for immediate cliff collapse or land slips assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicates that the dwelling is not impacted by cracking and is outside the first and second event lines.
261	23B Taylors Mistake Rd	Whitewash Head	Remain green	Less than half of property in risk area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable
262	2 Flowers Track	Whitewash Head	Remain green	Touching EQ event lines	These is not the potential for immediate cliff collapse or land slips assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model has overstated the risk to this property. There is not actually a cliff in this location, but a steep slope that was erroneously picked up in the GNS model (this limitation is noted in the GNS report).
263	3 Flowers Track	Whitewash Head	Remain green	Touching EQ event lines	These is not the potential for immediate cliff collapse or land slips assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model has overstated the risk to this property. There is not actually a cliff in this location, but a steep slope that was erroneously picked up in the GNS model (this limitation is noted in the GNS report).
264	5 Flowers Track	Whitewash Head	Remain green	Touching EQ event lines	These is not the potential for immediate cliff collapse or land slips assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model has overstated the risk to this property. There is not actually a cliff in this location, but a steep slope that was erroneously picked up in the GNS model (this limitation is noted in the GNS report).
265	May be more properties between 25B Taylors Mistake Rd and Tirohanga Lane (Map 27) that are affected by risk lines, which cannot be seen on maps currently.	Whitewash Head			See comment under Additional Information	Not applicable - see criterion	There are no whole properties in the gap between maps 26 and 27, just a small sliver of 1, 3 and 5 Tirohanga Lane

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266	266 13	Tirohanga Lane	27	Taylor's Mistake	Remain green	Touching EQ event lines	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Expert advice provided to the Group indicates that although this property is located close to a cliff there is a distinct lack of land cracking and damage. No perceived life safety risk.
267	267 5	Tirohanga Lane	27	Taylor's Mistake	Remain green	Touching EQ event lines	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Expert advice provided to the Group indicates that although this property is located close to a cliff there is a distinct lack of land cracking and damage. No perceived life safety risk.
268	268 26	Smugglers Cove	27	Taylor's Mistake	Remain green	Touching EQ event lines	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Expert advice provided to the Group indicates that although this property is located close to a cliff there is a distinct lack of land cracking and damage. No perceived life safety risk.
269	269 23	Smugglers Cove	27	Taylor's Mistake	Remain green	Touching EQ event lines	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Not applicable
270	270 24	Smugglers Cove	27	Taylor's Mistake	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group is that the GNS model overstates the level of life safety risk to this property because this areas of cliff is subject to different geology and there has been only minor loss at the cliff top. There is no immediate risk to life safety on this property and no land cracking or damage has been observed.

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271	22 Smugglers Cove	27	Taylors Mistake	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group is that the GNS model overstates the level of life safety risk to this property because this area of cliff is subject to different geology and there has been only minor loss at the cliff top. There is no immediate risk to life safety on this property and no land cracking or damage has been observed.
272	20 Smugglers Cove	27	Taylors Mistake	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group is that the GNS model overstates the level of life safety risk to this property because this area of cliff is subject to different geology and there has been only minor loss at the cliff top. There is no immediate risk to life safety on this property and no land cracking or damage has been observed.
273	16 Smugglers Cove	27	Taylors Mistake	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group is that the GNS model overstates the level of life safety risk to this property because this area of cliff is subject to different geology and there has been only minor loss at the cliff top. There is no immediate risk to life safety on this property and no land cracking or damage has been observed.
274	91 Taylors Mistake Rd	27	Taylors Mistake	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice is that dwelling outside immediate cliff collapse hazard, no visible damage to cliff driven by local geology.
275	93 Taylors Mistake Rd	27	Taylors Mistake	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice is that dwelling outside immediate cliff collapse hazard, no visible damage to cliff driven by local geology.
276	8 Appian Lane	27	Taylors Mistake	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice is that dwelling outside immediate cliff collapse hazard, no visible damage to cliff driven by local geology.
277	9 Appian Lane	27	Taylors Mistake	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice is that dwelling outside immediate cliff collapse hazard, no visible damage to cliff driven by local geology.

278	115 Taylors Mistake Rd	27	Taylors Mistake Rd	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice is that dwelling outside immediate cliff collapse hazard, no visible damage to cliff driven by local geology.
279	125 Taylors Mistake Rd	27	Taylors Mistake Rd	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice is that dwelling outside immediate cliff collapse hazard, no visible damage to cliff driven by local geology.
280	May be more properties on coast between Maps 27 and 28 that are affected by risk lines which cannot be seen on maps.	27	Taylors Mistake Rd			There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	133, 129 and 127 not shown on maps, dwelling is outside immediate cliff collapse area, no visible damage to cliff driven by local geology
281	147 Taylors Mistake Rd	28	Hobsons Bay	Remain green	More than half of property within risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Not applicable
282	155 Taylors Mistake Rd	28	Hobsons Bay	Remain green	More than half of property within risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Not applicable

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<p>283 157 Taylors Mistake Rd</p>	<p>28</p>	<p>Hobsons Bay</p>	<p>Remain green</p>	<p>Less than half of property within risk area</p>	<p>See Guiding Consideration</p>	<p>In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.</p>	<p>Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property. This is because the property is on the boundary of the model (the GNS model), like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints, and also because the rockfall source is one of a number of technical terms used by GNS and relates to the ability of the rockfall source to generate different amounts of rocks. A diminished rock source would be expected to generate fewer rocks than the neighbouring rock sources.)</p>
<p>284 159 Taylors Mistake Rd</p>	<p>28</p>	<p>Hobsons Bay</p>	<p>Remain green</p>	<p>More than half of property within risk area</p>	<p>The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.</p>	<p>Not applicable - see criterion</p>	<p>Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property. This is because the property is on the boundary of the model (the GNS model), like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints, and also because the rockfall source is one of a number of technical terms used by GNS and relates to the ability of the rockfall source to generate different amounts of rocks. A diminished rock source would be expected to generate fewer rocks than the neighbouring rock sources.)</p>
<p>285 161A Taylors Mistake Rd</p>	<p>28</p>	<p>Hobsons Bay</p>	<p>Remain green</p>	<p>Less than half of property within risk area</p>	<p>See Guiding Consideration</p>	<p>In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.</p>	<p>Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property. This is because the property is on the boundary of the model (the GNS model), like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints, and also because the rockfall source is one of a number of technical terms used by GNS and relates to the ability of the rockfall source to generate different amounts of rocks. A diminished rock source would be expected to generate fewer rocks than the neighbouring rock sources.)</p>

288	209 Taylors Mistake Rd	Hobsons Bay	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property. The area includes a steep slope adjacent to the dwelling which was not considered at risk as no damage was reported or seen.
287	233 Taylors Mistake Rd	Hobsons Bay	Remain green	Touching EQ event lines	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property. The area includes a steep slope adjacent to the dwelling which was not considered at risk as no damage was reported or seen.
288	231 Taylors Mistake Rd	Hobsons Bay	Remain green	Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property. The area includes a steep slope adjacent to the dwelling which was not considered at risk as no damage was reported or seen.
289	211 Taylors Mistake Rd	Hobsons Bay	Remain green	Touching Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property. The area includes a steep slope adjacent to the dwelling which was not considered at risk as no damage was reported or seen.
290	223 Taylors Mistake Rd	Hobsons Bay	Remain green	Touching Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property. The area includes a steep slope adjacent to the dwelling which was not considered at risk as no damage was reported or seen.
291	14 Gilmour Tce	Gilmour Tce	Rec: red > green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 and 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line. In addition, expert advice provided to the Group indicated that a GNS/PHGG field check had confirmed that the rock source area is smaller than in original model. The model has been revised accordingly since the earlier maps were prepared.
292	16 Gilmour Tce	Gilmour Tce	Rec: red > green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 and 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that a GNS/PHGG field check had confirmed that the rock source area is smaller than in original model. The model has been revised accordingly since the earlier maps were prepared.
293	18 Gilmour Tce	Gilmour Tce	Rec: red > green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 and 2016 risk levels as per the GNS model.	All Crown and CCC land should be recommended for green zoning.	Not applicable

294	10 Sumner Road	31	Gilmour Tee	Remain green	Touching Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
295	12 Sumner Road	31	Gilmour Tee	Remain green	Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
296	16 Sumner Road	31	Gilmour Tee	Remain green	Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
297	20 Sumner Road	31	Gilmour Tee	Remain green	Cliff Collapse Area	There is not the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
298	17-25 Gladstone Quay	31	Gilmour Tee	Remain green	Cliff Collapse Area	See comment under Guiding Considerations	The Group has considered the Port area (irrespective of the land ownership) as a separate item.	Not applicable
299	27 Gladstone Qy	31	Gilmour Tee	Remain green	Cliff Collapse Area	See comment under Guiding Considerations	The Group has considered the Port area (irrespective of the land ownership) as a separate item.	Not applicable
300	29 Gladstone Qy	31	Gilmour Tee	Remain green	Cliff Collapse Area	See comment under Guiding Considerations	The Group has considered the Port area (irrespective of the land ownership) as a separate item.	Not applicable
301	31 Gladstone Qy	31	Gilmour Tee	Remain green	Cliff Collapse Area	See comment under Guiding Considerations	The Group has considered the Port area (irrespective of the land ownership) as a separate item.	Not applicable
302	33 Gladstone Qy	31	Gilmour Tee	Remain green	Cliff Collapse Area	See comment under Guiding Considerations	The Group has considered the Port area (irrespective of the land ownership) as a separate item.	Not applicable
303	35 Gladstone Qy	31	Gilmour Tee	Remain green	Cliff Collapse Area	See comment under Guiding Considerations	The Group has considered the Port area (irrespective of the land ownership) as a separate item.	Not applicable

304	19 College Road	32	Brenchley Rd	Rec: red > green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at a 16 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property. This is because the property is at the boundary of the model (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints), and also because the local topography would tend to direct rockfall away from the dwelling.
305	22 College Road	32	Brenchley Rd	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at a 16 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line. In addition, expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property. This is because the property is at the boundary of the model (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints), and also because the local topography would tend to direct rockfall away from the dwelling.
306	3 Hylton Heights	32	Brenchley Rd	Remain green	Touching risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Not applicable
307	16 Hylton Heights	32	Brenchley Rd	Remain green	Most of property within risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Not applicable

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308/26 College Road	32	Brenchley Rd	Remain green	Half of property in risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	(Not applicable)
309/7 Endeavour Pl	33	Endeavour Place	Rec: red > green	Most of property within risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property due to the presence of gullies to the west and north-east of the property which would tend to divert rockfall away from the property.
310/1 Norton Close	33	Endeavour Place	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
311/4 Norton Close	33	Endeavour Place	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
312/2A Norton Close	33	Endeavour Place	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is on the risk line. Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property due to topographical effects ie the presence of a gully which would tend to direct rockfall away from the dwelling.
313/10A Upham Tce	33	Endeavour Place	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The title for 10A Upham Tce incorporates a half share in the underlying land (Lot 4 DP 21463). 10A Upham Terrace is recorded as having no improvements. The title for 10 Upham Tce is a composite title (i.e. cross-lease). The title incorporates a 1/2 share interest in the underlying land (fee simple) as well as a leasehold interest in respect of Flat 1 and Garage 1 (the only two structures on the whole of Lot 4 DP 21463). The dwelling on 10 Upham Terrace is outside the life safety risk line.

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314	91 Jacksons Rd	Hawkhurst Rd	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
315	60 Hawkhurst Rd	Hawkhurst Rd	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
316	62 Hawkhurst Rd	Hawkhurst Rd	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
317	63 Hawkhurst Rd	Hawkhurst Rd	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
318	64 Hawkhurst Rd	Hawkhurst Rd	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
319	66 Hawkhurst Rd	Hawkhurst Rd	Rec. red > green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling at 64 Hawkhurst Road is built across the boundary and is outside the life safety risk zone. 66 Hawkhurst is a vacant section.
320	65 Hawkhurst Rd	Hawkhurst Rd	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
321	71 Hawkhurst Rd	Hawkhurst Rd	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
322	23 Ross Parade	Hawkhurst Rd	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.

323/23A Ross Parade	Hawkhurst Rd	Remain green	More than half of property within risk area	See Guiding Consideration	See comment under Additional Information	This is a small piece of vacant land (144 m ²). The property has its own title but appears to be treated as being associated with 25 Ross Parade. Both titles are currently owned by the same individual. The north-western boundary of 23A is undeveloped land and not a formed road, although it appears that it may still be legal road.
324/25 Ross Parade	Hawkhurst Rd	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
325/34 Bridle Path	Voelas/Walkers	Remain green	Less than half of property within risk area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable
326/8A Harmans Road	Voelas/Walkers	Remain green	Less than half of property within risk area	See Guiding Consideration	In applying the Port Hills residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Not applicable
327/10 Harmans Rd	Voelas/Walkers	Rec. red > green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line on the revised model (revised November 2012).
328/38 Park Tce	Buxtons Rd	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property due to local topographical effects (a gully).
329/14 Buxtons Rd	Buxtons Rd	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property due to local topographical effects (a gully) and because the property is on the boundary of the model (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints).
330/19 Buxtons Rd	Buxtons Rd	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.

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331 180 Cressy Tce	36	Buxtons Rd	Remain green	Touching risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Not applicable
332 78 Cressy Tce	36	Buxtons Rd	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GMS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
333 48 Godley Quay	36	Buxtons Rd	Remain green	Cliff Collapse Area	See comment under Guiding Considerations	The Group has considered the Port area (irrespective of the land ownership) as a separate item.	Not applicable
334 12 Marina Access	37	Naval Point	Remain green	Touching Cliff Collapse area	See comment under Guiding Considerations	The Group has considered the Port area (irrespective of the land ownership) as a separate item.	Not applicable
335 16 Marina Access	37	Naval Point	Remain green	Touching Cliff Collapse area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable
336 271 Governors Bay Rd	39	Rapaki Bay	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GMS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line. (9 Omaru Road and 253 Governors Bay Road are recommended for red zoning because they are contiguous with the residential pattern and red zone).
337 261 Governors Bay Rd	39	Rapaki Bay	Remain green	More than half of property within risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	This is a large property and a significant portion is outside the life safety risk area. (9 Omaru Road and 253 Governors Bay Road are recommended for red zoning because they are contiguous with the residential pattern and red zone).

338	236	Governors Bay Rd	39	Rapaki Bay	Remain green	More than half of property within risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome. Not applicable - see criterion	This property is very large (172 ha) and only part of it lies within the risk line.
339	399	Governors Bay Rd	40	Governors Bay R	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
340	445	Governors Bay Rd	40	Governors Bay R	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
341	460	Governors Bay Rd	40	Governors Bay R	Remain green	More than half of property within risk area	See Guiding Consideration	Properties that are zoned rural under the CCC's City Plan and the Banks Peninsula District Plan are generally recommended for green zoning. Rural properties have been recommended for red zoning where they are included in the GNS Science rock roll or cliff collapse models, are part of the residential settlement pattern for the area, have met the red zoning criteria, and the Group has applied its guiding considerations in a consistent manner.	Not applicable
342	522	Governors Bay Rd	41	Maori Gardens	Remain green	More than half of property within risk area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable

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343	524 Governors Bay Rd	41	Maori Gardens	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the GNS model overstates the life safety risk to this property. This is because of local topographical effects (the property is located along a ridge line), and also because the property is at the boundary of the model (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints).
344	42 Zephyr Terrace	42	Zephyr Tce	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
345	42A Zephyr Terrace	42	Zephyr Tce	Remain green	More than half of property within risk area	See Guiding Consideration and additional comment	In applying the Port Hills residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	This property is a small parcel of land approximately 36m ² .
346	34 Zephyr Terrace	42	Zephyr Tce	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
347	28 Zephyr Terrace	42	Zephyr Tce	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
348	584 Dyers Pass Rd	42	Zephyr Tce	Remain green	Within risk area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable
349	571A Dyers Pass Rd	42	Zephyr Tce	Remain green	Touching risk area	See Guiding Consideration and additional comment	In applying the Port Hills residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	This property is a small triangular lot of land (approx 260 m ²) outside the life safety risk line. We were unable to locate a title, rating valuation or recorded owner for this property.
350	751 Dyers Pass Rd	42	Zephyr Tce	Remain green	Less than half of property within risk area	See Guiding Consideration	All Crown and CCC land should be recommended for green zoning.	Not applicable

351	1051B Dyers Pass Rd	42	Zephyr Tce	Remain green	Less than half of property within risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	This is a large property and a significant portion is outside the life safety risk line.
352	1051A Dyers Pass Rd	42	Zephyr Tce	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
353	1057 Dyers Pass Rd	42	Zephyr Tce	Remain green	Less than half of property within risk area	See Guiding Consideration	All Crown and COC land should be recommended for green zoning.	Not applicable
354	May be more properties in area of risk towards the end of Hays Rise that are out of sight on this map	42	Zephyr Tce	Remain green		See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	These properties are forestry lots and rural zoned land.
355	20 Hays Rise	43	Leading Light La	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
356	9 Hays Rise	43	Leading Light La	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
357	9A Hays Rise	43	Leading Light La	Remain green	Touching risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	The majority of this property is outside the life safety risk line.

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358	5 Leading Light Lane	43	Leading Light Lane	Remain green	Touching risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	The majority of this property is outside the life safety risk line.
359	6 Leading Light Lane	43	Leading Light Lane	Remain green	Less than half of property within risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	The majority of this property is outside the life safety risk line.
360	7 Leading Light Lane	43	Leading Light Lane	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
361	9 Leading Light Lane	43	Leading Light Lane	Remain green	Within risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	This property is a large subdivision balance lot comprising vacant land.
362	48 Main Road (access via	43	Leading Light Lane	Remain green	More than half of property within risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	Expert advice provided to the Group by GNS indicated that, based on the field verification team's observations and the position of the section on the boundary of the rockfall risk model, it is likely that the risk to this property is overstated (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints).
363	50 Main Road (access via	43	Leading Light Lane	Remain green	Less than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.

364	8 Glas Brae	43	Leading Light Lal	Remain green	Touching risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is just touched by the life safety risk line. Expert advice provided to the Group by GNS indicated that it is likely that the risk is overstated at this dwelling. This advice was based on the field verification team's observations and the position of the section on the boundary of the rockfall risk model (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints). A drainage line (gully) was noted by the field teams as having a sheltering effect on this dwelling. The field teams also noted that a gully tends to focus boulders past the dwelling; the large rock source tends to be the other side of a large gully.
365	15 Bay Heights	43	Leading Light Lal	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
366	17 Bay Heights	43	Leading Light Lal	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
367	21 Bay Heights	43	Leading Light Lal	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
368	22 Bay Heights	43	Leading Light Lal	Remain green	More than half of property within risk area	The annual individual fatality risk associated with the residential dwelling is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	The dwelling on this property is outside the life safety risk line.
369	39 The Terrace	43	Leading Light Lal	Remain green	Less than half of property within risk area	See Guiding Consideration	In applying the Port Hills zoning criteria to vacant residential lots the Group exercised judgement in relation to lots intersected by the life safety risk line and applied a reasonableness test to achieve a sensible outcome.	The majority of this property is outside the life safety risk line.

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Lake Recovery

14A Avoca Valley Rd 6	Port Hills Road	Rec: green > red	Outside risk area	The annual individual fatality risk associated with the residential dwelling is greater than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	GNS has advised that the rock roll model understates the life safety risk to this property and the property is in an elevated risk area. Following ground truthing and a close examination of the model, it was determined that the dwellings at 4A, 4B and 6 Avoca Valley Road are exposed to an Annual Individual Fatality Risk of 1 in 10,000 or greater in 2016.
2/251 St Andrews Hill Rd 13	Mt Pleasant	Rec: green > red	Not touching area of risk	The Group determined that the intent of the following criterion had been met: There is the potential for immediate cliff collapse or land slips as assessed by the Canterbury earthquakes with associated risk to life.	Where properties did not strictly meet the red zoning criteria, but the intent of the criteria was met, the Group has recommended that these properties be zoned red.	Expert advice provided to the Group indicated that this property is exposed to the potential for immediate land damage with an associated risk to life as a result of the earthquakes. A loess cliff affects this property which has significant land cracks. In addition to earthquake induced land damage a significant rainstorm could cause collapse. GNS did not include this steep slope in its model because it was not assessed as being a former coastal cliff (a key criteria for inclusion).
3/51C St Andrews Hill Rd 13	Mt Pleasant	Rec: green > red	Not touching area of risk	The Group determined that the intent of the following criterion had been met: There is the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Where properties did not strictly meet the red zoning criteria, but the intent of the criteria was met, the Group has recommended that these properties be zoned red.	Expert advice provided to the Group indicated that this property is exposed to the potential for immediate land damage with an associated risk to life as a result of the earthquakes. A loess cliff affects this property which has significant land cracks. In addition to earthquake induced land damage a significant rainstorm could cause collapse. GNS did not include this steep slope in its model because it was not assessed as being a former coastal cliff (a key criteria for inclusion).
4/10 Quarry Rd 13	Mt Pleasant	Rec: green > red	Not touching area of risk	The Group determined that the intent of the following criterion had been met: There is the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Where properties did not strictly meet the red zoning criteria, but the intent of the criteria was met, the Group has recommended that these properties be zoned red.	Expert advice provided to the Group indicated that this property is exposed to the potential for immediate land damage with an associated risk to life as a result of the earthquakes. A loess cliff affects this property which has significant land cracks. In addition to earthquake induced land damage a significant rainstorm could cause collapse. GNS did not include this steep slope in its model because it was not assessed as being a former coastal cliff (a key criteria for inclusion).
5/76 McCormacks Bay Rd 14	Martleys Rd	Rec: green > red	Not touching area of risk	The Group determined that the intent of the following criterion had been met: There is the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Where properties did not strictly meet the red zoning criteria, but the intent of the criteria was met, the Group has recommended that these properties be zoned red.	Expert advice provided to the Group indicated that the property is exposed to the potential for immediate land damage with an associated risk to life as a result of the earthquakes. The loess bank immediately upslope of this property shows signs of ongoing distress (as evidenced by ground cracking), suggestive of ongoing ground movement. There is a high possibility of collapse which is considered to pose a direct life safety risk to occupants. Ground damage is earthquake exacerbated, though not necessarily earthquake caused and mitigation options are unclear.
6/27 Glendevore Terrace 16	Redcliffs (1)	Remain red	Not touching EQ event lines	There is the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that this property is located in an area of cliff deformation. The cracking continues beyond the retreat lines and there is the potential for immediate cliff collapse or land slip with associated risk to life.

7 27A Glendevore Terrad 16	Redcliffs (1)	Remain red	Not touching EQ event lines	There is the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that this property is located in an area of cliff deformation. The cracking continues beyond the retreat lines and there is the potential for immediate cliff collapse or land slip with associated risk to life.
8 48 Balmoral Ln	Redcliffs (1)	Remain red	Not touching EQ event lines	There is the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that this property is located in an area of cliff deformation. The cracking continues beyond the retreat lines and there is the potential for immediate cliff collapse or land slip with associated risk to life.
9 16 Egnot Heights	Redcliffs (2)	Remain red	Not touching Cliff Collapse Area or EQ Event Lines	There is the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that the ground cracking and ground truthing in the area is evidence for ground instability with the potential to give rise to sudden cliff collapse with associated risk to life. This area is affected by cliff collapse and land movement. Extensive land cracking was observed nearby. The area is the southernmost extension of the Redcliffs cliff area. The area featured a residential dwelling that is now being demolished due to severe structural distress. The GNS cliff collapse risk appears to stop before the property and expert advice is that this is a boundary effect and it will cause the risk to life on this location to be underestimated (the GNS model, like all numerical models, becomes less certain at the edges of the modelled area due to inherent model assumptions and mathematical constraints). The model appears to be skewed due to the presence of the access road to south of the property. The very steep slope is bisected by the road but there is evidence by land cracking and property damage indicating that land has moved in past events. There is a steep to very steep slope present and expert advice is that on balance the risk on this property is similar to the properties to the north and north east along Defender Lane that feature very similar topographical and geological setting.

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The Minister

Canterbury Earthquake Recovery

<p>1014 Moncks Spur Rd</p>	<p>17</p>	<p>Redcliffs (2)</p>	<p>Rec: green > red</p>	<p>Not touching Cliff Collapse Area or EQ Event Lines</p>	<p>The Group determined that the intent of the following criterion had been met: There is the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.</p>	<p>Where properties did not strictly meet the red zoning criteria, but the intent of the criteria was met, the Group has recommended that these properties be zoned red.</p>	<p>The eight metre near vertical loess cliff adjacent to the properties at 4 and 8 Moncks Spur Lane was not included in the GNS model as it generally included sea-cut rock cliffs only.</p> <p>Expert advice provided to the Group indicated that these properties are exposed to the potential for immediate land damage with an associated risk to life as a result of the earthquakes. The advice indicated that the loess cliff presented an immediate life safety hazard, caused or accentuated by the earthquakes. In several areas the cliff failed and impacted the dwellings at 4 and 8 Moncks Spur. Remediation of the cliff would require both buildings to be demolished.</p> <p>On balance, the Group agreed that while the properties did not meet the red zoning criteria, they did meet the intent of the criteria and the risk to life is such that the panel recommended they be rezoned from green to red.</p>
<p>1118 Moncks Spur Rd</p>	<p>17</p>	<p>Redcliffs (2)</p>	<p>Rec: green > red</p>	<p>Not touching Cliff Collapse Area or EQ Event Lines</p>	<p>The Group determined that the intent of the following criterion had been met: There is the potential for immediate cliff collapse or land slips as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.</p>	<p>Where properties did not strictly meet the red zoning criteria, but the intent of the criteria was met, the Group has recommended that these properties be zoned red.</p>	<p>The eight metre near vertical loess cliff adjacent to the properties at 4 and 8 Moncks Spur Lane was not included in the GNS model as it generally included sea-cut rock cliffs only.</p> <p>Expert advice provided to the Group indicated that these properties are exposed to the potential for immediate land damage with an associated risk to life as a result of the earthquakes. The advice indicated that the loess cliff presented an immediate life safety hazard, caused or accentuated by the earthquakes. In several areas the cliff failed and impacted the dwellings at 4 and 8 Moncks Spur. Remediation of the cliff would require both buildings to be demolished.</p> <p>On balance, the Group agreed that while the properties did not meet the red zoning criteria, they did meet the intent of the criteria and the risk to life is such that the panel recommended they be rezoned from green to red.</p>

12	150 Clifton Tce	Kinsey Terrace	Remain red	Not touching Cliff Collapse Area or EQ Event Lines	There is the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that these properties are exposed to the potential for immediate land damage with an associated risk to life as a result of the earthquakes. There is mass movement in this area. While risk to life has not been quantified for this area, significant ground displacement (mass movement) was observed at the eastern end of the cliff. GNS has advised that the eastern mass movement area around the intersection of Kinsey and Clifton Terraces has moved approximately 1 metre laterally and 300-500mm vertically over three earthquake events. Given the mass movement and relatively high elevation, there is thought to be an immediate risk to life associated with this property.
13	151 Clifton Tce	Kinsey Terrace	Remain red	Not touching Cliff Collapse Area or EQ Event Lines	There is the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that there is mass movement in this area. While risk to life has not been quantified for this area, significant ground displacement (mass movement) was observed at the eastern end of the cliff. GNS has advised that the eastern mass movement area around the intersection of Kinsey and Clifton Terraces has moved approximately 1 metre laterally and 300-500mm vertically over three earthquake events. Given the mass movement and relatively high elevation, there is thought to be an immediate risk to life associated with this property.
14	149 Clifton Tce	Kinsey Terrace	Remain red	Not touching Cliff Collapse Area or EQ event lines	There is the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The Group spent a significant amount of time in this area. Expert advice provided to the Group indicated that there is mass movement in this area. While risk to life has not been quantified for this area, significant ground displacement (mass movement) was observed at the eastern end of the cliff. GNS has advised that the eastern mass movement area around the intersection of Kinsey and Clifton Terraces has moved approximately 1 metre laterally and 300-500mm vertically over three earthquake events. Given the mass movement and relatively high elevation, there is thought to be an immediate risk to life associated with this property.
15	153 Clifton Tce	Kinsey Terrace	Remain red	Not touching Cliff Collapse Area or EQ Event Lines	There is the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The Group spent a significant amount of time in this area. Expert advice provided to the Group indicated that there is mass movement in this area. While risk to life has not been quantified for this area, significant ground displacement (mass movement) was observed at the eastern end of the cliff. GNS has advised that the eastern mass movement area around the intersection of Kinsey and Clifton Terraces has moved approximately 1 metre laterally and 300-500mm vertically over three earthquake events. Given the mass movement and relatively high elevation, there is thought to be an immediate risk to life associated with this property.

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by the Ministry of Canterbury Earthquake Recovery

16/48 Clifton Toe	Kinsey Terrace	Remain red	Not touching Cliff Collapse Area or EQ Event Lines	There is the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	Expert advice provided to the Group indicated that there is mass movement in this area. While risk to life has not been quantified for this area, significant ground displacement (mass movement) was observed at the eastern end of the cliff. GNS has advised that the eastern mass movement area around the intersection of Kinsey and Clifton Terraces has moved approximately 1 metre laterally and 300-500mm vertically over three earthquake events. Given the mass movement and relatively high elevation, there is thought to be an immediate risk to life associated with this property.
17/1 Kinsey Toe	Kinsey Terrace	Remain red	Not touching Cliff Collapse Area or EQ event lines	There is the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The Group spent a significant amount of time in this area. Expert advice provided to the Group indicated that there is mass movement in this area. While risk to life has not been quantified for this area, significant ground displacement (mass movement) was observed at the eastern end of the cliff. GNS has advised that the eastern mass movement area around the intersection of Kinsey and Clifton Terraces has moved approximately 1 metre laterally and 300-500mm vertically over three earthquake events. Given the mass movement and relatively high elevation, there is thought to be an immediate risk to life associated with this property.
18/98 Richmond Hill Rd	Richmond Hill	Remain red	Outside risk area	There is the potential for immediate cliff collapse or land slip as assessed by GNS caused or accentuated by the Canterbury earthquakes with associated risk to life.	Not applicable - see criterion	The Group spent a significant amount of time in this area. Expert advice provided to the Group indicated that although the property is outside the earthquake event lines, the evidence of cracking signals that the property is at a high risk of sudden failure.
19/1/20 Nayland Street	Richmond Hill	Remain red	Outside risk area	See comment under Additional information	See comment under Additional information	This property is situated on a cross-lease with 2/20, 3/20, 4/20 and 5/20 Nayland Street. The properties at 3/20, 4/20 and 5/20 Nayland Street are subject to unacceptable risk. It was not considered appropriate to recommend a subdivision.
20/2/12 Firmsarby Pl	Wakefield (2)	Remain green	Not touching risk area	The annual individual fatality risk associated with the residential dwellings less than 1 in 10,000 at 2046 risk levels as per the GNS model.	Not applicable - see criterion	2/12 Firmsarby Place is outside the life safety risk line and is on a cross-lease title with 1/12 Firmsarby Place, which is just outside the life safety risk line and is zoned green. Expert advice provided to the Group indicated the level of life safety risk to 1/12 Firmsarby Place is overstated as the model does not recognise the benching effect of the road. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area.)

21	1/104 Sumnervale Dr	23	Sumnervale	Rec: green > red	Outside risk area	The annual individual fatality risk associated with the residential dwellings is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the model significantly understates risk due to suburb wide averaging and different rockfall sources. The advice indicated that the road between this property and the cliff provides a bench, but the Group is not convinced that it provides sufficient protection. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area but the Group does not consider this to be sufficient for this property.)
22	2/104 Sumnervale Dr	23	Sumnervale	Rec: green > red	Outside risk area	The annual individual fatality risk associated with the residential dwellings is less than 1 in 10,000 at 2016 risk levels as per the GNS model.	Not applicable - see criterion	Expert advice provided to the Group indicated that the model significantly understates risk due to suburb wide averaging and different rockfall sources. The advice indicated that the road between this property and the cliff provides a bench, but the Group is not convinced that it provides sufficient protection. (In most circumstances the presence of a flat area such as a road carriageway or building platform tends to reduce the rockfall risk for properties located below the flat area, but the Group does not consider this to be sufficient for this property.)
23	342 Marine Drive	44	Marine Drive	Rec: green > red	Outside risk area	The Group determined that the intent of the following criterion had been met. The annual individual fatality risk associated with the residential dwellings is higher than 1 in 10,000 at 2016 risk levels as per the GNS model.	Where properties did not strictly meet the red zoning criteria, but the intent of the criteria was met, the Group has recommended that these properties be zoned red.	There is a significantly elevated hazard to life on these properties due to rock roll, such that the risk is comparable to red zoned properties within GNS Science-modelled areas. Accordingly, it was considered that this recommendation is consistent with the intent of the red zoning criteria agreed to by Cabinet. Expert advice provided to the group indicated that Charteris Bay is outside the area covered by the GNS Science risk model and 3D model, as there is no Light Detection and Ranging (LIDAR) data for this area. PHGG/CCC advisors have noted that rock outcrops directly above select properties were weakened and fractured during recent earthquakes. As a result, these properties are exposed to significant rock roll hazard. Significant rock roll has occurred on these properties.

24 336 Marine Drive	44	Marine Drive	Rec: green > red	Outside risk area	The Group determined that the intent of the following criterion had been met: The annual individual fatality risk associated with the residential dwellings is higher than 1 in 10,000 at 2016 risk levels as per the GNS model.	Where properties did not strictly meet the red zoning criteria, but the intent of the criteria was met, the Group has recommended that these properties be zoned red.	There is a significantly elevated hazard to life on these properties due to rock roll such that the risk is comparable to red zoned properties within GNS Science-modelled areas. Accordingly, it was considered that this recommendation is consistent with the intent of the red zoning criteria agreed to by Cabinet.
25 334 Marine Drive	44	Marine Drive	Rec: green > red	Outside risk area	The Group determined that the intent of the following criterion had been met: The annual individual fatality risk associated with the residential dwellings is higher than 1 in 10,000 at 2016 risk levels as per the GNS model.	Where properties did not strictly meet the red zoning criteria, but the intent of the criteria was met, the Group has recommended that these properties be zoned red.	There is a significantly elevated hazard to life on these properties due to rock roll, such that the risk is comparable to red zoned properties within GNS Science-modelled areas. Accordingly, it was considered that this recommendation is consistent with the intent of the red zoning criteria agreed to by Cabinet.
26 332 Marine Drive	44	Marine Drive	Rec: green > red	Outside risk area	The Group determined that the intent of the following criterion had been met: The annual individual fatality risk associated with the residential dwellings is higher than 1 in 10,000 at 2016 risk levels as per the GNS model.	Where properties did not strictly meet the red zoning criteria, but the intent of the criteria was met, the Group has recommended that these properties be zoned red.	There is a significantly elevated hazard to life on these properties due to rock roll, such that the risk is comparable to red zoned properties within GNS Science-modelled areas. Accordingly, it was considered that this recommendation is consistent with the intent of the red zoning criteria agreed to by Cabinet. Expert advice provided to the group indicated that Charterns Bay is outside the area covered by the GNS Science risk model and 3D model, as there is no Light Detection and Ranging (LIDAR) data for this area. PHGG/CCC advisors have noted that rock outcrops directly above select properties were weakened and fractured during recent earthquakes. As a result, these properties are exposed to significant rock roll hazard. Significant rock roll has occurred on these properties.

