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Earthquake Commission
10 February 2016

Insurance Liability Valuation
as at 31 December 2015

Final Report

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Towers Watson Alliance Partner
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1 Executive Summary

1.1 Addressee

This report is addressed to Ian Simpson, Chief Executive of the Earthquake Commission (‘EQC’).

1.2 Report commissioned by

This report was commissioned by Hugh Cowan, EQC’s GM Reinsurance, Research and Education.

1.3 Purpose

This report was commissioned to provide information with regards to:

- EQC’s insurance liabilities and reinsurance recoveries for use in the financial statements as at 31 December 2015.
- The development of EQC’s Canterbury earthquakes claims costs since 30 June 2015.

1.4 Scope

1.4.1 Insurance liabilities components

The insurance liabilities include:

- Outstanding (OS) claims liabilities – which relate to the future direct and indirect claims costs and reinsurance recoveries for claims incurred up to 31 December 2015.
- Premium liabilities – which relate to the future net claims costs and administration and reinsurance expenses for future claims arising from unexpired risks as at 31 December 2015.

The liabilities calculated include a risk margin and are discounted for the time value of money.

Premium liabilities are not included directly in the balance sheet but are used for the Liability Adequacy Test of the unearned premium liability provision.

A more detailed description of the nature and components of the insurance liabilities are set out in Section 1.10 as well as Sections 7 and 12.

1.5 Effective valuation date

The effective date of the valuation is 31 December 2015.
1.6 This report

Although this report includes considerable detail on all aspects of the actuarial investigations, in order to keep it to a manageable size a lot of the information has been summarised. Further details regarding the data, methods, assumptions, calculations and results underlying this report are available from the authors on request.

Unless otherwise indicated, all amounts in this report are stated in New Zealand dollars and are net of GST (i.e. they exclude GST).

1.7 Previous valuations

Melville Jessup Weaver (‘MJW’) has prepared valuations for EQC at six monthly intervals since 2010, when the Canterbury Earthquake Sequence began.

The most recent valuation for EQC, which is referenced in this report, is the Insurance Liability Valuation Report (‘ILVR’) as at 30 June 2015 (dated 12 August 2015).

1.8 Definitions of technical terms

We have tried to avoid unnecessary insurance jargon wherever possible. To help understand the technical terms which were used in this report we have included a glossary in Appendix J.

1.9 Event groups

1.9.1 Canterbury earthquake claim events

A series of damaging earthquakes has affected the Canterbury region in general, and the city of Christchurch in particular, since the first event on 4 September 2010. These earthquakes have resulted in injury, loss of life, and billions of dollars of damage to infrastructure, commercial property and residential dwellings.

Details of the Canterbury earthquake events are set out in Appendix A.

For the purposes of valuing the outstanding claims, the Canterbury earthquake claims have been split into the following event groups:

- EQ1 – 4 September 2010 event
- EQ2 – 22 February 2011 event
- EQ3 – 13 June 2011 event (including 21 June 2011 event) *
- EQ4 – 23 December 2011 event
- Aftershocks (‘AS’) – the eleven other events shown on the Business Information Unit (‘BIU’) Daily Report as well as ‘Other Canterbury claims’ included in the Daily Report totals. The logic used to identify these claims is based on the claim’s Territorial Local Authority and loss cause and is consistent with the BIU’s definition.

*EQC’s reinsurance programme covers all incurred losses arising within 720 hours from an event. Consequently, losses arising from the 21 June 2011 aftershock are included in the EQ3 event definition.
1.9.2 Other claim events

Other outstanding EQC claims, including those arising from landslips, hydrothermal events, and from earthquakes outside Canterbury are categorised as ‘BAU’ (Business As Usual) claims.

1.9.3 Components of premium liabilities

For the purposes of valuing the premium liabilities, the following event categories were used:
- Business as Usual (‘BAU’) claims.
- Minerva claims - catastrophe event claims arising from earthquakes in NZ outside Canterbury.
- Canterbury earthquake claims.

1.10 Operational Developments since the 30 June 2015 valuation

There have been a number of operational developments within EQC which have had an impact on the valuation models since 30 June 2015. These relate to:
- Building model
  - Apportionment on paid claims
  - Insurer washup
- Land model
  - ILV DoV rates
  - Capping methodology
  - Port Hills
  - Unclaimed damage

A description of these operational developments is shown below with detail on how each of these have affected the valuation being shown in Section 1.11.

1.10.1 Canterbury earthquakes: building model

Apportionment on paid claims

Over the past six months we have been working closely with EQC, developing the process by which loss run reports are produced. These loss run reports are distributed to reinsurers and form the basis by which recovery payments are received.

It has been decided by EQC that a pragmatic solution to producing loss run reports is to use the paid apportionment information that is shown in the ILVR.

Consequently, we have been asked to expand our output to cater for this report.

Insurer washup
1.10.2 Canterbury earthquakes: land model

ILV DoV rates

As at 30 June 2015, the draft ILV policy had been approved in principle by the Board. At that time, there was no EQC position on the DoV rates that might apply. As such, it was necessary for us to derive a set of rates for the purposes of the valuation.

The ILV policy has now been finalised and a draft document outlining how some of the DoV rates should be calculated has been produced. The document:

- is focused on assessing DoV for properties where the house that existed before the Canterbury Earthquake Sequence is still in situ on the property,
- does not deal with properties with both IFV and ILV qualifying damage.

There are 2,900 properties that satisfy this criteria in the Green Zone, out of 9,950 ILV qualifying properties across Canterbury.

The draft document outlines a six step process which allows the calculation of a DoV rate for each qualifying ILV property. It concludes with a review of the DoV rate that has been calculated.

Capping methodology

EQC have recently clarified that land caps reinstate after each event. This is subject to the total cost over the Canterbury Earthquake Sequence not exceeding the value of the Insured Land Area (where the entire insured area has been damaged), plus the indemnity value of the bridges, culverts and retaining walls that are lost or damaged.

Insured Land Area is the area of land that has been modelled as being equivalent to the ‘residential land’ as defined in the EQC Act. It is generally described as being the land area beneath and up to 8 metres distance from permanent dwellings and includes the main accessway to the property. The land model is discussed further in Section 2.5.5.

Port Hills

The provision in respect of Port Hills properties has historically been derived by using an aggregate model and then subtracting paid claims to arrive at the outstanding figure.

We were asked at the previous valuation to create a property by property model to better reflect these costs.
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We have requested and received a listing of:
- All Port Hills properties (7837 properties).
- The remaining open Port Hills properties (217 properties).

The open Port Hill property listing includes a field indicating the reason why it is still open. There is a paucity of detail around each property that is available for use in the valuation and we will expand this for the valuation as at 30 June 2016.

Unclaimed damage

EQC's liability relating to land damage depends on the amount of the damage and how it is apportioned across events. Ordinarily, EQC wouldn't have any liability for an event if a claim was not lodged for that event. However, this approach would not have recognised that in general it was difficult for a customer to identify ILV and IFV, which are 'invisible'.

The potential issue of unclaimed land damage was resolved on 29 October 2015 with a Ministerial Direction to the effect that EQC would cover all land damage related to a property so long as there was at least one claim from the Canterbury earthquake sequence. EQC's cover rules (excesses and caps) would apply as normal.

This Ministerial Direction follows similar earlier directions (2012 and 2013) given in respect of building claims. The only distinction between the land and building directions is that in respect of building claims, excesses would only apply to events where a claim was lodged whereas for land claims, excesses are applied to all events.

1.11 Valuation Developments since the 30 June 2015 valuation

The operational developments noted above have been factored into the valuation model. The sections below describe how this has occurred. Further information on all of the items below is found in Section 5 and Appendix G.

The impact of these changes is shown in Section 1.13.3.

1.11.1 Canterbury earthquakes: building model

Apportionment on paid claims

The overall gross building claim payments made to date by EQC is an objective figure. However, establishing the gross claim payments by event requires some judgment. This leads to different possible estimated paid event apportionments. The apportionment of paid claims is a known issue and one that has been moving towards resolution over time.

Since November 2014, EQC's statistical consultant, [Redacted], has produced apportionment estimates specifically for undercap properties. The [Redacted] apportionment model is referred to as 'Small PAT' (Proxy Apportionment Tool).

As at 31 December 2014 apportionment of paid claims was taken, for the most part, directly from the Actuarial Data Extract ('ADE'). The only exception to this was the repairs costs for properties repaired through the EQR programme, which are recorded against one claim number and typically one of the later events. Within our building model, these EQR repair costs were apportioned using the Apportioned Cost Estimate ('ACE') data. The results produced for this valuation (December 2014) were materially similar to those that would have been produced had we used the Small PAT results.
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The Apportioned Cost Estimate data set contains information on every property that has been manually apportioned through the ACE team. These manual apportionments use all available information to inform the result.

As at 30 June 2015, the apportionment in regards to undercap paid claims was adjusted to follow the apportionment for all undercap estimated ultimate claims costs. All undercap claims costs which had not gone through the ACE apportionment process were apportioned as per the Small PAT results.

As at 31 December 2015 the process has been rationalised further with all properties either being apportioned using the ACE process or by reference to the Small PAT results. The only exception to this is overcap properties which have yet to go through the ACE process. For these properties, the claims paid by event in the ADE are taken and no further apportionment assumptions are applied.

In summary, the 31 December 2015 paid apportionment comprises:

- Overcap ACE. ACE apportionment.
- Overcap non-ACE. ADE paid apportionment for overcap claims yet to go through ACE.
- Undercap ACE. ACE apportionment.
- Undercap non-ACE. Small PAT apportionment.
- Partially completed EQR. Receive same bulk apportionment as completed EQR properties.

We would note that the current methodology is a refinement of the process used as at 30 June 2015 and the impact for the paid apportionment will be immaterial. The apportionment of paid claims does not directly impact the estimated gross ultimate claims costs.

It is intended that the results of the ILVR will form the basis for the loss run reports which are to be distributed to reinsurers.

We understand there will be a material change in the loss run reports that are provided to reinsurers as the reports will now more correctly apportion claims, specifically the claim payments made through EQR.

Insurer washup
1.11.2  Canterbury earthquakes: land model

ILV DoV rates

There is a draft DoV methodology document detailing how the DoV rates should be calculated. It produces DoV rates for some, but not all, ILV damaged properties.

Using this as a reference, we have constructed a set of DoV rates which we feel are appropriate for the purposes of this valuation. These rates happen to lie between those that we used at 30 June 2015 and the rates produced in the draft DoV document.

Residential Red Zone

In respect of land claim payments, Red Zone properties will be settled in aggregate with CERA (LINZ). We have assumed repair cost for all Red Zone properties. This is the same assumption that was used as at 30 June 2015.

Capping methodology

In respect of our capping methodology, we had previously modelled land caps as being either a single cap across all events or caps reinstating. This produced a result that was in between the lower limit (single cap) and the higher figure (multiple caps).

We have now modelled land caps in accordance with the recent information from EQC as set out above. This has led to an increase in the estimated gross ultimate claims costs of some $60 million.

Port Hills

In establishing an outstanding liability for the open Port Hills properties, we have divided the properties according to their reasons for being open. For each of the first two categories we have selected several properties and assessed each using EQC and other information (including CERA website, google maps etc.) to make an assessment of possible outcomes.

Following this assessment it became clear that without further information it was impossible to discount the possibility that the Port Hills Red Zone and Land Challenge properties could be paid their full land value.
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We have therefore proceeded with this assumption. We have also assumed that the recoveries properties effectively cancel out with the properties that are in progress.

The result of this was that there is a small release of the total provision for this valuation. We will update this for 30 June 2016 as more information is available.

**Unclaimed damage**

In respect of unclaimed damage, the land model (and building model), follow the relevant ministerial directions regarding the issue. That being:

- Unclaimed damage on an event is treated as being payable so long as there is at least one claim during the Canterbury Earthquake Sequence.
- Excesses and caps apply according to the normal rules of the EQC Act.

With the exception of excesses on building claims for which there is no valid claim, in which case an excess is not applied. Note that the building model has modelled the ministerial direction correctly for some time.

### 1.11.3 Canterbury earthquakes: contents model

No material changes to the model.

### 1.11.4 BAU model

No material changes to the model.

### 1.11.5 Claims handling expenses (CHE) model

No material changes to the model.

### 1.12 Principal areas of judgment

The valuation of the Canterbury earthquake claims costs requires judgment to be applied in many areas. Some of these areas have a material impact on the outcome and these are described below.

### 1.12.1 Building model

Within the building model there is a provision for reopened claims for insurer washup. This is discussed in detail in Section 1.11.1.

Judgment has been applied to estimate the quantum of the provision and also how it might fall over the events. It is recognised that the actual cost may differ significantly from that which has been allowed for and as more information is available, the provision will be refined.
1.12.2 Land model

The land model is based on information provided by T+T. A key part of this information is a scenario based model with detailed geotechnical and financial information on every flat land property that may be eligible for a land claim. We have then translated this into a stochastic land model and applied judgment in a number of key areas. The most material of these relate to:

- IFV DoV rates
- ILV DoV rates
- Settlement treatment of Red Zone properties

IFV DoV Rates

Settlement on IFV damaged properties has begun with properties in the Green Zone that have IFV damage only being addressed first. These properties are considered easier to assess and therefore estimate settlement costs than combination IFV+ILV damaged properties or qualifying Red Zone properties.

It has been established that there is a strong correlation between the extent of the Exacerbated Flooding Coverage (EFC), as a percentage of the insured land area, and the DoV rates that have been applied. This relationship has been used to estimate DoV rates for the remaining IFV properties, given that the EFC has been assessed for those properties.

The remaining properties, particularly combination IFV+ILV damaged properties and Red Zone properties, have higher EFC than the properties that have been settled to date. We would therefore expect higher settlement amounts on average for the remaining properties.

It should be recognised that the relationship between EFC and DoV rate may break down for the more difficult remaining areas and to address this we have increased the expected DoV rates for the remaining Green Zone properties.

In respect of the Red Zone properties, we have left our DoV rate assumptions unchanged from 30 June 2015. These were based on engineering judgment at the time and will be reassessed as more information is forthcoming.

ILV DoV Rates

The question of the appropriate ILV DoV rates to apply has been noted above in Section 1.11.2. The T+T model uses the draft DoV rates for all ILV affected properties. That is, they have explicitly not applied any judgment around what may ultimately occur.

There is a draft DoV methodology document detailing how the DoV rates should be calculated. The draft document:

- Produces DoV rates for properties where the house that existed before the Canterbury Earthquake Sequence is still in situ on the property.
- Does not deal with properties with both IFV and ILV qualifying damage.
- Is likely to produce rates that are an effective floor on the aggregate EQC claims costs.

The final step in the assessment process under the draft DoV methodology document is a review step. This review may lead to an increased DoV rate.

The DoV rates in this draft methodology document are not for the purpose of assessing DoV for combination ILV+IFV properties.
For properties in the Red Zone, the rates may produce inadequate results. We have assumed repair cost for all Red Zone properties. This is the same assumption that was used as at 30 June 2015.

Using these rates for combination ILV+IFV properties and for properties in the Red Zone is likely to produce inadequate results.

In addition to this, no ILV properties have been settled by DoV and so there is no way of knowing how much challenge will be forthcoming on the ILV policy, the rates, or the settlement path for each property.

Lastly, the dollar amounts produced by the draft DoV methodology document indicate an average figure considerably lower than the average figure that may be payable under the repair costs settlement path. This difference in quantum is likely to increase the risk of challenge in our opinion.

Our approach to this information is to use a set of rates which lie between those that we used at 30 June 2015 and those 'floor' rates produced in the draft DoV document.

The average DoV settlement amount under our valuation model is some $58k.

It should be recognised that the actual DoV settlement amounts may be quite different to this figure.

**Red Zone settlement path**

In respect of land claim payments, Red Zone properties will be settled in aggregate with CERA (LINZ). The ILV settlement path for these properties will have a material impact on the ultimate claims cost. Our approach to this is noted in Section 1.11.2.

EQC and LINZ have yet to substantively begin work on the Red Zone land settlement. There are several outstanding uncertainties, including completion of the EQC methodology for dealing with properties with IFV and ILV (which comprise the majority of the Red Zone properties).

We do not consider it is prudent to alter the modelling assumptions for Red Zone settlement at this point without further information from EQC. Therefore, all ILV Red Zone properties have had their settlement amounts calculated using repair costs.

**Scenario analysis**

We have carried out some scenario analysis around the ILV issues noted above, specifically changes to the ILV DoV rates and to the Red Zone settlement path. The results of this are shown in Section 8.3.

**1.13 Key results – claims incurred**

The gross incurred claims costs for all Canterbury EQ events, incurred to 31 December 2015 include:

- Claims costs paid to date
- Claims costs expected to be paid in future (the OS claims liability).
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Claims costs paid to date are known with certainty, but those to be paid in the future are unknown and so must be estimated. The approach that we have taken is to estimate the ultimate incurred claims costs and then deduct payments made to 31 December 2015 in order to determine the estimated OS claims liability.

The ultimate incurred claims costs are calculated in respect of Canterbury earthquake events only as it is not useful (or practical) to include ultimate incurred claims costs from BAU events. No risk margins have been calculated and no discounting has been applied to the estimated ultimate incurred claims costs.

The outstanding claims liabilities are in respect of all outstanding EQC claims (Canterbury earthquakes plus BAU) and are discounted for the time value of money and include risk margins at the 85th percentile.

1.13.1 Estimated ultimate claims costs – Canterbury earthquakes only

The table below summarises the main components involved in estimating the ultimate cost of claims to EQC arising from the Canterbury earthquakes only as at 31 December 2015. A more detailed version of this table, including comparatives with the 30 June 2015 ILVR, is given in Section 7.5.

The estimated ultimate claims cost is built up from the following components:

- Claims costs paid to date
- Case estimates
- Actuarial determination
- Claims handling expenses (CHE).

<table>
<thead>
<tr>
<th>Canterbury earthquakes only</th>
<th>EQ1 $m</th>
<th>EQ2 $m</th>
<th>EQ3 $m</th>
<th>EQ4 $m</th>
<th>AS $m</th>
<th>Total $m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Claims paid to date*</td>
<td>2,344</td>
<td>4,800</td>
<td>385</td>
<td>116</td>
<td>189</td>
<td>7,834</td>
</tr>
<tr>
<td>Case estimates</td>
<td>(116)</td>
<td>(353)</td>
<td>103</td>
<td>10</td>
<td>25</td>
<td>(330)</td>
</tr>
<tr>
<td>Actuarial determination</td>
<td>675</td>
<td>1,412</td>
<td>160</td>
<td>30</td>
<td>(4)</td>
<td>2,273</td>
</tr>
<tr>
<td>Gross estimated ultimate incurred claims</td>
<td>2,904</td>
<td>5,858</td>
<td>649</td>
<td>157</td>
<td>210</td>
<td>9,777</td>
</tr>
<tr>
<td>Claims handling expenses (CHE)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paid to date</td>
<td>424</td>
<td>690</td>
<td>108</td>
<td>35</td>
<td>45</td>
<td>1,302</td>
</tr>
<tr>
<td>Estimated future</td>
<td>47</td>
<td>98</td>
<td>26</td>
<td>5</td>
<td>4</td>
<td>180</td>
</tr>
<tr>
<td>Total</td>
<td>471</td>
<td>788</td>
<td>134</td>
<td>40</td>
<td>49</td>
<td>1,482</td>
</tr>
<tr>
<td>Gross ultimate incurred claims including CHE</td>
<td>3,375</td>
<td>6,646</td>
<td>783</td>
<td>197</td>
<td>258</td>
<td>11,259</td>
</tr>
<tr>
<td>Reinsurance recoveries</td>
<td>(1,854)</td>
<td>(2,477)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>(4,332)</td>
</tr>
<tr>
<td>Net ultimate incurred claims including CHE</td>
<td>1,521</td>
<td>4,169</td>
<td>783</td>
<td>197</td>
<td>258</td>
<td>6,927</td>
</tr>
</tbody>
</table>

30 June 2015 comparatives

- Gross ult incurred claims including CHE 3,341 6,675 790 199 244 11,249
- Net ult incurred claims including CHE 1,520 4,197 790 199 244 6,950

31 December 2014 comparatives

- Gross ult incurred claims including CHE 3,318 6,732 859 310 324 11,543
- Net ult incurred claims including CHE 1,520 4,255 859 310 324 7,267

*Includes Fletcher PMO direct costs of repair (excludes margin and infrastructure costs - included in CHE)
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For the 4 September 2010 event (EQ1), the central estimate, undiscounted ultimate cost of claims including CHE and gross of (i.e. excluding) reinsurance is $3.375b. The estimated reinsurance recoveries are $1.854b, giving a central estimate net of reinsurance of $1.521b.

By far the biggest single item is the $6.646b gross ultimate incurred claims (including CHE) arising from the 22 February 2011 event. This is $4.17b more than the $2.48b reinsurance available for that event.

In respect of EQ3, the gross central estimate ultimate incurred claims cost is $0.783b. This falls below the retention point of $1b.

The actuarial determination for AS is shown as -$4m. A negative actuarial determination is due to the loading of total property damage estimates to the most recent claim, which tends to overstate the case estimates for AS (and understate for the other events).

Fletcher Earthquake Recovery (EQR) direct claim costs are included in the claims costs paid to date. Fletcher PMO margin and infrastructure costs are included in CHE.

1.13.2 Estimated ultimate claims costs – variability in modelled results

The actual ultimate incurred claim costs arising from the Canterbury earthquake events will not be known until the last claim is settled. The figures shown in Section 1.13.1 are the central estimate (mean) of a distribution of modelled outcomes.

![Diagram showing variability in modelled results](image)

The chart above illustrates the variability in ultimate claims liabilities according to our valuation model, split by event. The numbers shown correspond to the central estimates.
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The numbers underlying the chart above are shown in the following table which gives figures at various percentiles. For example, the estimated 75th percentile loss for EQ2 is $6.798b.

<table>
<thead>
<tr>
<th></th>
<th>EQ1</th>
<th>EQ2</th>
<th>EQ3</th>
<th>EQ4</th>
<th>AS</th>
</tr>
</thead>
<tbody>
<tr>
<td>31 December 2015 ILVR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5%</td>
<td>$3.224b</td>
<td>$6.338b</td>
<td>$0.700b</td>
<td>$0.183b</td>
<td>$0.250b</td>
</tr>
<tr>
<td>25%</td>
<td>$3.301b</td>
<td>$6.495b</td>
<td>$0.729b</td>
<td>$0.190b</td>
<td>$0.255b</td>
</tr>
<tr>
<td>50%</td>
<td>$3.377b</td>
<td>$6.643b</td>
<td>$0.766b</td>
<td>$0.196b</td>
<td>$0.258b</td>
</tr>
<tr>
<td>75%</td>
<td>$3.446b</td>
<td>$6.798b</td>
<td>$0.837b</td>
<td>$0.204b</td>
<td>$0.262b</td>
</tr>
<tr>
<td>95%</td>
<td>$3.524b</td>
<td>$6.964b</td>
<td>$0.896b</td>
<td>$0.212b</td>
<td>$0.267b</td>
</tr>
<tr>
<td>Central Est</td>
<td>$3.375b</td>
<td>$6.646b</td>
<td>$0.783b</td>
<td>$0.197b</td>
<td>$0.258b</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>EQ1</th>
<th>EQ2</th>
<th>EQ3</th>
<th>EQ4</th>
<th>AS</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 June 2015 ILVR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5%</td>
<td>$3.193b</td>
<td>$6.290b</td>
<td>$0.695b</td>
<td>$0.185b</td>
<td>$0.225b</td>
</tr>
<tr>
<td>25%</td>
<td>$3.274b</td>
<td>$6.482b</td>
<td>$0.733b</td>
<td>$0.193b</td>
<td>$0.236b</td>
</tr>
<tr>
<td>50%</td>
<td>$3.342b</td>
<td>$6.660b</td>
<td>$0.772b</td>
<td>$0.199b</td>
<td>$0.244b</td>
</tr>
<tr>
<td>75%</td>
<td>$3.409b</td>
<td>$6.859b</td>
<td>$0.840b</td>
<td>$0.205b</td>
<td>$0.252b</td>
</tr>
<tr>
<td>95%</td>
<td>$3.490b</td>
<td>$7.096b</td>
<td>$0.926b</td>
<td>$0.214b</td>
<td>$0.263b</td>
</tr>
<tr>
<td>Central Est</td>
<td>$3.341b</td>
<td>$6.675b</td>
<td>$0.790b</td>
<td>$0.199b</td>
<td>$0.244b</td>
</tr>
</tbody>
</table>

1.13.3 *Estimated ultimate claims costs – movement since 30 June 2015*

The estimated ultimate gross claims cost for Canterbury earthquake events has moved from $11.249b as at 30 June 2015 to $11.259b as at 31 December 2015. Shown below is a graphical representation of the change in estimated ultimate incurred liabilities with a breakdown of this change below.
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Change since previous valuation
Canterbury earthquakes only

Change in estimated ultimate incurred claims cost (undiscounted, incl CHE)

<table>
<thead>
<tr>
<th></th>
<th>EQ1</th>
<th>EQ2</th>
<th>EQ3</th>
<th>EQ4</th>
<th>AS</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$m</td>
<td>$m</td>
<td>$m</td>
<td>$m</td>
<td>$m</td>
<td>$m</td>
</tr>
<tr>
<td>Gross ultimate incurred claims including CHE - central estimate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 June 2015 ILVR</td>
<td>3,341</td>
<td>6,675</td>
<td>790</td>
<td>199</td>
<td>244</td>
<td>11,249</td>
</tr>
<tr>
<td>Change in:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land claim costs</td>
<td>-5</td>
<td>-129</td>
<td>-31</td>
<td>+1</td>
<td>+0</td>
<td>-165</td>
</tr>
<tr>
<td>Building claim costs</td>
<td>+47</td>
<td>+77</td>
<td>+16</td>
<td>+5</td>
<td>+20</td>
<td>+165</td>
</tr>
<tr>
<td>Contents claim costs</td>
<td>+1</td>
<td>+6</td>
<td>+1</td>
<td>+0</td>
<td>+0</td>
<td>+9</td>
</tr>
<tr>
<td>CHE</td>
<td>-9</td>
<td>+17</td>
<td>+7</td>
<td>-8</td>
<td>-6</td>
<td>+2</td>
</tr>
<tr>
<td>Total change</td>
<td>+34</td>
<td>-29</td>
<td>-7</td>
<td>-2</td>
<td>+14</td>
<td>+10</td>
</tr>
<tr>
<td>31 December 2015 ILVR</td>
<td>3,375</td>
<td>6,646</td>
<td>783</td>
<td>197</td>
<td>258</td>
<td>11,259</td>
</tr>
</tbody>
</table>

Net ultimate incurred claims including CHE - central estimate

<table>
<thead>
<tr>
<th></th>
<th>EQ1</th>
<th>EQ2</th>
<th>EQ3</th>
<th>EQ4</th>
<th>AS</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$m</td>
<td>$m</td>
<td>$m</td>
<td>$m</td>
<td>$m</td>
<td>$m</td>
</tr>
<tr>
<td>30 June 2015 ILVR</td>
<td>1,520</td>
<td>4,197</td>
<td>790</td>
<td>199</td>
<td>244</td>
<td>6,950</td>
</tr>
<tr>
<td>Movements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Claims costs + CHE</td>
<td>+34</td>
<td>-29</td>
<td>-7</td>
<td>-2</td>
<td>+14</td>
<td>+10</td>
</tr>
<tr>
<td>Reinsurance recoveries</td>
<td>-33</td>
<td>+0</td>
<td>+0</td>
<td>+0</td>
<td>-</td>
<td>-33</td>
</tr>
<tr>
<td>Total movements</td>
<td>+0</td>
<td>-29</td>
<td>-7</td>
<td>-2</td>
<td>+14</td>
<td>-23</td>
</tr>
<tr>
<td>31 December 2015 ILVR</td>
<td>1,521</td>
<td>4,169</td>
<td>783</td>
<td>197</td>
<td>258</td>
<td>6,927</td>
</tr>
</tbody>
</table>

The biggest changes are in respect of land claims and building claims.

Estimated costs for land claims have decreased by $165m. The primary reason for the large reduction is our approach as a result of the release of a draft document detailing how DoV rates should be calculated for some ILV claims (see Section 1.12.2). In addition the Port Hills land liability has reduced with these claims almost all settled.

The estimated costs for building claims have increased by $165m. The increase in costs comes from a strengthening in reopened claims assumptions as well as deterioration of open claims experience as the programme winds up.

The other movements since 30 June 2015 are an increase in contents claims of $9m and an increase in CHE of $2m.

In addition to the aggregate movements above, there has been a movement in expected claims costs towards EQ1 and AS. This is as a result of the building movements negatively affecting these events while the positive land model movement mainly affects EQ2.
1.13.4 **Historical progression of ultimate incurred**

The table below shows the progression of the estimated gross ultimate incurred claims costs at each valuation since 31 December 2010.

**Canterbury earthquakes only**

<table>
<thead>
<tr>
<th>Valuation date</th>
<th>EQ1 $m</th>
<th>EQ2 $m</th>
<th>EQ3 $m</th>
<th>EQ4 $m</th>
<th>AS $m</th>
<th>Total $m</th>
</tr>
</thead>
<tbody>
<tr>
<td>31 December 2010</td>
<td>2,754</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2,754</td>
<td></td>
</tr>
<tr>
<td>Change in period</td>
<td>+494</td>
<td>+6,536</td>
<td>+1,382</td>
<td>-</td>
<td>+514</td>
<td>+8,525</td>
</tr>
<tr>
<td>30 June 2011</td>
<td>3,247</td>
<td>6,536</td>
<td>1,382</td>
<td>-</td>
<td>514</td>
<td>11,678</td>
</tr>
<tr>
<td>Change in period</td>
<td>+210</td>
<td>-22</td>
<td>-13</td>
<td>+448</td>
<td>-139</td>
<td>+485</td>
</tr>
<tr>
<td>31 December 2011</td>
<td>3,458</td>
<td>6,514</td>
<td>1,369</td>
<td>448</td>
<td>374</td>
<td>12,164</td>
</tr>
<tr>
<td>Change in period</td>
<td>-3</td>
<td>-27</td>
<td>+2</td>
<td>+69</td>
<td>0</td>
<td>+42</td>
</tr>
<tr>
<td>30 June 2012</td>
<td>3,455</td>
<td>6,487</td>
<td>1,371</td>
<td>517</td>
<td>375</td>
<td>12,205</td>
</tr>
<tr>
<td>Change in period</td>
<td>-298</td>
<td>-89</td>
<td>-253</td>
<td>-1</td>
<td>-8</td>
<td>-649</td>
</tr>
<tr>
<td>31 December 2012</td>
<td>3,157</td>
<td>6,398</td>
<td>1,118</td>
<td>517</td>
<td>367</td>
<td>11,556</td>
</tr>
<tr>
<td>Change in period</td>
<td>+101</td>
<td>-28</td>
<td>+13</td>
<td>-36</td>
<td>+15</td>
<td>+63</td>
</tr>
<tr>
<td>30 June 2013</td>
<td>3,258</td>
<td>6,370</td>
<td>1,131</td>
<td>478</td>
<td>382</td>
<td>11,620</td>
</tr>
<tr>
<td>Change in period</td>
<td>-46</td>
<td>-111</td>
<td>-75</td>
<td>-75</td>
<td>-28</td>
<td>-335</td>
</tr>
<tr>
<td>31 December 2013</td>
<td>3,212</td>
<td>6,259</td>
<td>1,057</td>
<td>403</td>
<td>354</td>
<td>11,284</td>
</tr>
<tr>
<td>Change in period</td>
<td>+68</td>
<td>+242</td>
<td>-42</td>
<td>-2</td>
<td>+3</td>
<td>+267</td>
</tr>
<tr>
<td>30 June 2014</td>
<td>3,277</td>
<td>6,501</td>
<td>1,015</td>
<td>401</td>
<td>357</td>
<td>11,551</td>
</tr>
<tr>
<td>Change in period</td>
<td>+41</td>
<td>+231</td>
<td>-156</td>
<td>-90</td>
<td>-33</td>
<td>-8</td>
</tr>
<tr>
<td>31 December 2014</td>
<td>3,318</td>
<td>6,732</td>
<td>859</td>
<td>310</td>
<td>324</td>
<td>11,543</td>
</tr>
<tr>
<td>Change in period</td>
<td>+23</td>
<td>-57</td>
<td>-69</td>
<td>-112</td>
<td>-80</td>
<td>-294</td>
</tr>
<tr>
<td>30 June 2015</td>
<td>3,341</td>
<td>6,675</td>
<td>790</td>
<td>199</td>
<td>244</td>
<td>11,249</td>
</tr>
<tr>
<td>Change in period</td>
<td>+34</td>
<td>-29</td>
<td>-7</td>
<td>-2</td>
<td>+14</td>
<td>+10</td>
</tr>
<tr>
<td>31 December 2015</td>
<td>3,375</td>
<td>6,646</td>
<td>783</td>
<td>197</td>
<td>258</td>
<td>11,259</td>
</tr>
</tbody>
</table>

**Results used for accounts**

<table>
<thead>
<tr>
<th>Valuation date</th>
<th>EQ1 $m</th>
<th>EQ2 $m</th>
<th>EQ3 $m</th>
<th>EQ4 $m</th>
<th>AS $m</th>
<th>Total $m</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 June 2013 (post-DoV adjustment)</td>
<td>3,351</td>
<td>6,591</td>
<td>1,180</td>
<td>512</td>
<td>382</td>
<td>12,016</td>
</tr>
<tr>
<td>Change in period</td>
<td>-66</td>
<td>-108</td>
<td>-124</td>
<td>-90</td>
<td>-28</td>
<td>-415</td>
</tr>
<tr>
<td>31 December 2013 (post hard/soft)</td>
<td>3,285</td>
<td>6,483</td>
<td>1,056</td>
<td>422</td>
<td>354</td>
<td>11,600</td>
</tr>
<tr>
<td>Change in period</td>
<td>+58</td>
<td>+110</td>
<td>-28</td>
<td>+2</td>
<td>+3</td>
<td>+146</td>
</tr>
<tr>
<td>30 June 2014 (post hard/soft)</td>
<td>3,343</td>
<td>6,593</td>
<td>1,028</td>
<td>424</td>
<td>357</td>
<td>11,746</td>
</tr>
</tbody>
</table>

Key reasons for the movements:

- **Dec 10**: EQ1 only.
- **Jun 11**: EQ2 and EQ3 events occurred.
- **Dec 11**: EQ4 event. Aggregate Tonkin + Taylor (’T+T’) land model.
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- Dec 12: Introduction of T+T property based land model (introduced DoV).
- Jun 13: ILVR result ($11,620m) based on revised building model (ACE model introduced) and T+T property based model (with DoV on ILV and IFV). Board elected to book results without DoV ($12,016m).
- Dec 13: ILVR result ($11,284m) based on revised building model. Board elected to book only those gains that were hard / definitive ($11,600m).
- Jun 14: ILVR result ($11,551m) based on new land model (higher remediation costs for ILV and IFV) but offset by increasing dominance of ACE model (within the building claim model).
- Dec 14: ILVR result ($11,543m) based on revised land model (more properties eligible for ILV and IFV settlement and slightly revised ILV repair costs). Building model now more weighted to ACE model, includes statistical apportionment model for undercap properties and more refinement of classifying open claims.
- Jun 15: ILVR result ($11,249m) incorporates ILV settlement (DoV) policy.
- Dec 15: ILVR result ($11,259m) incorporates changed approach as a result of draft ILV DoV rates and a strengthened insurer washup provision.

1.13.5 Estimated ultimate claims costs – land claims cost movement

Background

The land claims cost is a highly uncertain and dynamic component of EQC’s estimated ultimate claims costs. This component involves many complex engineering and legal issues and MJW relies heavily on information provided by EQC’s engineering consultants, (T+T).

The structure of the current land liability model is similar to the 30 June 2015 model although the parameters have been updated to reflect emerging knowledge.

The model development is described in Section 1.10.2.
Movement in ultimate incurred cost

The chart below illustrates the movement in estimated gross ultimate claims costs in respect of land sub-claims between 30 June 2015 ($1.76b) and 31 December 2015 ($1.60b). Note that the split between ILV and IFV is an estimation. The ILV/IFV split reflects the amount of land damage to a property which can be attributed to each damage type, prior to the application of EQC caps.

The movement of $165m can be attributed to four key areas:

- 9(2)(j)
- 9(2)(j)
- +$28m – With costs lower, and hence further away from cap, the demand surge component has a greater impact. This is also affected by the capping methodology change.
- 9(2)(j)

Other items contribute +$6m to the total land movement.
1.13.6  **Gross claim payments – comparison to previous estimates**

The following chart shows actual gross claim payments for Canterbury earthquakes to 31 December 2015 (including EQR payments and CHE) as the solid black line. Projected payments are shown as the blue broken line.

Future cashflow estimates underlying this chart can be found in Section 8.1, including a split by event.

The valuation reflects our understanding of anticipated future cashflows. CHE payments are assumed to continue until 30 June 2019. The final two years of CHE payments are assumed to be small and will be required for a variety of tail issues including managing warranty / rework and litigation.
1.13.7 **Outstanding claims liabilities – all claims**

The table below summarises the key components of the outstanding claims liabilities ('OSCL') as at 31 December 2015. A more detailed breakdown is set out in Section 7.6.

The net discounted OSCL at a probability of adequacy of 85% is $1.805b. The largest component of the liabilities is in respect of EQ2.

<table>
<thead>
<tr>
<th>All EQC claims</th>
<th>Estimated outstanding claims liabilities (OSCL) - 31 December 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EQ1</td>
</tr>
<tr>
<td><strong>Gross outstanding claims liabilities - central estimate</strong></td>
<td></td>
</tr>
<tr>
<td>Gross claims including CHE, undiscounted</td>
<td>607</td>
</tr>
<tr>
<td>Discounting</td>
<td>(15)</td>
</tr>
<tr>
<td>Gross claims including CHE, discounted</td>
<td>592</td>
</tr>
<tr>
<td><strong>Reinsurance recoveries - central estimate</strong></td>
<td></td>
</tr>
<tr>
<td>Reinsurance recoveries, undiscounted</td>
<td>597</td>
</tr>
<tr>
<td>Discounting</td>
<td>(15)</td>
</tr>
<tr>
<td>Reinsurance recoveries, discounted</td>
<td>583</td>
</tr>
<tr>
<td><strong>Net outstanding claims liabilities - central estimate</strong></td>
<td></td>
</tr>
<tr>
<td>Net claims excluding BAU CHE, undiscounted</td>
<td>9</td>
</tr>
<tr>
<td>Net claims including CHE, undiscounted</td>
<td>9</td>
</tr>
<tr>
<td>Discounting</td>
<td>(0)</td>
</tr>
<tr>
<td>Net claims including CHE, discounted</td>
<td>9</td>
</tr>
<tr>
<td><strong>Net outstanding claims liabilities - risk margin, 85% PoA</strong></td>
<td></td>
</tr>
<tr>
<td>Net risk margin, diversified</td>
<td>2</td>
</tr>
<tr>
<td><strong>Net OSCL and risk margin 85% PoA, discounted</strong></td>
<td>11</td>
</tr>
</tbody>
</table>
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1.13.8 Outstanding claims liabilities – movement since 30 June 2015

The net of reinsurance OSCL (85% probability of adequacy, discounted) has decreased from $2.156b at 30 June 2015 to $1.805b at 31 December 2015. A summary of the change is shown below with more detail in Section 7.5.

<table>
<thead>
<tr>
<th>All EQC claims</th>
<th>Reconciliation of change in outstanding claims liability from 30 June 2015 ILVR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All Periods</td>
</tr>
<tr>
<td></td>
<td>EQ $m</td>
</tr>
<tr>
<td>Net OSCL (85% PoA, discounted) as at 30 June 2015</td>
<td>2,128</td>
</tr>
<tr>
<td>Remove net risk margin (85% PoA)</td>
<td>(337)</td>
</tr>
<tr>
<td>Net OSCL (central estimate, discounted) as at 30 June 2015</td>
<td>1,792</td>
</tr>
<tr>
<td>Remove discounting</td>
<td>52</td>
</tr>
<tr>
<td>Net OSCL (central estimate, undiscounted) as at 30 June 2015</td>
<td>1,844</td>
</tr>
<tr>
<td>Estimated net paid over period</td>
<td>(295)</td>
</tr>
<tr>
<td>Change in net actuarial determination</td>
<td>(23)</td>
</tr>
<tr>
<td>Net OSCL (central estimate, undiscounted) as at 31 Dec 2015</td>
<td>1,526</td>
</tr>
<tr>
<td>Add discounting</td>
<td>(38)</td>
</tr>
<tr>
<td>Net OSCL (central estimate, discounted) as at 31 December 2015</td>
<td>1,488</td>
</tr>
<tr>
<td>Net diversified risk margin (85% PoA, discounted)</td>
<td>307</td>
</tr>
<tr>
<td>Net OSCL (85% PoA, discounted) as at 31 December 2015</td>
<td>1,795</td>
</tr>
</tbody>
</table>

The principal drivers of the change in total claims liabilities in decreasing order of impact are:
- Claim payments; net payments since 30 June 2015 have amounted to $324m.
- Risk margin; this has decreased by $32m.
- Discounting; this has reduced by $14m.
- Actuarial determination; this has decreased by $10m on a net of reinsurance basis. Section 1.13.3 details how the underlying claims models have moved over the period.

1.14 Key results – premium liabilities

1.14.1 Premium liabilities

The table below summarises the key results of the estimation of EQC’s premium liabilities as at 31 December 2015. The premium liabilities will be used in the liability adequacy test.

The total value at 75% probability of adequacy is $195m. This is greater than the $146m unearned premium reserve. This means that an additional unexpired risk reserve will be required in the accounts as at 31 December 2015.

The largest component ($95m, as compared to $96m as at 30 June 2015) relates to projected costs of future claims arising from major events (other than those related to Canterbury earthquakes) during the period of the runoff of risks on the books as at 31 December 2015. These claims are modelled by Minerva.